Exploring Science Workbook

Junior Certificate Science

Michael O'Callaghan
Seamus Reilly
Aidan Seery

THE EDUCATIONAL COMPANY
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## Mandatory Activity

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</thead>
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</tr>
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</tr>
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The questions in this workbook are designed for use with the Junior Certificate Science (revised syllabus) course. The workbook complements Edco’s *Exploring Science (Revised Edition)* textbook and *Science Experiment Book*. Together, these three books provide comprehensive coverage of the course.

The Theory Questions in this workbook will prepare students for the written examination (worth 65% of the overall marks). Some questions on the prescribed practical work are also included. In order to avoid confusion, the inclusive term ‘activity’ is used in this book to refer to both experiments and investigations.

The chapters in this workbook correspond with the sequence of chapters in the revised edition of the textbook. The Theory Questions are suited to both the ordinary level and higher level courses unless otherwise indicated. Where a question is accompanied by an asterix *, a higher level alternative follows question 10. The questions for higher level only are indicated by a colour band in the margin. The Theory Questions feature a simple marking scheme to enable them to be used as class tests – There are 10 marks for each of the 10 questions.

The workbook can be used in three ways.

• As homework, or in class, to reinforce what was learned in a chapter
• As homework, or in class, to revise a chapter
• As short, easily corrected chapter tests
Chapter 1 Theory Questions

Name: ___________________________ Date: ___________________________

1. Name five of the characteristics of living things.
   (a) ___________________________
   (b) ___________________________
   (c) ___________________________
   (d) ___________________________
   (e) ___________________________

2. Relate each of the processes in the box to one of the following.

   | Uses oxygen | Allows plants to grow towards light |
   | Removes wastes | Getting food | Forming new cells |

   (a) Nutrition _________________________________________________________
   (b) Response _________________________________________________________
   (c) Growth ___________________________________________________________
   (d) Respiration ________________________________________________________
   (e) Excretion _________________________________________________________

3. Name three of the features in the box that are associated with plants.

   (i) ___________________________
   (ii) ___________________________
   (iii) ___________________________

3(2)

(b) Name two of the features in the box that are associated with animals.

   (i) ___________________________
   (ii) ___________________________

2(2)
4 (a) Name the structures labelled on the diagram.

A _______________________________
B _______________________________
C _______________________________

3(2)

(b) Name two structures shown on the diagram which allow you to say that this is a plant cell.

(i) _______________________________  (ii) _______________________________
2(2)

5 (a) List the invertebrates shown in the diagram below.

(i) __________________________________________________________
(ii) __________________________________________________________
(iii) __________________________________________________________
(iv) __________________________________________________________
(v) __________________________________________________________ 5(1)
(b) List the vertebrates shown in the previous diagram.

(vi) ____________________________
(vii) ____________________________
(viii) ____________________________
(ix) ____________________________
(x) ____________________________ 5(1)

6 (a) Use the key given below to name organism X shown in the diagram.

<table>
<thead>
<tr>
<th>Shell plates</th>
<th>1 Attached to rocks or similar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Free moving</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2 Worm-like (tubular)</td>
</tr>
<tr>
<td></td>
<td>Not worm-like</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 Cone-shaped, single shell</td>
</tr>
<tr>
<td></td>
<td>More than one shell</td>
</tr>
<tr>
<td></td>
<td>Limpet</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>4 Six shell plates in pyramid</td>
</tr>
<tr>
<td></td>
<td>Eight shell plates</td>
</tr>
<tr>
<td></td>
<td>Barnacle</td>
</tr>
<tr>
<td></td>
<td>Chiton</td>
</tr>
</tbody>
</table>

Name of organism X ____________________________ 5

(b) List the numbered points you followed on the key to name organism X.
__________________________ 5

7 (a) What chemical causes plants to be green? ____________________________

(b) Animals get their food by ____________________________.

(c) Plants make food by the process of ____________________________.

(d) Plants make food using ____________________________,
__________________________ and water. 5(2)

8

Able to move from place to place

Have a cell wall   Do not have a cell wall

Make their own food   Are green in colour

Associate each of the terms in the box with either a plant or an animal.

Plant: __________________________________________

___________________________________________

Animal: __________________________________________

___________________________________________ 5(2)
9 Keys are designed to ____________________________ living things. (10)

10 Say if the following are true or false.

(a) Vertebrates are animals. ____________________________

(b) Invertebrates make their own food. ____________________________

(c) Vertebrates have cell walls. ____________________________

(d) Invertebrates have backbones. ____________________________

(e) Vertebrates are larger than invertebrates. ____________________________ 5(2)
Mandatory Activity 1 Questions

To investigate the variety of living things by direct observation of plants and animals in their environment  (Textbook page 6)

1 Name the environment in which you carried out your observations in this activity.
___________________________________________________________________________________

2 Name three plants you observed.
   (a) ______________________________________________________________________________
   (b) ______________________________________________________________________________
   (c) ______________________________________________________________________________

3 Name three animals you observed.
   (a) ______________________________________________________________________________
   (b) ______________________________________________________________________________
   (c) ______________________________________________________________________________

4 Suggest one reason why it is easier to observe plants rather than animals in most environments.
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

5 Name the biggest animal you observed.
___________________________________________________________________________________

6 Name the smallest animal you observed.
___________________________________________________________________________________

To classify living organisms as plants and animals

1 Name one plant and one animal that you observed.
   Plant ______________________________________________________________________________
   Animal ______________________________________________________________________________
2 State two features of the named plant that indicated to you that it was a plant.
   (a) ____________________________________________________________
   (b) ____________________________________________________________

3 State two features of the named animal that indicated to you that it was an animal.
   (a) ____________________________________________________________
   (b) ____________________________________________________________

*To classify animals as vertebrates or invertebrates*

1 Describe the differences between vertebrates and invertebrates in terms of:
   (a) a backbone _______________________________________________________
       ________________________________________________________________
   (b) their size _________________________________________________________
       ________________________________________________________________

2 Name two animals you classified as vertebrates.
   (a) ________________________________
   (b) ________________________________

3 Name two animals you classified as invertebrates.
   (a) ________________________________
   (b) ________________________________
Chapter 2 Theory Questions

Name: ___________________________  Date: ___________________________

1  The diagram represents an animal cell.
   (a) Name the labelled structures.

   A _______________________________
   B _______________________________
   C _______________________________

   3(2)

   (b) Which labelled structure:
       (i) is responsible for controlling the cell? _______________________________
       (ii) consists of a watery liquid? _______________________________

   2(2)

2  Arrange the words in the box into the correct order, starting with the simplest.

   System  Organ  Cell  Organism  Tissue

   ____________________________________________________________  (10)

3  (a) Name an animal tissue. _______________________________

   (b) Name a process that occurs in plants but not in animals.

   ____________________________________________________________

   (c) Name an animal organ. _______________________________

   (d) Name an organ found in plants. _______________________________

   (e) Name an organism. _______________________________

   5(2)
4 (a) Name the labelled parts on the diagram of a microscope.

A _______________________________
B _______________________________
C _______________________________
D _______________________________
E _______________________________

(b) On the microscope the structure labelled A is marked x10 and the structure labelled B is marked x20. State the total magnification produced.

_________________________________  (5)

5 Give a reason for each of the following.

(a) Placing a slide in the centre of the microscope stage.
_______________________________________________________________________________
_______________________________________________________________________________

(b) Clips may be found on the microscope stage.
_______________________________________________________________________________
_______________________________________________________________________________  2(5)

6 You are preparing a slide of plant tissue for viewing under a microscope. Answer each of the following.

(a) Name the source of the plant tissue you would use. _______________________________

(b) Why do you not use the coarse focus knob when the high power objective lens is in place? ______________________________________________________________________
_______________________________________________________________________________  2(5)

7 Give one reason for each of the following.

(a) There is more than one lens on the nosepiece of a microscope.
_______________________________________________________________________________
_______________________________________________________________________________

(b) A cover slip is lowered onto a microscope slide at an angle.
_______________________________________________________________________________  2(5)
8 The diagrams represent an animal and a plant cell as seen under a microscope.

![Cell X diagram](image1)

A _______________________________ B _______________________________

![Cell Y diagram](image2)

(a) Name the structures labelled on the diagrams.
   A _______________________________ B _______________________________
   2(3)

(b) Which cell is the plant cell (X or Y)? _______________________________
   2

(c) Name one structure visible on the plant cell that is not present in the animal cell.
   ____________________________________________
   2

9 When using a microscope the following procedures are carried out, but not in this order.
   A. Use the coarse focus knob.
   B. Turn on the light or adjust the mirror.
   C. Draw a diagram of what you see.
   D. Clip the slide into place.
   E. Use the fine focus knob.

Rewrite the letters in the order in which the events should take place.
   ____________________________________________
   10

10 Name five structures or processes in the box that are common to all cells.

<table>
<thead>
<tr>
<th>Cell membrane</th>
<th>Cell wall</th>
<th>Chloroplast</th>
<th>Vacuole</th>
<th>Nucleus</th>
<th>Genes</th>
<th>Cytoplasm</th>
<th>Chlorophyll</th>
<th>Respiration</th>
</tr>
</thead>
</table>

(a) _______________________________
(b) _______________________________
(c) _______________________________
(d) _______________________________
(e) _______________________________
5(2)
Mandatory Activity 2 Questions

To prepare a slide from plant tissue and draw it as seen under a microscope

(Textbook page 13)

1 Name the plant you used in this activity.

___________________________________________________________________________________

2 (a) Did you use a stain on the plant tissue? ______________________________

(b) If you did use a stain, name it. ______________________________

3 What magnification did you first use to view the tissue in this activity? ______

4 State any other magnification you used to view the plant tissue. ____________

5 State any one precaution you took to prevent damaging the slide.

___________________________________________________________________________________

___________________________________________________________________________________

6 Why might you have had to move the slide when it was on the microscope stage?

___________________________________________________________________________________

___________________________________________________________________________________

7 Draw a diagram (including two labels) of what you saw under the microscope.
Chapter 3 Theory Questions

Name: __________________________ Date: __________________________

1 Name five of the six parts (or constituents) of a balanced diet.

(i) __________________________

(ii) __________________________

(iii) __________________________

(iv) __________________________

(v) __________________________

2 Choose a food from the box above that is a good source of each of the following:

(a) Protein __________________________

(b) Starch __________________________

(c) Fibre __________________________

(d) A named vitamin: Vitamin ________ Source __________________________

(e) A named mineral: Mineral name ______________ Source __________________________

3 The amount of energy in two different meals is shown below.

<table>
<thead>
<tr>
<th>Meal X</th>
<th>Meal Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod  300 kJ</td>
<td>Sausage  500 kJ</td>
</tr>
<tr>
<td>Salad  20 kJ</td>
<td>Chips  1 000 kJ</td>
</tr>
<tr>
<td>Yoghurt  5 kJ</td>
<td>Fried egg  650 kJ</td>
</tr>
<tr>
<td>Bread and margarine  400 kJ</td>
<td>Beans  200 kJ</td>
</tr>
<tr>
<td>Milk  100 kJ</td>
<td>Tea and milk  50 kJ</td>
</tr>
</tbody>
</table>

(a) What is the total energy value of meal X? __________________________

(b) What is the total energy value of meal Y? __________________________

(c) Name one good source of fibre in meal Y. __________________________

(d) Give two reasons why meal X is the healthier meal.
   (i) __________________________
   (ii) __________________________

5(2)
4 Select the group from each of the following pairs that needs more food in their diet.
   (a) Young people or old people. _______________________________
   (b) Active people or inactive people. _______________________________
   (c) Healthy people or sick people. _______________________________
   (d) Boys or girls. _______________________________
   (e) Sports players or non-sports players. _______________________________ 5(2)

5 (a) What substance is used to test for the presence of starch?
    ____________________________________________
   (b) What colour is this substance in the absence of starch? ______________
   (c) What colour is this substance in the presence of starch? ______________
   (d) Is heat needed for this test? ______________
   (e) Circle the food from the following list that is a good source of starch.
   Fish  Oil  Ice cream  Table sugar  Pasta  Butter  5(2)

6 Name the two chemicals used to test a food sample for the presence of protein.
   ____________________________________________ and ____________________________________________ 2(5)

7 The diagram shows the apparatus used to investigate the conversion of energy in food into another form of energy.
   (a) Name the pieces of apparatus labelled X and Y.
      X ____________________________________________
      Y ____________________________________________ 2(2)
   (b) Name the substance labelled Z.
      Z ____________________________________________ 2(2)
   (c) In what form is the energy in food?
      ____________________________________________ 2(2)
   (d) To what form of energy is the energy in the food converted?
      ____________________________________________ 2(2)
8 A piece of food was rubbed in brown paper and it produced a stain that would not dry out. A small piece of the same food was dissolved in water and heated with Benedict's solution, which turned a deep red colour.

(a) Name the two food types in the piece of food.
________________________________________________________________________________ 2(2)

(b) Draw a labelled diagram of the apparatus you would use to carry out the test using Benedict's solution.

(c) What colour is Benedict's solution before it is added to a food sample?
________________________________________________________________________________ 2(2)

9 Choose a food from the list in the box that is needed for each of the following.

<table>
<thead>
<tr>
<th>Yoghurt</th>
<th>Orange</th>
<th>Chocolate</th>
<th>Fish</th>
<th>Butter</th>
</tr>
</thead>
</table>

(a) Healthy bones

(b) Energy

(c) Body insulation

(d) Growth and repair of cells

(e) Healthy skin

5(2)
Using your knowledge of the food pyramid, state which of the foods in the box should be eaten as follows:

(a) six servings a day _____________________________ (3)
(b) two servings a day _____________________________ (3)
(c) rarely _____________________________ (4)

<table>
<thead>
<tr>
<th></th>
<th>Fruit</th>
<th>Dairy product</th>
<th>Biscuits</th>
<th>Meat/Fish</th>
<th>Cereals/bread/potatoes</th>
</tr>
</thead>
</table>

**Mandatory Activity 3A Questions**

*To test a food for starch*  
(Textbook page 20)

1. Name two foods that you tested in this activity that contained starch.
   _____________________________ and _____________________________

2. Name the substance you used in this activity to test a food for starch.
   ___________________________________________________________________

3. State the colour change that tells you starch is present.
   The colour turns from _____________________________ to _____________________________.

**Mandatory Activity 3B Questions**

*To test a food for reducing (or simple) sugar*  
(Textbook page 20)

1. Name the food or foods you tested in this activity. _____________________________

2. Name the substance you used in this activity to show that reducing sugar was present.
   ___________________________________________________________________

3. State the colour change that told you reducing sugar was present.
   The colour turns from _____________________________ to _____________________________.
4. Draw a labelled diagram of the apparatus you used to test a food for reducing sugar.

Mandatory Activity 3C Questions

To test a food for fat (Textbook page 21)

1. Name two foods you tested for fat in this activity.
   ___________________________ and ___________________________

2. Name the material you used to test food for fat in this activity.
   ____________________________________________________________________

3. How could you tell if fat was in the food you tested?
   ____________________________________________________________________
   ____________________________________________________________________

4. Name a food you tested that did not contain any fat.
   ____________________________________________________________________

Mandatory Activity 3D Questions

To test a food for protein (Textbook page 21)

1. Name two foods you tested for protein in this activity.
   ___________________________ and ___________________________

2. (a) Name the first chemical you used to test food for protein in this activity.
   ____________________________________________________________________

   (b) What colour was this chemical? ___________________________
3 (a) Name the second chemical you used to test food for protein in this activity.
_____________________________________________________________________________

(b) What colour was this chemical?  _______________________________________________

4 What colour did you see when these two chemicals were added to a food containing protein?  
_____________________________________________________________________________

**Mandatory Activity 4 Questions**

*To investigate the conversion of chemical energy in food into heat energy*  
*(Textbook page 22)*

1 How did you get the food you used in this activity to light?  
_____________________________________________________________________________
_____________________________________________________________________________

2 Suggest one reason why you should only use a small amount of water in the test tube in this activity, rather than a large amount.  
_____________________________________________________________________________
_____________________________________________________________________________

3 Write out the result you recorded in this activity (naming the units used to measure the result).  
_____________________________________________________________________________
_____________________________________________________________________________

4 Approximately how long did it take for the piece of food to burn out?
_____________________________________________________________________________
Chapter 4 Theory Questions

1. Complete the following:
   (a) Digestion is the ___________________________ down of ___________________________.
   (b) An enzyme is a _________________________ that speeds up _________________________ in the body without being _________________________ up.

2. Name the parts of the digestive system shown in the diagram.
   A ___________________________
   B ___________________________
   C ___________________________
   D ___________________________
   E ___________________________

3. (a) Rewrite the words in the box in the order in which food passes through the digestive system.

   Stomach  Rectum  Large intestine  Oesophagus  Mouth

4. (a) The names of the four types of tooth are:

   ___________________________, ___________________________
   ___________________________, ___________________________

   (b) Name the type of teeth used to grip and tear food. ___________________________ 

5. (a) Name an enzyme. ___________________________
   (b) Name one place where this enzyme is produced. ___________________________
   (c) Name the substance this enzyme acts on. ___________________________
(d) Name the substance formed by the action of this enzyme.

________________________________________________________________________________

(e) Name a chemical that could be used to show the presence of the substance formed by the action of this enzyme.

________________________________________________________________________________

5(2)

6

1. Forms faeces  
2. Contains acid  
3. Stores faeces  
4. Physical digestion  
5. Connects mouth to stomach  
6. Allows digested food to enter the bloodstream

Write the number of the function carried out by each of the following parts (the first example is done for you).

Rectum 3  
Oesophagus  
Mouth  
Stomach  
Large intestine  
Small intestine  

5(2)

7 The following processes occur during human feeding, but not in this order.

A. Food is used by the body.  
B. Food is digested.  
C. Food is carried in the blood to all parts of the body.  
D. Waste is released from the digestive system.  
E. Food enters the mouth.

Write out the letters in the correct order in which they take place.

__________________________________________  (10)

8 When investigating the action of amylase on starch, state:

(a) from where you got the amylase ________________________________  
(b) the temperature of the water bath ________________________________  

2(5)

9 (a) Name the type of tooth found between the canines.

___________________________  

(b) Name a type of tooth used to chew food.

___________________________  

2(5)
10 (a) Name the substance used to show the presence of starch.
___________________________          (3)
(b) Name the substance used to show the presence of simple sugar.
___________________________          (3)
(c) State one difference between an enzyme and a catalyst.
________________________________________________________________________________
________________________________________________________________________________    (4)

Higher level only
3 (a) Name a substance formed in the liver. __________________________
                        (a) State the function of this substance. ______________________________________
________________________________________________________________________________    2(5)

9 (a) Name the type of tooth found between the canines.
___________________________          (3)
(b) Name a type of tooth used to chew food.
___________________________          (3)
(c) What is the function of the pancreas in the digestive system?
________________________________________________________________________________    (4)
Mandatory Activity 5 Questions

To investigate the action of amylase on starch  (Textbook page 27)

To carry out this activity two test tubes of a starch solution were placed in a beaker of hot water.

1. What colour is starch? ________________________________

2. How did you make up a starch solution in this activity? ________________________________
   __________________________________________________________________________________

3. How much starch solution did you add to each test tube?
   __________________________________________________________________________________

4. Saliva was added to one test tube. What was added to the second test tube?
   __________________________________________________________________________________

5. What temperature was the water in the beaker? ________________________________

6. How long did you leave the test tubes before testing their contents?
   __________________________________________________________________________________

7. What chemical did you use to test for the action of the enzyme?
   __________________________________________________________________________________

8. What colour did this chemical turn when you added:
   (a) some of the solution that contained saliva ________________________________
   (b) some of the second solution ________________________________

9. State the conclusion you reached in your investigation.
   __________________________________________________________________________________
   __________________________________________________________________________________
Chapter 5 Theory Questions

1. Name the parts of the breathing system labelled on the diagram.
   - A ___________________________
   - B ___________________________
   - C ___________________________
   - D ___________________________
   - E ___________________________

2. (a) Name the gas that is taken in during breathing and used by the body.
     ___________________________

   (b) Name one gas, which is a waste product, that the body gets rid of by breathing.
     __________________________________________________________________________

3. (a) The structure labelled A in the diagram above is made of rings of what material?
     __________________________________________________________________________

   (b) Why are these rings necessary?
     __________________________________________________________________________
     __________________________________________________________________________

4. (a) State the function of the lungs.
     __________________________________________________________________________

   (b) Name the muscles located between the ribs which help to get air in and out of the lungs.
     __________________________________________________________________________

Name: __________________________
Date: __________________________
Chapter 5 Respiration and the Breathing System

5 Use the figures in the box to answer each of the following.

| 78% | 0.04% | 21% | 4% | 16% |

(a) State the % of carbon dioxide breathed in. ___________________________
(b) State the % of oxygen breathed in. ___________________________
(c) State the % of nitrogen breathed in and out. ___________________________
(d) State the % of carbon dioxide breathed out at rest. ___________________________
(e) State the % of oxygen breathed out at rest. ___________________________ 5(2)

6 Give a reason for doing each of the following when investigating the effect of exercise on the rate of breathing.

(a) Using a watch or stopwatch.
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

(b) Counting the number of breaths or inhalations a few times.

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

(c) Counting the number of breaths or inhalations after exercising.

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

7 State two ways in which smoking can damage your health.

(a) _________________________________________________________________________________________ 2(5)

(b) _________________________________________________________________________________________

8 (a) Name the substance used to show the presence of carbon dioxide. ___________________________

(b) State the colour of this substance when carbon dioxide is not present. ___________________________

(c) State the colour of this substance when carbon dioxide is present. ___________________________
9 Fill in the missing words in the following:

(a) Respiration is the release of _______________ from _______________.
   The end products of this reaction are _______________ and _______________.

(b) In _______________ respiration oxygen is used. 5(2)

10 (a) Name one living thing that uses oxygen for respiration.
      _______________________________

(b) Name one living thing that does not use oxygen for respiration.
    _______________________________ 2(5)

Mandatory Activity 6 Questions

To compare the carbon dioxide levels of inhaled and exhaled air (Textbook page 36)

The apparatus shown below was used to compare the carbon dioxide levels of inhaled and exhaled air.

1 (a) Name the liquid you used in each of the test tubes in this activity.
      _______________________________________________________________________

(b) State the colour of this liquid at the start of the activity.
      _______________________________________________________________________

Diagram:

A

1

2

Liquid

B

3

4
2 Why should you not breathe in through tubes 2 or 3?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

3 Why should the stoppers be firmly in place?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

4 Why should you not breathe out through tubes 1 or 4?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

5 If you inhale through tube 1, which tube should you exhale through?
___________________________________________________________________________________

6 In which test tube (A or B) did the liquid change colour first in this activity?
___________________________________________________________________________________

7 What colour did the liquid turn in this activity? _______________________________________

8 Why did the liquid in the two test tubes not change colour at the same time?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
Chapter 6 Theory Questions

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
</table>

1. Match up a part of blood from the box with each of the following (note that one of the parts can be used twice in your answers).

(a) Liquid part of blood ___________________________

(b) Transports oxygen ___________________________

(c) Helps clot the blood ___________________________

(d) Fights infection ___________________________

(e) Is not made in bone marrow ___________________________

2. The function of haemoglobin is to transport a gas.

(a) Name this gas. ___________________________

(b) State a location in the body where this gas enters the blood. ___________________________

(c) State a location in the body where this gas leaves the blood. ___________________________

(d) Name the mineral needed to make haemoglobin. ___________________________

(e) State one effect on the body of a lack of haemoglobin. __________________________________________________________

3. The diagram shows two different types of blood vessels.

(a) Name the type of vessel shown in diagram A. ___________________________

(b) What is the function of the vessel shown in diagram A? ___________________________

(c) Name the type of vessel shown in diagram B. ___________________________

(d) What is the function of the vessel shown in diagram B? ___________________________
4 (a) Name the parts labelled A, B and C on the diagram of the heart.

A ___________________________
B ___________________________
C ___________________________

(b) Does the blood in structure D have a high or low concentration of oxygen?

___________________________

(c) To what organ is the blood in E flowing?

___________________________ 5(2)

5 (a) Name a good place in the body to find a pulse.

__________________________________________________________ (3)

(b) Which of the following is the average pulse rate of an adult at rest?

52  64  70  94  102

___________________________  (3)

(c) Name one factor that can cause our pulse rate to increase.

________________________________________________________________________________ (4)

6 (a) What is the function of the heart?

________________________________________________________________________________ (3)

(b) Name the type of muscle of which the heart is made.

________________________________________________________________________________ (3)

(c) Which chamber in the heart has the thickest walls?

________________________________________________________________________________ (4)
7 Give a reason for the following.

(a) The atria have thinner walls than the ventricles.
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

(b) The right ventricle has a thinner wall than the left ventricle.
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

8 State two reasons why exercise is good for the heart.

(a) ________________________________________________________________________________

(b) ________________________________________________________________________________

9 Say whether each of the following relate to red blood cells, white blood cells or platelets.

(a) have no definite shape ___________________________

(b) are round in shape ___________________________

(c) make antibodies ___________________________

(d) help to reduce loss of blood at a cut ___________________________

(e) help to supply us with energy ___________________________

10 Refer to the diagram below.

(a) Name the type of blood vessel shown in the diagram. ___________________________ (2)

(b) Name the structure labelled A. ___________________________ (2)

(c) What is the function of the structure labelled A?
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________ (3)

(d) Draw an arrow on the diagram to show the direction of blood flow. (3)
Higher level only

4 Name the parts labelled A, B, C, D, E, F, G, H, I and J on the diagram of the heart.

A ___________________________
B ___________________________
C ___________________________
D ___________________________
E ___________________________
F ___________________________
G ___________________________
H ___________________________
I ___________________________
J ___________________________

8 Name the blood vessel in each of the following cases that:

(a) carries blood from the heart to the lungs ________________________________________
(b) carries blood from the heart to the body ________________________________________
(c) carries blood from the body to the heart ________________________________________
(d) connects the lungs to the heart and carries oxygen-rich blood __________________________
(e) takes blood away from the left ventricle ________________________________________
Chapter 7 Theory Questions

1. Complete the spaces in the following passage.

"Excretion is the __________________________ of __________________________
products of reactions in the __________________________. Two organs of excretion
are the __________________________ and the __________________________."

2. Name three substances excreted by the body.
(a) __________________________
(b) __________________________
(c) __________________________

3. (a) Name the parts labelled on the diagram of the urinary system.

A __________________________
B __________________________
C __________________________
D __________________________

(b) Name the liquid that collects in structure C. __________________________

4. State the functions of each of the following.
(a) The kidneys. ____________________________________________________________
(b) The bladder. ____________________________________________________________
(c) The renal arteries. _______________________________________________________

Name: __________________________ Date: __________________________

5(2)
5 Urea is a waste product.
   (a) From what type of food is urea made? __________________________
   (b) Where in the body is urea made? ___________________________ 2(5)

6 Name two of the materials of which urine is made.
   ___________________________ and ___________________________ 2(5)

7 Name one substance that is normally present in the renal artery but not present
   in the renal vein. ___________________________ 10

8 Name one substance that is normally present in the renal artery and is also present
   in the renal vein. ___________________________ 10

9 Name one substance that is normally present in the renal artery and is also present
   in urine. ___________________________ 10

10 The urethra emerges through the ___________________________ in males and through
    the ___________________________ in females. 2(5)

Higher level only

4 State the functions of each of the following.
   (a) The kidneys. ____________________________________________________________________
       ____________________________________________________________________
   (b) The bladder. __________________________________________________________________
       __________________________________________________________________
   (c) The renal arteries. __________________________________________________________________
       __________________________________________________________________
   (d) The renal veins. __________________________________________________________________
       __________________________________________________________________
   (e) The ureters. __________________________________________________________________
       __________________________________________________________________ 5(2)

5 Urea is a waste product.
   (a) From what type of food is urea made? __________________________
   (b) Where in the body is urea made? ____________________________
   (c) Where in the body does urea enter the blood? _________________
   (d) Where in the body does urea leave the blood? _________________
   (e) In what form does urea leave the body? ______________________ 5(2)
6. In the kidneys filtration and reabsorption take place.
   (a) Name two substances that are filtered from the blood in the kidneys.
       ___________________________ and ___________________________
       2(3)
   (b) Name one substance that is reabsorbed into the blood in the kidneys.
       ___________________________
       4

7. (a) Name one substance that is normally present in the renal artery but not present in the renal vein.
       ___________________________
       5
   (b) Name one substance that is normally present in the renal artery and is also present in the renal vein.
       ___________________________
       5

8. (a) Name two substances excreted by the skin.
       ___________________________ and ___________________________
       2(3)
   (b) Name the openings in the skin through which sweat emerges.
       ________________
       4
Chapter 8 Theory Questions

1. State two functions of the skeleton.
   (a) ____________________________________________________________
   (b) ________________________________________________________ 2(5)

2. Name a mineral and a vitamin that are needed for healthy bones.
   Mineral ___________________________ Vitamin ___________________________ 2(5)

3. Name the bones that:
   (a) protect the lungs ______________________________________________________ (3)
   (b) surround the brain ____________________________________________________ (3)
   (c) make up the spine _____________________________________________________ (4)

4. Name the bones labelled on the diagram of the skeleton.
   A ___________________________
   B ___________________________
   C ___________________________
   D ___________________________
   E ___________________________ 5(2)
5

| Horse | Dandelion | Jellyfish | Crab |

Look at the list of living things above. Match the living things with the correct statement(s) below. (Note: A living thing may match more than one statement.)

(a) Has cell walls. ____________________________
(b) Has no cell walls.__________________________
(c) An animal with no skeleton. ____________________________
(d) An animal with an external skeleton. ____________________________
(e) A animal with an internal skeleton.__________________________

5(2)

6 A joint is where two ___________________________ meet.
The ___________________________ is an example of a fixed or non-moving joint. 2(5)

7 (a) Name a muscle in the arm. ___________________________
(b) What happens to the lower arm when the muscle you named contracts?
________________________________________________________________________________ 2(5)

8 Muscles are attached to ___________________________ on either side of a ___________________________.
Muscles cause bones to move when they ___________________________. (3, 3, 4)

9 Plants do not have bony skeletons because their cells are surrounded by ___________________________ made of ___________________________. 2(5)

10 Give one function for each of the following:
(a) Muscles and joints ___________________________
(b) Vertebrae ___________________________

2(5)

Higher level only

3 Name the bone(s) that:
(a) protect the lungs ___________________________
(b) surround the brain ___________________________
(c) make up the spine ___________________________
(d) connect the shoulder and elbow ___________________________
(e) is parallel to the tibia ___________________________

5(2)
6 Name the bones in the arm that are equivalent to the following bones in the leg.
   (a) Tibia ___________________________  (b) Femur ___________________________  2(5)

7 (a) Name an antagonistic pair of muscles in the arm. ___________________________
    ___________________________  2(2)
   (b) Which of these muscles:
      (i) raises the forearm? ___________________________
      (ii) is contracted when the arm is straight? ___________________________
      (iii) is stronger? ___________________________  3(2)

9 Joints can be classified as fixed, ball and socket or hinge joints. Which type of joint is each of the following?
   (a) Knee ___________________________
   (b) Elbow ___________________________
   (c) Skull ___________________________
   (d) Hip ___________________________
   (e) Shoulder ___________________________  5(2)

10 Give one function for each of the following.
   (a) Muscles and joints ___________________________
   (b) Vitamin D ___________________________
   (c) Ligament ___________________________
   (d) Tendon ___________________________
   (e) Cartilage ___________________________  5(2)
Chapter 9 Theory Questions

Name: __________________________ Date: __________________________

1. Name the sense organs responsible for each of the following:
   
   (a) Taste __________________________
   (b) Sight __________________________
   (c) Smell __________________________
   (d) Touch __________________________
   (e) Hearing __________________________  5(2)

2. Name the two parts of the central nervous system.
   __________________________ and __________________________  2(5)

3. The following are what happen when we react to hearing a command. However, the events are not listed in the correct order.

   A. The brain interprets the message.
   B. We detect the stimulus.
   C. A message is carried to our brain.
   D. A message is carried from the brain.
   E. We carry out a response.

   Rewrite the letters in the correct order in which they occur. __________________________  10

4. In what form are messages carried in the nervous system?
   ____________________________________________________________________________________  10

5. Name the parts labelled on the diagram of the eye.

   A __________________________
   B __________________________
   C __________________________
   D __________________________
   E __________________________  5(2)
6. Select the part of the eye from the list above that is linked with each of the following.

(a) carries messages to the central nervous system ___________________________

(b) contains light receptors ___________________________

(c) is the coloured part of the eye ___________________________

(d) changes shape to allow us to see clearly ___________________________

(e) allows light to enter the eye ___________________________

7. Refer to the following diagram.

(a) Draw on the diagram the pupil as it would appear in very dim light. 

(b) Label the pupil and the iris on the diagram.

8. A car horn makes a loud sound which causes a person to jump with fright. In this case state the:

(a) stimulus ______________________________________________________________________

(b) response ______________________________________________________________________

9. Sense organs contain ___________________________ which are attached to nerves. A message travels from the brain to a ___________________________ which contracts to cause the response.

10. Give a reason for each of the following.

(a) The lens can change shape. _____________________________________________________

(b) The pupil in the eye can change shape. ___________________________________________

Higher level only

4. A neurone is a ___________________________ cell. Sensory neurones carry a message ______ the brain. _______________________ neurones carry messages ______ the central nervous system. The optic nerve is an example of a _______________________ neurone.
6 Name the part of the eye that is linked with each of the following:
   (a) changes the shape of the lens __________________________
   (b) contains light receptors __________________________
   (c) is the coloured part of the eye __________________________
   (d) changes shape to allow us to see clearly __________________________
   (e) allows light to enter the eye __________________________

10 Give a reason for each of the following.
   (a) The lens can change shape. _____________________________________________________
       _____________________________________________________________________________
       _____________________________________________________________________________
   (b) The pupil in the eye can change shape. __________________________________________
       _____________________________________________________________________________
       _____________________________________________________________________________
   (c) There is a hole in the iris. _____________________________________________________
       _____________________________________________________________________________
       _____________________________________________________________________________
   (d) The cornea is transparent. _____________________________________________________
       _____________________________________________________________________________
       _____________________________________________________________________________
   (e) Damage to the optic nerve may result in blindness. ________________________________
       _____________________________________________________________________________
       _____________________________________________________________________________
Chapter 10 Theory Questions

1. Name the structures labelled on the diagram of the male reproductive system.

   A ___________________________
   B ___________________________
   C ___________________________
   D ___________________________

   (2,2,3,3)

2. (a) What is a gamete? _____________________________________________________________

   _____________________________________________________________

   (2)

   (b) Name the gametes produced by the male reproductive system.

   _____________________________________________________________

   (2)

   (c) What labelled part of the diagram in Question 1 produces gametes?

   _____________________________________________________________

   (2)

   (d) Name two fluids that may pass through the structure labelled B on the diagram in

   Question 1. (i) ___________________________ and (ii) ___________________________

   2(2)

3. Name the parts labelled on the diagram of the female reproductive system.

   A ___________________________
   B ___________________________
   C ___________________________
   D ___________________________
   E ___________________________

   5(2)
4. What letter on the diagram in Question 3 represents the location for each of the following?
   (a) Fertilisation ___________________________
   (b) Implantation ___________________________
   (c) Gamete formation ___________________________
   (d) Ovulation ___________________________
   (e) Pregnancy ___________________________

5. The diagram represents the menstrual cycle.

   (a) What is the normal length of the menstrual cycle?
   ___________________________

   (b) On what day of the menstrual cycle does menstruation begin?
   ___________________________

   (c) On what day of the menstrual cycle does ovulation normally take place?
   ___________________________

   (d) On what days in the cycle shown is the female most likely to become pregnant?
   ___________________________

   (e) If a female has a 32-day cycle, on what day is she most likely to release an egg from her ovary? ___________________________
Chapter 10 The Reproductive System

6. What causes movement in each of the following?
   (a) a sperm ____________________________
   (b) an egg ____________________________ 2(5)

7. Fertilisation is the _______________________ of the male and female
   _______________________ to form a ___________________.
   Implantation is the _______________________ of the embryo to the lining of the
   _______________________. 5(2)

8. (a) What is the normal length of pregnancy? ______________________________
   (b) Name the membrane that surrounds the embryo or foetus during pregnancy.
       ______________________________
   (c) Name the structure that connects the foetus with the placenta.
       ______________________________
   (d) What liquid surrounds and protects the foetus during pregnancy?
       ______________________________
   (e) Why do babies have a navel (belly button)?
       ______________________________ 5(2)

9. (a) Name two useful substances that pass into the foetus through the placenta.
     ______________________________ and ______________________________ 2(2)
   (b) Name two harmful substances that might pass into the foetus through the placenta.
     ______________________________ and ______________________________ 2(2)
   (c) Name a waste substance that passes out of the foetus through the placenta.
     ______________________________ 2(2)

10. Name a method of contraception that prevents each of the following.
    (a) Fertilisation ______________________________
    (b) Implantation ______________________________ 2(5)
Chapter 11 Theory Questions

Name: Date:

1. Genetics is the study of how __________________ are ______________________________. 2(5)

2. Humans show variations. What is meant by variation?
   ____________________________________________________________
   ____________________________________________________________ (10)

3. State five ways in which humans show variations.
   (a) __________________________________________________________________________
   (b) __________________________________________________________________________
   (c) __________________________________________________________________________
   (d) __________________________________________________________________________
   (e) __________________________________________________________________________ 5(2)

4. Inherited characteristics are passed from __________________ to their
   __________________________. 2(5)

5. Inherited characteristics are controlled by ___________________________. 10

6. Non-inherited characteristics are ___________________________ during life. They are not
   controlled by ___________________________. 2(5)

7. Inherited characteristics are passed from a father to his child in a cell called the
   ___________________________. 10

8. Inherited characteristics are passed from a mother to her child in a cell called the
   ___________________________. 10
9 Name five inherited characteristics from the box below.

<table>
<thead>
<tr>
<th>Reading</th>
<th>Eye colour</th>
<th>Speaking</th>
<th>Walking</th>
<th>Eyelashes</th>
<th>Shape of face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin colour</td>
<td>Whistling</td>
<td>Writing</td>
<td>Number of fingers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) ___________________________________
(b) ___________________________________
(c) ___________________________________
(d) ___________________________________
(e) ___________________________________

10 Name five non-inherited characteristics from the box below.

<table>
<thead>
<tr>
<th>Forming saliva</th>
<th>Earlobes</th>
<th>Freckles</th>
<th>Typing</th>
<th>Swimming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texting</td>
<td>Teeth</td>
<td>Toenails</td>
<td>Cooking</td>
<td>Dressing</td>
</tr>
</tbody>
</table>

(a) ___________________________________
(b) ___________________________________
(c) ___________________________________
(d) ___________________________________
(e) ___________________________________

**Higher level only**

4 Inherited characteristics are controlled by ________________________, which are located on ________________________ contained in the _________________________ of the cell. (4, 4, 2)

5 Chromosomes are made of ________________________ and _________________________. 2(5)

7 Inherited characteristics are passed from a father to his child in a cell called the ________________________. Inherited characteristics are passed from a mother to her child in a cell called the _________________________. 2(5)

8 Genes are made of ________________________ and they control the production of _________________________. 2(5)
9 Name ten inherited characteristics from the box below.

<table>
<thead>
<tr>
<th>Reading</th>
<th>Eye colour</th>
<th>Speaking</th>
<th>Walking</th>
<th>Eyelashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape of face</td>
<td>Skin colour</td>
<td>Whistling</td>
<td>Writing</td>
<td>Number of fingers</td>
</tr>
<tr>
<td>Forming saliva</td>
<td>Earlobes</td>
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<td>Swimming</td>
</tr>
<tr>
<td>Teeth</td>
<td>Toenails</td>
<td>Cooking</td>
<td>Dressing</td>
<td></td>
</tr>
</tbody>
</table>

(a) ____________________________
(b) ____________________________
(c) ____________________________
(d) ____________________________
(e) ____________________________
(f) ____________________________
(g) ____________________________
(h) ____________________________
(i) ____________________________
(j) ____________________________ 10(1)

10 State the number of chromosomes in each of the following human cells.

(a) A normal mouth cell. ____________________________
(b) An egg cell. ____________________________
(c) A sperm. ____________________________
(d) A zygote. ____________________________
(e) A white blood cell in the embryo. ____________________________ 5(2)
1 Name five flowering plants in the box below.

(a) _______________________________
(b) _______________________________
(c) _______________________________
(d) _______________________________
(e) _______________________________

2 Name the labelled parts on the diagram of a flowering plant.

A _______________________________
B _______________________________
C _______________________________
D _______________________________
E _______________________________

3 Name the parts labelled in the diagram in Question 2 that carry out each of the following functions:

(a) is the main organ of photosynthesis
   _______________________________

(b) absorbs water
   _______________________________

(c) carries out reproduction
   _______________________________

(d) consists of all the aerial parts of the plant
   _______________________________

(e) carries water to the leaves
   _______________________________
4 (a) Name a gas that passes into a leaf from the air. _______________________________
(b) Name a gas that passes out of a leaf into the air. _______________________________ 2(5)

5 Water passes out of tiny openings on the lower surface of a leaf.
(a) Name these tiny openings. _______________________________
(b) What name is given to this loss of water? _______________________________ 2(5)

6 In an investigation, the apparatus shown in the diagram was used.
(a) Name the liquid found in the bell jar. _______________________________ (2)
(b) Name a chemical that can be used to show the presence of this liquid. _______________________________ (2)
(c) What colour does this chemical turn in the presence of this liquid? _______________________________ (2)
(d) The liquid found in the bell jar may have come from two places within it. Name these places. _______________________________ and _______________________________ 2(2)

7 (a) State one function for each of the following.
(i) roots _______________________________
(ii) stems _______________________________
(iii) leaves _______________________________

(b) Give one example in each case of an edible plant that stores food in the following places.
(i) the roots _______________________________
(ii) the leaves _______________________________ 5(2)

8 (a) Where does water enter a plant? _______________________________ (4)
(b) Where does water leave a plant? _______________________________ (4)
(c) The movement of water through a plant is called the transpiration _______________________________. (2)
9 Refer to the diagram below.

(a) What will happen to the level of liquid in the flask over the course of a few days?
_______________________________________________________________________________ (2)

(b) What would happen to the level of water in the flask if there was no plant present?
_______________________________________________________________________________ (3)

(c) Why was ink added to the water? _______________________________________________
_______________________________________________________________________________ (2)

(d) Draw what you would expect to see, after a few days, if the stem was cut and observed.
Use the circle below. (3)

10 Give two benefits of water passing up through a plant.
(a) ____________________________________________________________________________
(b) ____________________________________________________________________________ 2(5)
Higher level only

7 (a) What is meant by vascular tissue?

_______________________________________________________________________________
_______________________________________________________________________________ (3)

(b) Name the two types of vascular tissue in flowering plants.

_______________________________________________________________________________ 2(2)

(c) Name the type of vascular tissue responsible for each of the following:

(i) carrying water _______________________________

(ii) carrying food _______________________________

(iii) carrying minerals _______________________________ 3(1)

8 Which of each of the following pairs of features are used by plants to reduce water loss?

(a) Large or small leaves _______________________________

(b) Stomata on the top or on the bottom of the leaf. _______________________________

(c) Many leaves or few leaves. _______________________________

(d) Broad leaves or narrow leaves. _______________________________

(e) Stomata open or shut. _______________________________ 5(2)
Chapter 13 Theory Questions

Name: ____________________________ Date: ____________________________

1. In photosynthesis _______________________________ energy is converted into _______________________________ energy. 2(5)

2. Complete the sentences below from the list in the box:

| Oxygen | Glucose | Carbon dioxide | Chlorophyll | Water |

(a) Name three substances needed for photosynthesis: _______________________________ and _______________________________ and _______________________________.

(b) Name two substances made in photosynthesis: _______________________________ and _______________________________. 5(2)

3. State two benefits of photosynthesis for animals.

(a) _____________________________________________________________________________ 2(5)

(b) _____________________________________________________________________________ 2(5)

4. When testing leaves for starch:

(a) Name the chemical used to show that starch is present. _______________________________ (2)

(b) Why are the leaves boiled in water? _______________________________ (2)

(c) Why are the leaves soaked in warm alcohol? _______________________________ (3)

(d) Why is the chlorophyll removed from the leaves? _______________________________ (3)

5. (a) Name the carbohydrate formed in photosynthesis. _______________________________ 2(5)

(b) Name a carbohydrate stored in a plant. _______________________________ 2(5)
6 A piece of apparatus was set up as shown in the diagram.

(a) Why would the plant be placed in the dark for a day before the black paper was put on the leaves? ____________________________ (2)

(b) Why was the black paper placed over part of the leaves? ____________________________ (2)

(c) Why was the plant then left in the light? ____________________________ (2)

(d) State the colour of each part of the leaf when later tested with iodine solution.
   (i) The part of the leaf that was not covered with black paper turned ____________________________ (2)
   (ii) The part of the leaf that was covered with black paper turned ____________________________ (2)

7 Phototropism is the way in which a ____________________________ changes its ____________________________ in response to ____________________________.
   The benefit of phototropism is that plants get more ____________________________, which is needed for the process of ____________________________. 5(2)
A dish containing seeds on moist cotton wool was placed in each of the boxes X, Y and Z as shown in the diagram. After a few days the three sets of seedlings 1, 2 and 3 were removed from the boxes.

(a) Which set of seedlings was grown in box X? _____________________________
(b) Which set of seedlings was grown in box Y? _____________________________
(c) Which set of seedlings was grown in box Z? _____________________________
(d) The lack of which substance caused the leaves in set 1 to be yellow? _____________________________
(e) State one reason why the seedlings in set 1 will eventually die.
   __________________________________________________________________________
   __________________________________________________________________________

Say where a plant gets each of the following.

(a) Water __________________________________________________________________________ (3)
(b) Light __________________________________________________________________________ (3)
(c) Food __________________________________________________________________________ (4)

State two ways that the sugar formed in photosynthesis may be used by a plant.

(a) __________________________________________________________________________
(b) __________________________________________________________________________ 2(5)
Higher level only

2 Complete the sentences below:

(a) Name three substances needed for photosynthesis: _______________________________
    and _______________________________ and _______________________________.

(b) Name two substances made in photosynthesis.
    _______________________________ and _______________________________ 5(2)

10 (a) State two reasons why the shoot grows in the direction shown in the diagram.

(i) ___________________________________________________________________________

(ii) ___________________________________________________________________________ 2(2)

(b) State one reason for the growth of the root as shown in the diagram.
    ___________________________________________________________________________ 3

(c) State one benefit to the plant for the root growing in this way.
    ___________________________________________________________________________ 3
Mandatory Activity 7 Questions

To show that starch is made by a plant in photosynthesis  (Textbook page 85)

1. Draw a diagram of the apparatus you used to carry out this activity.

2. How long did you leave the plant in the dark at the beginning of the activity?
   __________________________________________________________

3. How did you block out the light on some leaves?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. How long did you leave the plant in the light?
   __________________________________________________________
5 When testing the leaves for starch at the end of the activity, what did you do to achieve each of the results listed below:

(a) Kill and soften the leaves.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(b) Remove the green colour from the leaves.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(c) Soften the leaves a second time.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(d) Show if starch was present or not.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

6 What did you conclude as a result of your findings?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
Chapter 14 Theory Questions

Name: ___________________________ Date: ___________________________

1. Arrange the processes listed in the box into the order in which they take place in plant reproduction.

   Seed dispersal  Pollination  Germination  Seed formation  Fertilisation

   __________________________________________________________   (10)

2. There are two types of reproduction in plants: sexual and asexual reproduction.
   State whether the following are involved in sexual or asexual reproduction:
   (a) fertilisation _____________________________
   (b) forming identical offspring _____________________________
   (c) seeds _____________________________
   (d) gametes _____________________________
   (e) only one parent _____________________________    5(2)

3. (a) Name the parts labelled on the diagram of the flower.

   A__________________________  B__________________________
   C__________________________  D__________________________

   (b) Which of the labelled parts is a male structure?

   __________________________________________________________   5(2)

4. Match the terms in the box with the following parts of the plant.

   Protect the bud  Make female gametes  Make pollen  Attract insects  Asexual reproduction

   (a) Petals _____________________________  (d) Sepals _____________________________
   (b) Runners _____________________________  (e) Carpels _____________________________
   (c) Stamen _____________________________    5(2)
5. (a) Name three of the features in the box that are associated with insect pollination.
   (i) _____________________________
   (ii) _____________________________
   (iii) _____________________________

   (b) Name two of the features in the box that are associated with wind pollination.
   (i) _____________________________
   (ii) _____________________________

6. Pollination is the transfer of _____________________________ from a _____________________________ to a _____________________________.

7. Peas  Dandelion  Blackberry  Alder  Ash  Strawberry

   Name a plant from the box that has the following type of seed dispersal.

   (a) Animal _____________________________

   (b) Self _____________________________

   (c) Wind _____________________________

   (d) Water _____________________________

8. (a) Name three conditions needed for seeds to germinate.

   _____________________________, _____________________________ and _____________________________

   (b) Which of these conditions is lacking in winter?

   _____________________________
9. The diagram shows germination in a plant.
   (a) Name the parts labelled in the diagram.

   ![Diagram of germination process]

   A ____________________________
   B ____________________________
   C ____________________________
   D ____________________________

   (b) Which process can take place in the plant shown at Z that cannot take place in the plants shown in X and Y?

   ____________________________ 5(2)

10. The following apparatus was set up to investigate one of the factors needed for germination.

   ![Apparatus diagram]

   (a) Which factor is being investigated? ____________________________

   (b) Why was the water in tube Y boiled? ____________________________
               __________________________________________________________

   (c) Why was the oil placed on top of the water in tube Y? ____________________________
               __________________________________________________________

   (d) Why were four seeds used in each tube instead of single seeds?
               __________________________________________________________
               __________________________________________________________

   (e) Which set of seeds (X or Y) would you expect to grow? ____________________________ 5(2)
Higher level only

4 (a) Name the parts labelled on the diagram of the flower.

A ___________________________
B ___________________________
C ___________________________
D ___________________________
E ___________________________

(b) Which labelled part is associated with each of the following?

(i) the formation of the egg ____________________________ (2)
(ii) losing pollen in pollination ____________________________ (2)
(iii) the formation of a seed or a fruit ____________________________ (1)

5 (a) What type of pollination is carried out by the flower shown in the diagram?
_______________________________________________________________________________ (2)

(b) State two reasons based on the diagram why the flower shown has this type of pollination.

(i) ____________________________________________________________
(ii) ____________________________________________________________ 2(4)
8. (a) Name the labelled parts of the seed shown in the diagram.

A ___________________________
B ___________________________
C ___________________________
D ___________________________

(b) Which of the labelled parts will form the future shoots of the plant?
_______________________________________________________________________________ 5(2)

Mandatory Activity 8 Questions

To investigate the conditions necessary for germination  (Textbook page 98)

1 Name the type of seed you used in your investigation.
___________________________________________________________________________________

2 How many test tubes did you use? _________________________________________________

3 How many seeds were placed in each test tube? ____________________________________

4 Why were some of the seeds grown in the presence of water, oxygen and a suitable
temperature? ______________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

5 What did you do to show that water is needed for germination?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

6 What did you do to show that oxygen is needed for germination?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
7. What did you do to show that a suitable temperature is needed for germination?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

8. In which of the test tubes relating to Questions 4, 5, 6 and 7 was it essential to have a stopper? ________________________________
Chapter 15 Theory Questions

1. Match each of the words in the box with one of the definitions given below.

<table>
<thead>
<tr>
<th>Herbivore</th>
<th>Adaptation</th>
<th>Consumer</th>
<th>Habitat</th>
<th>Decomposer</th>
</tr>
</thead>
</table>

(a) Animals that eat plants and other animals. _____________________________
(b) The area where a plant or animal lives. _____________________________
(c) Organisms that feed on dead plants and animals. _____________________________
(d) A structure or habit that helps an organism survive in a habit.
_________________________________________________________________________
(e) An animal that eats plants only. _____________________________

2. Answer each of the following in relation to the food chain below.
Cabbage ➞ Caterpillar ➞ Thrush ➞ Hawk

(a) Name the secondary consumer. _____________________________ (4)
(b) Name a carnivore. _____________________________ (3)
(c) Name the producer. _____________________________ (3)

3. Give two examples of decomposers acting in the habitat you studied.

(a) _____________________________________________________________________
(b) _____________________________________________________________________ (2(5))

4. (a) Use the organisms listed in the box to complete the food chain given below.

| Ladybird | Greenfly | Rose leaves |

   ➞   ➞   

__________________________________________ (3(2))

(b) Name a habitat where this food chain might be found.
_________________________________________________________________________ (2)

(c) Which organism in the list contains chlorophyll? _____________________________ (2)
5 Name the habitat you have studied. _____________________________ (no marks)
   (a) (i) Name an animal found in the named habitat. _____________________________ (2)
        (ii) State one adaptation shown by the named animal. _____________________________
        _____________________________ _____________________________ (3)
   (b) (i) Name a plant found in the named habitat. _____________________________ (2)
        (ii) State one adaptation shown by the named plant. _____________________________
        _____________________________ _____________________________ (3)

6 The diagram shows two pieces of apparatus used in studying a habitat.

   A

   B

   (a) Name the piece of apparatus labelled A. _____________________________
   (b) Give a use for A. _____________________________ _____________________________
   (c) Name the piece of apparatus labelled B. _____________________________
   (d) Give a use for B. _____________________________ _____________________________
   (e) Name one other piece of apparatus you used in your habitat study.
       _____________________________ 5(2)

7 (a) Name two non-living features that you measured when studying a habitat.
    (i) Feature 1 _____________________________
    (ii) Feature 2 _____________________________ 2(3)

    (b) Name the device or apparatus used to measure each of the features named above.
    (i) Device for feature 1 _____________________________
    (ii) Device for feature 2 _____________________________ 2(2)
Chapter 15 Ecology

8 (a) Conservation is the protection of our _____________________________.

(b) Give one reason why conservation is necessary. ____________________________
    ____________________________
    ____________________________ 2(5)

9 (a) Pollution is caused when ____________________________ add too much
    ____________________________ material to the environment. 2(2)

(b) Give one cause of air pollution. ____________________________

(c) Give one cause of water pollution. ____________________________

(d) State one way in which humans can have a positive effect on the environment.
    ____________________________
    ____________________________
    ____________________________ 2

10 (a) Give two examples of waste materials produced by modern lifestyles.
    ____________________________ and ____________________________ 2(2)

(b) The three Rs form one of the main methods of controlling waste.
    What are the three Rs?
    (i) ____________________________
    (ii) ____________________________
    (iii) ____________________________ 3(2)

Higher level only

2  Answer each of the following in relation to the food chain below.
   Cabbage ➞ Caterpillar ➞ Thrush ➞ Hawk
   (a) Name the secondary consumer. ____________________________
   (b) Name a carnivore. ____________________________
   (c) Name the producer. ____________________________ 3(2)
   (d) State one effect on the food chain above if all the caterpillars were wiped out by
       a disease. ____________________________
       ____________________________ (4)
7 (a) Construct a food web using all the organisms listed in the box. (6)

| Oak tree | Greenfly | Caterpillar | Spider | Blackbird | Hawk |

(b) Give two examples of interdependence based on the food web you have drawn.

(i) __________________________________________________________

(ii) __________________________________________________________ 2(2)

8 A student recorded the number of plants of a certain type at different distances from the base of a large tree. The results are shown below.

<table>
<thead>
<tr>
<th>Distance from tree (m)</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of plants/unit area</td>
<td>0</td>
<td>12</td>
<td>23</td>
<td>42</td>
<td>82</td>
<td>105</td>
<td>105</td>
</tr>
</tbody>
</table>

(a) Name an apparatus that could be used to record the number of plants per unit area. (2)

(b) What is the total number of plants found in the study? __________________________ 2(2)

(c) How many plants would you expect to find at a distance of 14 metres from the tree?

(d) Suggest an explanation for the variation in the number of plants as shown in the table.

_______________________________________________________________________________

_______________________________________________________________________________ 3(3)
Mandatory Activities 9A, 9B and 9C Questions

■ To study a local habitat, using appropriate instruments and simple keys to show the variety and distribution of named organisms

■ Using a quadrat to estimate the number and distribution of plants in a habitat

■ Using a line transect to estimate the number and distribution of plants in a habitat

(Textbook pages 110 and 111)

1. Name the habitat you studied. ______________________________________________________

2. Name three non-living factors that you measured in your habitat study.
   (a) __________________________________________________________________________
   (b) __________________________________________________________________________
   (c) __________________________________________________________________________

3. Name two animals you found in your habitat.
   (a) __________________________________________________________________________
   (b) __________________________________________________________________________

4. Name two plants you found in your habitat.
   (a) __________________________________________________________________________
   (b) __________________________________________________________________________

5. Give one example of how a named animal is adapted to living in your habitat.
   ______________________________________________________________________________
   ______________________________________________________________________________

6. Give one example of how a named plant is adapted to living in your habitat.
   ______________________________________________________________________________
   ______________________________________________________________________________

7. (a) Name two animals that compete in your habitat.
    ________________________________________________________________________________ and __________________________________________________________________________
    (b) Say what the animals compete for. __________________________________________________________________________
8 (a) Name two plants that compete in your habitat.
__________________________________ and __________________________________

(b) Say what the plants compete for. ____________________________________________

9 Name the material used to make the quadrat you used.
________________________________________

10 What length were the sides of the quadrat you used?
________________________________________

11 Suggest one problem that might arise when you throw the quadrat over your shoulder.
________________________________________

12 Describe exactly what you did when the quadrat had landed in the habitat.
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

13 How many times did you throw the quadrat? ________________________________

14 Why should a quadrat be thrown the number of times you stated?
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

15 What was the line transect you used made from?
_____________________________________________________________________________

16 (a) What distance was there between the markings on the line transect?
_____________________________________________________________________________

(b) What was used to identify the markings on the transect?
_____________________________________________________________________________
Chapter 16 Theory Questions

Name: Date:

1 (a) Name three types of micro-organisms.
   (i) _____________________________
   (ii) _____________________________
   (iii) _____________________________

(b) Which of these is:
   (i) the biggest _____________________________
   (ii) the smallest _____________________________ 5(2)

2 (a) Name three conditions or factors needed for bacteria to grow.
   (i) _____________________________
   (ii) _____________________________
   (iii) _____________________________ 3(3)

(b) Do bacteria reproduce sexually or asexually? _____________________________ 1(1)

3 The apparatus shown below was used to show the presence of micro-organisms in the air.

   Name the piece of apparatus labelled A. _____________________________ 2(2)
   (a) Name the material labelled B. _____________________________ 2(2)
   (b) Why should this apparatus not be stored in a fridge during the course of
       the investigation? _____________________________ 3(3)
   (c) In the investigation, a dish similar to the one above was left unopened.
       Suggest a reason for this. _____________________________ 3(3)
4 Name a human disease caused by:
   (a) Bacteria _____________________________
   (b) Viruses _____________________________
   (c) A fungus _____________________________
   (d) Name the type of cell in the blood that attacks micro-organisms that enter the body. 
       _____________________________

5 (a) Name a type of micro-organism that:
   (i) is affected by antibiotics _____________________________
   (ii) is not affected by antibiotics _____________________________
   (iii) makes antibiotics _____________________________
   (b) Name an antibiotic. _____________________________

6 State two uses for bacteria in industry or in medicine.
   (a) __________________________________________________________________________
   (b) __________________________________________________________________________

7 State two uses for fungi in industry or in medicine.
   (a) __________________________________________________________________________
   (b) __________________________________________________________________________

8 (a) State one way in which bacteria are harmful. _____________________________
     _____________________________
   (b) State one way in which fungi are harmful. _____________________________
     _____________________________

9 Name two types of living things used in biotechnology.
   (a) _____________________________
   (b) _____________________________

10 (a) State two industrial products made by biotechnology.
      ______________________________________
      ______________________________________
   (b) State two medical products made by biotechnology.
      ______________________________________
      ______________________________________ (2, 3, 2, 3)
Mandatory Activity 10 Questions

To investigate the presence of micro-organisms in air and soil (Textbook page 123)

1. Name the type of container in which you grew micro-organisms in this activity.
   __________________________________________________________________________

2. Name the jelly-like substance on which the micro-organisms grew.
   __________________________________________________________________________

3. The jelly-like material and the dishes were said to be sterile.
   (a) What does sterile mean in this case?
       __________________________________________________________________________
       __________________________________________________________________________
       __________________________________________________________________________
   (b) Why was it important that they were sterile?
       __________________________________________________________________________
       __________________________________________________________________________
       __________________________________________________________________________

4. Why was one dish left open to the air?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

5. Why was soil sprinkled over one dish?
   __________________________________________________________________________
   __________________________________________________________________________
Chapter 17 Theory Questions

Name: ___________________________ Date: ___________________________

1 Name the three states of matter.
   (a) ___________________________ (3)
   (b) ___________________________ (3)
   (c) ___________________________ (4)

2 Fill in the correct word from the following list.
   compressed  definite  flow  shape  volume
   Solids have a definite ________________.
   Liquids can ________________ and hence do not have a definite ________________.
   The particles in a solid are ________________ and cannot easily move past each other.
   Liquids and solids have a definite ________________, but gases do not. 5(2)

3 What do we call these changes?
   Liquid _______ gas _______ boiling __________________________
   Gas _______ liquid (i) __________________________
   Solid _______ liquid (ii) __________________________
   Liquid _______ solid (iii) __________________________ (3,3,4)

4 Water boils at _______ °C and has a freezing point of _______ °C. 2(5)

5 Fill in the correct words from the following list.
   time  space  weight  mass
   Matter is anything that occupies ___________________________ and has ___________________________. 2(5)
6 Answer True or False to the following statements.
   (a) Solids have a definite shape. _____________________________
   (b) Gases cannot be compressed. _____________________________
   (c) Liquids have a definite shape. _____________________________
   (d) Solids cannot flow. _____________________________
   (e) The particles in a solid are packed tightly together. _____________________________ 5(2)

7 What is diffusion? Give an example.
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________ 2(5)

8 If ice is heated it will _____________________________ and if heated further it will boil
   and turn to _____________________________. 2(5)

9 Name the processes shown in the diagrams.
   (i) _____________________________

   (ii) _____________________________ 2(5)

10 (a) What is condensation? _______________________________________________________
      ___________________________________________________________________________
      ___________________________________________________________________________
      ___________________________________________________________________________
      ___________________________________________________________________________ 4
(b) Write (i) an example of a situation where condensation occurs and (ii) what you could do to prevent this occurring.

(i) ___________________________________________________________________________
_____________________________________________________________________________

(ii) ___________________________________________________________________________
_____________________________________________________________________________

Higher level only

10 Briefly explain the difference between evaporation and boiling.
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

2(3)
Chapter 18 Theory Questions

Name: __________________________ Date: ______________________

1 Give two everyday examples of mixtures.
   (a) ____________________________
   (b) ____________________________ 2(5)

2 Name two mixtures that can be separated by filtration.
   (a) ____________________________
   (b) ____________________________ 2(5)

3 Name the parts labelled A–E on the following diagram of the apparatus used to separate soil and water.

   A ____________________________
   B ____________________________
   C ____________________________
   D ____________________________
   E ____________________________ 5(2)

4 Briefly explain how decanting is performed.
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________ (10)

5 Sand is insoluble in water. List two methods that could be used to separate sand from water.
   (a) ____________________________
   (b) ____________________________ 2(5)
6 Name the parts labelled A–E on the following diagram.

A _____________________________
B _____________________________
C _____________________________
D _____________________________
E _____________________________

5(2)

7 Distillation is a technique used to separate _____________________________ that have _____________________________ boiling points.

2(5)

8 During filtration the substance that is trapped in the filter paper is called the _____________________________ and the liquid that passes through is known as the _____________________________.

2(5)
9 From the list in the box choose the correct separation technique to separate:

<table>
<thead>
<tr>
<th>Filtration</th>
<th>Distillation</th>
<th>Chromatography</th>
<th>Evaporation</th>
</tr>
</thead>
</table>

(a) Sand and water _____________________________ (3)
(b) Colours in a dye _____________________________ (3)
(c) Alcohol and water _____________________________ (4)

10 Give one example in each case of:
(a) a solid that is soluble in water _____________________________ (3)
(b) a solid that is insoluble in water _____________________________ (3)
(c) a mixture that could be separated by filtration _____________________________ (4)

Higher level only

2 A student separated a mixture of salt and chalk. The diagrams below show the steps involved in the separation. They are not in the correct order, however. Write the correct order of the diagrams.

Chalk and salt mixture

A → B → C → D → E → F.

5(2)

9 Complete the following table by writing the most suitable technique for the separation of each mixture.

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Separation technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Alcohol and water</td>
<td></td>
</tr>
<tr>
<td>(b) Chalk and water</td>
<td></td>
</tr>
<tr>
<td>(c) Mixture of ink dyes</td>
<td></td>
</tr>
<tr>
<td>(d) Sugar and water</td>
<td></td>
</tr>
<tr>
<td>(e) Crude oil</td>
<td></td>
</tr>
</tbody>
</table>

5(2)
Chapter 18 Separating Mixtures

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Mandatory Activity 11A Questions

To separate soil and water  (Textbook page 135)

1 Name a mixture that could be separated by filtration.
   ________________________________________________________________

2 The substance trapped in the filter paper is called the _____________________________
   and the liquid that passes through is called the _____________________________.

Mandatory Activity 11B Questions

To separate salt and water through evaporation  (Textbook page 136)

1 Name the technique used to isolate salt from seawater.
   ________________________________________________________________

2 Explain why filtration would not be a suitable separation technique for salt and water.
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

Mandatory Activity 11C Questions

To separate water and salt through distillation  (Textbook page 136)

1 What advantage has distillation over evaporation?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

2 What is the function of the condenser in the distillation apparatus in this activity?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
Mandatory Activity 11D Questions

To separate the dyes in water-soluble markers  (Textbook page 139)

1  Mixtures of colours in a dye can be separated by ____________________________.
   The different colours are carried different distances along the ____________________________.

2  Why must the spotted colours be above the level of the solvent in this activity?
   __________________________________________________________________________
   __________________________________________________________________________
Chapter 19 Theory Questions

Name: ___________________________ Date: ___________________________

1 (a) An element is a substance made up of _____________________________ type of _____________________________. 2(2)

(b) Give three examples of elements.
   (i) ____________________________
   (ii) ____________________________
   (iii) ____________________________ 3(2)

2 Give an example of an element that is:
   (a) a solid at room temperature ____________________________
   (b) a liquid at room temperature ____________________________
   (c) a gas at room temperature ____________________________ (3,3,4)

3 (a) A molecule is made up of _____________________________ or more _____________________________ chemically combined. 2(2)

(b) Give three examples of molecules.
   (i) ____________________________
   (ii) ____________________________
   (iii) ____________________________ 3(2)

4 State two differences between a mixture and a compound.
   (a) _____________________________________________________________
   (b) _____________________________________________________________ 2(5)

5 Iron and sulfur are two elements that chemically combine to form the compound iron sulfide. The properties of FeS will be:
   (a) the same as iron □
   (b) the same as sulfur □
   (c) different from Fe or S □
   (d) a mixture of Fe and S □ (10)
6 Indicate whether each of the following are elements, compounds or mixtures.

<table>
<thead>
<tr>
<th></th>
<th>Element</th>
<th>Compound</th>
<th>Mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Gold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>Carbon dioxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv)</td>
<td>Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v)</td>
<td>Seawater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi)</td>
<td>Aluminium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii)</td>
<td>Whiskey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(viii)</td>
<td>Iron sulfide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ix)</td>
<td>Boron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(x)</td>
<td>Sodium chloride</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7 Look at the boxes.

Which box contains:

(a) iron only? _____________
(b) mixture of iron and sulfur? _____________
(c) iron sulfide only? _____________

8 Answer True or False.

(a) Magnesium oxide is a white compound. ________________
(b) A compound has the same properties as the elements it contains. ________________
(c) Iron and sulfur cannot be separated using a magnet. ________________
(d) A compound is made up of two or more different types of atom mingled together. ________________
(e) Glucose is a compound whose chemical formula is C₆H₁₂O₆. ________________
9  Briefly describe how you would make the compound iron sulfide.

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

10  Underline the three compounds in the following list:
mercury    water    carbon dioxide    sulfur    iron    iron sulfide

Higher level only

8  Give the name of the element or compound below.
(a) Ca _____________________________
(b) K _____________________________
(c) CO₂ _____________________________
(d) H₂O _____________________________
(e) NaCl _____________________________
Chapters 20 & 21 Theory Questions

1. The three particles that make up the atom are the proton, _____________________________ and _____________________________.

2. Protons have a positive charge. What charge does:
   (a) an electron have? _____________________________
   (b) a neutron have? _____________________________

3. The neutron is found in the nucleus of an atom.
   (a) Where are the protons found? _____________________________
   (b) Where are the electrons found? _____________________________

4. In the Periodic Table, a Russian scientist called Dmitri _____________________________ arranged the elements according to their atomic _____________________________.

5. Vertical columns in the Periodic Table are called _____________________________.
   Horizontal rows across the table are known as _____________________________.

6. (a) Group ___________ are known as the alkali metals.
   (b) Group II are known as the alkaline _____________________________.

7. Look at the Periodic Table below.

   What letters represent the following?
   (i) An alkali metal _____________
   (ii) A halogen _____________
   (iii) A noble gas _____________
(iv) An element in period 3 ____________

(v) Two elements in the same group ____________ and ____________ 5(2)

8 Write down the symbols of the following elements.

(a) Carbon ____________

(b) Hydrogen ____________

(c) Copper ____________

(d) Helium ____________

(e) Calcium ____________ 5(2)

9 Which elements are represented by the following symbols?

(a) Cl _____________________________

(b) Na _____________________________

(c) Al _____________________________

(d) S _____________________________

(e) Li _____________________________ 5(2)

10 The elements in Group 7 of the Periodic Table are known as the _____________________________.

The elements in Group 8 (or 0) of the Periodic Table are called the _____________________________. 2(5)
Chapter 20 Theory Questions

Name: Date:

1. An atom is made up of three types of particle. Name them.
   
   (a) ___________________________ (3)
   
   (b) ___________________________ (3)
   
   (c) ___________________________ (4)

2. Complete the table.

<table>
<thead>
<tr>
<th>Particle</th>
<th>Charge</th>
<th>Location</th>
<th>Mass in Atomic Mass Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proton</td>
<td>+1</td>
<td>(i)</td>
<td>(ii)</td>
</tr>
<tr>
<td>Electron</td>
<td>(iv)</td>
<td>(v)</td>
<td>0</td>
</tr>
</tbody>
</table>

3. Define:
   
   (a) Atomic number ________________________________________________________________
       __________________________________________________________________________
   
   (b) Mass number __________________________________________________________________
       __________________________________________________________________________

4. The centre of an atom is called the ___________ and the electrons are found whizzing around in ____________________________.

5. Write down the atomic number and mass number of the element sodium.

   ![](Na.png)

   Atomic number __________
   
   Mass number __________

   From this we can calculate sodium to have __________ protons, __________ electrons and __________ neutrons.
6 Using the Periodic Table, complete the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Atomic number</th>
<th>Mass number</th>
<th>No. of protons</th>
<th>No. of neutrons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>6</td>
<td>12</td>
<td>(i)</td>
<td>(ii)</td>
</tr>
<tr>
<td>Sulfur</td>
<td>16</td>
<td>(iii)</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Argon</td>
<td>18</td>
<td>40</td>
<td>(iv)</td>
<td>(v)</td>
</tr>
</tbody>
</table>

7 Electrons are arranged in shells or orbits. The first shell holds up to ________ electrons, the second shell holds ________ and the third shell holds up to ________. (3,3,4)

8 Using the Periodic Table, write out the electronic configuration of:
   (a) Helium _____________________________
   (b) Oxygen _____________________________
   (c) Fluorine _____________________________
   (d) Aluminium _____________________________
   (e) Calcium _____________________________

9 Draw a simple atomic diagram of:
   (a)  
   ![Be Diagram]
   (b)  
   ![Al Diagram]
10 (a) What are isotopes? 

(b) Draw atomic diagrams showing two isotopes of carbon, e.g. (i) $^6_{12}\text{C}$ and (ii) $^6_{13}\text{C}$.
Chapter 21 Theory Questions

Name: Date: 

1. In the Periodic Table, the Russian chemist _________________________ arranged the elements according to their _______________________. 2(5)

2. Vertical columns in the Periodic Table are called _______________________. Horizontal rows across the table are known as _______________________. 2(5)

3. Place the terms from the following box next to their correct Group from the Periodic Table.

<table>
<thead>
<tr>
<th>the noble gases</th>
<th>the alkaline earth metals</th>
<th>the halogens</th>
<th>the alkali metals</th>
</tr>
</thead>
</table>

Group 1 _____________________________ (3)
Group 2 _____________________________ (3)
Group 7 _____________________________ (2)
Group 8 _____________________________ (2)

4. List three properties of the alkali metals.
   (a) ______________________________________________________________________ 3
   (b) ______________________________________________________________________ 3
   (c) ______________________________________________________________________ 4

5. Look at the Periodic Table below.

What letters represent the following?
   (i) A noble gas __________
   (ii) An element with one electron in its outer shell __________
   (iii) A halogen __________
   (iv) An element in Period 3 __________
   (v) An element that reacts vigorously with water __________ 5(2)
6. Describe two observations made when a piece of sodium is added to water.
   (a) _____________________________________________________________
   (b) _____________________________________________________________ 2(5)

7. The first 20 elements of the periodic table are shown below. The electronic configuration (arrangement) of two elements has been inserted. Insert the electronic configuration for the elements of groups I, II, VII and VIII.

<table>
<thead>
<tr>
<th>H(l)</th>
<th>He</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li</td>
<td>Be</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>N</td>
<td>O</td>
</tr>
<tr>
<td>F</td>
<td>Ne</td>
</tr>
<tr>
<td>Na</td>
<td>Mg</td>
</tr>
<tr>
<td>Al</td>
<td>Si</td>
</tr>
<tr>
<td>P</td>
<td>S</td>
</tr>
<tr>
<td>Cl</td>
<td>Ar</td>
</tr>
<tr>
<td>K</td>
<td>Ca</td>
</tr>
<tr>
<td>(2, 8, 8, 2)</td>
<td></td>
</tr>
</tbody>
</table>

10(1)

8. Write out the word equation for the reaction of sodium with water.
   _____________________________________________________________ (10)

9. (a) When lithium and oxygen chemically combine they produce ___________________. (4)
   (b) Name two elements that belong to the halogens.
   ___________________________ and _____________________________ 2(3)

10. The noble gases are also known as the inert gases.
    (a) What does the word inert mean? ______________________________
    _____________________________________________________________
    _____________________________________________________________
    (b) Explain why these elements are inert. ______________________________
    _____________________________________________________________
    _____________________________________________________________ 2(5)
Chapter 22 Theory Questions

Name:__________________ Date:__________________

1. Complete the following passage:
   All atoms react in order to achieve a ______________________ outer ___________________ of electrons. The elements of group ____________________, which are known as the ____________________ gases, do not react because their outer shell is _______________________. 5(2)

2. When elements react they form bonds with each other. Name the two types of bonds.
   (a) __________________________  (b) __________________________ 2(5)

3. (a) What is an ionic bond? _________________________________________________________  
       ________________________________________________________________________________     (7)

   (b) Give one example of an ionic compound.  
       ________________________________________________________________________________     (3)

4. When atoms gain or lose electrons, they become __________________________.
   If an atom loses electrons it becomes __________________________ charged, whereas
   if an atom gains electrons it becomes __________________________ charged.  (3,3,4)

5. The following is a list of common ions. Using your knowledge of ionic bonding, predict
   the formulae of the following compounds:

   | Na⁺¹ | Mg⁺² | Al⁺³ | Cl⁻¹ | O⁻² | F⁻¹ |

   (a) Sodium fluoride ________

   (b) Sodium oxide ________

   (c) Magnesium chloride ________

   (d) Magnesium oxide ________

   (e) Aluminium oxide ________ 5(2)

6. Using the Periodic Table, write out the electronic configuration of:
   (a) Helium ____________________________________________________________

   (b) Lithium ____________________________________________________________

   (c) Silicon ____________________________________________________________

   (d) Sulfur _____________________________________________________________

   (e) Argon _____________________________________________________________ 5(2)
7. Following on from Question 6, write down what each of the following elements needs to do in terms of losing or gaining electrons in order to become stable.

(a) Helium ________________________________________________________________________
(b) Lithium _______________________________________________________________________
(c) Silicon _________________________________________________________________________
(d) Sulfur _________________________________________________________________________
(e) Argon _________________________________________________________________________ 5(2)

8. (a) A covalent bond consists of a ____________________________ of electrons being ________________ between two non-metal __________________________. 5(2)

(b) Write down two examples of covalent compounds.
   (i) ______________________________ (ii) ______________________________ 5(2)

9. Explain, using diagrams, the bonding between two fluorine atoms.

10. (a) List three differences in the properties of ionic and covalent compounds.

    | Ionic          | Covalent       |
    |----------------|----------------|
    | (i)            | (i)            |
    | (ii)           | (ii)           |
    | (iii)          | (iii)          | 3(2)

(b) Complete the following definition:

The valency of an element is _______________________________________________________
______________________________________________________________________________ 4
Chapter 23 Theory Questions

Name: ___________________________ Date: ___________________________

1. Match the metals in the list (a) – (g) with the correct descriptions.
   (a) Lead (b) Magnesium (c) Sodium (d) Mercury (e) Aluminium (f) Copper (g) Gold

<table>
<thead>
<tr>
<th>Description</th>
<th>Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) The only metal which is liquid at room temp.</td>
<td>(d) Mercury</td>
</tr>
<tr>
<td>(ii) Ladders are often made of this</td>
<td>(B) Copper</td>
</tr>
<tr>
<td>(iii) This metal is used in electric wiring</td>
<td>(E) Aluminium</td>
</tr>
<tr>
<td>(iv) This metal must be stored under oil</td>
<td>(A) Gold</td>
</tr>
<tr>
<td>(v) Jewellery is often made of this</td>
<td>(C) Sodium</td>
</tr>
</tbody>
</table>

2. Fill in the missing descriptions.

A: ___________________________
   ___________________________

B: ___________________________
   ___________________________

C: ___________________________
   ___________________________

D: ___________________________
   ___________________________

E: ___________________________
   ___________________________ 5(2)

3. (a) Mercury is an unusual metal. In what way is it unusual?
   ___________________________
   ___________________________
   ___________________________

(b) In what way do alkali metals differ from other metals?
   ___________________________
   ___________________________ 2(5)
4 Fill in the missing terms.

LOW

A ______________________

B ______________________

POOR

A ______________________

B ______________________

5 (a) What is an alloy?

______________________________________________________________________________
______________________________________________________________________________

(b) Give two examples.

(i) ______________________  (ii) ______________________

6 Complete the table.

<table>
<thead>
<tr>
<th>Alloy</th>
<th>Use</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Musical instruments, ornaments</td>
<td>Copper and zinc</td>
</tr>
<tr>
<td>(b)</td>
<td>Statues</td>
<td>Copper and tin</td>
</tr>
<tr>
<td>(c)</td>
<td>Soldering</td>
<td>Lead and tin</td>
</tr>
<tr>
<td>(d)</td>
<td>Building reinforcement</td>
<td>Iron and carbon</td>
</tr>
<tr>
<td>(e)</td>
<td>Knives, sinks etc.</td>
<td>Iron, chromium and nickel</td>
</tr>
<tr>
<td>Alnico</td>
<td>Powerful magnets</td>
<td>Aluminium, nickel and cobalt</td>
</tr>
</tbody>
</table>

7 Rusting is the name given to the corrosion of iron. Explain the underlined terms.

(i) _______________________________________________________

(ii) _____________________________________________________
8. Place the four metals, zinc, copper, magnesium and calcium in order of decreasing relative reactivity.

(a) __________________________
(b) __________________________
(c) __________________________
(d) __________________________

(3,3,2,2)

9. The following diagram shows an activity to investigate rusting using iron nails.

(a) What is the function of the calcium chloride?
________________________________________
________________________________________
________________________________________

(b) Why is boiled water used in one test tube?
________________________________________
________________________________________
________________________________________

(c) Why is the oil poured on the boiled water?
________________________________________
________________________________________
________________________________________

(d) Which nails will rust most?
________________________________________

(e) Why do galvanised nails not rust?
________________________________________

5(2)

10. Answer True or False.

(a) Metals conduct heat and electricity. __________________________
(b) Metals are lustrous, i.e. they are shiny. __________________________
(c) Brass is an alloy of copper and zinc. __________________________
(d) Bronze is an alloy of copper and zinc. __________________________
(e) The two conditions necessary for rusting to occur are water and hydrogen. __________________________

5(2)
Higher level only

8

Each test tube above contains one of four metals.

(i) Copper
(ii) Calcium
(iii) Magnesium
(iv) Zinc

(a) Identify the metals in each test tube.

<table>
<thead>
<tr>
<th>Test tube</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) In some of the test tubes a gas is being produced. Name the gas. ___________  5(2)

10 Write out the word equations for the reaction of potassium with:

(a) oxygen ____________________________________________________________  

(b) water ____________________________________________________________  2(5)
Mandatory Activity 12 Questions

To investigate the conditions necessary for rusting to occur  
(Text book page 168)

1. Galvanised nails are not suitable for this activity. Why?
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

2. One test tube contains boiled water with a layer of oil on top.
   (a) Why is the water boiled?
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
   (b) What is the purpose of the oil?
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

3. Describe the conditions inside the test tube under which you would expect most rusting to occur.
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
4  Why is there no rusting of the nails in the test tube containing calcium chloride?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

5  What colour is rust?
___________________________________________________________________________________

6  Rusting of iron is a type of metal corrosion. List three ways of preventing corrosion.
   (a) ______________________________________
   (b) ______________________________________
   (c) ______________________________________

7  Answer True or False to the following statements.
   (a) In order for rusting to occur, both water and oxygen must be present. _________________
   (b) When a nail rusts its overall mass is decreased. ________________________
   (c) Rust is an orange-brown substance. ________________________
   (d) The chemical name for rust is iron chloride. ________________________
   (e) Calcium chloride is a compound that absorbs oxygen. ________________________
   (f) Boiling water helps remove oxygen from it. ________________________
   (g) Galvanised nails rust more readily than iron nails. ________________________
   (h) Painting helps prevent rusting. ________________________
Chapter 24 Theory Questions

Name: ___________________________ Date: ___________________________

1. (a) Lemon juice is a common everyday acid. Name two other household acids.
   ___________________________, ___________________________, ________ (2)(3)
   (b) Name one acid found in the lab. ___________________________ (4)

2. Name parts A, B and C in the following diagram.
   A ___________________________ (4)
   B ___________________________ (3)
   C ___________________________ (3)

3. Litmus is an __________________________ which is ___________________________.
   In acids and __________________________ in bases, if the blue stays blue and the red
   stays red, then the substance is said to be ___________________________.
   Litmus does not tell us the ___________________________ of the solution. ________ (5)(2)

4. A group of students tests a variety of substances using red litmus paper and blue litmus
   paper. They do this to determine whether the substances are acidic, basic or neutral.
   Use the table below to predict their results.

<table>
<thead>
<tr>
<th>Substance tested</th>
<th>Colour change of red litmus paper and blue litmus paper</th>
<th>Acidic, basic or neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Vinegar</td>
<td>Red litmus stays red</td>
<td>Acidic</td>
</tr>
<tr>
<td>(b) Washing-up liquid</td>
<td>(i)</td>
<td>(ii)</td>
</tr>
<tr>
<td>(c) Lemon juice</td>
<td>(iii)</td>
<td>(iv)</td>
</tr>
<tr>
<td>(d) Water</td>
<td>(v)</td>
<td>Neutral</td>
</tr>
</tbody>
</table>


5 Explain, using a diagram, how you would measure the pH of a substance.

6 An acid and a base react together and form __________ and _____________. This reaction is known as a ______________ reaction.

7 Give a brief explanation for why the following are done:
   (a) rubbing baking soda on a bee sting _____________________________________________
       ____________________________________________________________________________
   (b) rubbing vinegar on a wasp sting ______________________________________________
       ____________________________________________________________________________
   (c) adding lime to a river or lake _________________________________________________
       ____________________________________________________________________________

8 (a) What would you observe happening when a piece of zinc is placed in a test tube containing dilute acid? ____________________________________________________________
       ____________________________________________________________________________
       ____________________________________________________________________________
   (b) What gas is produced in this reaction? _________________________________________
       ____________________________________________________________ 2(5)

9 Describe how you would test a gas to check if it was hydrogen.
   ____________________________________________________________________________
   ____________________________________________________________________________ 10

10 (a) Write out the word equation for the reaction between hydrochloric acid and zinc.
   ____________________________________________________________________________
   (b) What would you expect to happen if a gold ring were placed in dilute acid?
       ____________________________________________________________________________ 2(5)
Higher level only

9 Write out the word equation and the chemical equation for the reaction between hydrochloric acid and sodium hydroxide.

(a) Word equation: ______________________________________________________________

(b) Chemical equation: _____________________________________________________________ 2(5)

10 A pupil prepared the salt sodium chloride using the items shown in the diagram.

(a) Name the piece of glassware used to measure the volume of the base.

(b) What readings must be taken to find the volume of acid used to neutralise the base?

(c) Why is an indicator added to the flask?

(d) Why is a white tile placed under the flask?

(e) What separation technique is used to isolate the salt from the salt water?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________ 5(2)
Mandatory Activity 13 Questions

To investigate the pH of a variety of substances using the pH scale (Textbook page 177)

1 Name the indicator used in this activity.

2 Write the colour you would expect to obtain when universal indicator is placed in:
   (a) lemon juice
   (b) distilled water
   (c) washing soda

3 What device could be used in place of universal indicator?

4 The pH scale is used to measure the strength of _____________________________ and _____________________________.

5 To measure the pH of a solid, it must first be dissolved in water. Why?

Mandatory Activity 14 Questions

To titrate HCl against NaOH and form sodium chloride (Textbook page 179)

1 Why is a pipette used in preference to a graduated cylinder in this activity?

2 Why must the conical flask be continuously swirled during the titration?

3 Why is the conical flask placed over a white tile during the titration?
4 Why is the titration repeated a few times?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
5 What shape is the meniscus of the acid in the burette? ________________________________
___________________________________________________________________________________
6 The final titration is performed without any indicator being added. Why?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
7 Name the separation technique used to remove the water from the salt.
___________________________________________________________________________________
8 Write out the word equation for the reaction between hydrochloric acid and sodium hydroxide.
___________________________________________________________________________________
___________________________________________________________________________________
9 Write out the chemical equation for the reaction in Question 8.
___________________________________________________________________________________
___________________________________________________________________________________
Mandatory Activity 15 Questions

To investigate the reaction between zinc and hydrochloric acid (Textbook page 180)

1. What is observed when a piece of zinc is placed in dilute hydrochloric acid?
   ___________________________________________________
   ___________________________________________________
   ___________________________________________________

2. Fill out the word equation for the reaction between zinc and hydrochloric acid.
   Zinc + ________________________ → zinc chloride + ________________________

3. Write out the chemical equation for the reaction between zinc and hydrochloric acid.
   __________________ + _______________ → __________________ + _______________

4. What would you expect to happen if a piece of gold was placed in a test tube of hydrochloric acid? Why?
   ___________________________________________________
   ___________________________________________________
   ___________________________________________________
   ___________________________________________________
Chapter 25 Theory Questions

Name: ____________________________ Date: __________________

1 (a) What is a physical change? ______________________________________________________
_______________________________________________________________________________

(b) Give two examples. _____________________________________________________________
_______________________________________________________________________________

2 (a) What is a chemical change? _____________________________________________________
_______________________________________________________________________________

(b) Give two examples. _____________________________________________________________
_______________________________________________________________________________

3 Fill in the missing sentences in the following table.

<table>
<thead>
<tr>
<th>Physical change</th>
<th>Chemical change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 One or more new substances formed</td>
</tr>
<tr>
<td>2</td>
<td>2 Very difficult or impossible to reverse</td>
</tr>
<tr>
<td>3</td>
<td>3 Often no heat change occurs</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

5(2)

4 Indicate which of the following reactions are physical changes and which are chemical changes.

<table>
<thead>
<tr>
<th>Reactions</th>
<th>Physical change</th>
<th>Chemical change</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) melting ice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) cutting potatoes into chips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) cooking chips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) a candle burning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) blowing up a balloon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) hammering a nail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) adding sugar to tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(viii) a gate rusting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ix) drying clothes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(x) zinc reacting with dilute acid</td>
<td></td>
<td>10(1)</td>
</tr>
</tbody>
</table>
5 What is a fuel?
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

6 When a fuel burns, it is an example of a ____________________________ change.
In order to burn ____________________________ and ____________________________
must also be present.

7 Name the unlabelled segments of the diagram below.

8 Answer True or False:
(a) Oxygen gas is used in fire extinguishers. ____________________
(b) The three conditions necessary for a fire to occur are fuel, heat and carbon dioxide.
___
(c) Water should never be used on electrical fires. ____________________________
(d) In a chemical change a new substance is produced. ____________________________
(e) A physical change is easy to reverse. ____________________________

9 Which side of the fire triangle is being removed when:
(a) water is poured on a waste paper bin fire? ____________________________
(b) a fire blanket is placed over a chip pan on fire? ____________________________
(c) a carbon dioxide fire extinguisher is used on a petrol fire? ____________________________
10 When a candle burns there are both physical and chemical changes occurring. Explain.

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

(10)
Chapter 26 Theory Questions

Name: _______________________________ Date: _______________________________

1. Look at the pie chart on the left. Label it with the names of the two main gases in the atmosphere and the approximate percentages of the atmosphere they make up.

2. Draw in the expected result to the following diagram.

3. Describe, using a diagram, an activity to show that air contains carbon dioxide.
4 ________________ ________________ paper can be used to test for the presence of water. If water is present it changes colour from ________________ to ________________. (3,3,4)

5 The following is a diagram of the apparatus used to prepare oxygen gas. Name the items labelled A–E.

A ________________ D ________________
B ________________ E ________________
C ________________

5(2)

6 (a) Manganese dioxide acts as a catalyst. Explain the underlined word.

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________ (4)

(b) Fill in the blanks:

manganese dioxide → oxygen + ________________ 2(3)

7 (a) Describe how you would test a gas for oxygen.

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(b) What happens when a piece of burning magnesium is lowered into a jar of oxygen?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________ 2(5)
8 Name the items labelled A–E in the following diagram of apparatus used for the preparation of carbon dioxide gas.

A _____________________________ D _____________________________
B _____________________________ E _____________________________
C _____________________________

Delete as appropriate:

Carbon dioxide gas is an/a acid/basic gas. It will turn limewater clear/milky.

It will ignite/quench a glowing splint. It is heavier/lighter than air.

It will turn litmus paper blue/red.

10 (a) Complete the word equation for the preparation of carbon dioxide:

Calcium _________________ calcium _________________ _________________
+ calcium _________________ _________________
chloride _________________ + _________________

(b) Give two uses for carbon dioxide.

(i) ________________________________________________________________________________ (2)

(ii) ________________________________________________________________________________ (2)
Higher level only

8 (a) Insert the missing chemical symbols.

\[
\text{Calcium hydroxide + carbon dioxide} \rightarrow \text{calcium carbonate + water.}
\]

\[
\text{Ca(OH)}_2 + \text{____________} \rightarrow \text{____________} + \text{H}_2\text{O}
\]

(b) Give two uses for carbon dioxide.

(i) ____________________________________________________________

(ii) ____________________________________________________________

9 Write out the word equation and the chemical equation for the preparation of oxygen gas.

(a) Word equation: ______________________________________________________________

(b) Chemical equation: _____________________________________________________________

10 Write out the word and chemical equation for the preparation of carbon dioxide.

(a) Word equation: ______________________________________________________________

(b) Chemical equation: _____________________________________________________________
Mandatory Activity 16A Questions

To show that approximately one-fifth of the air is oxygen  \(\text{(Textbook page 188)}\)

1. Draw the expected result on the following diagram.

   ![Diagram of steel wool and graduated cylinder]

2. Explain the observed result in Question 1.

   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
Mandatory Activity 16B Questions

To show that air contains carbon dioxide (Textbook page 188)

1. Label the following diagram of an activity to show that air contains carbon dioxide.

```
A ________________
B ________________
C ________________
D ________________
E ________________
```

2. What would the expected result of the activity above be?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

3. If the activity was repeated and exhaled air was bubbled through instead of inhaled air, what would you expect to happen?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

Mandatory Activity 16C Questions

To show there is water vapour in air (Textbook page 189)

1. What colour is dry cobalt chloride paper? _____________________________

2. In the presence of water, cobalt chloride paper turns from ________________ to ________________ in colour.

3. Name another chemical that could be used instead of cobalt chloride in this activity.

___________________________________________________________________________________
Mandatory Activity 17 Questions

To prepare and examine oxygen gas  *(Textbook page 190)*

1. List five pieces of equipment used in the preparation of oxygen gas.
   (a) ____________________________________
   (b) ____________________________________
   (c) ____________________________________
   (d) ____________________________________
   (e) ____________________________________

2. Manganese dioxide acts as a catalyst. Explain the underlined term.
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

3. Why is the hydrogen peroxide added in a drop-by-drop manner in this activity?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. Is oxygen an acidic, neutral or alkaline gas? ____________________________

5. Fill in the missing words in the following equation for the preparation of oxygen.
   ________________________________________________ + ________________

6. Write out the chemical equation for the preparation of oxygen.
   ________________________________________________ + ________________

7. What is observed when a piece of burning magnesium is placed in a jar of oxygen gas?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
Mandatory Activity 18 Questions

To prepare and examine carbon dioxide gas  (Textbook page 192)

1 Label the following diagram of the apparatus used in the preparation of carbon dioxide gas.

![Diagram of apparatus]

A __________________________ E __________________________
B __________________________ F __________________________
C __________________________ G __________________________
D __________________________ H __________________________

2 What is the function of the beehive shelf?
___________________________________________________________________________________
___________________________________________________________________________________

3 What is observed when a wooden splint is lit and lowered into a jar of carbon dioxide?
___________________________________________________________________________________
___________________________________________________________________________________

4 Give the name and chemical formula for limewater.
___________________________________________________________________________________

5 Write out the word equation for the reaction between carbon dioxide and limewater.
___________________________________________________________________________________

6 Complete the following chemical equation for the reaction between carbon dioxide and limewater.

\[ \text{CO}_2 + \text{________} \rightarrow \text{________} + \text{H}_2\text{O} \]
7 Carbon dioxide turns moist blue litmus paper red. What does this tell us about the gas?

___________________________________________________________________________________
___________________________________________________________________________________

8 What two properties of carbon dioxide make it ideal for use in fire extinguishers?
   (a)  _____________________________________________________________________________
   (b)  _____________________________________________________________________________

9 List two uses of carbon dioxide gas.
   (a)  _____________________________________________________________________________
   (b)  _____________________________________________________________________________
Chapter 27 Theory Questions

Name: Date:

1. The chemical formula for water is _______. This means every water molecule is made up of two ___________ atoms and one ___________ atom. (4,3,3) 

2. List five ways that water is used in everyday life.
   (a) __________________________
   (b) __________________________
   (c) __________________________
   (d) __________________________
   (e) __________________________ 5(2)

3. Pure water freezes at _______°C and boils at _______°C. 2(5)

4. Water will turn cobalt chloride paper from ___________ to ___________. 2(5)

5. The curved surface of a liquid in a vessel is called the ___________. It has two possible shapes: ___________ and ___________. (4,3,3)

6. (a) Name the parts labelled A–C in the following diagram of a Hoffmann voltameter.

   A ___________________________ (2)
   B ___________________________ (2)
   C ___________________________ (2)
(b) Why is a small amount of acid added to the water?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

7 Place the following stages in water treatment in the correct order:

flouridation screening filtering settling chlorination

__________________  __________________  __________________  __________________

5(2)

8 (a) Why is chlorine added to water? ____________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(b) Why is fluorine added to water? ____________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

2(5)

9 Describe, using a diagram, how you could make a model of a water filter.
10 Briefly describe what happens during:

(a) Screening:
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

(b) Settling:
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

Higher level only

3 When water freezes it _____________________________.
   The density of ice is ____________________________ than water, hence ice forms on top.
   The curved surface of water in a test tube is called the _____________________________.
   It has a ____________________________ shape. Water boils at _____________________.

5 (a) What does the word desalination mean? _________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

(b) What separation technique is used to desalinate seawater?
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

2(5)
8 Answer True or False.

(a) Chlorine is added to drinking water to prevent tooth decay. _______________________

(b) Water is filtered by passing it through beds of sand. _______________________

(c) Ice is more dense than water. _______________________

(d) Water turns cobalt chloride paper from blue to pink. _______________________

(e) Water has a convex meniscus. _______________________

5(2)
Chapter 28 Theory Questions

Name: _____________________________ Date: _____________________________

1 (a) What is a solute? ________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(6)

(b) Give two examples. ____________________________ and ____________________________ 2(2)

2 (a) Water is an excellent solvent. Explain the underlined term.

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(6)

(b) Name two other household solvents.

____________________________ and ____________________________ 2(2)

3 When salt is added to water they form a solution. Salt is the ___________________________

and water is the ___________________________. 2(5)

4 If one substance dissolves in another it is said to be ____________________________.

A substance that does not dissolve in another is said to be ____________________________.

Sand is ____________________________ in water, whereas sugar is

____________________________ in water. Water is an excellent ___________________________. 5(2)

5 Answer True or False.

(a) Salt is insoluble in water. ________________________

(b) Sand is insoluble in water. ________________________

(c) A solution can be made more dilute by adding more solute. ________________________

(d) A solution can be made more concentrated by removing some of the solvent.

____________________________

(e) A solute dissolves in a solvent forming a solution. ________________________ 5(2)

6 (a) When a saturated solution of copper sulfate is filtered, what will the filtrate be?

____________________________

(b) What will be the residue? ____________________________ 2(5)
7 If a hot concentrated solution of copper sulfate is rapidly cooled, ________________ crystals of copper sulfate form. Alternatively, if it is allowed to slowly cool, ________________ crystals will be formed. 2(5)

8 What is crystallisation? _____________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________ 10

9 Describe, with the aid of a diagram, a simple activity you could carry out to determine whether a substance is soluble or insoluble in water.

___________________________________________________________________________________

10 Give an everyday example of:
   (a) a solid dissolved in a liquid ____________________________
   (b) a liquid dissolved in a liquid ____________________________
   (c) a gas dissolved in a liquid ____________________________  (3,3,4)
Higher level only

3 (a) What is a saturated solution? __________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

(b) What effect has temperature on the solubility of water? __________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

4

The graph shows the solubility of a particular salt at different temperatures.

(i) What effect does increasing the temperature of the solvent have on the solubility
of the solute? ________________________________________________________________
__________________________________________________________________________________

(ii) How many grams of solute dissolve in the solvent at 50°C?________________________

(iii) If a solution saturated at 30°C is cooled down to 10°C, how many grams of crystals
will form? ________________
Mandatory Activity 19 Questions

To examine the preparation and formation of copper sulfate crystals
(or aluminium sulfate crystals) (Textbook page 212)

1. What colour is a copper sulfate solution? _____________________________

2. When a saturated solution of copper sulfate is filtered, what is the residue?
   _______________________________________________________________________

3. The filtrate is poured into an evaporating dish and heated on a water bath in this activity.
   Why? _______________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________

4. Fill in the missing words from the following:
   A rapidly cooled saturated solution results in a formation of ___________________ crystals,
   whereas slow cooling produces ___________________ ________________________.
   When copper sulfate is dehydrated, the crystals change colour from
   _______________________________ to _____________________________.

5. What is a saturated solution?
   ___________________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________

6. Briefly explain the difference between a dilute solution and a concentrated solution.
   ___________________________________________________________________________
   ___________________________________________________________________________
   ___________________________________________________________________________
Chapter 29 Theory Questions

Name: ____________________________ Date: _______________________

1. (a) Soft water ___________________________ with soap, whereas hard water ___________________________ lather easily. 2(5)

2. Name two methods of removing hardness in water.
   (a) ____________________________________________ 2(5)
   (b) ____________________________________________ 2(5)

3. Name two metals present in water that cause hardness.
   (a) ____________________________________________ 2(5)
   (b) ____________________________________________ 2(5)

4. Describe, with the aid of a diagram, a simple activity to investigate a sample of water for hardness.

5. List two advantages of hard water.
   (a) ____________________________________________ 2(5)
   (b) ____________________________________________ 2(5)
A student sets up an experiment to compare three different water samples for hardness. List the two of the three things the student should do to ensure fair testing.

(i) ____________________________________________________________________________

(ii) ____________________________________________________________________________ 2(5)

7 (a) In an activity to show the presence of dissolved substances in a water sample, the water must first be filtered. Why?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(b) Why must the evaporating dish be clean and dry at the beginning?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________ 2(5)

8 Two water samples, A and B, were tested for hardness.

<table>
<thead>
<tr>
<th>Water sample</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of X added (cm³)</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

(a) What is the substance, X, added to the samples? ____________________________

(b) Which sample, A or B, is hard water? ____________________________ 2(5)

9 Answer True or False.

(a) Hard water lathers easily with soap. ____________________________

(b) There are two types of water, hard and easy. ____________________________

(c) An ion exchanger can be used to soften hard water. ____________________________

(d) People who drink hard water have strong bones and teeth. ____________________________

(e) Many substances dissolve easily in water, making it an excellent solute. ____________________________ 5(2)
Choose the correct term from the box to complete the following sentences.

lathers  calcium  limescale  soft  soften

(a) Hard water provides ______________ for our bones and teeth.
(b) There are two types of water: hard and ______________.
(c) An ion exchanger can be used to ______________ hard water.
(d) Soft water ______________ easily with soap.
(e) Hard water causes ______________ in kettles.  5(2)

Higher level only

6 Other than passing water through an ion exchanger, mention two other ways by which water can be softened.

(a) ____________________________________________
(b) ____________________________________________  2(5)

9 The following is a diagram of an activity to compare water samples for hardness.

Briefly explain the method used to test each water sample so they can be compared.
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
(10)
Mandatory Activity 20A Questions

To test water for hardness (Textbook page 218)

1. When comparing water samples for hardness it is important to add the same volume of water to each test tube. Why?

___________________________________________________________________________________

___________________________________________________________________________________

2. What substance is added to the water? ________________________

3. Would you expect water found in limestone areas to be hard or soft? Explain why.

___________________________________________________________________________________

___________________________________________________________________________________

Mandatory Activity 20B Questions

To show the presence of dissolved substances in a water sample (Textbook page 219)

1. Which colour flame should be used when heating the evaporating dish?

___________________________________________________________________________________

2. What did you notice about the mass of the evaporating dish after carrying out the activity?

___________________________________________________________________________________

___________________________________________________________________________________
### Chapter 30 Theory Questions

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
</table>

1 (a) What is a fuel?

_______________________________________________________________________________
_______________________________________________________________________________

(b) Give two examples. ____________________________ and ____________________________

(2,3)

2 (a) What is a fossil fuel?

_______________________________________________________________________________

(b) Give two examples. ____________________________ and ____________________________

(2,3)

3 Hydrocarbons are compounds made up of the elements ________________ and _________________. When a hydrocarbon fuel is burned ________________ and ________________, ________________ are produced.

(5)

4 (a) How does an increase in the levels of carbon dioxide gas lead to global warming?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(7)

(b) Name another gas that contributes to global warming. ____________________________

(3)

5 Examine the following diagram and answer the questions overleaf.

![Diagram of experiments with candle, cobalt chloride paper, ice and water, limewater, and a vacuum pump.]

- **A**: Cobalt chloride paper
- **B**: Limewater
- **To vacuum pump**

1. What happens to the cobalt chloride paper in experiment A?
2. What happens to the limewater in experiment B?
3. How do you interpret the results of these experiments in terms of the chemical reactions occurring?
(a) What is observed in test tube A as the candle burns?

_______________________________________________________________________________
_______________________________________________________________________________

(b) What happens in test tube B?

_______________________________________________________________________________
_______________________________________________________________________________

6 Natural gas, which is mainly methane, is a major contributor to global warming. List two causes for the rise in the levels of natural gas.

(i) ____________________________________________________________________________

(ii) ____________________________________________________________________________ 2(5)

7 Acid rain has many negative effects. Describe how acid rain affects:

Limestone buildings:
_______________________________________________________________________________
_______________________________________________________________________________

Trees: ____________________________________________________________________________ 2(5)
_______________________________________________________________________________
_______________________________________________________________________________

8 Describe, with the aid of a diagram, how you would find the pH of a soil sample.

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
9 Give a reason for the following:

(a) Farmers spreading lime on their fields. ___________________________________________
__________________________________________________________ (3)

(b) Limestone statues being covered to prevent rainwater falling on them.  
__________________________________________________________ (3)

(c) Catalytic converters being fitted to car exhausts. __________________________________
__________________________________________________________ (4)

10 Answer True or False

(a) Buildings and statues are now eroding faster than they were 50 years ago.  
_______________________

(b) The earth is gradually cooling down, leading to an expansion of the ice caps.  
_______________________

(c) Nitrogen is a major contributor to the greenhouse effect. ________________

(d) Fossil fuels were formed from the remains of plants and animals. ________________

(e) Fossil fuels are a non-renewable source of energy. ________________ 5(2)

Higher level only

10 (a) Name the two gases that contribute to acid rain.

(i) ________________________ (ii) ________________________ 2(2)

(b) How are these gases produced?

(i) ______________________________________________________
__________________________________________________________
__________________________________________________________

(ii) ______________________________________________________
__________________________________________________________
__________________________________________________________ 2(3)
Chapter 31 Theory Questions

Name: 

Date: 

1 Plastics are __________-______________ materials. Most plastics are made from _________________. This substance is separated into fractions by _______________________.

(3, 3, 4)

2 In an oil refinery, large compounds are converted into smaller, more useful compounds by a process called _________________. It is speeded up by the use of a _________________.

2(5)

3 All plastics are made up of repeating units called _________________. which link together to form _________________. This process is called _________________.

(3, 3, 4)

4 Give one advantage of:
   (a) PVC windows in place of wooden windows.
   (b) Polystyrene cups in place of ceramic cups.
   (c) PVC guttering in place of metal.
   (d) Moulded plastic seats in place of wooden seats.
   (e) Velcro fasteners in place of buttons.

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

5 Outline the main difference between a thermoplastic and a thermosetting plastic.

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

5(2)
6 Briefly outline two environmental disadvantages of plastics.
(a) ____________________________________________________________
(b) ____________________________________________________________ 2(5)

7 List three advantages of manufacturing items from plastic instead of traditional materials.
(a) ____________________________________________________________
(b) ____________________________________________________________
(c) ____________________________________________________________ (4,3,3)

8 Identify the five groups of plastics in the diagrams A-E and complete the table.

<table>
<thead>
<tr>
<th>Group of plastics</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Polythene</td>
<td></td>
</tr>
<tr>
<td>(ii) Polyvinylchloride</td>
<td></td>
</tr>
<tr>
<td>(iii) Nylon</td>
<td></td>
</tr>
<tr>
<td>(iv) Polystyrene</td>
<td></td>
</tr>
<tr>
<td>(v) Polypropene</td>
<td></td>
</tr>
</tbody>
</table>

5(2)
9  What particular property makes plastic suitable for use in:
   (a) light switches ____________________________________________________________
        _______________________________________________________________________
   (b) hot drinks’ containers ____________________________________________________
        _______________________________________________________________________
   (c) spectacle lenses _________________________________________________________
        _______________________________________________________________________
   (d) contact lenses __________________________________________________________
        _______________________________________________________________________
   (e) underground pipes _______________________________________________________ 5(2)
        _______________________________________________________________________

10  When crude oil is distilled, different fractions are separated out. List two main differences between the first and third fraction.
   (a) _______________________________________________________________________
        _______________________________________________________________________
        _______________________________________________________________________
        _______________________________________________________________________
   (b) _______________________________________________________________________
        _______________________________________________________________________
        _______________________________________________________________________ 2(5)
Chapter 32 Theory Questions

Name: __________________________ Date: __________________________

1. For a measurement in physics to be useful it must be:
   (a) __________________________
   and it must be measured in
   (b) __________________________  2(5)

2. Define the following physical quantities:
   (a) length __________________________
   (b) mass __________________________
   (c) temperature __________________________
   (d) area __________________________
   (e) volume __________________________  5(2)

3. Name two instruments that are used to measure curved distances.
   (a) __________________________
   (b) __________________________  2(5)

4. Name two instruments that are used to measure the diameter of circular objects.
   (a) __________________________
   (b) __________________________  2(5)

5. A box has a square top and bottom. The length of the side of the square is 10 cm. The height of the box is 4 cm. Calculate:
   (a) the area of the top of the box __________________________ (2)
   (b) the area of a side of the box __________________________ (2)
   (c) the total area of all of the surfaces __________________________ (3)
   (d) the volume of the box __________________________ (3)
6 Change the following measurements in cm³ into m³.
   (a) 500 cm³ _____________________________
   (b) 2500 cm³ _____________________________ 2(5)

7 Change the following measurements in m³ into cm³.
   (a) 0.1 m³ _____________________________
   (b) 0.25 m³ _____________________________ 2(5)

8 Estimate the area of the shape in the diagram below.

   _______________________________________________________________________________  (10)

9 On the Celsius scale of temperature what is the temperature of:
   (a) ice water? _____________________________
   (b) boiling water? _____________________________ 2(5)

10 Write down the standard units used in physics to measure the following quantities:
    (a) length: _____________________________
    (b) mass: _____________________________
    (c) time: _____________________________
    (d) area: _____________________________
    (e) volume: _____________________________ 5(2)
Chapter 33 Theory Questions

1. (a) What is the density of a material?
   ______________________________________________________

(b) What are the standard units of density?
   ______________________________________________________  2(5)

2. Write down the formula for calculating density.
   ______________________________________________________  (10)

3. What is the density of a block of wood that has a mass of 150 g and a volume of 200 cm³?
   ______________________________________________________  (10)

4. What is the mass of a piece of iron that has a volume of 25 cm³ if the density of iron is 8 g/cm³?
   ______________________________________________________  (10)

5. A metal coin has a mass of 36 g. The density of the metal in the coin is 9 g/cm³.
   The coin is put into a graduated cylinder with 25 cm³ of water in it. What is the new reading on the graduated cylinder with the coin in it?
   ______________________________________________________  (10)

6. The density of lead is 11 200 kg/m³. There are 10 000 cm³ in one cubic metre.
   (a) What is the mass of 1 cm³ of lead in kg?
       ______________________________________________________ (4)

   (b) What is the mass of 1 cm³ in grams?
       ______________________________________________________ (4)

   (c) What is the density of lead in g/cm³?
       ______________________________________________________ (2)
Chapter 33 Density and Flotation

7 (a) What is the mass of 100 cm³ of lead? The density of lead is 11 200 kg/m³.

_______________________________________________________________________________
_______________________________________________________________________________

(b) What is the volume of a piece of lead of mass 200 g?

_______________________________________________________________________________
_______________________________________________________________________________

8 Water is put in a graduated cylinder as in the diagram to the right. A piece of copper is placed in the cylinder and the reading changes.

(a) Look at the scale on the cylinder. What is the volume of the piece of copper?

______________________________________________

(b) If the mass of the piece of copper is 223 g, what is the density of copper?

______________________________________________

9 An empty beaker is placed on a laboratory balance. The mass of the beaker is 40 g.

25 cm³ of a liquid is poured into the beaker and placed on the balance.
The new reading is 55 g.

(a) What is the mass of the liquid? ________________________________

(b) What is the density of the liquid? ________________________________

10 Which of the following materials will float in water?

<table>
<thead>
<tr>
<th>Material</th>
<th>Float (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cork</td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
</tr>
</tbody>
</table>


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8. An empty beaker is placed on a laboratory balance. The mass of the beaker is 40 g. 25 cm³ of a liquid is poured into the beaker and placed on the balance. The new reading is 55 g.
   (a) What is the mass of the liquid? ________________________________
   (b) What is the density of the liquid? ________________________________  2(5)

9. Complete the following sentence.
   ‘An object will float in water if the __________________________ of the object is
   ___________________________ than the density of water.’  2(5)

10. The densities of water, methylated spirits and paraffin oil are 1.0, 0.83 and 0.80 g/cm³ respectively. An equal volume of each is poured carefully into a graduated cylinder and allowed to rest.
   (a) Write down the order in which the liquids separate.
       On top ____________________________  (2)
       In the middle ____________________________  (2)
       On the bottom ____________________________  (2)
   (b) Write down the reason for the order.
       _______________________________________________
       _______________________________________________
       _______________________________________________
       _______________________________________________  (4)
Mandatory Activity 21A Questions

To determine the density of a rectangular block of material  (Textbook page 246)

1 How do you find the mass of the block in this activity?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

2 What formula do you use to find the volume of the block?
___________________________________________________________________________________

3 What formula do you use to find the density of the block?
___________________________________________________________________________________

4 Which units did you use for density?
___________________________________________________________________________________

Mandatory Activity 21B Questions

To find the density of an irregular solid  (Textbook page 246)

1 Name two pieces of apparatus that can be used to find the volume of an irregular solid.
___________________________________________________________________________________
___________________________________________________________________________________

2 Why would you use the one piece of apparatus rather than the other?
___________________________________________________________________________________
___________________________________________________________________________________

3 What units are used in this activity for the volume of the irregular solid?
___________________________________________________________________________________

4 What formula is used to find the density of the solid?
___________________________________________________________________________________
Mandatory Activity 21C Questions

To find the density of a liquid (Textbook page 247)

1. Which two quantities must be measured to find the density of a liquid?
   ______________________________ and ______________________________

2. Name the two pieces of apparatus that can be used to find a known volume of the liquid.
   ______________________________ and ______________________________

3. Which two measurements are subtracted in order to find the mass of the known volume
   of the liquid?
   ______________________________ and ______________________________

4. What formula is used to find the density of the liquid in this activity?
   ____________________________________________
## Chapter 34 Theory Questions

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
</table>

1. Which two fundamental ideas in physics are used to describe motion?
   (a) ________________________________________________________
   (b) ________________________________________________________ 2(5)

2. (a) Write down the definition of speed.
       __________________________________________________________
   (b) Write down the formula used to measure speed.
       __________________________________________________________ 2(5)

3. A cyclist travels a distance of 36 m in 8 seconds.
   (a) What is the speed of the cyclist in m/s? ___________________
   (b) What distance would the cyclist travel in 1 hour? __________ 2(5)

4. A car is travelling at 50 km/hr.
   (a) What is the speed of the car in m/s? _______________________
   (b) How long would it take the car to travel 400 km? ____________ 2(5)

5. (a) Write down the definition of acceleration.
       __________________________________________________________
   (b) What are the standard units of acceleration?
       __________________________________________________________ 2(5)

6. A car increases its speed from 11 m/s to 17 m/s in 5 seconds.
   What is the acceleration of the car? ___________________________ (10)

7. A motorcyclist increases her speed from 40 km/hr to 60 km/hr in 3 seconds.
   (a) What is her acceleration in km/hr? _________________________
   (b) What is her acceleration in m/s? ____________________________ 2(5)
8 Write down two pieces of information that can be found from a distance-time graph.
   (a) ____________________________________________________________
   (b) ____________________________________________________________ 2(5)

9 If the distance-time graph for an object is a straight line, then the speed of the body
   is the same as a concept from mathematics.
   (a) What is the mathematical concept?
       ____________________________________________________________
   (b) Why is it much more difficult to find the speed of an object if its graph is not a
       straight line?
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________ 2(5)

10 (a) What is meant by deceleration?
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
   (b) What mathematical symbol is used to indicate deceleration?
       ____________________________________________________________ 2(5)

Higher level only

10 (a) What is the difference between speed and velocity?
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
   (b) How can an object have a constant speed and still have a change in velocity?
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________ 2(5)
# Chapter 35 Theory Questions

Name:  
Date:  

1. (a) What is the definition of force?  

(b) Write down two effects that a force can have on a body.  

   ___________________________________________  
   ___________________________________________  

2. (a) Name the scientist who described three laws of motion.  

   ___________________________________________  

(b) What is the unit of force?  

   ___________________________________________  

2(5)  

3. Write down five different kinds of force.  

   (a) ___________________________________________  
   (b) ___________________________________________  
   (c) ___________________________________________  
   (d) ___________________________________________  
   (e) ___________________________________________  

5(2)  

4. Use arrows to show the forces acting on the mass in the diagram.  

(10)
5 (a) What is friction? ________________________________________________________________  
_______________________________________________________________________________  
_______________________________________________________________________________  

(b) Name a situation in which friction is an advantage and one where it is a disadvantage.  
Advantage  
_______________________________________________________________________________  
Disadvantage  
_______________________________________________________________________________  

6 (a) What is lubrication? ____________________________________________________________  
_______________________________________________________________________________  
_______________________________________________________________________________  

(b) Give an example of a machine in which lubrication is used.  
_______________________________________________________________________________  

2(5)

7 (a) Write down an equation relating force and acceleration.  
_______________________________________________________________________________  

(b) What is the weight of a body? __________________________________________________  
_______________________________________________________________________________  
_______________________________________________________________________________  

2(5)

8 Why is the weight of a body different at sea-level and at the top of Mount Everest?  
_______________________________________________________________________________  
_______________________________________________________________________________  
_______________________________________________________________________________  

(10)

9 (a) Calculate the force that is needed to give a mass of 5 kg an acceleration of 3 m/s.  
_______________________________________________________________________________  

(b) What acceleration does a force of 20 N give a body of mass 4 kg?  
_______________________________________________________________________________  

2(5)

10 State Hooke’s Law.  
_______________________________________________________________________________  
_______________________________________________________________________________  
_______________________________________________________________________________  

(10)
Higher level only

8 (a) Write down an equation connecting weight to mass.

_______________________________________________________________________________ (4)

(b) Calculate the force of gravity on the following objects:
   (i) a bag of sugar of mass 2 kg ____________________________________ (3)
   (ii) a person of mass 60 kg ____________________________________ (3)

Mandatory Activity 22 Questions

To investigate the relationship between the extension in a spring and the restoring force
(Text book page 261)

1 In this activity, what piece of apparatus is used to measure the stretch or extension in the
   spring? __________________________________________________________________________

2 What piece of apparatus is used to measure the force put on the spring?
   _______________________________________________________________________________

3 The extension in the spring when a force is put on it is not the length of the spring.
   What do you have to subtract from the length of the spring to find the extension?
   _______________________________________________________________________________

4 Name the two quantities that are plotted on the axes of a graph.
   x-axis:______________________ y-axis:____________________

5 When you plot your measurements what kind of a graph do you get?
   _______________________________________________________________________________

6 The graph illustrates a law. Who is the law named after?
   _______________________________________________________________________________

7 State the law that is illustrated in this activity.
   _______________________________________________________________________________
Chapter 36 Theory Questions

1. Lifting a ladder in the middle is much easier than lifting it at one end. Why?
   ________________________________________________________________
   ________________________________________________________________ (10)

2. Define the centre of gravity of a body.
   ________________________________________________________________
   ________________________________________________________________ (10)

3. Name the two properties that make buildings and vehicles stable.
   (a) ____________________________________________________________
   (b) ____________________________________________________________ 2(5)

4. Complete the following statements.
   (a) An object is in stable equilibrium if ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________
   (b) An object is in unstable equilibrium if ____________________________________________________________
       ____________________________________________________________
       ____________________________________________________________ 2(5)

5. Give an everyday example of a body
   (a) in stable equilibrium _____________________________
   (b) in unstable equilibrium _____________________________ 2(5)

6. Define the terms:
   (a) lever ____________________________________________________________
       ____________________________________________________________
   (b) fulcrum ____________________________________________________________
       ____________________________________________________________ 2(5)
7 Give five everyday examples of levers.
(a) ______________________
(b) ______________________
(c) ______________________
(d) ______________________
(e) ______________________ 5(2)

8 State the law of the lever.
___________________________________________________________________________________
___________________________________________________________________________________ (10)

9 Describe how the law of the lever is illustrated by a crane lifting a load.
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________ (10)

10 A metre stick is suspended at its centre. A 5 N weight is placed at the 25 cm point to the left of the centre. Where would you put the 2.5 N weight to balance the metre stick?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________ (10)
# Chapter 37 Theory Questions

Name: | Date: 
---|---

1. (a) Define pressure.  

(b) Write down an equation that connects force and pressure.  

2. (a) What is the unit of pressure?  

(b) The unit is named after which scientist?  

3. (a) What pressure is exerted by a force of 50 N on an area of 2 m²?  

(b) What pressure is exerted by a force of 20 N on the bottom of a square box with 10 cm sides?  

4. The pressure on the bottom of a rectangular box is 0.2 N/cm².  
   The length of the box is 30 cm and the width is 10 cm. Find:  
   (a) the area of the bottom of the box.  

   (b) the force on the bottom of the box.  

5. Name two other materials apart from solids that exert pressure.  
   (a)  
   (b)
6 Explain why a diver at a depth of 30 m in water experiences a greater pressure than a diver at 10 m.

__________________________________________

__________________________________________

__________________________________________

__________________________________________

__________________________________________ (10)

7 (a) What are pistons used for in machines?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(b) Name an industrial machine that uses pistons.

_______________________________________________________________________________ 2(5)

8 A 50 N force is applied to a piston with an area of 10 cm². If this pressure is transferred to a piston of area 250 cm², what is the force on the larger piston?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________ (10)

9 (a) What is the cause of atmospheric pressure?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(b) Why is the atmospheric pressure in Dublin greater than in Mexico City?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________ 2(5)
10 (a) How does a mercury barometer measure atmospheric pressure?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(b) Name one instrument that uses a barometer.

_______________________________________________________________________________

_______________________________________________________________________________

Higher level only

10 (a) What do the lines on a weather chart show?

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(b) Name the type of weather that is usually associated with:

(i) low pressure ______________________________________________________________

_______________________________________________________________________________

(ii) high pressure ____________________________________________________________

_______________________________________________________________________________

(iii) ____________________________________________________________

(iv) ____________________________________________________________

(v) ____________________________________________________________
Chapter 38 Theory Questions

Name: ____________________________ Date: ____________________________

1 (a) Define what is meant in physics by work.

_______________________________________________________________________________

(b) Write down the equation that is used to calculate work.

_______________________________________________________________________________ 2(5)

2 (a) What is the unit of work in terms of standard units? ______________________________

(b) This unit is also named after a scientist. Which one? ______________________________ 2(5)

3 Write down five everyday examples of forces doing work.

(a) ____________________________________________________________________________

(b) ____________________________________________________________________________

(c) ____________________________________________________________________________

(d) ____________________________________________________________________________

(e) ____________________________________________________________________________ 5(2)

4 (a) What is energy? ___________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

(b) Name four forms of energy.

(i) ____________________________________________________________________________

(ii) ____________________________________________________________________________

(iii) ____________________________________________________________________________

(iv) ____________________________________________________________________________ 5(2)

5 Write down the principle of the conservation of energy. ______________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________

_______________________________________________________________________________ (10)
6 Write down whether the following sources of energy are renewable or non-renewable.

<table>
<thead>
<tr>
<th>Source of energy</th>
<th>Renewable or non-renewable?</th>
<th>Source of energy</th>
<th>Renewable or non-renewable?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td></td>
<td>Wind</td>
<td></td>
</tr>
<tr>
<td>Solar</td>
<td></td>
<td>Geothermal</td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7 Give two reasons why the sun is considered to be our primary source of energy.
(a) __________________________________________________________
(b) __________________________________________________________

8 Write down two reasons why it is important to conserve energy.
(a) __________________________________________________________
(b) __________________________________________________________

9 Write two energy conversions that happen when using a hair dryer.
(a) __________________________________________________________
(b) __________________________________________________________

10 (a) What is meant in physics by the word ‘power’?
_____________________________________________________________
_____________________________________________________________
(b) What are the standard units of power? ____________________________
**Higher level only**

10 (a) What is meant in physics by the word ‘power’?
_______________________________________________________________________________
_______________________________________________________________________________

(b) A force of 30 N moves an object a distance of 100 m in 30 seconds.
What power is being produced? _________________________________________________
_______________________________________________________________________________

2(5)

**Mandatory Activity 23A Questions**

*Converting electrical energy to magnetic energy to kinetic energy*  (Textbook page 284)

1 Where is the electrical energy stored in this activity?
_______________________________________________________________________________

2 What kind of energy is stored in the coil around the nail when the current flows in the circuit?
_______________________________________________________________________________

3 What is kinetic energy?
_______________________________________________________________________________

4 Name two changes you would make in the activity to increase the magnetic energy in the coil and nail.
(a) ______________________________________ (b) ______________________________________

5 If the battery is disconnected while the paper clips are attached to the nail, what happens?
_______________________________________________________________________________
Mandatory Activity 23B Questions
Converting light energy to electrical energy to kinetic energy  (Textbook page 285)

1. In this activity, what energy conversion happens in the solar panel?

___________________________________________________________________________________

2. What energy conversion happens in the motor?

___________________________________________________________________________________

3. How could you show that the energy in the solar cells comes from light and not from some other energy source?

___________________________________________________________________________________
___________________________________________________________________________________

4. Not all of the light energy is converted to kinetic energy in this activity. Can you suggest where the other energy goes?

___________________________________________________________________________________
___________________________________________________________________________________

Mandatory Activity 23C Questions
Converting chemical energy to electrical energy to heat energy  (Textbook page 285)

1. Describe the energy changes that take place when a dynamo on a bicycle is used to provide light.

___________________________________________________________________________________
___________________________________________________________________________________

2. In which piece of apparatus is electrical energy converted into heat energy?

___________________________________________________________________________________

3. What is the function of the thermometer in this activity?

___________________________________________________________________________________

4. What does the principle of the conservation of energy say?

___________________________________________________________________________________

5. Name a household appliance that converts one type of energy to another.

___________________________________________________________________________________

6. What are the energy conversions involved in the appliance you chose?

___________________________________________________________________________________
Chapter 39 Theory Questions

Name: Date:

1 (a) What is heat?
_______________________________________________________________________________ (3)

(b) What are the units of heat?
_______________________________________________________________________________ (3)

(c) Use arrows to show the direction heat flows between the ice and the water in the diagram. _________________
_______________________________________________________________________________
_______________________________________________________________________________ (4)

2 Complete the following.
(a) When a solid is heated it _____________________________.

(b) When a solid cools it _____________________________. 2(5)

3 (a) What is a thermometer?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(b) What changes in a thermometer when the temperature changes?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________ 2(5)

4 (a) Describe what happens to water as it cools from 10°C to 0°C.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
5 (a) What is temperature?
_______________________________________________________________________________
_______________________________________________________________________________

(b) Name one important difference between heat and temperature.
_______________________________________________________________________________
_______________________________________________________________________________

6 (a) What property of liquids is used in a thermometer?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(b) Which two special points are used to fix the Celsius temperature scale?
_______________________________________________________________________________

7 (a) Why does food cook more quickly in a pressure cooker than in a saucepan?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

(b) Why does water boil at a lower temperature on the top of Mont Blanc than at sea level?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

8 (a) Name three states of matter.
(i) ___________________________ (2)  
(ii) ___________________________ (2)  
(iii) ___________________________ (2)  

(b) What quantity is either absorbed or emitted when matter changes state?
_______________________________________________________________________________
_______________________________________________________________________________

(b) What does this tell you about the density of ice and water?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

2(5)
9 (a) Name the three ways in which heat is transferred.

(i) ____________________________________________________________

(ii) __________________________________________________________

(iii) ____________________________________________________________

(b) In heat terms what is

(i) an insulator? _________________________________________________

(ii) a conductor? _______________________________________________

10 List five ways in which heat can be conserved in the home.

(a) ____________________________________________________________

(b) ____________________________________________________________

(c) ____________________________________________________________

(d) ____________________________________________________________

(e) ____________________________________________________________

Higher level only

9 Explain how you would show that water is a poor conductor of heat.

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

(10)
10 The graph below shows a cooling curve for a substance. Explain, in heat energy terms, what is happening when the curve is flat.

Mandatory Activity 24A Questions

To investigate the expansion and contraction of solids when heated and cooled

(Textbook page 289)

1 What piece of apparatus is used to heat the ball and ring in this activity?

___________________________________________________________________________________

2 Why is the handle of the ball and ring made of wood instead of metal?

___________________________________________________________________________________

3 What happens to the ball when it is heated?

___________________________________________________________________________________

4 What happens to the ball when it cools again?

___________________________________________________________________________________
Mandatory Activity 24B Questions

To investigate the expansion and contraction of liquids when they are heated and cooled

(Textbook page 290)

1. How do you see the expansion of the liquid when it is heated in this activity?
   _______________________________________________________________________

2. What is observed when the liquid in the flask is allowed to cool?
   _______________________________________________________________________

3. What energy conversion has taken place in this activity?
   _______________________________________________________________________

4. When water freezes it expands. Explain why this seems to be unusual.
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

Mandatory Activity 24C Questions

To investigate the expansion and contraction of gases when they are heated and cooled

(Textbook page 291)

1. What is observed in the water when the flask is heated in this activity?
   _______________________________________________________________________

2. What are the bubbles made of?
   _______________________________________________________________________

3. Explain what happens when the flask is allowed to cool. Why does this happen?
   _______________________________________________________________________
   _______________________________________________________________________

4. What moves through the air using the idea in this activity?
   _______________________________________________________________________
   _______________________________________________________________________
Mandatory Activity 25A Questions

To show the transfer of heat energy by conduction  (Textbook page 295)

1  Explain the term conduction.
____________________________________________________________________________________

2  When the boiling water is poured into the tank, it should be poured in evenly along the length of the tank and not just at one end. Why is this?
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

3  List the following metals in the order of better conductor: aluminium, iron, copper.
____________________________________________________________________________________

4  How do you know that the heat moved down the rods by conduction and not by convection?
____________________________________________________________________________________
____________________________________________________________________________________

Mandatory Activity 25B Questions

To demonstrate the transfer of heat by convection in water  (Textbook page 295)

1  What is the purpose of the potassium permanganate in this activity?
____________________________________________________________________________________

2  Which part of the water heats up first?
____________________________________________________________________________________

3  What causes the currents in the water?
____________________________________________________________________________________

4  Explain the term convection.
____________________________________________________________________________________
Mandatory Activity 25C Questions

To show the transfer of heat by radiation from two different surfaces
(Textbook page 296)

1. In this activity, why is it important that both cans contain the same amount of water?

2. What piece of apparatus is used to measure the temperature of the water?

3. Explain the term radiation.

4. Why do you think the black can is a better radiator than the shiny one?

Mandatory Activity 25D Questions

To investigate the transfer of heat in water by conduction
(Textbook page 296)

1. Why do you cover the ice with a piece of wire in this activity?

2. What can you say about water as a result of this activity?

3. Divers often use ‘wet-suits’. When in water there is a layer of water between the body and the suit. Explain why this layer of water helps to keep the diver warm.
Chapter 40 Theory Questions

Name: Date:

1. (a) What is light?

_______________________________________________________________________________

(b) Name two main sources of light.
   (i) ____________________________
   (ii) ____________________________ (4, 3, 3)

2. Give two examples of how light can be changed into another energy form.
   (a) ____________________________________________________________________________
       ____________________________________________________________________________
       ____________________________________________________________________________
   (b) ____________________________________________________________________________
       ____________________________________________________________________________
       ____________________________________________________________________________ 2(5)

3. Name two things that show that light travels in straight lines.
   (a) ____________________________________________________________________________
       ____________________________________________________________________________
   (b) ____________________________________________________________________________ 2(5)

4. Define the following terms.
   (a) a luminous body
       ____________________________________________________________________________
       ____________________________________________________________________________
       ____________________________________________________________________________
   (b) a non-luminous body
       ____________________________________________________________________________
       ____________________________________________________________________________
       ____________________________________________________________________________ 2(5)
5 Give two examples of luminous bodies and two examples of non-luminous bodies.
   (a) luminous bodies
       (i) ____________________________  (ii) ____________________________  (5)
   (b) non-luminous bodies
       (i) ____________________________  (ii) ____________________________  (5)

6 (a) Name five of the colours that make up light.
       (i) ____________________________
       (ii) ____________________________
       (iii) ____________________________
       (iv) ____________________________
       (v) ____________________________  5(1)
   (b) Describe one way in which light can be separated into its colours.
       ____________________________________________________________
       ____________________________________________________________  (5)

7 Describe two everyday situations when you might see the colours that make up light.
   (a) ____________________________
   (b) ____________________________  2(5)

8 (a) Why can you see an image of yourself in a mirror?
       ____________________________________________________________
       ____________________________________________________________  (4)
   (b) Write down three examples of the everyday use of mirrors.
       (i) ____________________________
       (ii) ____________________________
       (iii) ____________________________  3(2)

9 (a) A telescope is made using two ____________________________.
   (b) What is a telescope used for? ______________________________________________________
       ______________________________________________________  2(5)
10. Complete the ray diagrams below showing how the ray of light travels.

(a) 

(b) 

Higher level only

8 (a) What is dispersion?

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

(b) How is a rainbow formed?

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

9 (a) Explain the term refraction.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

(b) Complete the following ray diagram showing how the ray comes out the other side of the block.

Ray

Glass block
10 (a) Name one important everyday application of refraction.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
(b) Name an everyday object that uses refraction.
_______________________________________________________________________________

Mandatory Activity 26 Questions

To show that light travels in straight lines  (Textbook page 300)

1 What might you use to help you keep the holes in the cardboard in a straight line in this activity? ___________________________________________________________________________

2 What property of light is shown by this activity?
___________________________________________________________________________________

3 Are there any times when light does not travel in straight lines? Give one example.
_______________________________________________________________________________
_______________________________________________________________________________

Mandatory Activity 27A Questions

To investigate the reflection of light by a plane mirror  (Textbook page 302)

1 What is meant by a ‘plane’ mirror?
_________________________________________________________________________________

2 Draw a diagram showing at least two rays of light going to a mirror and leaving a mirror.
3 What can you say about the rays going to and from the mirror?

___________________________________________________________________________________

4 Draw a diagram to show what would happen to the rays of light if the mirror had a very uneven surface.

Mandatory Activity 27B Questions

To demonstrate the operation of a simple periscope  (Textbook page 303)

1 Name a use for a periscope.

___________________________________________________________________________________

2 Why must the two mirrors be at an angle of 45 degrees?

___________________________________________________________________________________

3 Draw a ray diagram for the periscope showing how a ray of light reaches the eye from a distant object.

___________________________________________________________________________________
Chapter 41 Theory Questions

Name: Date:

1 (a) What is sound?
_______________________________________________________________________________

(b) How is sound produced?
_______________________________________________________________________________ 2(5)

2 Write down five examples of objects that can be used to create sound.
(a) _____________________________
(b) _____________________________
(c) _____________________________
(d) _____________________________
(e) _____________________________ 5(2)

3 Name two forms of energy that can be produced using sound energy.
(a) ____________________________________________________________________________
(b) ____________________________________________________________________________ 2(5)

4 Imagine you are in deep space. Explain why you might see an exploding star but you could not hear the explosion.________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________ 10

5 The speed of sound is about 340 m/s. The speed is not constant because it depends on at least two factors. Name these.
(a) ____________________________________________________________________________
(b) ____________________________________________________________________________ 2(5)
6. Give two examples of events that show that the speed of sound is very much slower than the speed of light.
   (a) __________________________________________________________
       __________________________________________________________
   (b) __________________________________________________________

7. Why is it important that we protect our ears from very loud sounds?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

8. Define the following terms:
   (a) an echo
       __________________________________________________________
       __________________________________________________________
   (b) ultrasound
       __________________________________________________________

9. The velocity of sound in water is 1500 m/s.
    A ship's sonograph sends a signal to the bottom of the sea and the reflected wave reaches back to the ship in 2 seconds.
    How deep is the sea at this point?
    __________________________________________________________
    __________________________________________________________
    __________________________________________________________

10. (a) What is a sonogram?
    __________________________________________________________
        __________________________________________________________
   (b) Name one use of sonograms.
    __________________________________________________________
        __________________________________________________________
Chapter 42 Theory Questions

Name: Date:

1 Magnetic forces can act in two ways. How are these ways named?
   (a) ____________________________________________________________
   (b) ____________________________________________________________ 2(5)

2 The ends of a magnet are named: __________________________ and ___________________________ 2(5)

3 Complete the following statement.
   ‘Opposite poles of a magnet ___________________________ and like poles of a magnet ___________________________.’ 2(5)

4 (a) What is a compass? __________________________________________________________

   (b) What is a compass used for? __________________________________________________________ 2(5)

5 Name two metals that are attracted to a magnet.
   (a) __________________________
   (b) __________________________ 2(5)

6 What is meant by the term ‘magnetic field’?
   __________________________________________________________
   __________________________________________________________ (10)

7 Draw a picture of the magnetic field around the bar magnet below. (10)
   Indicate the direction of the field using arrows.

   N   S
8. Name two household items that contain magnets.
   (a) ______________________
   (b) ______________________

9. Why does a compass needle always point in the same direction on the earth?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

10. Draw a picture illustrating the magnetic field of the earth.

Mandatory Activity 28 Questions

To plot the magnetic field of a bar magnet  (Textbook page 316)

1. Name the two poles of a bar magnet. ________________ and ________________

2. What are the curves called that you get when you join up the dots you plot in this activity?
   __________________________________________________________________________

3. In which direction do you put the arrow on the curves you have drawn?
   __________________________________________________________________________

4. What do we mean by a ‘magnetic field’?
   __________________________________________________________________________
Chapter 43 Theory Questions

Name: ______________________ Date: ______________________

1. Some combs can pick up small pieces of paper when they are rubbed. What is this force due to? ____________________________________________________________ (10)

2. The atom is made of protons, neutrons and electrons. Two of these have charge. Which two and what is their charge?

<table>
<thead>
<tr>
<th>Particle</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Use symbols to show the possible charges on the rod and ball in the diagrams.

   (a) [Diagram of First possibility]

   (b) [Diagram of Second possibility]

4. In electrical terms, define the following:
   (a) an insulator ________________________________________________________________ (3)

   (b) a conductor _________________________________________________________________ (3)

   (c) earth ____________________________________________________________________ (4)

5. (a) What is a lightning rod? ____________________________________________________

   (b) What does a lightning rod do? ________________________________________________ 2(5)
6. (a) What is current electricity? ______________________________________________________
   _______________________________________________________________________________

   (b) Name a device that causes current to flow. ______________________________________
   _______________________________________________________________________________

7. Complete the following statement.
   ‘The pull on the electrons in a circuit is commonly called the _______________ or the _______________ of a battery.’

8. (a) In electricity terms, what is ‘resistance’? __________________________________________
   _______________________________________________________________________________

   (b) What is the energy needed to push charge through a body called?
       _____________________________________________________________________________

9. (a) How are voltage and current related in a metal resistor?
       _______________________________________________________________________________
       _______________________________________________________________________________
       _______________________________________________________________________________

   (b) Write a mathematical equation to show the relationship between voltage, current and resistance.
       _______________________________________________________________________________

10. (a) What are the two ways in which bulbs can be connected in circuits?
       (i) ___________________________________________

       (ii) _________________________________________

   (b) Draw two diagrams illustrating the circuits named in part (a).
       (i) _________________________________________
Mandatory Activity 29 Questions

*To test the electrical conduction of various materials*  *(Textbook page 322)*

1. Draw the symbols for (a) a battery, (b) a bulb, (c) a switch.

2. Fill in the table below depending on whether the bulb lights or not when the material is put in the circuit in this activity.

<table>
<thead>
<tr>
<th>Material</th>
<th>Bulb lights</th>
<th>Bulb does not light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip of iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strip of steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardboard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3 If the wires on the poles of the battery were switched, would this make any difference to the activity?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

4 What is the difference between an electrical conductor and an insulator?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

5 Why do we use a battery to give a current and not the mains supply from a socket?

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

Mandatory Activity 30 Questions

To establish the relationship between current, potential difference and resistance in part of a circuit (Textbook page 324)

1 Draw the circuit diagram for this activity.

___________________________________________________________________________________

2 What is the function of the ammeter?

___________________________________________________________________________________
3 What is the function of the voltmeter?
___________________________________________________________________________________
___________________________________________________________________________________

4 Why is there a variable resistor in the circuit?
___________________________________________________________________________________
___________________________________________________________________________________

5 On the graph that you draw with your data, which quantity goes on which axis of your graph?
x-axis: ______________________  y-axis: ______________________

6 What kind of a graph do you get when you join the data points on the graph?
___________________________________________________________________________________

7 What does the graph tell you about the relationship between the current in the resistor and the voltage across the resistor?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
Chapter 44 Theory Questions

Name: _____________________________ Date: __________________

1 Define the following terms:
   (a) direct current __________________________________________________________________
       _______________________________________________________________________________
   (b) alternating current __________________________________________________________________
       _______________________________________________________________________________

2 Name and describe the functions of the three pins on a plug.
   (a) Name: _____________________________ (1)
       Function: __________________________________________
       ______________________________________________________ (2)
   (b) Name: _____________________________ (1)
       Function: __________________________________________
       ______________________________________________________ (2)
   (c) Name: _____________________________ (1)
       Function: ______________________________________________________________________
       _______________________________________________________________________________
       The wire to which of these pins is coloured blue? _____________________________ (1)

3 (a) What is the function of a fuse or a circuit breaker in an electrical circuit?
       _______________________________________________________________________________
       _______________________________________________________________________________
   (b) What is the difference between a fuse and a circuit breaker?
       _______________________________________________________________________________
       _______________________________________________________________________________

2(5)

4 Name the appliances that might be on two different circuits in a house.
   Circuit 1 _____________________________
   Circuit 2 _____________________________

2(5)
5. Name two energy sources that are used to make electricity.
   (a) ____________________________________________________________ 2(5)
   (b) ____________________________________________________________ 2(5)

6. (a) What is a kilowatt hour? __________________________________________
   ____________________________________________________________
   ____________________________________________________________ 2(5)
   (b) What is this unit used for? ______________________________________
   ____________________________________________________________
   ____________________________________________________________ 2(5)

7. (a) What is the cost of running an electric heater with a power rating of 3 kW for 3 hours
      if the charge for a kilowatt hour is 12.73c?
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________ 2(5)
   (b) What is the cost of running a hair dryer with a power rating of 1.2 kW for 15 minutes
      if the charge for a kilowatt hour is 12.73c?
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________ 2(5)

8. (a) Name one effect of electrical current. ________________________________
      ____________________________________________________________
      ____________________________________________________________ 2(5)
   (b) Name two household appliances that use this effect.
      ____________________________________________________________
      and ____________________________________________________________ 2(5)

9. Explain what happens in a fuse when too much current is allowed to flow through it.
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________ (10)

10. Explain, using the atomic particles, what is happening when a wire heats up as current
    flows through it.
    ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________ (10)
Higher level only

8 Name the three main effects of electricity.
   (a) ___________________________________________________________ (3)
   (b) ___________________________________________________________ (3)
   (c) ___________________________________________________________ (4)

9 Explain the following terms:
   (a) electroplating ____________________________________________
       ___________________________________________________________
   (b) electro-painting __________________________________________
       ___________________________________________________________ 2(5)

10 (a) Explain how an electromagnet works. __________________________
       __________________________________________________________
       __________________________________________________________
   (b) Name one appliance that contains an electromagnet.
       ________________________________ 2(5)
Chapter 45 Theory Questions

Name: ___________________________ Date: ___________________________

1. Name five household appliances that contain electronic circuits.
   (a) ___________________________
   (b) ___________________________
   (c) ___________________________
   (d) ___________________________
   (e) ___________________________

2. What is the purpose of electronics? ___________________________
   ___________________________
   ___________________________
   ___________________________

3. Define the following terms:
   (a) switch ___________________________
   ___________________________
   ___________________________
   (b) resistor ___________________________
   ___________________________
   ___________________________
   (c) diode ___________________________
   ___________________________
   ___________________________

4. Draw the circuit symbol for each of the components in the following table.

<table>
<thead>
<tr>
<th>Component</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch</td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td></td>
</tr>
<tr>
<td>Bulb</td>
<td></td>
</tr>
<tr>
<td>Diode</td>
<td></td>
</tr>
<tr>
<td>Light-dependent resistor</td>
<td></td>
</tr>
</tbody>
</table>
5 (a) Name one important use of a diode. ____________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
(b) Name an appliance in the home that cannot work with alternating current.
_______________________________________________________________________________ 2(5)

6 (a) What is a light-emitting diode? _______________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
(b) Why is there always a resistor in series with a LED in a circuit?
_______________________________________________________________________________ 2(5)

7 Describe the use of LEDs in a calculator or electronic alarm clock.
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________ 10

8 (i) Name the components labelled (a), (b), (c) and (d).
(a) _____ (b) _____ (c) _____ (d) _____ 4(2)
(ii) What do the arrows mean which are indicated at (d) ____________________________ 2

9 Complete the following statements about LDRs.
‘If very little light falls on an LDR, its _____________________________ is very
_____________________________ and it will allow little current to flow.
If intense light falls on an LDR, its _____________________________ is very
_____________________________ and it will allow a lot of current to flow.’ (3, 2, 3, 2)

10 Name two uses of the light-dependent resistor in circuits.
(a) ____________________________ 2(5)
(b) ____________________________