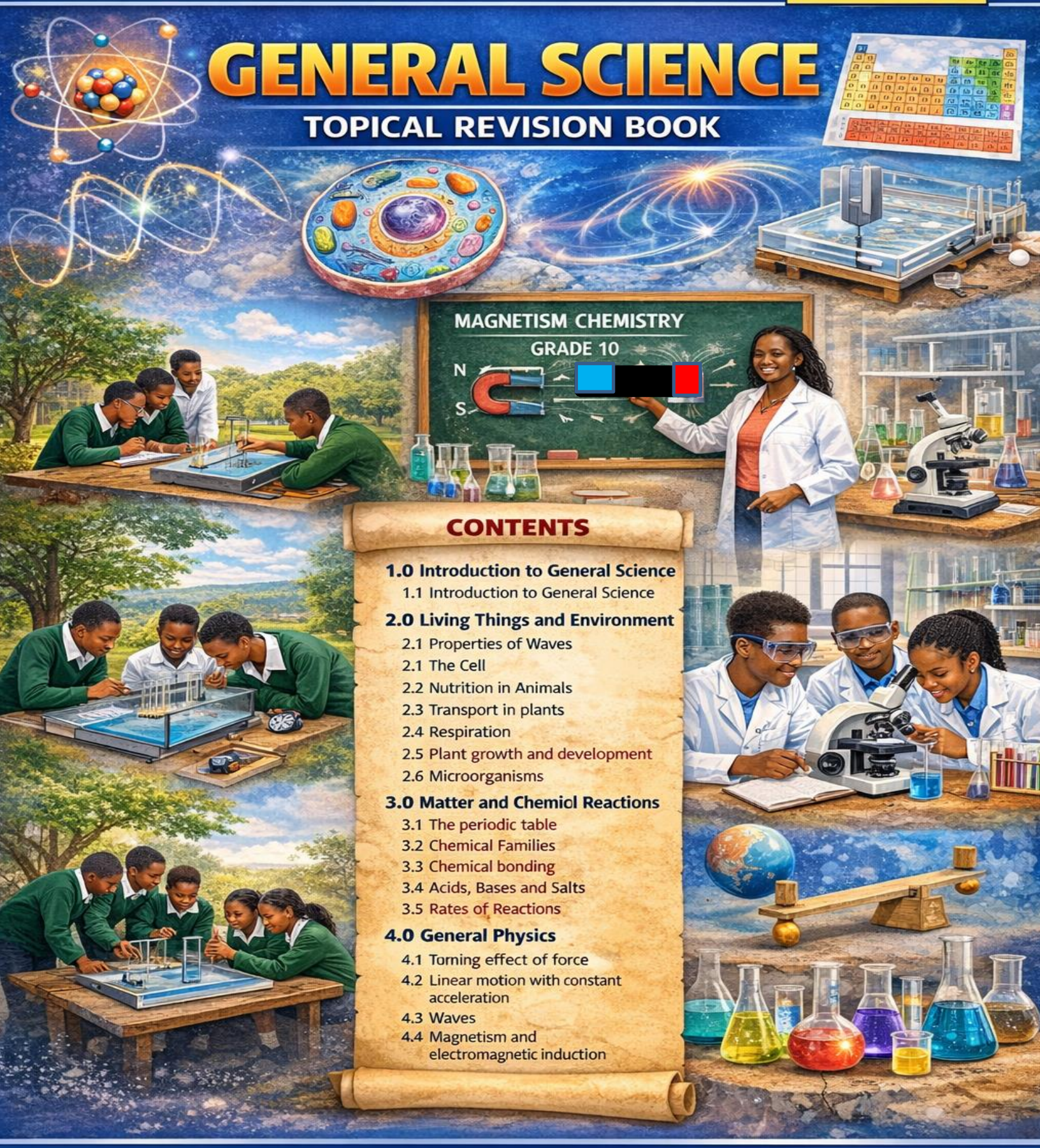
COMPETENCE BASED EDUCATION | SENIOR SCHOOL

GRADE 10

GENERAL SCIENCE

TOPICAL REVISION BOOK



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AUTHORS: COMPETENCE EDUCATION GROUP

1.0 INTRODUCTION TO GENERAL SCIENCE

1.1 Introduction to General Science

1. Define General Science. (2 marks)

_____

_____

2. List three main branches of General Science. (3 marks)

i. _____

ii. _____

iii. _____

3. Explain two ways General Science is important in:

a) Human life (2 marks)

i. _____

ii. _____

b) The environment (2 marks)

i. _____

ii. _____

c) Technology (2 marks)

i. _____

ii. _____

4. Career Opportunities:

(a) Name four career opportunities related to General Science. (4 marks)

i. _____

ii. _____

iii. _____

iv. _____

(b) For one career of your choice, describe the main role of the professional. (2 marks)

i. _____

ii. _____

5. Principle of Inference in Science:

(a) Explain the meaning of inference in science education. (2 marks)

_____

_____

(b) State two methods of collecting evidence for drawing conclusions in science. (2 marks)

i. _____

ii. _____

6. A student observes plants growing differently in two parts of the school garden.

(a) Suggest two observations they would record. (2 marks)

i. _____

ii. _____

(b) Identify two skills acquired through learning general science. (2 marks)

i. _____

ii. _____

(c) Using the principle of inference, explain what conclusion can be drawn. (2 marks)

_____

_____

_____

_____

7.

(a) Give one example of how General Science is used in agriculture. (1 mark)

_____

_____

(b) Give one example of its use in medicine. (1 mark)

_____

_____

(c) Explain why scientific knowledge is important in these areas. (2 marks)

i. _____

ii. _____

8. Diagram Interpretation:

Look at the chart below showing evidence collection methods in science:

Measurement --> Analysis --> Recording --> Observation

(a) Label the steps in order. (2 marks)

i. _____

ii. _____

iii. _____

iv. _____

(b) Explain why each step is important. (3 marks)

iii. _____

iv. _____

v. _____

(c) Draw an example of a tool used in each step. (3 marks)

9. Mention three branches of General Science?

i. _____

ii. _____

vi. _____

10. Fill-in-the-Blank:

(a) General Science is a learning area that studies _____, _____, and _____. (2 marks)

(b) The principle of _____ is used to draw conclusions from collected evidence. (1 mark)

11. True or False:

(a) The study of General Science is only useful in school. (_____) (1 mark)

(b) Evidence collection is essential for making valid scientific inferences. (_____) (1 mark)

(c) Technology is unrelated to General Science. (_____) (1 mark)

12. Short Answer with Scenario:

A community wants to find out why their river water quality is decreasing.

(a) Suggest two types of evidence they could collect. (2 marks)

i. _____

i. _____

(b) Explain how the principle of inference can help them identify the cause. (2 marks)

i. _____

ii. _____

(c) Draw a diagram showing at least two methods of collecting evidence. (2 marks)

ii. _____

iii. _____

iii. _____

iv. _____

13. (a) Identify one career in Biology, Chemistry, and Physics each. (3 marks)

Biology	Chemistry	Physics

(b) Draw one laboratory apparatus used in the study of (3 marks)

Biology	Chemistry	Physics

1. **Technology Influenced by General Science (3 Marks)**

(a) **Name one technology influenced by General Science.** (1 mark)

_____

_____

(b) **State two ways the technology benefits human life.** (2 marks)

i) _____

ii) _____

15. Match the branch of General Science in Column A with the correct example in Column B.

Column A: Branch	**Column B: Example**
1. Biology	A. Motion of a pendulum
2. Chemistry	B. Drug formulation
3. Physics	C. Study of living organisms

16. (a) **State five steps followed in scientific investigation.** (5 marks)

i) _____

ii) _____

iii) _____

iv) _____

v) _____

17. A student observes the following plant growth under different light conditions:

Light Type	Plant Height (cm)
Sunlight	25
Shade	10

(a) **State the light condition that produced taller plants.** (1 mark)

_____

(b) **Give one inference that can be made from the data.** (1 mark)

_____

_____

(c) **State two possible reasons why the plant in shade grew shorter.** (2 marks)

i) _____

ii) _____

18. A student grows **five different plant seedlings** under the **same light condition (sunlight)** for **14 days** and measures their height.

Plant Type	Height After 14 Days (cm)
Maize	28
Beans	19
Tomato	15
Sukuma wiki	12
Onion	9

(a) **State the plant that grew the tallest.** (1 mark)

_____

(b) **State the plant that grew the shortest.** (1 mark)

_____

(c) **Give the height of tomato after 14 days.** (1 mark)

_____

(d) **Calculate the difference in height between maize and onion.** (2 marks)

(e) **Give one inference that can be made from the data.** (1 mark)

_____

_____

_____

19. A hospital uses a device to measure blood sugar levels.

(a) **Name the branch of General Science related to this device.** (1 mark)

_____

(b) **State two ways the device supports decision-making in healthcare.** (2 marks)

i) _____

ii) _____

20. (a) **Name one application of General Science in food preservation.** (1 mark)

_____

(b) **Name one application of General Science in energy generation.** (1 mark)

_____

_____

(c) **State two benefits of using General Science in daily life.** (2 marks)

i) _____

ii) _____

21. General Science and Human Development (6 Marks)

State two ways knowledge of General Science improves each of the following:

(a) Environmental protection (2 marks)

i) _____

ii) _____

(b) Technology development (2 marks)

i) _____

ii) _____

(c) Human health (2 marks)

i) _____

ii) _____

22. Floating and Sinking (4 Marks)

A student notices that some materials float while others sink in water.

(a) **State two observations the student can record.** (2 marks)

i) _____

ii) _____

(b) **Give two factors that determine whether a material floats or sinks.** (2 marks)

i) _____

ii) _____

23. General Science in Disaster Management (4 Marks)

(a) **State two ways General Science helps in disaster management.** (2 marks)

i) _____

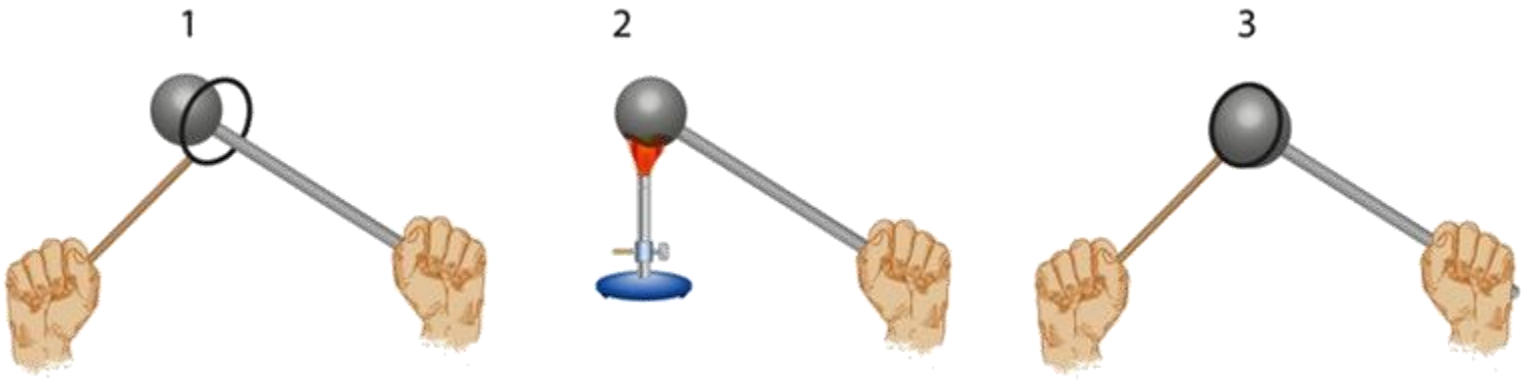
ii) _____

(b) **Name two tools or technologies used in disaster management.** (2 marks)

i) _____

ii) _____

24. A student heats a metal rod and observes it expands.



(a) **Name the branch of General Science related to this observation.** (1 mark)

_____

(b) **State two effects of heating metals in daily life.** (2 marks)

i) _____

ii) _____

25. (a) **Name four valid methods of collecting evidence in science.** (4 marks)

i) _____

ii) _____

iii) _____

iv) _____

26. Match the scientific term in Column A with the correct description in Column B.

Column A: Term	**Column B: Description**
1. Atom	A. A structure made of a bob and string that swings
2. Cell	B. The smallest unit of life
3. Pendulum	C. The smallest particle of an element

27. (a) **State two ways inference helps in predicting outcomes of experiments.** (2 marks)

i) _____

ii) _____

(b) **State two ways inference supports technology development.** (2 marks)

i) _____

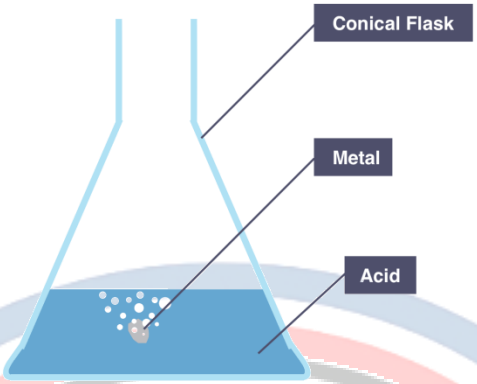
ii) _____

(c) **State two ways inference helps in understanding environmental changes.** (2 marks)

i) _____

ii) _____

28. A student notices a reaction produces heat and concludes it is exothermic.



a) **Name the scientific skill used when the student notices heat is produced.** (1 mark)

_____

(b) **Name the scientific skill used when the student concludes it is exothermic.** (1 mark)

_____

(c) **State one importance of using evidence before making an inference.** (1 mark)

_____

_____

29. (a) **State four safety requirements when collecting evidence during school experiments.** (4 marks)

i) _____

ii) _____

iii) _____

iv) _____

30. (a) **State two types of scientific evidence.** (2 marks)

i) _____

ii) _____

(b) **Give one example of each type of evidence stated above.** (2 marks)

i) _____

ii) _____

31. State five ways General Science is important in daily living. (5 marks)

i) _____

ii) _____

iii) _____

iv) _____

v) _____

2.0 LIVING THINGS AND ENVIRONMENT

2.1 THE CELL

1. Define a cell. (2 marks)

_____

_____

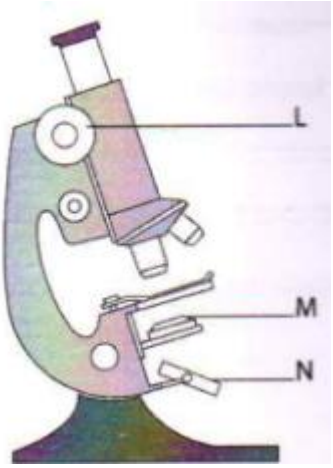
2. Name the two types of cells. (2 marks)
   i) _____
   ii) _____
3. List three levels of cell organisation. (3 marks)
   i) _____
   ii) _____
   iii) _____
4. (a) Name two types of microscopes used to study cells. (2 marks)
   i) _____
   ii) _____

(b) Explain two differences between a light microscope and an electron microscope. (4 marks)

Light microscope	Electron microscope

(c) Draw a simple labeled diagram of a light microscope. (3 marks)

5. The following diagram represents a light microscope:



a. Name the part labelled N. (1 mark)

_____

b. State the functions of the parts labelled L and M.(2 marks)

L - _____(1 mark)

M-_____

6. Identify the function following parts of a microscope (3marks)

   a. Diaphragm

   _____

   _____

   b. Condenser

   _____

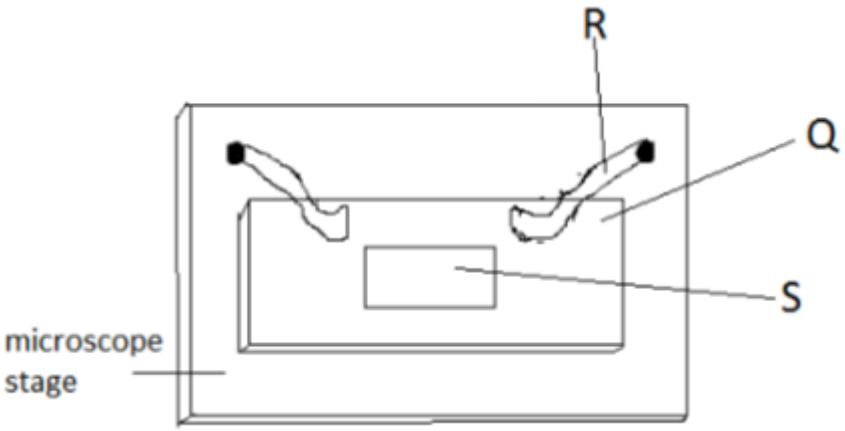
   _____

   c. Fine adjustment knob

   _____

   _____

7. Below is a diagram of part of microscope, use it to answer the questions that follow.



a. Label the parts labelled Q and R. (2mks)

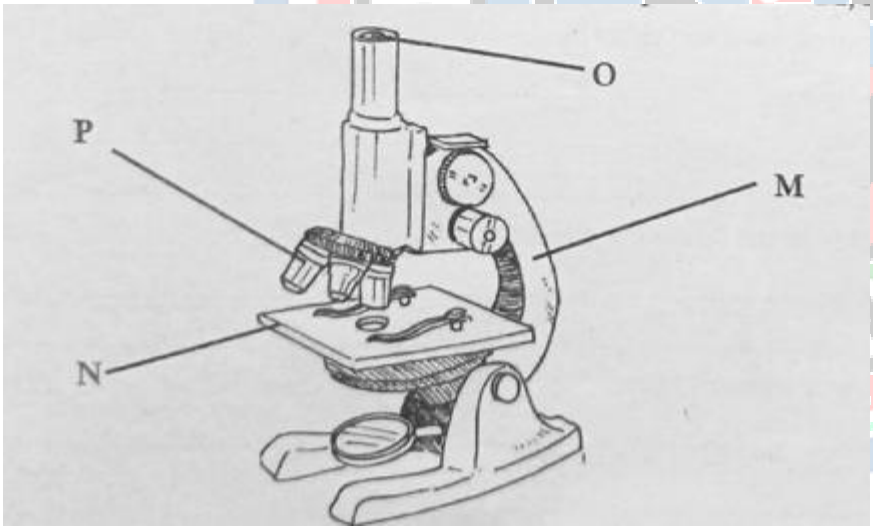
Q:_____

R:_____

b. State the function of part labelled S (1mk)

S:_____

8. Below is a diagram of a light microscope. Name the parts marked M, N, O and P.



M:_____

N:_____

O:_____

P:_____

9. A student observes a plant cell under a light microscope.

(a) Identify two structures they are likely to see. (2 marks)

i) _____

ii) _____

(b) Draw a labeled diagram of the plant cell as seen under a light microscope. (5 marks)

10. (a) State three advantage of using an electron microscope over a light microscope. (3 marks)

i) _____

ii) _____

iii) _____

(b) Mention three areas where electron microscopes are mostly used. (3 marks)

i) _____

ii) _____

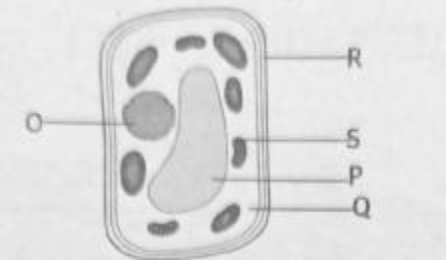
iii) _____

(c) Identify two components visible under an electron microscope but not under a light microscope. (2 marks)

i) _____

ii) _____

11. The following diagram shows the components of a plant cell under a microscope. Use it to answer questions 6 and 7.



Name the parts labelled?

O:_____

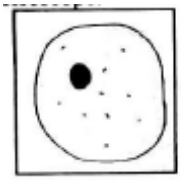
P:_____

Q:_____

R:_____

S:_____

12. The diagram below represents a cell as seen under a light microscope.

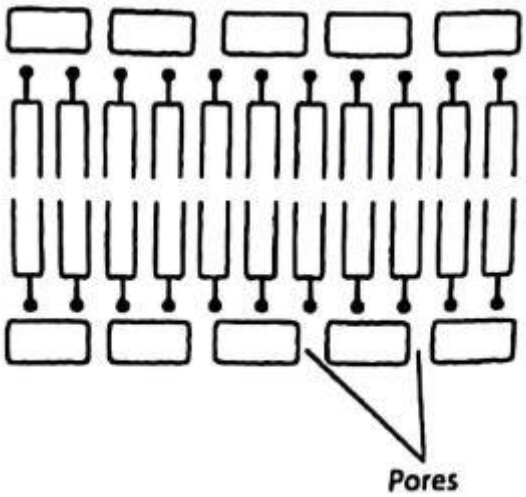


_____

13. Which organelle in the diagram (12) above is responsible for controlling cell activities?

_____

14. The following diagram represents part of a cell structure as seen under an electron microscope.



a. Identify the structure represented. (1 mark)

_____

b. State two functions of the structure. (2 marks)

i) _____

ii) _____

c. Suggest two ways in which the functioning of the structure can be impaired. (2 marks)

i) _____

ii) _____

d. Name two structures found in plant cells but not in animal cells. (2 marks)

i) _____

ii) _____

15. The diagram below represents a cell organelle.

a. Identify the organelle. (1 mark)

_____

b. Name the part labelled B. (1 mark)

_____

c. State the function of part labelled A. (1 mark)

_____

_____

16. The following diagram represents a specialized animal cell.

(a) Identify the cell. (1 mark)

_____

(b)

(i) Name the cell organelle that is likely to be found in abundance in the part labelled F. (1 mark)

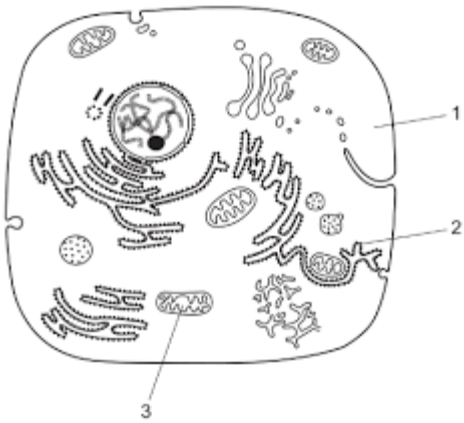
_____

(ii) Explain the answer in 16(b)(i). (2 marks)

_____

_____

17. The diagram below shows a certain cell. Use it to answer the questions that follow.



a. Identify the cell. (1 mark)

_____

b. Give two reason for your answer in (a) above. (2 marks)

i) _____

ii) _____

c. Name the structures labeled 1, 2 (2 marks)

1) _____

2) _____

d. State the function of the part labeled 3 (1 mark)

_____

_____

18. The diagram below represents a cell organelle.

a. Identify the organelle. (1mk)

_____

b. State the name of X. (1mk)

_____

c. State the function of X. (1mk)

_____

_____

d. Give an example of animal cell where the organ occurs in abundance. (1mk)

_____

_____

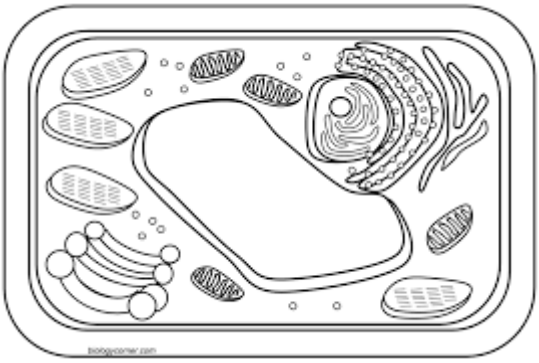
19. State the organelles of the cells involved in. (3 Marks)

i. Digestion of food particles -_____

ii. Influencing osmotic properties of animal cell -_____

iii. Formation of spindle fibres in animal cell-_____

20. The diagram below shows a cell. Study it carefully and answer the questions that follow.



a. State whether the diagram represents a **plant cell** or an **animal cell**. (1 mark)

_____

b. Give **ONE visible reason** for your answer in **20. (a)**. (1 mark)

_____

_____

21. Study the diagram of an animal cell below and answer the questions that follow.

a. Name the small structures found around the nucleus. _____(1 mark)

b. State **one function** of the following cell parts:

a) Nucleus _____(1 mark)

b) Mitochondrion _____ (1 mark)

c. Describe **one structural feature** of the nucleus that enables it to carry out its function. (2 marks)

_____

_____

d. State what would happen to the cell if the cell membrane is removed. (2 marks)

_____

_____

e. Explain why mitochondria are found in large numbers in muscle cells. (2 marks)

_____

_____

f. Name the organelle responsible for packaging and transporting proteins. (1 mark)

_____

_____

g. State **one function** of the nucleolus. (2 marks)

_____

_____

22. (a) List three differences between plant and animal cells. (3 marks)

Plant cell	Animal cell

(b) List two similarities between plant and animal cells. (2 marks)

i) _____

ii) _____

23. (a) State the function of the nucleus. (1 mark)

_____

_____

(b) State the function of the mitochondria. (1 mark)

_____

_____

(c) State the function of the chloroplast. (1 mark)

_____

_____

(d) State the function of the cell membrane. (1 mark)

_____

_____

(e) State the function of the vacuole in plant cells. (1 mark)

_____

_____

(f) Explain why plant cells have a cell wall while animal cells do not. (2 marks)

_____

_____

24. The following are examples of biological structures:

Heart, Muscle cell, Leaf, Epithelial tissue, Digestive system, Human being

Organelles	Cells	Tissues	Organs	Organ systems	Organisms

25. (a) Name two types of specialized plant cells and their functions. (2 marks)

Cell: Function

i) _____ _____

ii) _____ _____

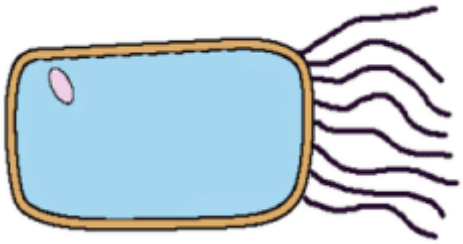
(b) Name two types of specialized animal cells and their functions. (2 marks)

Cell: Function

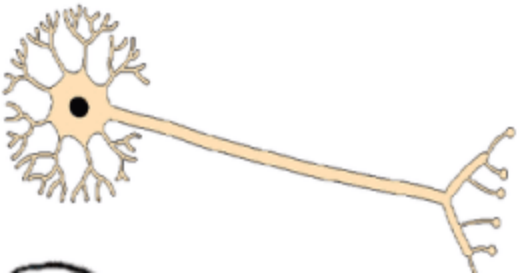
i) _____ _____

ii) _____ _____

(c) Identify the name of the following specialized cell. (4 marks)



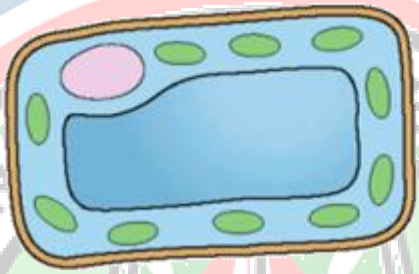
A



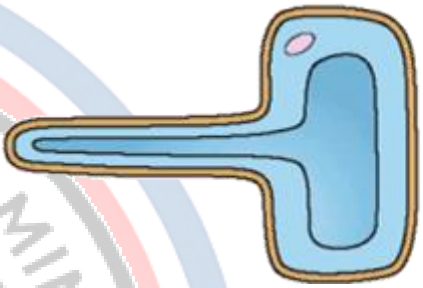
B

C

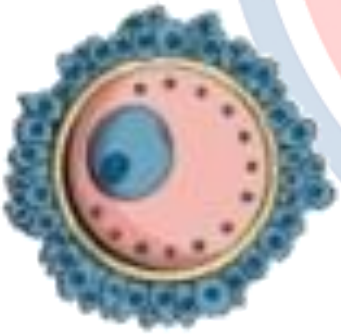
D



E



F



G

H

I

A:_____ **D:** _____ **G:** _____

B: _____ **E:** _____ **H:** _____

C: _____ **F:** _____ **I:** _____

26. (a) Explain how root hair cells are adapted for their function. (2 marks)

i) _____

ii) _____

(b) Explain how red blood cells are adapted to transport oxygen. (2 marks)

i) _____

ii) _____

(c) State three adaptations of the guard cell. (3 marks)

i) _____

ii) _____

iii) _____

27. Using locally available materials, make a model of:

(a) a plant cell (2 marks)

(b) an animal cell (2 marks)

(c) Label at least five components on each model. (4 marks)

28. A student observes a cell under a microscope and notices

i. A large vacuole,
ii. Chloroplasts, and
iii. A cell wall.

(a) Identify the type of cell. (1 mark)

_____

(b) List two functions of the structures observed. (2 marks)

i) _____

ii) _____

(c) Explain why this cell cannot move like an animal cell. (2 marks)

i) _____

ii) _____

29. (a) What is the function of ribosomes in a cell? (1 mark)

_____

_____

(b) State the function of the endoplasmic reticulum. (1 mark)

_____

_____

(c) Describe the role of the Golgi apparatus. (1 mark)

_____

_____

(d) Explain the importance of lysosomes in animal cells. (2 marks)

i) _____

ii) _____

30. (a) The _____ controls the activities of the cell. (1 mark)

(b) The _____ stores water and nutrients in plant cells. (1 mark)

(c) _____ carry out photosynthesis in plant cells. (1 mark)

(d) The _____ protects the cell and provides support in plant cells. (1 mark)

31. Match the cell component to its function:

Component	**Function**
i. Nucleus	a) Photosynthesis
ii. Mitochondria	b) Protein synthesis
iii. Chloroplast	c) Control of cell activities
iv. Ribosomes	d) Energy production

(4 marks)

32. (a) Give an example of a tissue in plants and its function. (2 marks)

i) _____

ii) _____

(b) Give an example of a tissue in animals and its function. (2 marks)

i) _____

ii) _____

(c) Name one organ made of these tissues and its function. (2 marks)

i) _____

ii) _____

33. (a) Define an organelle. (1 mark)

_____

_____

(b) State the difference between a cell and a tissue. (1 mark)

_____

_____

(c) Explain why organs are important for survival. (2 marks)

i) _____

ii) _____

34. Draw and label:

(a) a root hair cell (2 marks)

(b) a red blood cell (2 marks)

35. A student observes the following under a microscope:

Cell Type	**Observed Structures**
Plant cell	Cell wall, chloroplast, large vacuole
Animal cell	Nucleus, mitochondria, small vacuoles

(a) Identify which is plant and which is animal. (2 marks)

i) _____

ii) _____

(b) State one difference in observed structures. (1 mark)

i) _____

ii) _____

(c) Draw one cell with labeled structures. (3 marks)

36. Which of the following can be used to model an animal cell?

A. Ball of clay

B. Bottle of water

C. Paper notebook

D. Pencil

37. Explain why knowledge of cell structure and function is important in:

(a) Medicine (2 marks)

i) _____

ii) _____

(b) Agriculture (2 marks)

i) _____

ii) _____

(c) Environmental studies (2 marks)

i) _____

ii) _____

38. (a) A _____ microscope uses electrons instead of light. (1 mark)

(b) A _____ microscope uses lenses to magnify the object. (1 mark)

2.0 LIVING THINGS AND ENVIRONMENT

2.2 NUTRITION IN ANIMALS

1. Define digestion. (2 marks)

_____

_____

2. List the main regions of the human digestive system. (3 marks)

i) _____

ii) _____

iii) _____

3. (a) State the function of the mouth in digestion. (2 marks)

i) _____

ii) _____

(b) State the function of the stomach. (2 marks)

i) _____

ii) _____

(c) State the function of the small intestine. (2 marks)

i) _____

ii) _____

(d) State the function of the large intestine. (2 marks)

i) _____

ii) _____

4. (a) Draw a labeled diagram of the human digestive system. (6 marks)

(b) Identify the regions where:

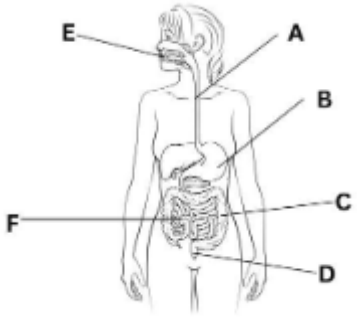
i. Starch is digested_____.

ii. Proteins are digested_____.

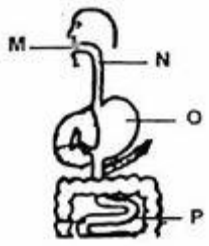
iii. Fats are digested_____.

5.

The picture below shows the digestive system. Name the parts marked. (2 mks)

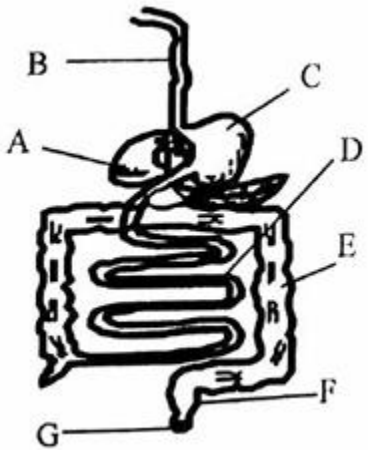


The picture below shows the digestive system.



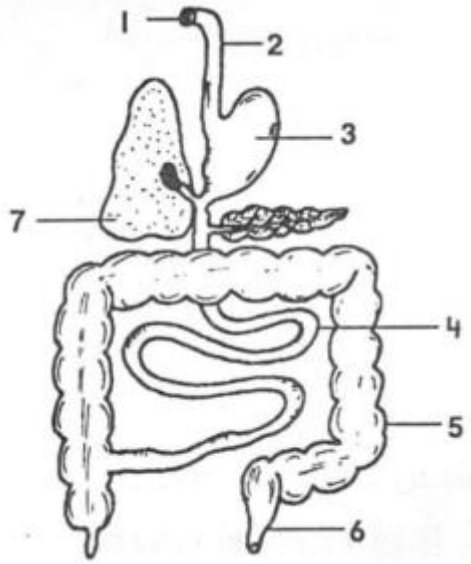
What is the function of the part labelled M?

The diagram below shows parts of the digestive system. Use it to answer questions.



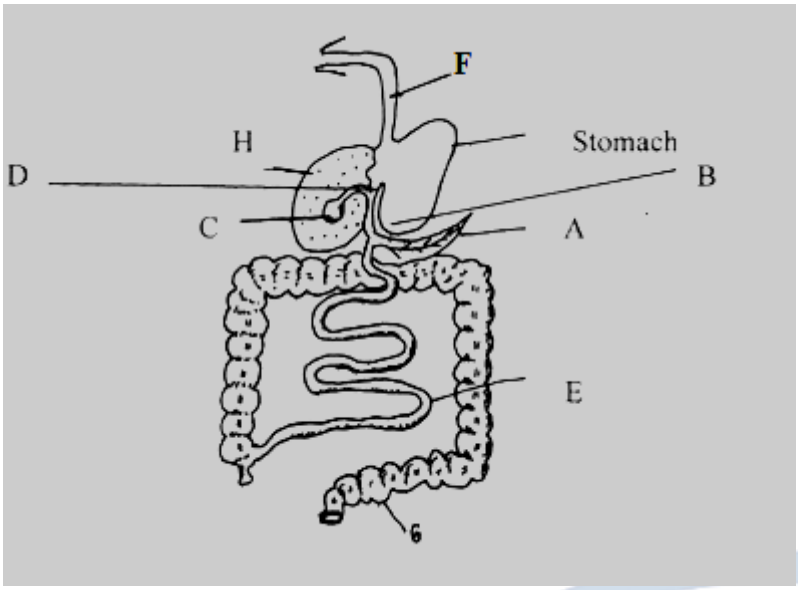
Which part represents the stomach?

The diagram below shows the parts of the human digestive system.



Digestion of food starts in the?

The diagram below shows part of the mammalian digestive system



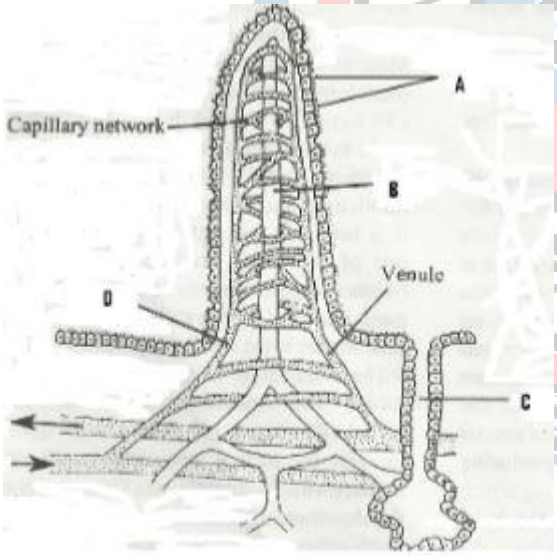
a) Name the parts labeled A, D and F (3mks)

b) State the functions of the parts labeled C and E (2mks)

c) What are the adaptations of the stomach to its function (2mks)

d) Name a deficiency disease resulting from lack of proteins in the diet (1mk)

The figure below represents a structure obtained from the ileum of a mammal.



a. Give the identity of the structure. (1 mark)

b. What is the importance of the structure named in (a) above? (1 mark)

c. Name the parts labeled **A, B** and **D**. (3 marks)

d.

i. Name the juice secreted by the part labeled **C**. (1 mark)

ii. List two enzymes present in the juice named in d (i) above. (2 marks)

QUESTION: DIGESTION AND ABSORPTION (8 MARKS)

1. Digestive Enzymes (4 Marks)

Digestive enzymes are produced by different organs in the digestive system.

Complete the table below by placing a tick **(√)** where the enzyme is produced and a cross **(X)** where it is not produced.

The first one has been done.

Enzyme	**Salivary glands**	**Stomach**	**Pancreas**	**Ileum**
Amylase	√	X	√	√
Lipase				
Protease				

---

2. Surface Area for Absorption (2 Marks)

State **TWO features** that increase the surface area of the small intestine for absorption. (2 marks)

---

3. Vitamins (1 Mark)

Name the vitamin commonly found in **citrus fruits and green vegetables**. (1 mark)

---

4. Absorption of Nutrients (1 Mark)

A learner eats a meal of **boiled rice**.

State the nutrient that would be found in the **villi of the ileum** a few hours after the meal. (1 mark)

---

5. Caecum in Mammals (2 Marks)

The caecum is poorly developed in humans.

a) Name the group of mammals in which the caecum is well developed. (1 mark)

b) State the role of the caecum in that group of mammals. (1 mark)

6. (a) Name the enzyme that digests starch and where it is produced. (2 marks)

Enzyme	Where it is produced

(b) Name the enzyme that digests proteins and where it is produced. (2 marks)

Enzyme	Where it is produced

(c) Name the enzyme that digests fats and where it is produced. (2 marks)

Enzyme	Where it is produced

(d) Explain the importance of enzymes in the digestive system. (2 marks)

i) _____

ii) _____

7. (a) Explain how the structure of teeth is adapted for their function. (3 marks)

i) _____

ii) _____

iii) _____

(b) Explain how the small intestine is adapted for absorption. (3 marks)

i) _____

ii) _____

iii) _____

(c) State one adaptation of the stomach for mechanical digestion. (2 marks)

i) _____

ii) _____

(d) Explain the role of digestive juices in food breakdown. (2 marks)

i) _____

ii) _____

8. Compare the digestion of carbohydrates, proteins, and fats in terms of:
   (a) Digestive region
   (b) Enzyme involved
   (c) End product of digestion

	Carbohydrates	Proteins	Fats
Digestive region			
Enzyme involved			
End product of digestion			

9. (a) Name the food test used to detect:
   i. Starch:_____
   ii. Protein: _____
   iii. Glucose: _____
   iv. Fat: _____

(b) Describe the procedure for testing starch in a sample. (3 marks)

i) _____

ii) _____

iii) _____

iv) _____

(c) Describe the procedure for testing protein using Biuret test. (3 marks)

i) _____

ii) _____

iii) _____

iv) _____

10. You are provided with a substances labeled **N,P,Q,V** and **W. N** is Benedict's solution, **P** is dilute hydrochloric acid, **Q** is sodium hydrogen carbonate solution, suspensions **V** and **W** are test solutions.

i. Using the reagents provided, test for the food substances in the suspension. In the table below, record the food tested, Procedures, observations conclusions. (10 mks).

Substance	Food substance being tested for	Procedure	Observations	Conclusion
V				
W				

ii. Name one enzyme that may be required to digest suspension **W** in the alimentary canal in human beings. State the organ from which the enzyme is produced. (2 marks)

Enzyme	Organ Producing the enzyme
.....	.....

iii. State the role of the following in the experiment:

a. Substance Q(2 marks)

_____

_____

b. Substance P (1 mark)

_____

_____

11. A student eats a meal containing rice, beans, and vegetable oil.

(a) Identify where starch, protein, and fat will be digested. (3 marks)

Food	Where digested
Starch	
Protein	
Fat	

(b) State the enzymes responsible for digesting each type of food. (3 marks)

i) _____

ii) _____

iii) _____

iv) _____

(c) Explain why complete digestion is important for the body. (2 marks)

i) _____

ii) _____

12. (a) Function of the liver in digestion. (1 mark)

_____

_____

(b) Function of the pancreas. (1 mark)

_____

_____

(c) Function of the gall bladder. (1 mark)

_____

_____

(d) Explain why bile is important in fat digestion. (2 marks)

13. Match the enzyme to the food it digests:

Enzyme	**Food**
Amylase	Protein
Pepsin	Starch
Lipase	Fat
Maltase	Maltose

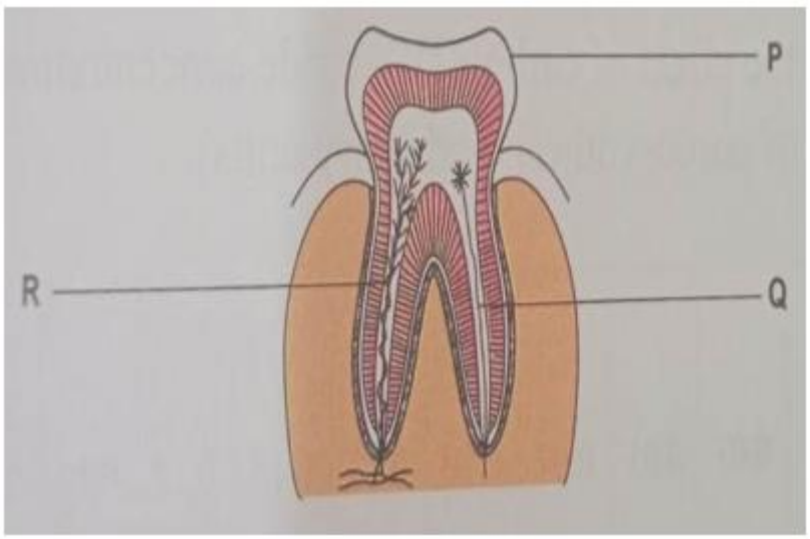
14. Explain how the following are adapted for their digestive role:

(a) Teeth (2 marks)

(b) Small intestine villi (2 marks)

(c) Stomach muscles (2 marks)

15. The diagram below represents a section through a human tooth.



i. Name the type of tooth shown (1 mark)

_____

ii. Give a reason for your answer (i) above. (1 mark)

_____

_____

iii. Name the structures P, Q, R. (3 marks)

P:_____

Q:_____

R:_____

iv. State three ways of keeping teeth healthy. (3 marks)

_____

_____

_____

_____

16. Using locally available materials:

(a) Make a 3D model of the human digestive system. (4 marks)

(b) Label all main parts. (3 marks)

(c) Indicate where each nutrient is digested. (3 marks)

17. (a) Explain why a balanced diet is important for proper digestion. (2 marks)

i) _____

ii) _____

(b) Describe the consequences of eating food without proper digestion. (2 marks)

i) _____

ii) _____

18. A student forgot to chew food properly.

(a) Predict the effect on starch digestion. (2 marks)

i) _____

ii) _____

(b) Explain why chewing is important for digestion. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

19. A student performed a food test and obtained the following results:

Sample	Iodine Test	Biuret Test	Benedict's Test	Sudan III Test
Rice	Blue-black	-	-	-
Meat	-	Violet	-	-
Oil	-	-	-	Red

(a) Identify the main nutrient in each sample. (3 marks)

i) _____

ii) _____

iii) _____

(b) Explain the principle of each test. (3 marks)

i) _____

ii) _____

iii) _____

20. (a) Define alimentary canal. (1 mark)

_____

_____

(b) State one difference between digestive juices and mechanical digestion. (2 marks)

_____

_____

(c) Explain the role of peristalsis in digestion. (2 marks)

i) _____

ii) _____

21. Explain the effect of:

(a) Eating food with no digestive enzymes. (2 marks)

i) _____

ii) _____

(b) Having a blocked bile duct. (2 marks)

i) _____

ii) _____

22. Complete the labeled diagram showing the pathway of food:

Mouth → _____ → _____ → Small intestine → Large intestine → Anus. (3 marks)

23. During a food test experiment, a student observes:

i. Iodine turns blue-black

ii. Biuret turns violet

iii. Benedict's turns brick-red

(a) Identify the nutrients present. (3 marks)

_____

(b) Explain why the tests produce color changes. (3 marks)

i) _____

ii) _____

iii) _____

iv) _____

24. (a) State one disease caused by lack of digestive enzymes. (1 mark)

_____

(b) Suggest one dietary modification to correct it. (2 marks)

_____

_____

25. (a) List two safety precautions when performing food tests. (2 marks)

i) _____

ii) _____

(b) Explain why controls are important in a food test experiment. (2 marks)

i) _____

ii) _____

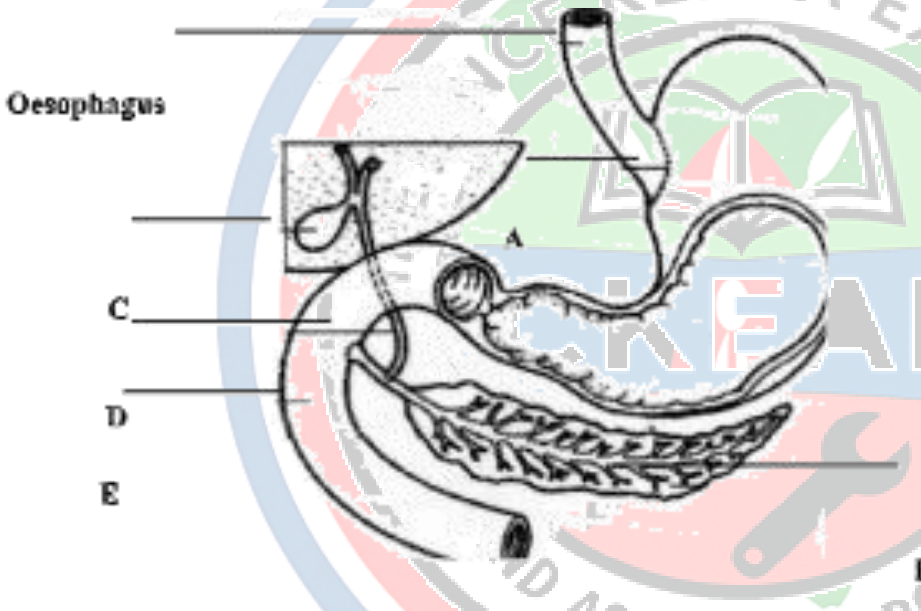
26. Create a poster showing:

(a) Regions of the digestive system and their function. (4 marks)

(b) Enzymes and their specific substrates. (3 marks)

(c) Importance of a balanced diet for digestion. (3 marks)

27. The diagram below illustrates a part of the mammalian alimentary canal



i) Identify the organ labelled B. (1 mark)

_____

ii) Name two secretions of the organ labelled B. (2 marks)

_____

iii) Name each of the parts labelled A and D. (2 marks)

A:_____

D:_____

iv) State one function of the part labelled C. (1 mark)

_____

v) Explain why the part labelled E is curved. (1 mark)

_____

_____

28. You are provided with a suspension labelled M.

a) Using the reagents provided only, test for the food substances present in the suspension. In the table below, record the food tested, procedure, observation and conclusions. 12 marks.

Food TEST	Procedure	Observation	Conclusion

b) Name two enzymes that may be required to digest suspension M in the alimentary canal in human. (2mark)

i) _____

ii) _____

c) State role of the following in the experiment. (2marks)

(i) Sodium hydrogen carbonate.

_____

_____

(ii) Dilute hydrochloric acid.

_____

_____

29. You are provided with Solution Z, 15 cm3 solution labeled Q, test tubes, dilute Hydrochloric, and dilute sodium hydroxide solution W, Water bath, Bunsen burner, Iodine solution, Benedict's solution, Stop watch and labels.

Follow the procedure below and record your observations and conclusions in the table below.

Procedure

Place 5 cm^3 of solution Q into 3 test tubes and label them 1A, 2A, and 3A.

I. To test tube 1A add 1 cm^3 of dilute Hydrochloric acid and shake. Add 1 cm^3 of the solution Z and shake.

II. To test tube 2A add 1 cm^3 of dilute sodium hydroxide and shake. Add 1 cm^3 of the solution Z and shake.

III. To test tube 3A add 1 cm^3 of solution W and shake. Add 1 cm^3 of the solution Z and shake.

IV. Place the three labeled test tubes into a water bath and maintained at 37 °C for 20 minutes then divide the portions into another separate test tube as 1A and 1B, 2A and 2B, 3A and 3B respectively.

V. Using the reagents provided carry out food test and fill in the table below. (12 marks)

Test tube	Test with iodine using the **A portion**		Test with Benedict's solution using the **B portion**	
	Observation	Conclusion	Observation	Conclusion
Dilute hydrochloric acid+ solution Q +solution Z				
Dilute sodium hydroxide +solution Q + solution Z				
Solution W +solution Q + solution Z				

(b) what is the identity of solution Z ?_____ (1 mark)

(c)What is the significance of maintaining them at a temperature of 37°C? (1 mark)

_____

_____

2.0 LIVING THINGS AND ENVIRONMENT

2.3 TRANSPORT IN PLANTS

1. Define transport in plants. (2 marks)

_____

_____

2. List the main transport systems in plants. (2 marks)

i) _____

ii) _____

3. Functions:

(a) State the function of xylem. (2 marks)

_____

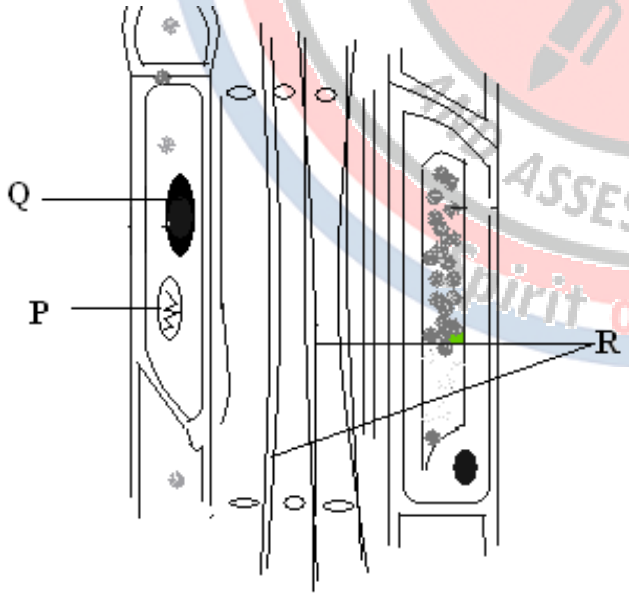
_____

(b) State the function of phloem. (2 marks)

_____

_____

4. The diagram below represents part of a phloem tissue. Study it to answer the question that follow.



a. Name the structures labeled P, Q and R. (3 marks)

P: _____ Q: _____ R: _____

b. State the function of the phloem tissue. (1 mark)

_____

_____

c. (i). State how the functioning of the phloem tissue is affected if the companion cell is destroyed. (1 mark)

_____

_____

(ii). Give a reason for your answer. (1 mark)

5. The diagram below shows a section through plant organ.

a)

(i) Name the class of the section was obtained. (1 mark)

_____

(ii) Give a reason for your answer in (a) above (1 mark)

_____

_____

b) What is the role of vascular bundles in plant nutrition? (2 marks)

i) _____

ii) _____

6. Name the tissues in plants responsible for: (2 mks)

a. Transport of water and mineral salts:_____

b. Transport of carbohydrates:_____

7. Discuss the role of each of the following structures in plants. (4 mks)

a) Xylem vessels:_____

b) Phloem:_____

c) Root hairs:_____

d) Root cap:_____

8. a) Name three cells that form the phloem tissue.(3 marks)

i) _____

ii) _____

iii) _____

b) Name physiological process by which water is transported from the cortical cell to the xylem of the root. (1mark)

_____

_____

c) State the role of the pericycle in roots.(1mark)

_____

_____

9. Explain why plants do not require complex excretory organs. (3 mks)

i) _____

ii) _____

iii) _____

10. In an experiment, a leafy shoot was set up in a photometer and kept in a dark room for 2 hours. The set up was then transferred to a well-lit room for 2 hours.

    a. What was the aim of this experiment? (1mk)

_____

_____

b. Explain the results which would be expected in each of the two experiments conditions. (3mks)

i) _____

ii) _____

iii) _____

11. Outline four environmental factors affect the rate of transpiration in flowering plants.

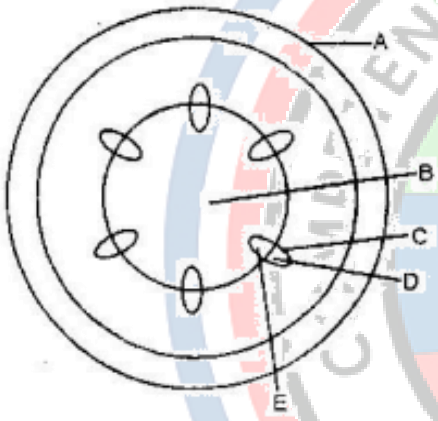
i) _____

ii) _____

iii) _____

iv) _____

12. The diagram below represents a transverse section of a young stem.



a. Name the parts labeled A and B (2mks)

A_____

B_____

b. State the functions of the parts labeled C, D and E

C_____

D_____

E_____

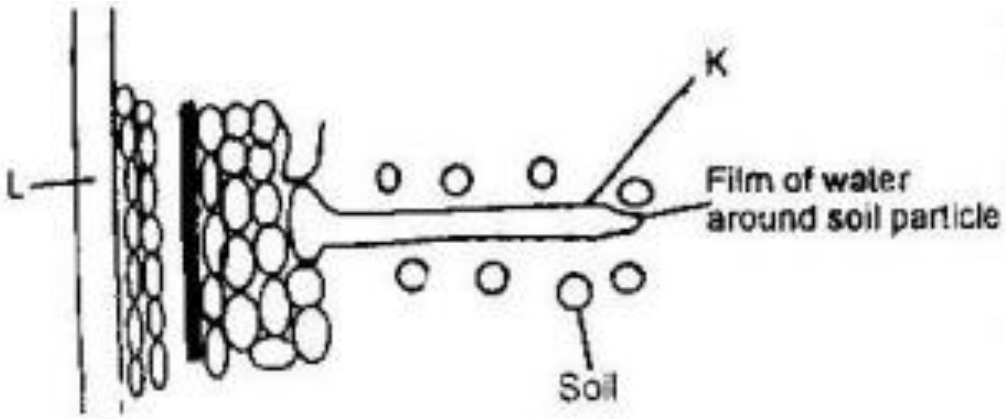
c. List three differences between the section shown above and one that would be obtained from the root of the same plant (3mks)

_____

_____

_____

13. The diagram below represents the pathway of water from soil into the plant.



a. Name the structures labeled K and L

K_____

L_____ (2mks)

b. Explain how water from the soil reaches the structure labeled L. (5mks)

i) _____

ii) _____

iii) _____

iv) _____

v)_____

14. Name the process by which mineral salts enter into the plant. (1mk)

_____

15. State two ways in which xylem are adapted to their function. (2mks)

i) _____

ii) _____

16. What makes young herbaceous plant remain upright? (2mks)

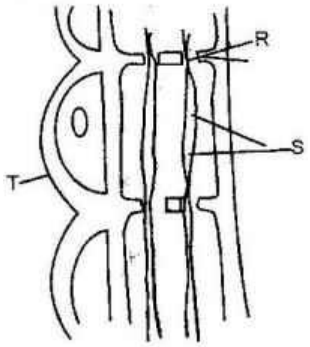
_____

_____

_____

_____

17. The diagram below represents part of phloem tissue



a. Name the structures labeled R and S and a cell labeled T.

R _____

S _____

Cell T _____ (3mks)

b. State the function of the structure labeled S. (1mk)

_____

c. Explain why xylem is a mechanical tissue (2mks)

_____

_____

18. Name the

a. Material that strengthens xylem tissue. (1mk)

_____

b. Tissue that is removed when the bark of a dicotyledonous plant is ringed. (1mk)

_____

19. How are xylem vessels adapted for support? (1mk)

_____

_____

20. What is the role of vascular bundles in plant nutrition? (3mks)

i) _____

ii) _____

iii) _____

21. Name two tissues which are thickened with lignin. (2mks)

i) _____

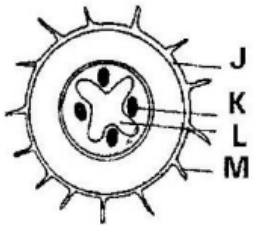
ii) _____

22. How is support attained in herbaceous plant? (1mk)

_____

_____

23. The diagram below represents a transverse section through a plant organ.



a. From which plant organ was the section obtained? (1mk)

_____

_____

b. Give two reasons for your answer in (a) above. (2mks)

_____

_____

c. Name the parts labeled J, K and L (3mks)

J_____

K_____

L_____

24. State two functions of the part labeled M. (2mks)

i) _____

ii) _____

25. Describe how water moves from the soil to the leaves in a tree. (20mks)

_____

_____

_____

_____

_____

_____

_____

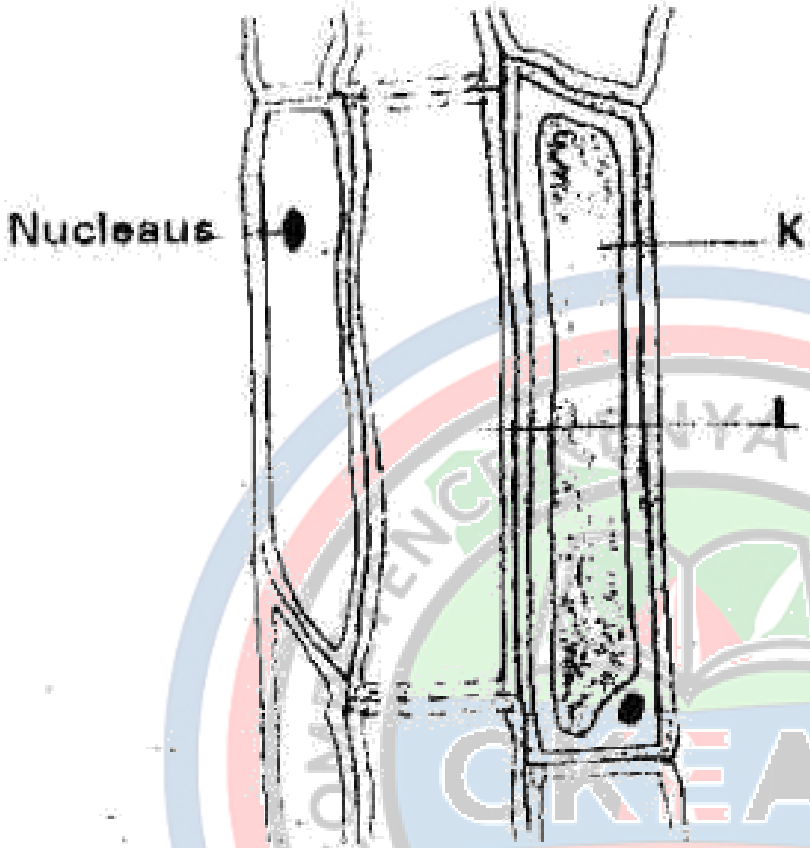
_____

26. State two ways in which the root hairs are adapted to their function. (2mks)

i) _____

ii) _____

27. The diagram below represents a plant tissue.



Name the parts labelled K and L.

K_____

L_____

28. In an experiment to determine the effect of ringing on the concentration of sugar in phloem, a ring of bark from the stem of a tree was cut and removed. The amount of sugar in grammes per 16cm3 piece of bark above the ring was measured over a 24 hour period. Sugar was also measure in the bark of a similar stem of a tree which was not ringed. The results are shown in the table below

Time of the day	Amount of sugar in grammes per 16 cm^3 piece of bark	
	Normal stem	Ringed stem
0645	0.78	0.78
0945	0.80	0.91

1245	0.81	1.01
1545	0.80	1.04
1845	0.77	1.00
2145	0.73	0.95
0045	0.65	0.88

a. Using the same axes, plot a graph of the amount of sugar against time (6mks)

b. At what time was the amount of sugar highest in the;

   i. Ringed stem (1mk)

   ii. Normal stem (1mk)

c. How much sugar would be in the rigged stem if it was measured at 0345 hours. (2mks)

d. Give reasons why there was sugar in the stems of both trees at 06 45 hours. (2mks)

e. Account for the shape of the graph for the tree with ringed stem between:

   i. 0645 hours and 1545 hours (3mks)

   ii. 1545 hours and 0045 hours (2mks)

f. Other than sugars name two compounds that are translocated in phloem. (2mks)

29. (a) Draw and label a transverse section of a stem showing xylem and phloem. (5 marks)

(b) Identify which tissues are responsible for:

i. Water transport

ii. Food transport

(2 marks)

30. (a) Describe how roots absorb water. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

(b) Explain the role of root hairs in water absorption. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

(c) Describe one adaptation of roots for efficient water absorption. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

31. (a) Explain how plants absorb mineral salts. (2 marks)

i) _____

ii) _____

(b) State the importance of mineral salts in plants. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

32. (a) Define translocation in plants. (2 marks)

_____

_____

(b) State the role of phloem in translocation. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

(c) Explain why translocation is important for plant growth. (2 marks)

i) _____

ii) _____

33. (a) Define transpiration. (2 marks)

_____

_____

(b) State the significance of transpiration in plants. (2 marks)

i) _____

ii) _____

(c) Explain how transpiration helps in cooling the plant. (2 marks)

i) _____

ii) _____

d) State four factors that affect transpiration

i) _____

ii) _____

iii) _____

iv) _____

34. (a) Name four environmental factors affecting transpiration. (2 marks)

i) _____

ii) _____

iii) _____

iv) _____

(b) Name three structural factors that affect transpiration. (2 marks)

i) _____

ii) _____

iii) _____

(c) Explain how each factor affects the rate of transpiration. (4 marks)

i) _____

ii) _____

iii) _____

iv) _____

35. (a) Design an experiment to measure the rate of transpiration in a plant. (3 marks)

(b) List the materials needed. (2 marks)

(c) Explain the procedure and how results would be recorded. (3 marks)

(d) State one safety precaution when performing the experiment. (1 mark)

36. An experiment was carried out to investigate transpiration and absorption of water in a certain plant species. The plants were potted and supplied with adequate water. The amount of water lost and absorbed was determined. The results are shown in the table below;

Time of the day	**Amount of water in grams**	
	Transpiration	**Absorption**
0700	30	15
0900	40	25
1100	48	34
1300	56	45
1500	40	50
1700	25	40
1900	15	28
2100	10	21

a. Using the same axes, plot graphs to show transpiration and absorption of water in grams against time of the day. (7mks)

b.

i. At what time of the day was the amount of water the same for transpiration and absorption; (1mk)

ii. how much water was absorbed at 1800 hours? (1mk)

c. Explain the shape of the graphs of:-

i. Transpiration (4mks)

ii. Absorption (4mks)

d. Suggest what would happen to transpiration and absorption of water if the experiment was continued for another 2 hours; (1mks)

e. Name **two** environmental factors that affect the rate of transpiration (2mks)

i) _____

ii) _____

37. The table below shows stomatal distribution on leaves A and B and their surface area. Use the information to answer the questions.

	Leaf surface	A	B
Number of stomata	Upper leaf surface	20	5
	Lower leaf surface	0	15
Surface area		25 cm²	18cm²

Identify with reasons the habitats of the plant from which the leaves were obtained.

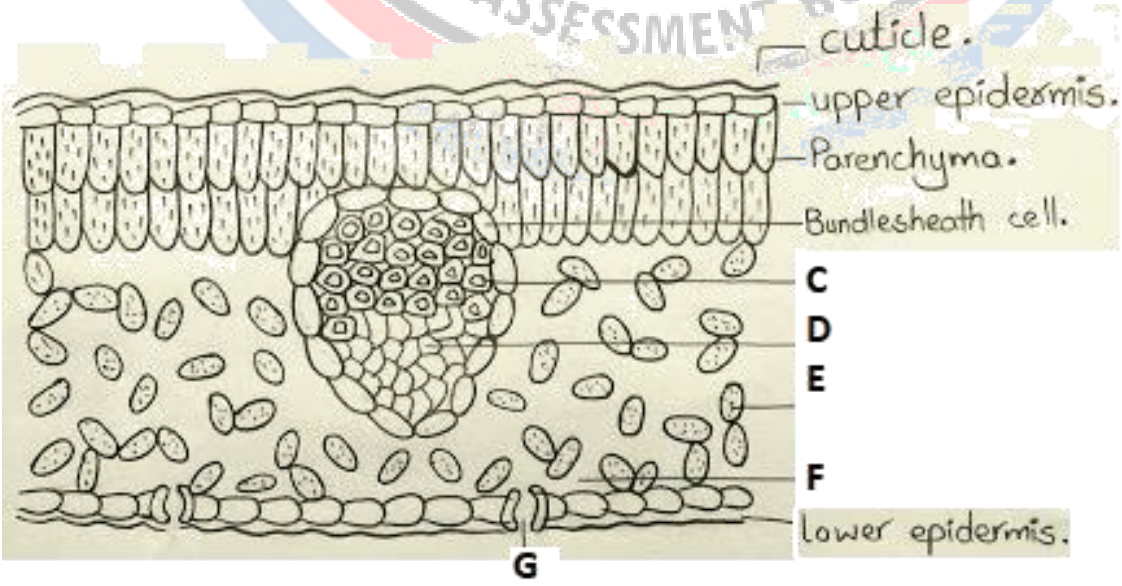
a. Leaf A: Habitat: _____(1 mark)

b. Reason;_____ (1 mark)

c. Leaf B: Habitat:_____ (1 mark)

d. Reason: _____(1 mark)

38. Study the diagram below and use it to answer the questions that follow.



a. Name the organ shown in the drawing above. _____(1 mark)

b. Identify the parts labeled **C** and **D**. (2 marks)

C:_____

D:_____

c. Explain the concept of transpiration pull as it may takes place in the structure drawn above. (3 marks)

_____

_____

_____

d. Name **three** forces responsible for movements of water and mineral ions in a stem of a tall plant. (3 marks)

_____

_____

_____

12. A farmer notices his crop leaves are wilting during a hot, dry season.

(a) Explain the physiological reason for wilting. (2 marks)

_____

_____

_____

(b) Suggest two methods to reduce transpiration. (2 marks)

_____

_____

_____

13. Explain how the following plant features reduce water loss:

(a) Waxy cuticle (2 marks)

_____

_____

_____

(b) Sunken stomata (2 marks)

(c) Leaf rolling (2 marks)

-14. A student measured the rate of transpiration under different conditions:

Condition	Rate of Transpiration (ml/hour)
Shade	2
Sunlight	5
Windy	6
Humid	1

(a) Which condition resulted in the highest transpiration? (1 mark)

(b) Explain why sunlight increases transpiration. (2 marks)

(c) Explain why high humidity reduces transpiration. (2 marks)

15. Write True/False.

(a) Phloem transports water from roots to leaves. (1 mark)

(b) Xylem vessels have thick walls to support plant structure. (1 mark)

(c) Transpiration is a passive process. (1 mark)

16. Match the plant structure to its function:

Structure	**Function**
Xylem	Transport of water and mineral salts
Phloem	Transport of food
Stomata	Gas exchange and transpiration
Root hairs	Increase surface area for absorption

(4 marks)

17. Fill-in-the-Blank:

(a) Water moves up the plant through the _____. (1 mark)

(b) Food is transported in the plant through the _____. (1 mark)

(c) Evaporation of water from leaves is called _____. (1 mark)

(d) The opening on leaves for gas exchange is called _____. (1 mark)

18.

(a) State two reasons why transport of water is essential for plant survival. (2 marks)

(b) State two reasons why translocation is important. (2 marks)

(c) Explain how transpiration contributes to nutrient movement. (2 marks)

19. A student set up an experiment with a potted plant covered in a plastic bag to measure water loss.

(a) Identify which factor of transpiration is being tested. (1 mark)

(b) Predict the outcome of the experiment. (2 marks)

(c) Explain your observation. (2 marks)

20. Explain how drought conditions affect:

(a) Rate of transpiration (2 marks)

(b) Mineral salt uptake (2 marks)

(c) Plant growth (2 marks)

21.

(a) Using locally available materials, make a model showing transport of water in a plant. (3 marks)

(b) Show xylem and phloem tissues clearly. (2 marks)

(c) Demonstrate transpiration using a potted plant and plastic bag. (2 marks)

22. Explain why a plant wilts when cut off from its roots. Include the roles of xylem, phloem, and transpiration. (4 marks)

_____

_____

_____

_____

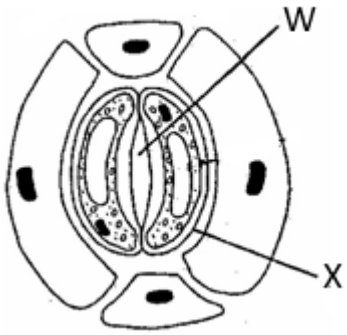
_____

_____

23. Complete the flow diagram of water transport:

Soil → _____ → Root hairs → _____ → Leaves → _____ → Atmosphere (3 marks)

24. The diagram below shows part of plant tissue.



a. Name cell labelled X and part labelled W. (2 marks)

X:_____

W:_____

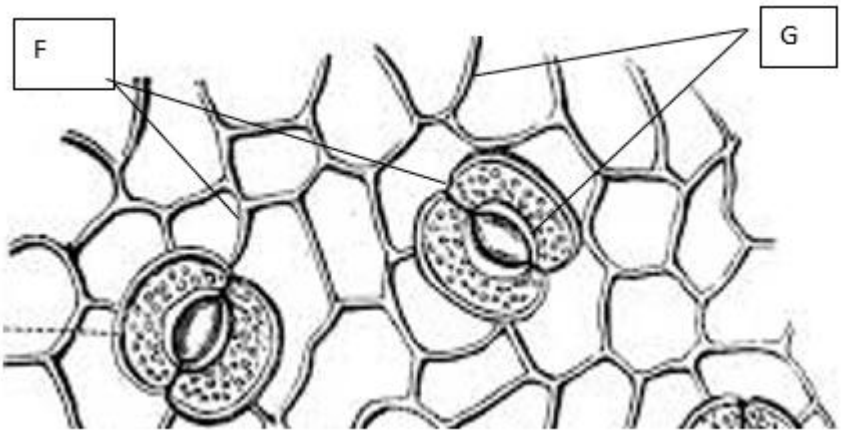
b. State two adaptations of cell labelled X to its function. (2 marks)

_____

_____

_____

25. Study the diagram below and answer the questions that follow

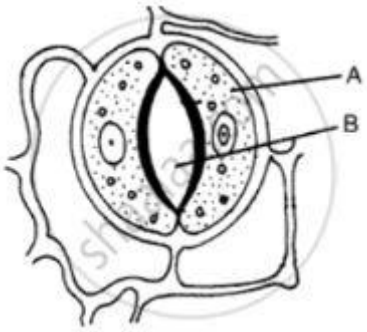


(a) Name two processes carried out by the structures labelled F to allow the opening of the stoma. (2 marks)

(b) State three characteristics of the structures labelled G. (3 marks)

(c) Explain how uptake of water enables the structures labelled F to function. (3 marks)

26. The diagram below shows part of the plant tissue.



a) Name the cell labeled A, and part labeled B. (2 marks)

A:_____

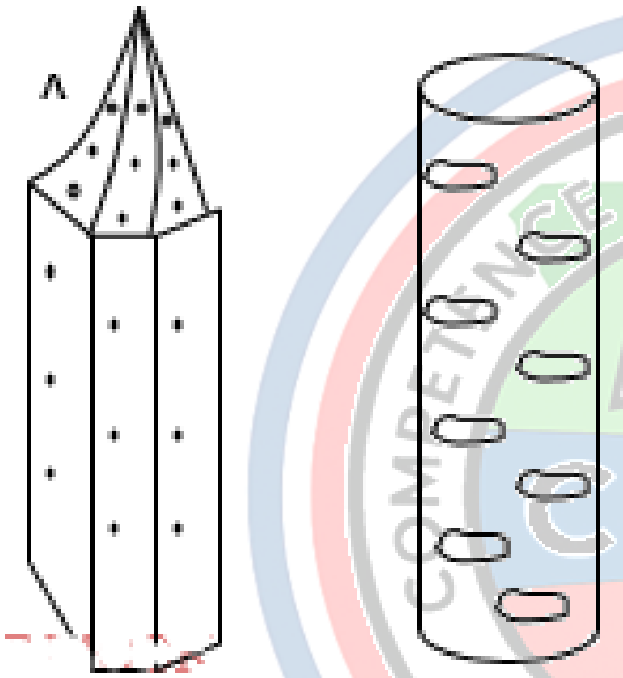
B:_____

b) State two adaptations of cell labeled A to its function. (2 marks)

_____

_____

27.The diagram below represents a plant tissue.



a. Identify the structures labelled A and B (2 mks)

_____

_____

b. What property makes B to be more efficient in function? (1 mk)

_____

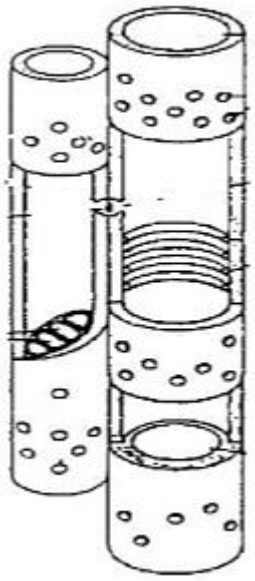
_____

c. What makes the walls of both A and B impermeable to water and solutes? (1 mk)

_____

_____

28. The diagram below shows cells in flowering plants involved in transport.



a) Name the tissue in which the cells are found. (1 mark)

b) Identify and explain two observable features of these cells that adapt them to their role in transport. (2 marks)

c) Name 3 forces involved in transport of water and mineral salts through the plant. (3 marks)

d) Explain how sunken stomata lower the rate of transpiration. (2 marks)

29. Data Interpretation – Factors:

A student measured transpiration at different wind speeds:

Wind Speed (km/h)	Water loss (ml/hour)
0	2
5	4
10	6

(a) What trend is observed? (1 mark)

(b) Explain the effect of wind on transpiration. (2 marks)

30. Explain how desert plants reduce transpiration. Include at least three adaptations. (4 marks)

31.

(a) Explain why root hairs are important in mineral absorption. (2 marks)

(b) Explain how active transport is involved in mineral uptake. (2 marks)

32:

(a) Phloem transports food only from leaves to roots. (False – explain) (1 mark)

(b) Translocation occurs in both directions. (True – explain) (1 mark)

33. Prepare a presentation or poster showing:

(a) Transport of water and minerals in plants. (3 marks)

(b) Transport of food in plants. (3 marks)

(c) Factors affecting transpiration and how they influence plant growth. (3 marks)

GRADE 10 GENERAL SCIENCE – TOPICAL REVISION QUESTIONS

2.0 Living Things and Environment

2.4 Respiration

1. Define respiration in living things. (2 marks)

_____

_____

2. Distinguish between aerobic and anaerobic respiration. (3 marks)

_____

_____

3. State the respiratory substrates used in living organisms. (2 marks)

_____

_____

4. Write the word and balanced chemical equation for:

   (a) Aerobic respiration. (2 marks)

_____

_____

   (b) Anaerobic respiration in animals. (2 marks)

_____

_____

   (c) Anaerobic respiration in yeast during fermentation. (2 marks)

_____

_____

5. Compare aerobic and anaerobic respiration under the following headings:

	Aerobic respiration	***Anaerobic respiration***
Energy released		
End products		
Oxygen requirements		
Efficiency		

6. Define respiratory quotient (RQ). (2 marks)

_____

_____

7. The following data were obtained for an organism:

- Volume of CO_2 released = 40 cm^3
- Volume of O_2 absorbed = 50 cm^3

(a) Calculate the RQ. (3 marks)

(b) State the type of substrate being respired. (2 marks)

(c) Explain your answer. (2 marks)

_____

_____

8. List four environmental factors that affect respiration in living things. (2 marks)

_____

_____

_____

_____

9. Explain how each of the following factors affects the rate of respiration:

   (a) Temperature (2 marks)

   _____

   _____

   (b) Oxygen availability (2 marks)

   _____

   _____

   (c) Type of substrate (2 marks)

   _____

   _____

   (d) Exercise/activity level (2 marks)

   _____

   _____

10. Design an experiment to investigate anaerobic respiration in yeast. Include:

    (a) Aim (1 mark)

    (b) Materials required (2 marks)

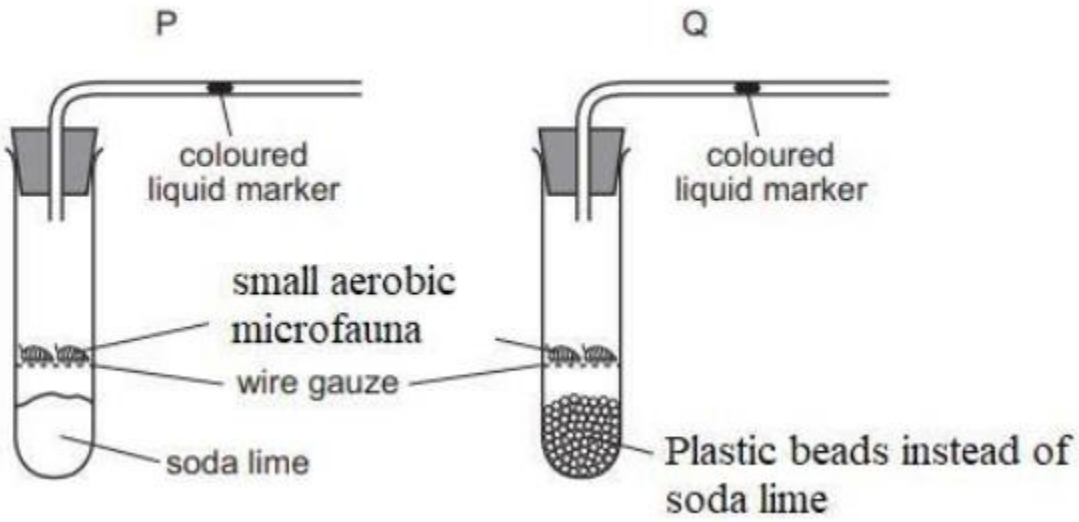
    (c) Procedure (3 marks)

    (d) Observations expected (2 marks)

    (e) Safety precautions (1 mark)

11. Explain how you would demonstrate oxygen debt in humans after exercise. Include diagram of setup. (5 marks)

12. The experimental setup below was used by students at school to investigate a certain physiological process.



(a) Why was setup Q included in the experiment? (1 mark)

_____

_____

(b) State and explain the observations made in setup P above. (3 marks)

_____

_____

_____

_____

(c) State the purpose of soda lime in the setup. (1 mark)

_____

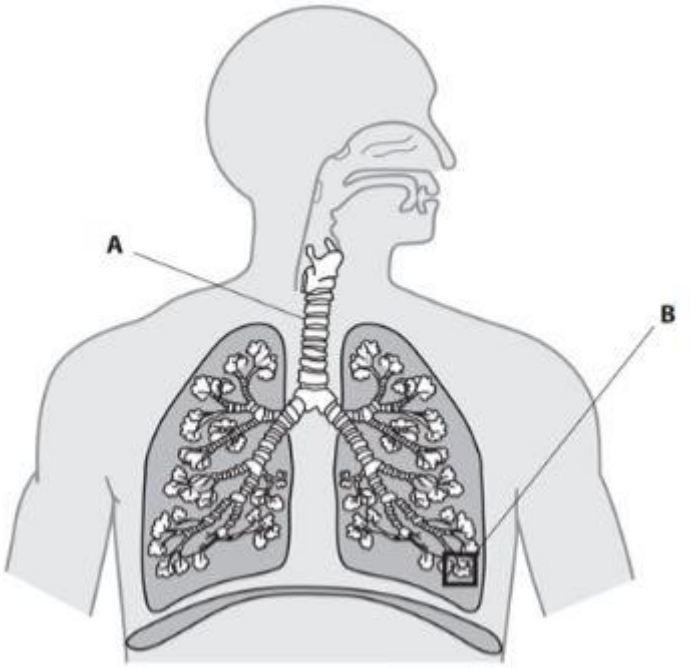
_____

(d) Explain how the rate of respiration is measured. (2 marks)

_____

_____

13. The diagram shows some structures in the human breathing system. (2 marks)



a. Name structures A and B. (2 marks)

A: _____ B:_____

b. The table shows the level of two gases, X and Y, in blood entering and leaving the lungs during the process of gas exchange.

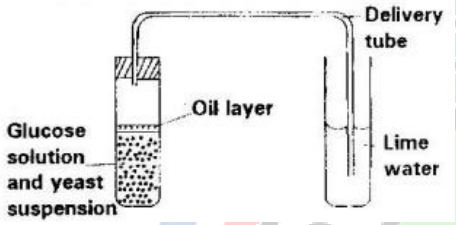
Gas	Level of gas in cm^3 per 100 cm^3 of blood	
	Blood entering lungs	Blood leaving lungs
X	10.6	19.0
Y	58.0	50.0

Name the two gases. (1 mark)

a. Gas X:_____

b. Gas Y:_____

14. The diagram below shows a set up that was used to demonstrate fermentation.



Glucose solution was boiled and oil added on top of it. The glucose solution was then allowed to cool before adding the yeast suspension.

a. Why was the glucose solution boiled before adding the yeast suspension? (1mk)

_____

_____

b. What was the importance of cooling the glucose solution before adding the yeast suspension? (1mk)

_____

_____

c. What was the use of the oil in the experiment? (1mk)

_____

_____

d. What observation would be made in test tube B at the end of the experiment (1mk)

_____

_____

e. Suggest a control for this experiment (1mk)

_____

_____

15. Give two reasons why accumulation of lactic acid during vigorous exercise lead to an increase in heart beat. (2mks)

_____

_____

_____

_____

16. A process that occurs in plants is represented by the equation below.

$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + (2CO_2) + Energy$

Glucose Ethanol Carbon Dioxide

a. Name the process (1mk)

_____

_____

b. State the economic importance of process name in (a) above. (1mk)

_____

_____

17. Other than carbon dioxide, name the other products of anaerobic respiration in plants. (2mks)

_____

_____

18. Name the substance which accumulates in muscles when respiration occurs with insufficient oxygen. (1mk)

_____

_____

19. A runner feels muscle cramps after a 400 m sprint.

(a) Explain why this occurs in terms of respiration. (3 marks)

_____

_____

(b) Which type of respiration caused this condition? (1 mark)

(c) Suggest two ways to reduce oxygen debt. (2 marks)

20. In an experiment, yeast is provided with glucose in anaerobic conditions.

(a) Predict the products formed. (2 marks)

(b) Explain why carbon dioxide is produced in this process. (2 marks)

(c) State one economic application of this process in industry. (2 marks)

21. State three industrial uses of anaerobic respiration in yeast. (3 marks)

22. Explain the role of anaerobic respiration in the production of:

(a) Alcohol (2 marks)

(b) Bread (2 marks)

(c) Biogas (2 marks)

_____

_____

23. TRUE OR FALSE?

Aerobic respiration produces more energy than anaerobic respiration. (1 mark)

_____

_____

24. Oxygen is not required for aerobic respiration. (1 mark)

_____

_____

25. Muscle fatigue is caused by lactic acid accumulation during anaerobic respiration. (1 mark)

_____

_____

Fill-in-the-Blank:

26. The primary energy currency of the cell is _____. (1 mark)

27. During anaerobic respiration in yeast, glucose is converted to _____ and _____. (2 marks)

28. The respiratory quotient is calculated by dividing the volume of _____ by the volume of _____. (2 marks)

29. Match the process to the correct description:

Process	**Description**
Aerobic respiration	Requires oxygen, produces CO_2, H_2O, and large energy
Anaerobic respiration (animal)	Occurs without oxygen, produces lactic acid, small energy
Anaerobic respiration (yeast)	Produces ethanol and CO_2

(3 marks)

30. State four reasons why respiration is important in living things. (4 marks)

_____

_____

_____

_____

31. Explain why aerobic respiration is preferred for sustained energy activities in humans. (3 marks)

32. Discuss the role of anaerobic respiration in survival during low oxygen conditions. (3 marks)

33. The table shows oxygen consumption in a plant under different conditions:

Condition	**O_2 consumed (cm^3/hr)**
Light	50
Dark	30
High temp	70
Low temp	20

(a) Which condition shows the highest respiration rate? (1 mark)

(b) Explain why temperature affects the rate of respiration. (2 marks)

(c) Suggest a reason why light affects oxygen consumption in plants. (2 marks)

34. A student wants to measure the RQ of a plant using a respirometer.

(a) What data should they collect? (2 marks)

(b) How can they determine the substrate from the RQ? (2 marks)

35. Explain why bread rises when dough is left to ferment using yeast. Include the type of respiration and products formed. (4 marks)

_____

_____

_____

_____

36. A factory uses anaerobic respiration to produce ethanol. Explain two benefits and one environmental concern of this process. (3 marks)

_____

_____

_____

_____

GRADE 10 GENERAL SCIENCE – TOPICAL REVISION QUESTIONS

2.0 Living Things and Environment

2.5 Plant Growth and Development

1. Explain the difference between growth and development in plants. (3 marks)

2. Define seed dormancy. (2 marks)

3. State four causes of seed dormancy. (4 marks)

4. Describe the conditions necessary for seed germination. (4 marks)

5. Explain the differences between epigeal and hypogeal germination. (4 marks)

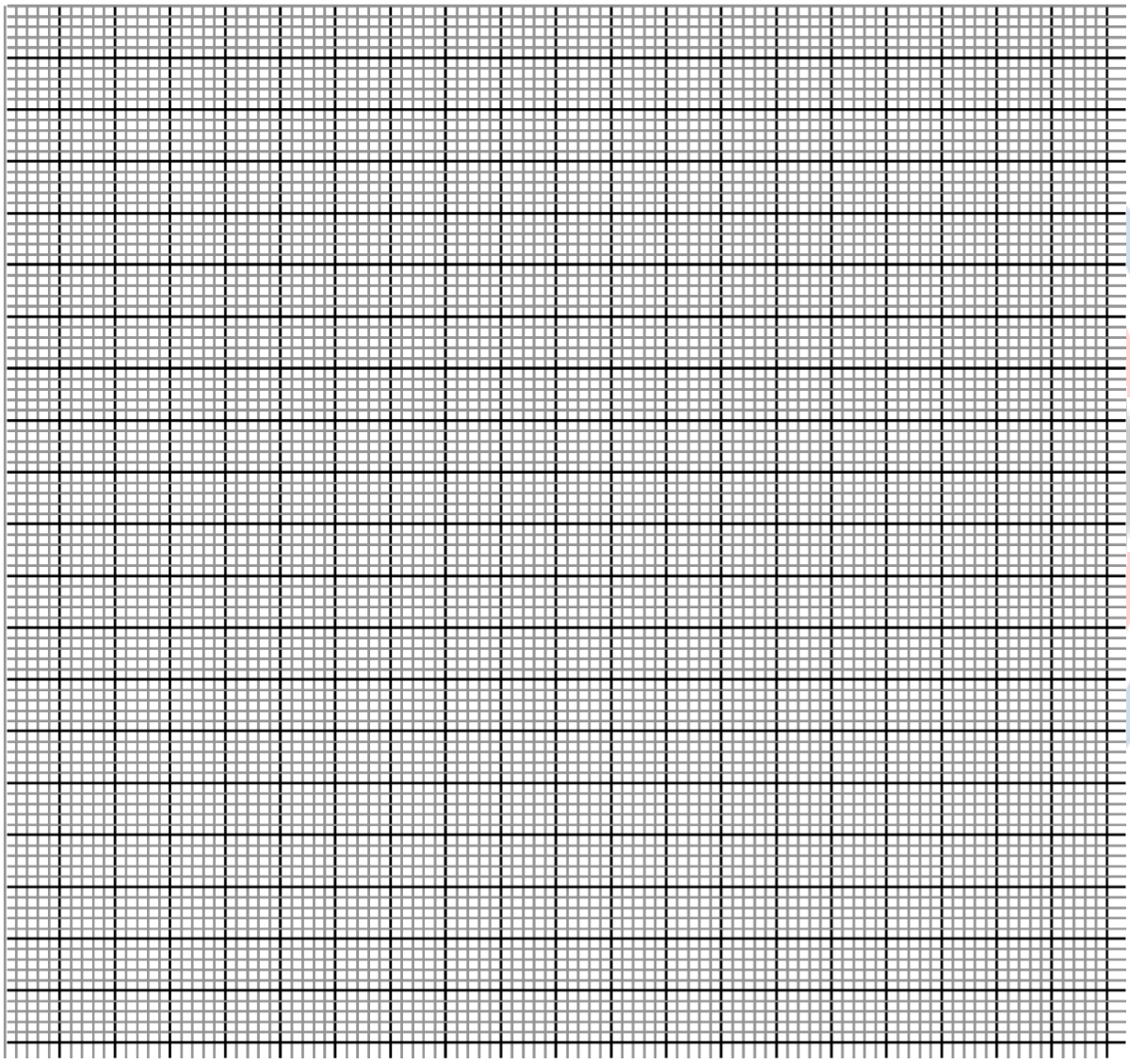
6. Differentiate between primary and secondary growth in plants. (4 marks)

7. List the functions of the following plant growth hormones: Auxins, Gibberellins, Cytokinins, ABA, and Ethylene. (5 marks)

Time in weeks	0	1	2	4	6	10	13	15	16	18
Dry mass in grams	1	2	3	10	18	32	44	45	44	38

The following data represents the development in dry mass of germinating seedlings within 18 weeks:

(a) Using suitable scale plot a graph of dry mass against time (6mks)



(b) With reference to the graph, explain the changes in dry mass between:-

(i) Week 0 to 2 (4mks)

(ii) Week 5 to 13 (3mks)

(iii) Week 16 - 18 (3mks)

(c)

(i) What is the significance of time zero? (1mk)

(ii) What difference would be expected from the above results if the experiment started with the seeds? Give a reason for your answer. (2mks)

(d) Name the phase of growth curve represented by the curve between 2nd and 13th week.(1mk)

8. Complete the table below by filling in the missing functions of hormones:

Hormone	**Function in Growth**	**Relation to Seeds**
Auxins		
Gibberellins		Breaks dormancy, activates enzymes
Cytokinins	Cell division, delays aging	
ABA		Maintains dormancy
Ethylene	Fruit ripening, senescence	

(5 marks)

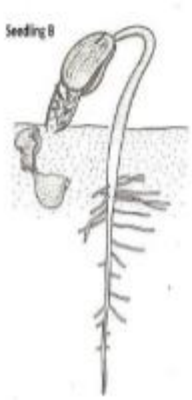
9. Match the following terms with the correct descriptions:

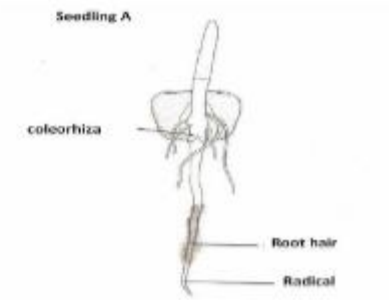
Term	**Description**
Epigeal germination	Cotyledons pushed above the soil
Hypogeal germination	Cotyledons remain below the soil
Primary growth	Increase in length of roots and shoots
Secondary growth	Increase in girth of stems and roots
Seed dormancy	Delay in germination until conditions are favorable

(5 marks)

10. Differentiate between primary and secondary growth. (5 marks)

11. The diagram below represents a stage of growth in two different seeds.





a. Identify the type of germination exhibited by seedlings A and B. (2 marks)

Seedling A:_____

Seedling B_____

b. Distinguish between the two types of germination stated in (a) above. (3 marks)

_____

_____

_____

_____

c. State the role of oxygen during germination. (3 marks)

_____

_____

d. Account for the loss of weight in cotyledons in germinating seeds. (2 marks)

_____

_____

_____

_____

13. A farmer finds that some of his maize seeds do not germinate even after watering.

(a) Suggest possible causes of dormancy. (3 marks)

_____

_____

_____

(b) Suggest two practical methods to break seed dormancy. (2 marks)

_____

_____

(c) Explain how gibberellins can help overcome dormancy. (2 marks)

_____

_____

14. A horticulturist wants to grow a fast-maturing tomato plant.

(a) Which growth hormone could be applied to promote stem elongation? (1 mark)

_____

_____

(b) How would cytokinins help in this situation? (2 marks)

_____

_____

(c) Explain why ABA should be minimized. (2 marks)

_____

_____

15. During an experiment, students plant seeds in three different conditions: light and moist soil, dry soil, and cold soil.

(a) Predict which condition will show fastest germination. (1 mark)

_____

_____

(b) Explain the effect of unsuitable temperature on seed growth. (2 marks)

_____

_____

(c) Suggest modifications to ensure uniform germination. (2 marks)

_____

_____

16. In a laboratory experiment, students measured the length of roots for seeds treated with different hormones:

Treatment	Average Root Length (cm)
Control	2.1
Auxin	4.8
Gibberellin	3.5
Cytokinin	2.5

(a) Draw a bar graph to represent the data. (3 marks)

(b) Which hormone caused maximum root elongation? (1 mark)

_____

_____

(c) Explain the result based on hormone function. (2 marks)

_____

_____

_____

_____

17. A student investigates the effect of water availability on germination. Data collected:

Water Availability	% Seeds Germinated
5 ml	20
10 ml	60
15 ml	90

(a) Plot a line graph of % germination against water availability. (3 marks)

(b) Explain the trend observed. (2 marks)

_____

_____

(c) What conclusion can be drawn about the role of water in seed germination? (2 marks)

_____

_____

Fill-in-the-Blank / Word Bank

18. The _____ is the first root to emerge during germination. (1 mark)

19. _____ is the growth hormone responsible for cell elongation and apical dominance. (1 mark)

20. Seeds fail to germinate in _____ conditions due to lack of enzyme activation. (1 mark)

21. The increase in girth of a tree is called _____ growth. (1 mark)

22. Discuss how plant hormones can be used in agriculture to:

(a) Break seed dormancy. (2 marks)

_____

_____

(b) Promote uniform germination. (2 marks)

_____

_____

(c) Enhance crop yield. (2 marks)

_____

_____

23. Explain why understanding plant growth and development is important for:

(a) Farmers (2 marks)

_____

_____

(b) Horticulturists (2 marks)

_____

_____

(c) Environmental conservationists (2 marks)

_____

_____

24. (a) **Define the term plant hormone.** (2 marks)

……

……

(b) **Name FOUR plant growth hormones.** (4 marks)

(i) ……

(ii) ……

(iii) ……

(iv) ……

(c) **State FOUR roles/functions of plant growth hormones in plants.** (4 marks)

(i) ……

(ii) ……

(iii) ……

(iv) ……

25. Match the plant growth hormone in **Column A** with the correct function in **Column B**. Write the letter of the correct function beside each hormone.

Column A: Growth Hormone	**Column B: Function**
1. Auxin	A. Causes fruit ripening
2. Gibberellin	B. Promotes seed dormancy
3. Cytokinin	C. Stimulates cell division
4. Ethylene	D. Stimulates stem elongation
5. Abscisic acid	E. Causes phototropism (bending towards light)
6. Auxin	F. Promotes root formation in cuttings
7. Gibberellin	G. Breaks seed dormancy and promotes germination
8. Cytokinin	H. Delays ageing of leaves
9. Ethylene	I. Causes leaf fall (abscission)
10. Abscisic acid	J. Closes stomata during drought

GRADE 10 GENERAL SCIENCE – TOPICAL REVISION QUESTIONS

2.0 Living Things and Environment

2.6 Microorganisms (Fungi, Bacteria, Viruses).

1. List four types of microorganisms that affect human beings. (2 marks)

   _____

   _____

   _____

   _____

2. Classify the following microorganisms as fungal, bacterial, or viral:

   a. Influenza virus: _____

   b. Escherichia coli: _____

   c. Yeast: _____

   d. HIV: _____ (2 marks)

3. Explain one structural difference between bacteria and viruses. (2 marks)

   _____

   _____

4. State two mode of transmission in relation to microorganisms. (2 marks)

   _____

   _____

5. State two ways by which bacteria can be transmitted between humans. (2 marks)

   _____

   _____

6. Explain how viruses are transmitted through airborne droplets. (2 marks)

   _____

   _____

   _____

   _____

7. A school child develops chickenpox after playing with a classmate who had the disease.

(a) Identify the microorganism responsible. (1 mark)

_____

_____

(b) State the mode of transmission. (1 mark)

_____

_____

(c) Suggest one preventive measure. (1 mark)

_____

_____

8. A nurse accidentally pricks herself with a contaminated needle. Name one microorganism that may be transmitted and its type. (1 mark)

_____

_____

10. Name two diseases caused by bacteria in humans. (2 marks)

_____

_____

11. Identify two viral infections that affect humans. (2 marks)

_____

_____

12. Fungal infections can affect the skin and nails. Name one example. (1 mark)

_____

_____

13. Describe the symptoms of malaria and name the microorganism responsible. (2 marks)

_____

_____

_____

_____

14. Explain why bacterial infections can be treated with antibiotics, but viral infections cannot. (3 marks)

15. Outline four methods of controlling the spread of microorganisms in a school setting. (4 marks)

16. A community experiences a cholera outbreak. Explain two measures that could prevent transmission. (4 marks)

17. Why is vaccination important in controlling viral infections? (2 marks)

18. A food vendor notices that some of the bread sold becomes moldy after two days.

(a) Identify the type of microorganism responsible. (1 mark)

(b) Explain one factor that promotes this growth. (1 mark)

(c) Suggest one method to prevent spoilage. (1 mark)

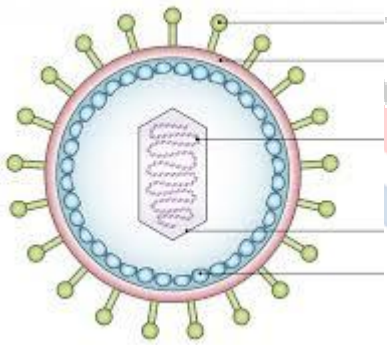
19. During a flu outbreak, students are advised to wash hands frequently and avoid close contact. Explain the rationale behind these instructions. (2 marks)

20. A child has diarrhea after eating contaminated water. Name one bacterial microorganism that could be responsible and the likely mode of transmission. (2 marks)

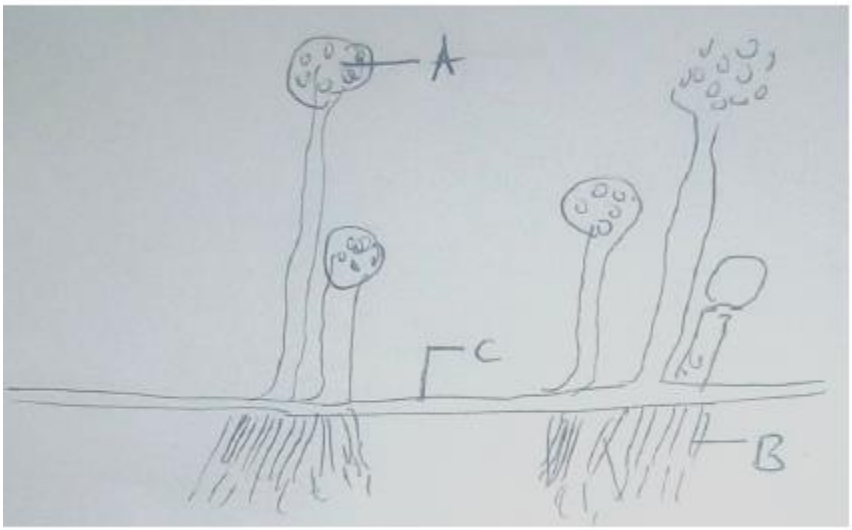
21. In a laboratory experiment, students are asked to culture yeast to produce alcohol. Identify one economic importance of this microorganism. (1 mark)

22. A farmer uses bacteria to enrich soil fertility. Identify the process and microorganism type. (2 marks)

23. The diagram below shows a virus. Name at least four key parts. (4 marks)



24. The diagram below shows a mould of the genus Rhizopus. Study it and answer the questions that follow.



a. Name the kingdom to which it belongs. (1 mk)

_____

b. Name the structure labeled A, B and C.

A._____

B._____

C._____

25. A lab experiment cultured bacteria from two water samples. The table shows bacterial colonies:

Sample	Number of Colonies
A	250
B	10

(a) Represent the data using a bar graph. (3 marks)

(b) Which sample is more contaminated? (1 mark)

_____

(c) Suggest two possible causes of contamination in Sample A. (2 marks)

_____

_____

(d) Suggest two methods to reduce bacterial contamination in water. (2 marks)

_____

_____

(e) Explain why waterborne bacterial diseases are common in rainy seasons. (2 marks)

_____

_____

26. Explain how microorganisms are important in the following sectors:

(a) Agriculture (2 marks)

_____

_____

(b) Medicine (2 marks)

_____

_____

(c) Food industry (2 marks)

_____

_____

(d) Environmental conservation (2 marks)

_____

_____

(e) Industry (2 marks)

_____

_____

27. Discuss the economic and health consequences of not controlling microorganisms in human environments. (5 marks)

_____

_____

_____

_____

28. Explain how improper food storage can lead to foodborne diseases, citing microorganisms involved. (3 marks)

29. During an influenza outbreak, the government advises vaccination and proper hygiene. Explain why both measures are necessary. (3 marks)

30. A student investigates the effect of disinfectants on bacterial growth on a culture plate.

(a) State the aim of the experiment. (1 mark)

(b) Suggest one hypothesis. (1 mark)

(c) Identify the control in this experiment. (1 mark)

(d) Suggest one expected result. (1 mark)

(e) Explain the importance of disinfectants in daily life. (1 mark)

31. A farmer observes fungal growth on stored grains. Suggest three methods to prevent spoilage and indicate the type of microorganism involved. (3 marks)

32. Explain how viruses can spread rapidly in crowded environments and suggest two preventive measures. (3 marks)

_____

_____

_____

_____

33. Describe two positive roles of microorganisms in human life. (2 marks)

_____

_____

GRADE 10 GENERAL SCIENCE – TOPICAL REVISION QUESTIONS

3.0 Matter and Chemical Reactions

3.1 The Periodic Table

1. Draw a table showing the first 20 elements of the periodic table arranged into **groups and periods**. (4 marks)

2. State the **period number** and **group number** of the following elements:
   a) Oxygen:_____
   b) Sodium:_____
   c) Carbon:_____
   d) Neon:_____ (2 marks)

3. Explain why the elements in **Group 8** are chemically stable. (2 marks)

   _____
   _____
   _____
   _____

4. Define **periodic law** and explain its significance in arranging elements. (2 marks)

   _____
   _____
   _____
   _____

5. Write the **electron arrangement** of the following elements:

   a) Lithium:_____

   b) Nitrogen:_____

   c) Magnesium:_____

   d) Fluorine:_____ (4 marks)

6. Draw **dot and cross diagrams** to show the formation of:

   a) Sodium chloride (NaCl)

   b) Magnesium oxide (MgO) (4 marks)

7. Explain why sodium forms **Na^+** ion while chlorine forms **Cl^-** ion. (3 marks)

   _____

   _____

8. State one factor that determines whether an atom forms a **cation or anion**. (1 mark)

   _____

   _____

9. A student observed that oxygen forms O^{2-} ions in compounds. Explain the reason. (3 marks)

   _____

   _____

10. (a) Define **valency** a

_____

_____

(b) Give the valency of:

a) Hydrogen:_____

b) Oxygen:_____

c) Nitrogen:_____

d) Sulphur :_____ (4 marks)

11. Determine the **oxidation number** of nitrogen in **NH_3** and **NO_3^-**. (2 marks)

_____

_____

_____

_____

12. Write the chemical formulae for the following compounds:

a) Sodium nitrate:_____

b) Ammonium sulphate:_____

c) Calcium carbonate:_____

d) Potassium hydroxide:_____ (4 marks)

13. Draw a table showing **common radicals** (ammonium, hydroxide, sulphate, nitrate) and their **charges**. (3 marks)

14. Explain the relationship between **valency** and the **number of electrons gained or lost** by an atom. (2 marks)

_____

_____

_____

_____

15. Write balanced chemical equations for:

a) Reaction of magnesium with oxygen

b) Reaction of sodium with chlorine

c) Reaction of calcium with water (6 marks)

16. State one observation for each of the reactions in question 15. (3 marks)

_____

_____

_____

_____

17. Explain why it is important to **balance chemical equations**. (1 mark)

_____

_____

18. A student combines hydrogen and oxygen gases in a test tube to form water.

a) Draw the electron dot diagram showing bonding in water. (3 marks)

b) Write the chemical equation for the reaction. (1 mark)

c) Identify the type of bond formed. (1 mark)

_____

19. A teacher provides the electron arrangement: 2, 8, 1

a) Identify the element. (1 mark)

_____

b) Determine the group and period. (2 marks)

_____

c) State the ion it forms. (1 mark)

_____

20. Explain why fluorine and chlorine are placed in **Group 17** of the periodic table. (2 marks)

_____

_____

21. Sodium reacts violently with water to form sodium hydroxide and hydrogen gas.

a) Write the chemical equation. (2 marks)

b) Explain the observations. (2 marks)

_____

_____

22. A student observes that noble gases do not readily form compounds. Using **electron arrangement**, explain why. (2 marks)

_____

_____

_____

23. Draw a **diagram of the first 20 elements showing their atomic number, symbol, and electron arrangement**. (5 marks)

24. Use a diagram to explain the **difference between s and p orbitals** for the first 20 elements. (3 marks)

25. Draw **Lewis dot structures** for:

a) H_2O

b) CO_2

c) NH_3 (6 marks)

26. Label the **cation and anion** in the dot and cross diagram of **$MgCl_2$**. (1 mark)

27. The table below shows elements with their electron arrangements:

Element	Electron Arrangement
A	2
B	2, 8
C	2, 8, 1

a) Identify elements A, B, and C. (3 marks)

A:_____

B:_____

C:_____

b) State the period number for each element. (3 marks)

_____

_____

_____

_____

c) Determine the valency of each element. (4 marks)

_____

_____

_____

_____

28. A compound contains 2 atoms of hydrogen and 1 atom of oxygen. Using your knowledge of valency and bonding,

a) Draw its dot and cross diagram. (2 marks)

b) Write its chemical formula. (1 mark)

29. The table shows ions and their charges. Complete the missing information:

Ion	Charge	Type of Ion
Na^+	+1	Cation
O^{2-}	?	?
Cl^-	?	?

(3 marks)

30. A teacher shows two compounds: **NaCl** and **MgO**. Describe one **similarity** and one **difference** in their bonding. (2 marks)

31. Explain how the **electron arrangement of elements** influenced the **development of the modern periodic table**. (2 marks)

32. Discuss why **alkali metals** are more reactive than **alkaline earth metals**. (2 marks)

33. Using examples, explain the relationship between **group number and valency**. (2 marks)

34. Describe how understanding ion formation is useful in **predicting the chemical formulae of compounds**. (2 marks)

35. Explain why some elements have **variable oxidation states** and give one example. (2 marks)

GRADE 10 GENERAL SCIENCE – TOPICAL REVISION QUESTIONS

3.0 Matter and Chemical Reactions

3.2 Chemical Families

1. Draw a table of the **first 20 elements**, grouping them into **Alkali metals, Alkaline earth metals, Halogens, and Noble gases**. (4 marks)

2. Study the elements below:

i. Li,
ii. Be,
iii. B,
iv. C,
v. N,
vi. O,
vii. F,
viii. Ne,
ix. Na,
x. Mg

a) Identify **which elements belong to Alkali metals**. (1 mark)

_____

b) Identify **which elements belong to Halogens**. (1 mark)

_____

c) Identify **which elements belong to Noble gases**. (1 mark)

_____

_____

d) State the **period numbers** of Be and Ne. (2 marks)

3. Explain why **noble gases are chemically unreactive**. (1 mark)

4. Using a diagram, show the **physical differences between sodium (Na) and magnesium (Mg)** in terms of:

   i. Appearance

   ii. Hardness

   iii. Density (3 marks)

5. List **three physical properties** of halogens that differentiate them from alkali metals. (3 marks)

6. Describe **one observable property** for each of the following:

   a) Noble gases

   b) Transition metals (e.g., copper)

c) Alkaline earth metals (e.g., magnesium) (3 marks)

7. Why is sodium stored under oil in the laboratory? (1 mark)

8. Complete the table below for reactions of selected elements:

Element	Reacts with Water	Reacts with Oxygen	Reacts with Dilute Acid	Observation
Sodium				
Magnesium				
Chlorine				

(6 marks)

9. Write **balanced chemical equations** for the reaction of:

a) Sodium with water

b) Magnesium with dilute hydrochloric acid

c) Chlorine with sodium (forming a compound) (6 marks)

10. Explain why **alkaline earth metals are less reactive than alkali metals**. (3 marks)

4. Uses of Elements (10 marks)

11. Match the elements to their common uses:

Element	Use
Sodium	
Magnesium	
Chlorine	
Neon	

(4 marks)

12. A student wants to use an element to **prevent corrosion in water pipes**. Which chemical family would you recommend and why? (2 marks)

_____

_____

13. Explain one use of **noble gases** in day-to-day life and why their chemical property makes them suitable. (2 marks)

_____

_____

14. State two uses of **transition metals** in industry and explain why their properties make them suitable. (2 marks)

_____

_____

15. A teacher places **sodium and magnesium metals** in separate test tubes containing water.

a) Predict the products of each reaction. (2 marks)

_____

_____

b) Which gas is evolved in each reaction? (2 marks)

_____

_____

c) State one safety precaution when performing these reactions. (1 mark)

_____

_____

16. Chlorine gas is released in a laboratory experiment. Describe **two ways it can be safely handled or prevented from causing harm**. (2 marks)

_____

_____

17. A student observes that **copper, iron, and zinc** react differently with acids.

    a) Which of these is a **transition metal**? (1 mark)

_____

_____

    b) Arrange them in order of **reactivity with dilute HCl**. (2 marks)

_____

_____

    c) Explain why copper reacts the least. (1 mark)

_____

_____

18. Draw a **diagram showing the position of halogens in the periodic table** and label the group and period numbers. (2 marks)

19. Using a flow diagram, show the **electron transfer process** when sodium reacts with chlorine to form NaCl. (3 marks)

20. Study the table below showing some properties of elements:

Element	**Melting point (°C)**	**Density (g/cm³)**	**Reactivity with water**
Sodium	98	0.97	High
Magnesium	650	1.74	Moderate
Neon	-249	0.0009	None

a) Identify which element is a **noble gas**. (1 mark)

b) Which element is **alkaline earth metal**? (1 mark)

c) Which is **alkali metal**? (1 mark)

d) Explain the trend in **reactivity with water** among the elements. (3 marks)

e) Why does neon have such a low melting point? (2 marks)

f) Suggest one practical use of magnesium based on its density. (2 marks)

21. Explain why **transition metals** are widely used in **construction and machinery** compared to alkali metals. (3 marks)

22. Compare the **chemical reactivity** of alkali metals and halogens using examples. (3 marks)

23. Using a labelled diagram, show **differences in appearance** between sodium, chlorine, and neon. (3 marks)

24. Discuss the importance of **halogens** in daily life and one risk associated with improper handling. (3 marks)

25. A chemist wants to design a **non-reactive container** for storing reactive gases. Which chemical family would be suitable? Explain. (3 marks)

26. The table below gives information on four elements by letters E, F, G, and H. study it answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Electron arrangement	Atomic radius(nm)	Ionic radius(nm)
E	2.8.2	0.136	0.065
F	2.8.7	0.099	0.181
G	2.8.8.1	0.203	0.133
H	2.8.8.2	0.174	0.099

i. The ionic radius of H is smaller than its atomic radius. Explain. (2 marks)

ii. Write the equation for the reaction between E and chlorine (1 mark)

27. The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters are not the actual symbols of the elements.

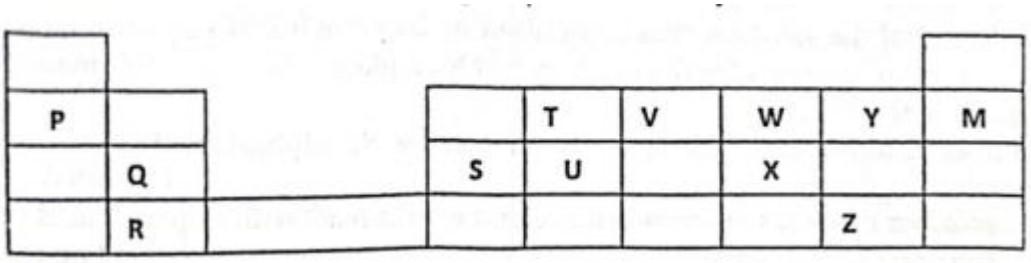
F					B		K	
	Y			V		M		T
H							P	

(a) Select an element that cannot form an ion. (½mark)

(b) Which group (I) element has the highest first ionization energy? (½mark)

(c) Compare the atomic radius of Y and V (2marks)

28. The grid below forms part of the periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements.



a. Write the general name given to the element P belong. (1 mark)

b. An element N has an atomic number of 15. Write down its electronic arrangement and hence fix it in its right position on the grid above. (2 marks)

c. Compare the size of the atom of R and that of its ion. Explain your answer. (2 marks)

d. Give the formula of the compound formed between P and W. (1 mark)

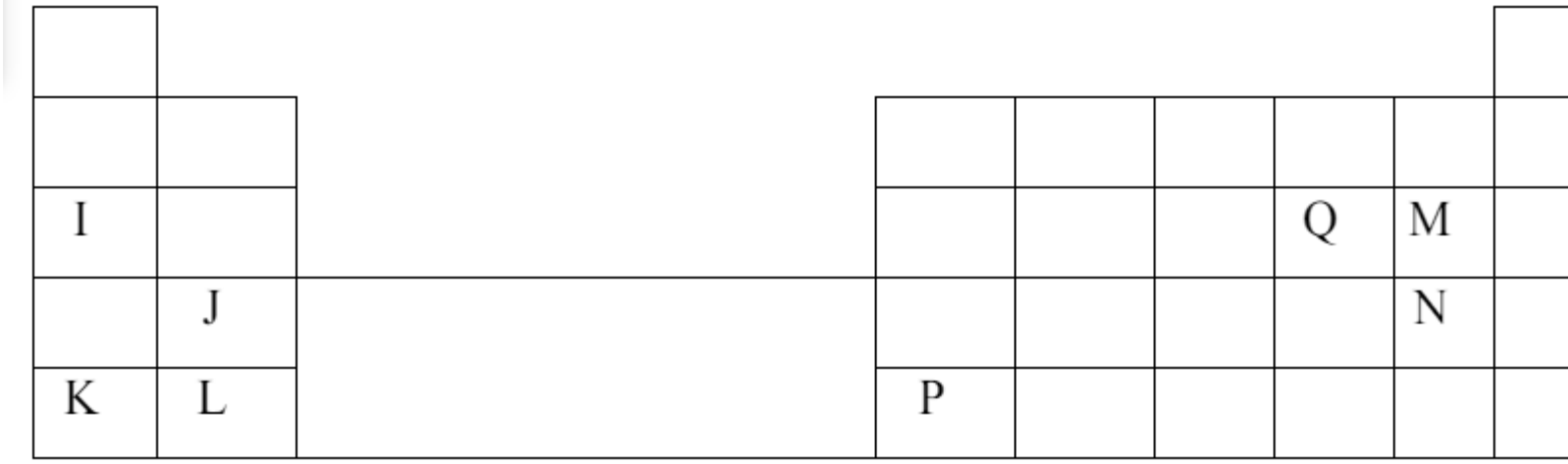
e. T and Y compare the melting points of element Q and S. Explain (2 marks)

f. State the least reactive element in the grid. Give a reason for your answer. (2 marks)

g. Give two advantages that element S has over element Q in making electric cables. (2 marks)

h. Draw (a) dot (•) and cross (x) diagram to represent the bonding in compound formed between T and Y (2 marks)

29. Below is a sample of the periodic table



a) Give the family name to which elements **M** and **N** belong (1 mark)

(b) Compare the reactivity of elements **I** and **K**. Give a reason (2 mark)

(c) Write the formula of the compound formed when **P** reacts with **Q** (1 mark)

Study the periodic table below and answer the questions that follow. The letters do not represent the actual symbols of the elements.

A								B
C		Transition		D		X	E	F
G	H	Elements	I	J	K	L	M	N
O	P			Q			R	S

a. Name the chemical family to which the following elements belong

i. C, G, O (1 mark)

ii. B, F, N, S (1 mark)

b. Compare the atomic radii of G and H. (1 mark)

c. State one use of element.

i. A (1 mark)

ii. N (1 mark)

d. Compare the atomic radius of G and H. (1 mark)

e. Ionic radius of R is larger than its atomic radius. Explain. (2 marks)

f. Write down the formula of the compound formed when element I reacts with element X. (1 mark)

g. Identify the strongest reducing agent. Explain. (2 marks)

h. State one property of the transition elements (1 mark)

i. Compare the first and second ionisation energies of element H. (2 marks)

GRADE 10 GENERAL SCIENCE – TOPICAL REVISION QUESTIONS

3.0 Matter and Chemical Reactions

3.3 Chemical Bonding

1. Draw and label **dot and cross diagrams** to show bonding in the following:

   a) Water (H_2O)

   b) Sodium chloride (NaCl)

   c) Hydrogen molecule (H_2)

   d) Diamond (C) (4 marks)

2. Using a **table**, classify the above compounds based on **bond type (ionic, covalent, metallic, Van der Waals)** and **state at room temperature**. Include an example of **electrical conductivity** for each. (4 marks)

3. Explain why **ionic compounds like NaCl conduct electricity when molten but not as solids**. (2 marks)

4. Distinguish between ionic bond and covalent bond (2 marks)

5. State the type of bonding in the following substances: (2 marks)

(i) Diamond

(ii) Copper (I) oxide

6. Use the table below to answer the questions that follow. (The letters are not the actual symbols of the elements)

Element	Atomic number	Melting point (^{0}C)
A	11	97.8
B	13	660
C	14	1410
D	17	-101
E	19	63.7

a. Write the electronic arrangement for the ions formed by the elements B and D

B _____(½ mark)

D _____(½ mark)

b. Select an element which is

i. a poor conductor of electricity (½ mark)

_____

_____

ii. most reactive metal (½ mark)

_____

_____

c. Explain briefly how the atomic radii of element B and C compare. (2 marks)

_____

_____

d. Use dots (·) and crosses (x) to represent outermost electrons and show the bonding in the compound formed between C and D. (2 marks)

e. Explain why the melting point of element B is higher than that of element A. (2 marks)

_____

_____

f. Write an equation for the reaction that takes place between element A and water. (1 mark)

_____

_____

g. Describe how a solid mixture of the sulphate of element E and lead (II) sulphate can be separated into solid samples. (3 marks)

_____

_____

5. a) State the type of bonding in graphite. (1 mark)

_____

b) Explain why graphite is **soft and slippery**. (2 marks)

_____

_____

c) Suggest one industrial use of graphite based on its bonding and structure. (2 marks)

_____

_____

6. Compare the physical properties of **diamond** and **graphite** in the following table:

Property	**Diamond**	**Graphite**	**Explanation (How bond affects property)**
Hardness			
Electrical conductivity			
Melting point			

(6 marks)

7. Explain the differences in **melting and boiling points** between ionic compounds and simple molecular compounds. (2 marks)

_____

_____

_____

_____

8. A student is given three samples: NaCl, H_2O, and Aluminium metal. For each sample:

   a) Predict whether it will conduct electricity in solid and liquid/aqueous state. (3 marks)

   b) Predict its solubility in water. (3 marks)

   c) Explain the observations in terms of **bond type**. (3 marks)

9. During a chemistry experiment, a teacher demonstrates that **diamond does not conduct electricity** while **graphite does**.

   a) Explain why graphite conducts electricity but diamond does not. (2 marks)

   b) Which property of the carbon atom in each structure is responsible for this difference? (2 marks)

   c) Suggest one practical application for each structure. (2 marks)

10. A laboratory exercise shows that **NaCl dissolves in water but not in oil**, while **I_2 (iodine) dissolves in oil but not in water**.

    a) Explain this observation in terms of bonding. (2 marks)

b) Classify each substance as **polar or non-polar**. (1 mark)

_____

_____

11. You are given **sodium chloride, sugar ($C_{12}H_{22}O_{11}$), and aluminium**. You are asked to test their properties. Complete the following table:

Substance	Melting point	Electrical conductivity	Solubility	Bond type	Uses
NaCl					
Sugar					
Aluminium					

(6 marks)

12. During a project, students are asked to model **ionic, covalent, and metallic bonding** using locally available materials. Explain one **advantage and one limitation** of such a model for understanding chemical bonding. (2 marks)

_____

_____

13. The **melting points of some compounds** are shown below:

Compound	Melting Point (°C)
NaCl	801
H_2O	0
Diamond	3550

a) Arrange these compounds in order of **increasing bond strength**. (1 mark)

_____

_____

b) Explain the trend. (2 marks)

_____

_____

c) Suggest an industrial application for diamond based on its melting point. (2 marks)

14. A student observes the following properties:

Substance	Hardness	Conductivity	Solubility	Use
Aluminium	High	Yes	Insoluble in water	Roofing sheets
Graphite	Soft	Yes	Insoluble in water	Lubricant
Diamond	Very high	No	Insoluble in water	Cutting tools

a) Identify the **bond type** for each substance. (3 marks)

b) Explain why aluminium is malleable. (2 marks)

c) Why is diamond used for cutting tools but not graphite? (2 marks)

15. In an experiment, the student dissolves **NaCl in water** and passes **electric current** through the solution.

a) Predict the ions present in solution. (2 marks)

b) Explain why NaCl conducts electricity only in aqueous or molten state. (2 marks)

16. A company wants a **lubricant** for high temperature machines. Which substance among **diamond, graphite, or Aluminium** would be most suitable and why? (2 marks)

17. Discuss how **bond type affects:**

a) Melting point

b) Electrical conductivity

_____

_____

c) Solubility

_____

_____

d) Hardness

_____

_____

e) Uses of compounds (Provide one example for each). (10 marks)

_____

_____

GRADE 10 CHEMISTRY – TOPICAL REVISION QUESTIONS

3.0 Matter and Chemical Reactions

3.4 Acids, Bases, and Salts

1. Define the following terms:

   a) Acid

   _____

   _____

   b) Base

   _____

   _____

   c) Salt (3 marks)

   _____

   _____

2. Using a **universal indicator and pH chart**, classify the following substances as strong acid, weak acid, strong base, weak base, or neutral:

i. Hydrochloric acid (HCl) _____

ii. Ethanoic acid (CH_3COOH) _____

iii. Sodium hydroxide (NaOH) _____

iv. Ammonia solution (NH_3) _____

v. Water (H_2O) _____ (5 marks)

3. Draw a **labeled diagram of a pH scale** showing where each of the above substances falls. (3 marks)

4. Identify whether each of the following is an acid or a base and state one biological process it is involved in:

i. Gastric juice

ii. Sodium bicarbonate ($NaHCO_3$)

iii. Lemon juice (3 marks)

5. Classify the following salts as **normal, acidic, basic, or double**:

i. Na_2SO_4

ii. NH_4Cl

iii. $NaHCO_3$

iv. $KAl(SO_4)_2$ (3 marks)

6. Differentiate between **hygroscopic, deliquescent, and efflorescent salts**, giving **one example for each**. (3 marks)

7. A student adds **dilute hydrochloric acid to magnesium ribbon** in a test tube.

   a) Write a **balanced chemical equation** for the reaction.

   _____

   _____

   b) Identify the **gas produced** and a simple test to confirm it.

   _____

   _____

   c) State the type of reaction. (4 marks)

   _____

   _____

8. During a lab, **vinegar (CH_3COOH) is added to sodium carbonate (Na_2CO_3)**.

   a) Write the **balanced chemical equation** for this reaction.

   _____

   _____

   b) Identify the products formed.

   _____

   _____

   c) Suggest one **practical use** of this reaction in real life. (4 marks)

   _____

   _____

9. A farmer adds **calcium hydroxide (slaked lime) to acidic soil**.

   a) Identify the type of chemical reaction involved.

   _____

   _____

   b) Explain the effect on the soil's pH.

   _____

   _____

c) State why this process is important for crop growth. (4 marks)

10. You are given three salts: **NaCl, $CaCl_2$, and Na_2CO_3**.

a) Predict which one is **deliquescent**.

b) Describe a simple experiment to observe its behavior in air. (4 marks)

11. A student tests **ammonia solution** with universal indicator. The solution turns **blue**.

a) Explain why the color changed.

b) State whether the solution is acidic or basic.

c) Suggest a practical household use for ammonia solution. (3 marks)

12. The following data was obtained from testing different substances with universal indicator:

Substance	pH	Color on indicator
Lemon juice	2	Red
Sodium hydroxide	13	Dark blue
Distilled water	7	Green
Vinegar	3	Red-orange

a) Classify each substance as acid, base, or neutral. (4 marks)

b) Identify the **strongest acid** and **strongest base** from the table. (2 marks)

c) Suggest one **biological or industrial application** for each of the acids and bases listed. (4 marks)

13. A chemical engineer wants to produce a salt by reacting **HCl with NaOH**.

a) Write a **balanced chemical equation** for this reaction.

b) Identify the type of salt formed.

c) Suggest a **practical use** for the salt. (5 marks)

14. You are asked to **prepare a sample of copper (II) sulfate ($CuSO_4$)** using **reaction between copper oxide and dilute sulfuric acid**.

a) Write the **balanced chemical equation**.

b) Describe the steps you would take to **prepare and crystallize the salt**.

c) Identify a safety precaution in the experiment. (5 marks)

15. Explain how you would **test for the following in food samples**:

a) Reducing sugars using Benedict's solution

b) Proteins using Biuret solution

c) Fats using ethanol test (5 marks)

16. A student adds water to **anhydrous sodium carbonate (Na_2CO_3)**. Describe what will happen and explain why. (3 marks)

17. You are given three salts: **Na_2CO_3, $CaCl_2$, and KOH**. Describe **one method to classify them based on their reaction with water**. (3 marks)

18. Explain why **deliquescent salts are stored in sealed containers**, while **efflorescent salts may become powdery over time**. (4 marks)

19. Farmers use **fertilizer salts** containing nitrogen and phosphorus. Explain:

    a) How such salts help plants grow.

    b) One environmental problem caused by excess use of salts. (4 marks)

20. In the food industry, **sodium chloride** is used for preservation. Explain:

    a) How salt prevents microbial growth.

    b) One other use of salt in daily life. (3 marks)

21. Some salts are used in **laundry and cleaning agents**.

    a) Identify one such salt.

    b) Explain its role in cleaning. (3 marks)

22. Discuss **economic importance of salts** in the following sectors:

i. Agriculture

_____

_____

ii. Food industry

_____

_____

iii. Medicine

_____

_____

iv. Construction (5 marks)

_____

_____

23. Discuss the **importance of acids, bases, and salts** in everyday life and the environment. Your answer should include:

_____

_____

_____

_____

GRADE 10 CHEMISTRY – TOPICAL REVISION QUESTIONS

3.0 Matter and Chemical Reactions

3.5 Rates of Reactions

1. Define the term **rate of chemical reaction** and give **one example** in daily life. (3 marks)

   _____

   _____

2. Explain the significance of studying **rates of reactions** in:

   a) Biological processes

   _____

   _____

   b) Industrial processes (4 marks)

   _____

   _____

3. Draw a **diagram showing the effect of temperature on the rate of a reaction**. Explain why the rate increases with temperature. (4 marks)

4. Using a simple graph, show how **surface area affects reaction rate** and explain the observation. (4 marks)

5. A student reacts **hydrochloric acid with magnesium ribbon** in a test tube and measures the time taken for the magnesium to dissolve.

   a) Identify a factor that could **increase the rate of reaction**.

   _____

   _____

   b) Suggest a method to **measure the rate quantitatively**.

   _____

   _____

   c) Predict what would happen if the magnesium was powdered instead of ribbon. (4 marks)

   _____

   _____

   _____

   _____

6. During a biology experiment, **enzyme catalase is added to hydrogen peroxide**.

   a) Identify the type of factor affecting reaction rate in this scenario.

   _____

   _____

   b) Write the chemical equation for the decomposition of hydrogen peroxide.

   _____

   _____

   c) Explain how catalase affects the reaction. (4 marks)

   _____

   _____

7. In an industrial setup, **ammonia is synthesized using the Haber process**.

   a) Identify two factors affecting the rate of this industrial reaction.

   _____

   _____

   b) Explain why the reaction is carried out at **high pressure and moderate temperature**.

   _____

   _____

   c) Suggest one safety measure in the process. (4 marks)

8. A student wants to study the effect of **concentration of hydrochloric acid on reaction with sodium thiosulphate**.

a) Describe the experimental setup.

b) Explain how the concentration affects the rate.

c) Suggest a method to record the rate. (4 marks)

9. During an experiment, light is shone on **silver chloride**.

a) Identify the factor affecting reaction rate in this case.

b) Write the reaction equation.

c) Predict what would happen if the experiment was carried out in darkness. (4 marks)

10. The following data was obtained from an experiment on reaction rate:

Experiment	Temperature (°C)	Time (s) for reaction to complete
1	20	120
2	30	90
3	40	60

a) Plot a graph of **temperature vs time taken**. (3 marks)

b) Describe the relationship between **temperature and rate**. (3 marks)

c) Predict the time for the reaction at 50°C if the trend continues. (3 marks)

d) Explain why reaction time decreases as temperature increases. (3 marks)

e) Identify one factor not shown in the table that could affect the rate. (3 marks)

11. The table below shows the effect of surface area on reaction rate:

Form of Magnesium	Time for Reaction with HCl (s)	Rate of Reaction (g/s)
Ribbon	120	0.05

Powder	30	0.20

a) Compare the rates and explain. (3 marks)

b) Draw a diagram showing why powdered magnesium reacts faster. (3 marks)

c) Suggest another way to increase reaction rate without changing surface area. (3 marks)

12. Design an experiment to investigate the effect of **concentration on rate of reaction** using hydrochloric acid and sodium thiosulphate. Include:

- Materials
- Method
- Observations
- How to calculate the rate

(5 marks)

13. Describe how you would investigate the **effect of a catalyst** on the decomposition of hydrogen peroxide. Include:

- Materials
- Steps
- Observation
- Explanation of the effect of catalyst

(5 marks)

14. Suggest a simple experiment to show the effect of **light on a chemical reaction**. Include:

- Reactants
- Observation
- Conclusion

(5 marks)

15. An experiment is set up to investigate the effect of **pressure on rate of reaction between gases**. Explain:

a) How to vary the pressure

b) How to measure the rate

c) Expected results if pressure is increased

(5 marks)

16. Explain how **manipulating temperature, pressure, and catalysts** increases the efficiency of the Haber process. (5 marks)

17. Discuss the importance of controlling **reaction rate** in:
    a) Pharmaceutical industry
    b) Food industry
    (5 marks)

18. Explain the environmental importance of understanding reaction rates when using **fertilizer salts**. (5 marks)

19. A chemical factory is planning to synthesize ammonia using the Haber process:

- Identify all factors that can affect the rate of reaction.
- Suggest how the factory can **increase efficiency** without compromising safety.
- Explain the consequences of ignoring optimum reaction conditions.
  (15 marks)

GRADE 10 PHYSICS – TOPICAL REVISION QUESTIONS

4.0 General Physics

4.1 Turning Effect of Force

1. Define **moment of a force at a point**. (2 marks)
2. State **the principle of moments** and give a **real-life example**. (3 marks)
3. Distinguish between **moments of parallel and antiparallel forces** with diagrams. (4 marks)
4. Explain why a **spanner works better when it is longer** when tightening a nut. (2 marks)
5. Define **torque** and relate it to the turning effect of a force. (4 marks)
6. A student applies a force of **20 N at the end of a 0.5 m meter rule** balanced on a pivot.
   a) Calculate the moment of the force.
   b) Explain what happens if the force is applied closer to the pivot.
   c) Draw a diagram showing the pivot, force, and lever arm. (4 marks)
7. A seesaw is balanced with a **child of 30 kg sitting 2 m from the pivot**. Another child sits at 1.5 m from the other side.
   a) Calculate the mass of the second child to balance the seesaw.
   b) Explain why the child closer to the pivot must be heavier.
   c) Represent the scenario with a labelled diagram. (5 marks)
8. A wrench of length 0.4 m is used to apply a turning moment of **12 Nm**. Calculate the **force applied at the end of the wrench**. (3 marks)
9. A door is 1 m wide and a person applies a **force of 30 N at the handle perpendicular to the door**.
   a) Calculate the moment of the force.
   b) Explain how the moment would change if the force was applied at an angle of 30° to the door.
   c) Illustrate with a diagram. (4 marks)
10. A uniform meter rule of mass 0.2 kg is balanced on a pivot at its center. A **50 g mass is placed 30 cm from the pivot**. Calculate the force required on the opposite side to balance it. Draw a diagram. (4 marks)
11. A force of 25 N is applied at a distance of 0.6 m from a pivot. Calculate:
    a) The turning effect (moment) of the force.
    b) The moment if the distance is halved.
    c) Explain the change in terms of lever principle. (4 marks)

12. Two forces of 40 N and 60 N act **antiparallel on a beam** at distances 0.3 m and 0.2 m from the pivot respectively.
    a) Calculate the **resultant moment**.
    b) Determine if the beam will rotate clockwise or anticlockwise. (4 marks)

13. A crane lifts a load using a lever. The load is 200 N and the lever arm is 1.2 m. Calculate the **force required to lift the load if the effort arm is 3 m**. Draw a diagram. (4 marks)

14. A bicycle pedal is 0.175 m from the center of the crank. If a cyclist exerts a force of 250 N on the pedal perpendicular to the crank, calculate the torque produced. (4 marks)

15. A uniform plank of length 2 m and weight 100 N is supported at its ends. A 50 N weight is placed 0.5 m from the left end.
    a) Calculate the reaction at each support.
    b) Draw a diagram showing forces and moments. (4 marks)

16. The following data was collected from an experiment on moments:

Force (N)	Distance from pivot (m)	Moment (Nm)
10	0.2	
15	0.4	
20	0.5	

a) Calculate the missing moments.
b) Plot a graph of **moment vs distance**.
c) Describe the relationship between moment and distance from pivot. (5 marks)

17. Table showing **antiparallel forces on a beam**:

Force 1 (N)	Distance 1 (m)	Force 2 (N)	Distance 2 (m)	Resultant Moment (Nm)	Direction
30	0.3	40	0.2		

a) Calculate the resultant moment.
b) Indicate whether the beam rotates clockwise or anticlockwise. (5 marks)

18. Explain how the **principle of moments** is applied in:
    a) Seesaws
    b) Crowbars
    c) Nutcrackers
    (6 marks)

19. Identify **three tools or machines** in daily life that rely on the turning effect of force and explain how. (6 marks)

20. A mechanic uses a longer spanner to loosen a tight bolt. Explain why this reduces the effort needed. Draw a labelled diagram. (3 marks)

21. A uniform rod of length 3 m is pivoted at 1 m from one end. Two children of masses 40 kg and 50 kg sit at the ends.
    a) Draw a diagram showing the system.
    b) Calculate the moment of each child about the pivot.
    c) Determine the direction of rotation.
    d) Suggest where to place a 20 kg child to balance the rod. (10 marks)

22. A door is 2 m high and 1 m wide. A person applies a force of 50 N at different points along the width to open it:
    a) At the handle 1 m from the hinge
    b) At a point 0.5 m from the hinge

Calculate the turning effect in both cases. Discuss why doors have handles at the edge rather than near the hinge. (10 marks)

GRADE 10 PHYSICS – TOPICAL REVISION QUESTIONS

4.0 General Physics

4.2 Linear Motion with Constant Acceleration

1. Define the following terms as used in linear motion:
   a) Distance
   b) Displacement
   c) Speed
   d) Velocity
   e) Acceleration
   (5 marks)

2. Explain the difference between **speed and velocity** using a real-life example. (3 marks)

3. A body moves along a straight path. Explain what is meant by **uniformly accelerated motion** and give **two examples** in real life. (4 marks)

4. What is **free fall motion**? Explain the effect of gravity on a freely falling object. (3 marks)

5. A car accelerates uniformly from **20 m/s to 50 m/s** over a distance of **300 m**.
   a) Calculate the acceleration of the car.
   b) Determine the time taken to cover the distance.
   c) Draw a velocity–time graph representing the motion. (6 marks)

6. A ball is dropped from a **height of 20 m**.
   a) Calculate the time it takes to hit the ground.
   b) Determine the velocity just before hitting the ground.
   c) Draw a diagram showing displacement vs time. (6 marks)

7. A cyclist starts from rest and accelerates at **1.5 m/s²** for **10 s**.
   a) Calculate the final velocity.
   b) Determine the distance covered in this time.
   c) Explain how increasing acceleration would affect the distance covered. (6 marks)

8. A train moving at **25 m/s** accelerates uniformly at **0.5 m/s²** for **40 s**. Calculate:
   a) The final velocity
   b) Distance covered during acceleration
   c) Represent the motion on a velocity-time graph. (8 marks)

3. Numerical & Application-Based Questions (20 marks)

9. A sprinter accelerates from rest to **10 m/s** in **5 s**.
   a) Calculate the acceleration
   b) Distance covered in this time
   c) Sketch a velocity-time graph. (6 marks)

10. A freely falling object acquires a velocity of **30 m/s** after falling for **3 s**. Calculate:
    a) Acceleration due to gravity (g)
    b) Distance fallen
    c) Draw a diagram showing displacement vs time. (6 marks)

11. A ball is thrown vertically upward with a velocity of **15 m/s**.
    a) Calculate the time to reach the maximum height
    b) Determine the maximum height
    c) Draw a velocity-time graph for the motion. (6 marks)

12. A car decelerates uniformly from **40 m/s to 10 m/s** over **150 m**. Calculate:
    a) Deceleration
    b) Time taken to stop
    c) Explain why understanding deceleration is important in road safety. (6 marks)

13. The table below shows the motion of a car accelerating uniformly:

Time (s)	**Velocity (m/s)**	**Acceleration (m/s²)**	**Distance (m)**
0	0	2	
5		2	
10		2	

a) Fill in the missing values

b) Plot **distance vs time** graph

c) Describe the relationship between distance and time in uniformly accelerated motion (5 marks)

14. A table shows the velocity of a freely falling object at different times:

Time (s)	**Velocity (m/s)**
0	0
1	
2	
3	

a) Complete the table assuming g = 10 m/s²

b) Plot a **velocity-time graph**

c) Determine the distance covered in the first 3 s using the graph (5 marks)

15. Explain how **linear motion with constant acceleration** is applied in:
    a) Road safety
    b) Sports (e.g., sprinting)
    c) Elevators
    (6 marks)

16. A ball dropped from a rooftop injures a passerby. Discuss **safety measures** that could minimize injuries using concepts of free fall and acceleration. (4 marks)

17. Explain why **seat belts and airbags** are important in vehicles in the context of linear motion and acceleration. (5 marks)

18. A ball is dropped from a height of **45 m**:
    a) Draw a displacement vs time graph
    b) Calculate time to hit the ground
    c) Determine velocity just before hitting the ground
    d) Discuss the effect of air resistance on free fall motion (8 marks)

19. A motorbike accelerates from rest at **2 m/s²** for **12 s**. Then it moves at a constant speed for **8 s** before decelerating uniformly to rest over **4 s**.
    a) Draw the velocity-time graph for the motion
    b) Calculate total distance covered
    c) Identify the sections of the graph corresponding to acceleration, uniform motion, and deceleration (12 marks)

GRADE 10 PHYSICS – TOPICAL REVISION QUESTIONS

4.0 General Physics

4.3 Waves

1. Define the following terms as used in waves:
   a) Wavelength
   b) Period
   c) Amplitude
   d) Frequency
   e) Velocity
   (5 marks)

2. Explain the difference between **mechanical waves** and **electromagnetic waves**, giving **two examples of each**. (4 marks)

3. A wave travels along a string with **a frequency of 20 Hz** and a **wavelength of 2 m**. Calculate:
   a) Wave velocity using the wave equation
   b) Time period of one oscillation
   (6 marks)

4. A sound wave of frequency **500 Hz** travels at **340 m/s** in air.
   a) Calculate its wavelength
   b) Draw a diagram showing one complete wave cycle with labelled amplitude, wavelength, and crest/trough
   c) Explain how the properties of this sound wave allow humans to hear it (6 marks)

5. During a science experiment, a student observes water waves with a **wavelength of 0.5 m** and **period of 2 s**.
   a) Determine the wave velocity
   b) If the amplitude of the waves is 0.1 m, illustrate a **wave diagram** showing amplitude and wavelength
   c) Discuss one real-life application of water waves with similar properties (6 marks)

6. A student produces **sound waves** and notices that the waves bend around a corner. Name the phenomenon and explain why it occurs. Provide **one real-life application**. (4 marks)

7. A light ray strikes a flat mirror at **30°**. Draw a **diagram** showing the incident ray, reflected ray, and normal. Explain which wave property is illustrated. (4 marks)

8. A wave has a **frequency of 50 Hz** and a **wavelength of 0.2 m**. Calculate:
   a) Wave speed

b) Time period of one oscillation

c) Sketch a displacement vs distance diagram for one wavelength (6 marks)

9. Ultrasound waves are used in medical imaging. The speed of ultrasound in human tissue is **1500 m/s**. If the ultrasound has a wavelength of **0.015 m**, calculate:

   a) Frequency of the ultrasound wave

   b) Time taken for the wave to travel **3 cm** into the tissue

   c) Explain how the wave reflects at tissue boundaries to produce images (6 marks)

10. A student sets up an experiment to measure the speed of sound using **echoes**. If the distance to the reflecting wall is **170 m** and the time between the sound and echo is **1 s**, calculate the speed of sound. Explain any sources of error. (4 marks)

11. A light wave travels from **air to water**. The speed of light in water is **2.25×10^8 m/s**. If its wavelength in air is **600 nm**, calculate its wavelength in water. (4 marks)

12. The table below shows properties of water waves in a ripple tank:

Wave	**Wavelength (m)**	**Frequency (Hz)**	**Velocity (m/s)**
A	0.4	2	
B	0.25		1.25
C		5	2

a) Complete the missing values using the wave equation

b) Plot **wave velocity vs frequency** for the waves

c) Comment on the relationship between wave velocity, frequency, and wavelength (5 marks)

13. The table shows the time taken for waves to travel a fixed distance:

Wave Type	**Time (s)**	**Frequency (Hz)**	**Wavelength (m)**
Sound	2	?	340
Light	?	6×10^{14}	?

a) Complete the missing values

b) Discuss why light travels faster than sound in air (5 marks)

14. Explain how **reflection of sound waves** is applied in:

   a) Echo-sounding in submarines

   b) Medical ultrasonography

   c) Architecture (concert halls)

   (6 marks)

15. Explain how **refraction of waves** is applied in:
    a) Lenses
    b) Spectacles
    c) Fiber optic communication
    (6 marks)

16. Give **two examples of diffraction of waves** in daily life and explain their significance. (3 marks)

17. A student carries out an experiment with a **ripple tank** to study water waves:
    a) Draw a diagram showing the wave fronts and wavelength
    b) Measure the wavelength and period from the diagram
    c) Calculate wave speed
    d) Explain one factor that could affect the measured speed (8 marks)

18. A speaker produces **sound waves** of frequency **400 Hz** in air. A student places a wall at a distance of **8.5 m** and measures the echo:
    a) Calculate the speed of sound
    b) Draw a diagram showing the incident and reflected waves
    c) Explain one application of this experiment in real life (6 marks)

19. A light wave passes from air into glass at an angle of **45°** to the normal.
    a) Draw a ray diagram showing the path of the light in glass
    b) Identify the wave property demonstrated
    c) Explain why refraction occurs (6 marks)

GRADE 10 PHYSICS – TOPICAL REVISION QUESTIONS

4.0 General Physics

4.4 Magnetism and Electromagnetic Induction

1. Define the following terms:
   a) Magnetization
   b) Demagnetization
   c) Magnetic field
   d) Induced e.m.f
   e) Soft iron (5 marks)

2. Explain the difference between a **permanent magnet** and a **temporary magnet**, giving **two examples** of each. (4 marks)

3. Describe **three methods of magnetizing soft iron** and identify which method is most effective. (6 marks)

4. A student wants to magnetize a soft iron rod using a coil and battery.
   a) Draw a **diagram** showing how the setup should be arranged
   b) Explain what will happen if the battery is disconnected
   c) Name one practical application of the magnetized rod (6 marks)

5. A nail is magnetized by stroking with a bar magnet repeatedly.
   a) Describe the process of **magnetization by stroking**
   b) Explain what happens to the nail when it is **hammered gently after magnetization**
   c) Suggest a method to **demagnetize** the nail (4 marks)

6. A teacher demonstrates that **magnetic field lines exist around a bar magnet** using iron filings.
   a) Draw the expected pattern around a **bar magnet**
   b) Draw the expected pattern around a **horseshoe magnet**
   c) Explain why the pattern is different (6 marks)

7. A galvanometer is connected to a coil. A bar magnet is moved into the coil:
   a) Explain what is observed on the galvanometer
   b) State what **electromagnetic principle** is demonstrated
   c) Explain how this principle is applied in a **bicycle dynamo** (4 marks)

8. A coil of wire with 50 turns is moved quickly through a magnetic field. If the rate of change of magnetic flux is **0.2 Wb/s**, calculate the induced e.m.f in the coil. (5 marks)

9. A straight conductor of length **0.5 m** moves perpendicularly through a magnetic field of strength **0.8 T** at a speed of **2 m/s**.
   a) Calculate the induced e.m.f across the conductor
   b) Explain the factors affecting this induced e.m.f (5 marks)

10. A solenoid of 100 turns is connected to a galvanometer. When a magnet is pushed into the solenoid, the galvanometer shows a maximum deflection of 0.5 A. Explain:
    a) Why the deflection is maximum when the magnet is **first inserted**
    b) Why the deflection decreases when the magnet is held stationary inside the coil
    c) One **real-life application** of this observation (5 marks)

11. A student moves a magnet in and out of a coil 20 times in 10 seconds.
    a) Calculate the **frequency of movement**
    b) Explain how increasing the **number of turns in the coil** affects the induced e.m.f
    c) Suggest one **industrial application** (5 marks)

12. The table below shows observations of a coil when a magnet is moved in different ways:

Movement Type	**Observed Deflection**	**Direction of Current**
Magnet inserted slowly		
Magnet withdrawn quickly		
Magnet held stationary		

a) Fill in the missing observations
b) Explain why deflection occurs only when the magnet is moving
c) Suggest one way to increase the deflection (5 marks)

13. The table shows properties affecting induced e.m.f:

Factor	**Increase in Factor**	**Effect on Induced e.m.f**
Number of turns in coil		
Speed of magnet		
Strength of magnet		

Complete the table with the correct effects (5 marks)

14. Describe how electromagnetic induction is applied in:
    a) Electric bells
    b) Electric generators
    c) Transformers (6 marks)

15. A student uses a hand-cranked generator to light a bulb. Explain:
    a) The role of the magnet in producing electricity
    b) Why the bulb lights brighter when cranked faster
    c) One other practical application of hand-cranked generators (6 marks)

16. Explain how **demagnetization** is important in:
    a) Electrical appliances
    b) Hard disk drives
    c) Magnetic storage devices (3 marks)

17. A teacher demonstrates **electromagnetic induction** using a U-shaped magnet, a coil, and a galvanometer:
    a) Draw the experimental setup
    b) Predict the galvanometer readings when:
    i) The magnet is moved into the coil
    ii) The magnet is held stationary inside the coil
    iii) The magnet is pulled out of the coil
    c) Explain how the experiment demonstrates Faraday's law (8 marks)

18. A soft iron bar is magnetized by electricity and then demagnetized by hammering:
    a) Explain why hammering causes demagnetization
    b) Suggest two other methods of demagnetization
    c) Explain why soft iron is preferred for temporary magnets (6 marks)

19. Design a simple **electric bell** using a coil, soft iron, and a spring:
    a) Draw a labeled diagram of the electric bell
    b) Explain the role of each component in producing sound
    c) Suggest one way to increase the loudness of the bell (6 marks)