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Provincial Department of Education - NWP

දෙවන වාර පරීක්ෂණය - 2025
Second Term Test - 2025

Grade 11

Science - I

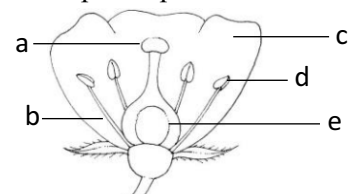
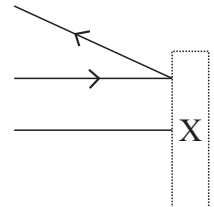
Time : 01 hour

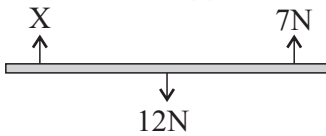
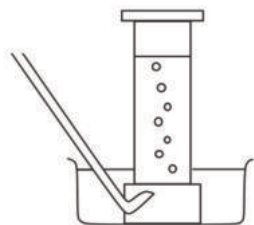
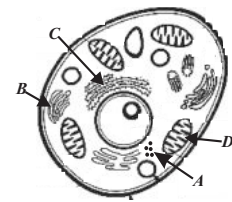
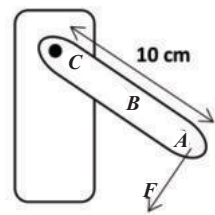
Name. / Index No.:

Instructions :-

- Write answers to all the questions.
- In questions number 1 to 40, four options are given as (1), (2), (3), (4) for answers. Choose the correct or most appropriate option for each question or answer.
- Mark (X) in the circle provided for the number of the option you have chosen for each question on the answer sheet provided to you.

- Which of the following **is not** a bio molecule?
 (1) Carbohydrates. (2) Lipids. (3) Vitamins. (4) Proteins.
- What is the most excreted substance, as a percentage, from the human kidneys?
 (1) Water. (2) Urea. (3) Uric acid. (4) Carbon dioxide.
- When an immersion heater was connected to a plug base of the kitchen and the switch was closed, the power went out only in the kitchen. In this case, the device that opened to cut off the power could be the,
 (1) Isolator. (2) Residual current circuit breaker.
 (3) Miniature circuit breaker. (4) Overload circuit breaker.
- What is the non-metallic element found in allotropic form that have the properties of an electrical conductor?
 (1) Iodine. (2) Sulphur. (3) Carbon. (4) Silicon.
- When heat is supplied to a container of water, its temperature increases from 25°C to 35°C . What is the temperature increase in Kelvin?
 (1) 10 K. (2) 35 K. (3) 60 K. (4) 283 K.
- The figure shows the path of a light ray incident parallel to the principal axis after it strikes an optical device called X. What could be the optical device X?
 (1) Convex Lens. (2) Concave Lens.
 (3) Convex mirror. (4) Concave mirror.
- Which of the following **is not** an external factor affecting photosynthesis?
 (1) Water. (2) Oxygen. (3) Carbon dioxide. (4) Light Energy.
- Which metal forms the corresponding hydroxide with hot water and the corresponding oxide with steam?
 (1) Magnesium. (2) Iron. (3) Aluminum. (4) Sodium.
- A pair of factors that contribute to increasing the reaction rate in non-gaseous reactants are,
 (1) Temperature and pressure. (2) Concentration and pressure.
 (3) Nature of reactants and temperature. (4) Inhibitors and concentration.
- An arrow of mass 40 g released from a bow hits a board as shown in the figure and gets stuck. If the velocity of the arrow when it hits the board is 75 m s^{-1} , what is its momentum?
 (1) 3 kg m s^{-1} (2) 25 kg m s^{-1}
 (3) 115 kg m s^{-1} (4) 300 kg m s^{-1}
- The diagram below shows a section of a flower. Which is the correct order of the pollen production site and the ovule production site?
 (1) a and e. (2) d and e.
 (3) a and b. (4) a and d.



12. Which of the following atoms has no neutrons? (given letters are not real symbols)
 (1) ${}^1_1\text{A}$. (2) ${}^2_1\text{B}$. (3) ${}^5_2\text{C}$. (4) ${}^4_2\text{D}$.
13. The figure shows a rod in equilibrium under three forces. The magnitude of the force x is,
 (1) 5 N. (2) 7 N.
 (3) 12 N. (4) 19 N.
- 
14. Which of the following molecules has the same molecular mass? (C=12, N=14, O=16)
 (1) C_3H_8 and CO (2) C_2H_6 and CO_2 (3) C_3H_8 and CO_2 (4) C_2H_6 and CO
15. Which of the following answers correctly represents the Lewis structure of the ammonia molecule?
 (1) $\begin{array}{c} \text{H}-\text{N}-\text{H} \\ | \\ \text{H} \end{array}$ (2) $\begin{array}{c} \text{H}-\ddot{\text{N}}-\text{H} \\ | \\ \text{H} \end{array}$ (3) $\begin{array}{c} \text{H}=\ddot{\text{N}}=\text{H} \\ | \\ \text{H} \end{array}$ (4) $\begin{array}{c} \text{H}-\ddot{\text{N}}-\text{H} \\ | \\ \text{H} \end{array}$
16. Which of the following correctly describes the organelle and its related cell division process that is important for transmitting genetic information from generation to generation?
 (1) Ribosomes and Meiosis. (2) Ribosomes and Mitosis.
 (3) Nucleus and Meiosis. (4) Nucleus and Mitosis.
17. The figure shows how a gas jar is placed to collect a gas sample released in a certain reaction. A student mentioned three types of gases that can be collected using this method.
A - Oxygen gas
B - Carbon dioxide gas
C - Hydrogen gas
 The correct ones are,
 (1) **A** and **B** only. (2) **B** and **C** only.
 (3) **A** and **C** only. (4) **A**, **B** and **C** all.
- 
18. If the mass of an object is m , the weight of the object near the Earth is, ($g = 10 \text{ ms}^{-2}$)
 (1) $\frac{m}{10}$ N (2) $\frac{10}{m}$ N (3) $10m$ N (4) $10m^2$ N
19. Below is an electron microscopic representation of a typical cell. A membrane less and membrane-bound organelle is, respectively,
 (1) **A** and **B** only. (2) **B** and **C** only.
 (3) **C** and **D** only. (4) **D** and **A** only.
- 
20. If a moment of 1 Nm is required to turn the lock from position **A** of the door frame as shown in the figure, which of the following statements is false? ($AB=BC$)
 (1) The force required to turn the lock from position **A** is 10 N.
 (2) The moment of force generated when the lock is turned from position **B** is 1 N m.
 (3) Couple of forces are acting on the handle.
 (4) Even if the length of the handle is increased, the magnitude of the moment remains constant
- 
21. The three steps in which cell growth and development occur are listed below,
A - Increase in size of the cell.
B - Increase in number of cells.
C - Cell differentiation.
 The step/s in which cell division occurs is/are:
 (1) **A** only. (2) **B** only. (3) **A** and **B** only. (4) **B** and **C** only.
22. Which of the following is an exothermic reaction?
 (1) Lime burning (heating of limestone). (2) Cellular Respiration.
 (3) Photosynthesis. (4) Dissolving urea in water.
23. Three kingdoms belonging to domain Eukarya are,
 (1) Protista, Fungi and Animalia. (2) Bacteria, Plantae and Fungi.
 (3) Bacteria, Plantae and Animalia. (4) Protista, Fungi and Plantae.
24. Which is the correct answer for the speeds of light and sound in a vacuum?
 (1) 0 m s^{-1} and 0 m s^{-1} (2) 0 m s^{-1} and $3 \times 10^8 \text{ m s}^{-1}$
 (3) $3 \times 10^8 \text{ m s}^{-1}$ and 0 m s^{-1} (4) $3 \times 10^8 \text{ m s}^{-1}$ and 330 m s^{-1}

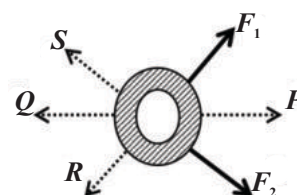
25. The mass percentage of silica (SiO_2) in mica samples taken from Madampe and Wariyapola areas of the North Western Province has been revealed to be 46%. Accordingly, the mass of silica contained in 50 g of mica is,

(1) 23 g (2) 46 g (3) 50 g (4) 92 g

26. Two equal forces F_1 and F_2 act on the wire ring shown in the figure.

The third force that must act to keep the ring in equilibrium is,

(1) P (2) Q (3) R (4) S



27. Consider the following statements made about a motor neuron.

Statement - The speed of nerve impulses traveling along the axon is higher compared to the dendrites.

Reason - Myelin sheaths are formed around the axon.

Which of the following is correct regarding the statement and the reason?

- (1) Both statement and the reason are correct.
 (2) Both statement and the reason are incorrect.
 (3) Statement is correct and the reason is incorrect
 (4) Statement is incorrect and the reason is correct.

28. Solute A dissolves well in solvent B but dissolves poorly in solvent C .

Solvent B and solvent C are immiscible.

What is the answer given for A , B and C respectively?

- (1) Iodine crystals, Water and Carbon tetrachloride.
 (2) Carbon tetrachloride, Iodine solution and Water.
 (3) Iodine crystals, Carbon tetrachloride and Water.
 (4) Water, Carbon tetrachloride and Iodine solution.

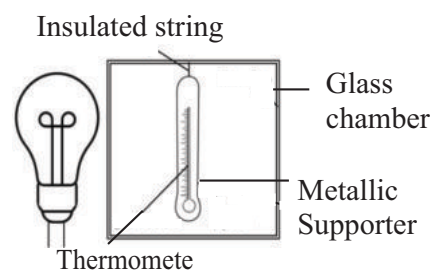
29. The picture shows a dog chasing a man. Which of these **is not** a change takes place in the human body?

- (1) Dilation of the pupil. (2) Increases heart beat rate.
 (3) Increases aeration rate of lungs. (4) Increases peristalsis.



30. A thermometer is placed in a glass chamber that has been evacuated (vacuumed) and a filament bulb placed nearby is lit. What is the correct answer that shows the observation and the reason for it?

Observation	Reason
(1) The thermometer reading does not change.	No heat transfer from the bulb into the glass chamber.
(2) The thermometer reading rises.	Transferring of heat from the bulb into the glass chamber by conduction.
(3) The thermometer reading rises.	Transferring of heat from the bulb into the glass chamber by Radiation.
(4) The thermometer reading rises.	Transferring of heat from the bulb into the glass chamber by Radiation.



31. Which answer includes elements that achieve the noble gas configuration only by gaining electrons?

(1) H, Li and C (2) Na, K and Ca (3) H, F and Cl (4) C, N and O

32. What is the answer given in order of function of red blood cells, white blood cells and blood platelets?

- (1) Oxygen transportation, Antibody production and Blood coagulation.
 (2) Phagocytosis, Antibody production and Oxygen transportation.
 (3) Oxygen transportation, Blood coagulation and Antibody production.
 (4) Antibody production, Phagocytosis and Oxygen transportation.

33. The following are two statements about electromagnetic waves A and B .

Wave A - A type of wave used to detect counterfeit currency notes.

Wave B - Has a wavelength longer than visible light.

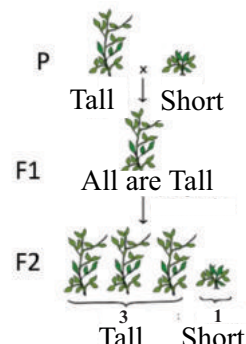
The corresponding pair of electromagnetic waves for A and B is,

- (1) UV rays and Radio waves. (2) Infra red rays and Micro waves.
 (3) Infra red rays and Radio waves. (4) Micro waves and UV rays.

34. Consider the following statements about plants.
- A** Cactus - Flowering plant, Produces seeds.
 - B** Aloe vera - Flowering plant, Does not produce seeds.
 - C** Bird's nest fern - Non-flowering plant. Does not produce seeds.
 - D** Bamboo - Non-flowering plant. Produces seeds.

The correct ones are,

- (1) **A** and **B** only. (2) **A** and **C** only. (3) **B** and **C** only. (4) **B** and **D** only.
35. The figure shows a student's diagram of heredity based on the tall and the short feature of a plant. Which of the following correctly represents the possible genotypes of the parents, F1 and F2 generations?

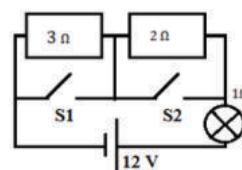


	Parents	F1 generation	F2 generation
(1)	TT, tt	TT	Tt, tt
(2)	TT, Tt	Tt	TT, tt
(3)	TT, tt	tt	Tt, tt
(4)	TT, tt	Tt	Tt, tt

36. Two identical wooden blocks of equal weight but different surface areas are placed on the same surface and the limiting friction force is measured. What are the possible correct readings?

	A wooden block with a base area of 100 cm ²	A wooden block with a base area of 200 cm ²
(1)	5 N	5 N
(2)	5 N	10 N
(3)	10 N	5 N
(4)	100 N	200 N

37. Below are 4 statements made using the circuit shown in the figure.
- a) S1 switch should be closed to obtain maximum brightness of the bulb.
 - b) Brightness of the bulb when the S2 switch is closed, is higher than the brightness when the S1 switch is closed.
 - c) Both S1 and S2 switches should be opened to obtain minimum brightness of the bulb.



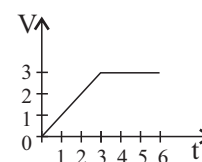
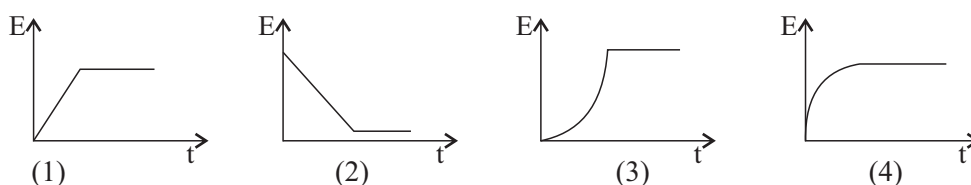
Which of these statements is true?

- (1) a and b only. (2) a and c only. (3) b and c only. (4) a, b and c all.
38. A cricket player hits a ball with his bat. When the stimulus, sensory organ, response, and effector are shown in order for the player,

	Stimulus	Receptor	Response	Effector
(1)	Bowler	Ear	Hitting the ball	Skeletal muscle
(2)	Bowler	Optic nerve	Moving muscles	Smooth muscle
(3)	Seeing the ball	Eye	Hitting the ball	Skeletal muscle
(4)	Seeing the ball	Eye	Scoring marks	Smooth muscle



39. The first velocity-time graph shows the change in velocity of an object moving along a straight line. Which graph accurately shows the change in kinetic energy of the object over time?



40. The most appropriate action that can be taken to avoid a salt shortage in Sri Lanka in the future is,
- (1) Discourage excessive salt consumption as it has a negative impact on heart disease.
 - (2) Government support for the maintenance of a small scale saltern in each Province.
 - (3) Developing infrastructure facilities for the production and storage of the amount of salt required per year.
 - (4) Importing and stockpiling the necessary stocks from countries like India and Maldives even before there is a shortage of salt.

(04)



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Provincial Department of Education - NWP

දෙවන වාර පරීක්ෂණය - 2025
Second Term Test - 2025

Grade 11

Science - II

Time : 03 hours

Additional reading time 10 minutes

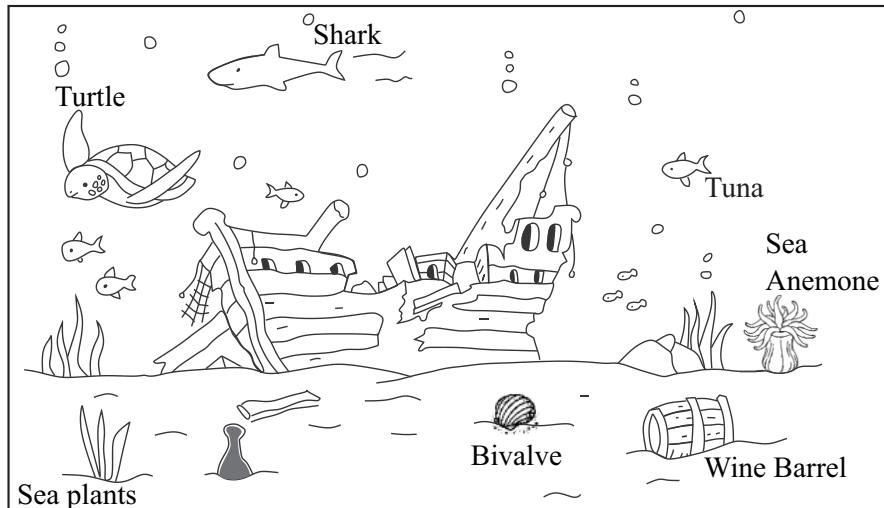
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Important :

- This paper consists of parts A and B
- Answer **all the questions** of part A in the space given.
- Answer **three questions** from the five questions given in the part B

Part A – Structured Essay

(01) (A) The image shows a view of the seabed surrounding a sunken ship.



(i) Provide examples related to the information in the table below using the figure. (04m.)

Information	Example
(a) Spends a sedentary life. Possesses two forms.	
(b) Possesses muscular foot. Shows sexual dimorphism.	
(c) Three chambered heart with partially separated ventricles. Posses lungs for respiration.	
(d) Contributes to increasing oxygen concentration at the seabed.	

(ii) Name a salt of Magnesium dissolved in the sea water. (01m.)

.....

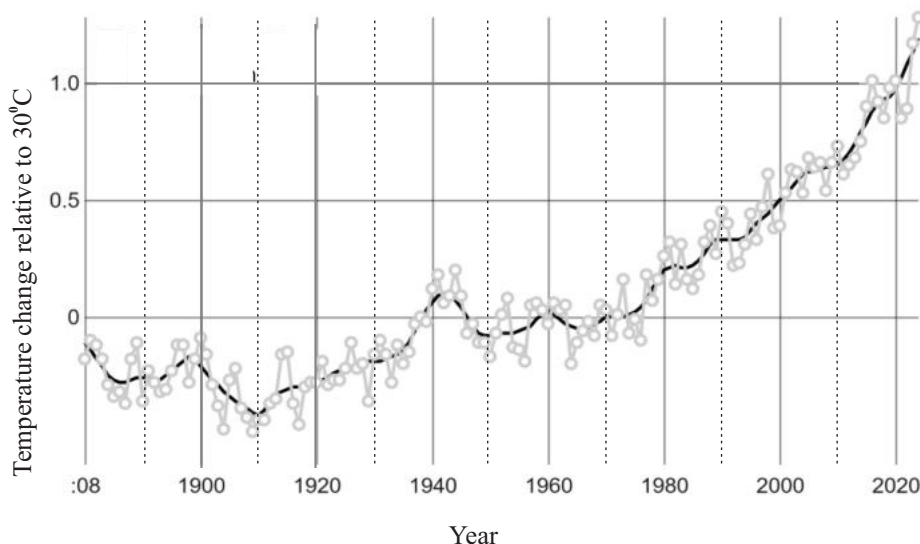
(iii) When a sample of filtered seawater is taken, can it be considered a homogeneous mixture or a heterogeneous mixture? (01m.)

.....



- (iv) The alcohol composition of a wine barrel on board was recorded by mass as 23%.
(Molar mass of alcohol = 46 g mol^{-1})
- (a) Express the composition of wine in the barrel as a mass fraction. (01m.)
.....
- (b) State the above composition in mol dm^{-3} ? (02m.)
.....
- (v) Initial investigations revealed that the ship was sunken due to damage to the hull.
- (a) What is the relationship between the weight of the ship and the upthrust before it starts to sink? (01m.)
.....
- (b) Why does a ship sink when the hull is damaged? (01m.)
.....
- (vi) Mention an adverse impact on the marine environment due to accidents and shipwrecks. (01m.)
.....

(B) Below is a graph showing how the temperature of ocean water have varied over the past century.



- (i) Which decade has the lowest temperature? (01m.)
.....
- (ii) What year did the increase in temperature begin to vary only in a positive range? (01m.)
.....
- (iii) How long has it taken for the temperature to increase by 0.5°C since 2000? (01m.)
.....

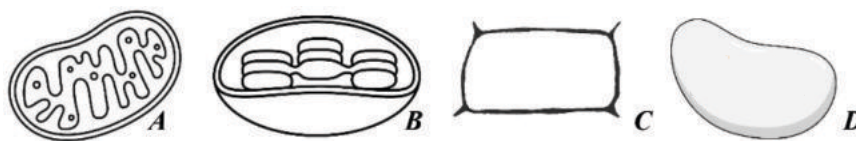


(02) (A) According to the cell theory, Structural and the functional unit of life is the cell.

- (i) Name the other two points explained in the cell theory. (02m.)
.....
.....

(02)

- (ii) Some of the structures and organelles found in a typical plant cell are shown below. Complete the table below accordingly. (04m.)

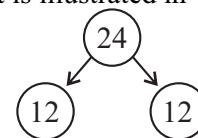


	information	Letter that names the structure/ organelle
(a)	Present in all plant cells. Absent in animal cells.	
(b)	Double membrane bounded organelle. Carries out photosynthesis.	
(c)	Contains pigments. Maintains the water balance.	
(d)	Generate energy by cellular respiration.	

- (iii) The first step in the meiosis of a pollen mother cell of a shoe flower plant is illustrated in the figure below.

- (a) How many chromosomes are there in a pollen cell of a shoe-flower plant?

(01m.)



- (b) Complete the second step in the process of above diagram. (02m.)

(B) Respiration, excretion, and nutrition are three characteristics of life.

- (i) Considering the characteristics of living things, complete the following table by using the symbol (✓) or (✕) as appropriate. (06m.)

Characteristic	Virus	Bacteria	Mushroom	Mimosa
Performs anaerobic respiration.		✓	✓	
Excretion does not occur.		✓	✓	
All are heterotrophic.	✕			✕

15

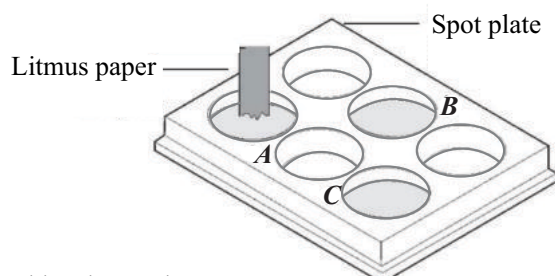
- (03) (A) Three containers containing aqueous solutions **A**, **B** and **C** containing unlabeled acids, bases and salts are required to be identified separately.

The figure shows an activity carried out by a student using a spot plate.

A - No colour change.

B - No colour change.

C - Turned in to red.



- (i) What is the colour of the litmus paper used by the student? (01m.)

.....

- (ii) Which of the solution could be in plate **C** ? acid/base or salt? (01m.)

.....

(03)

(iii) The litmus paper, which had turned red and was used to separate the remaining two solutions, was dipped back into **A** and **B** and observations were made.

(a) If there was no color change at **A**, what color should be obtained at **B**?

..... (01m.)

(b) What is the value of the color obtained at **A** if pH paper is used instead of litmus?

..... (01m.)

(iv) If the solutions used above are NaCl, HCl and KOH, separate them into acid bases and salts.

NaCl -

HCl -

KOH -



(03m.)

(v) Draw the Lewis structure of HCl in the given box.

(02m.)

(vi) Write the balanced chemical equation for the reaction between KOH and HCl.

(02m.)

.....

(vii) Draw an energy level diagram showing the heat change in the above reaction.

(02m.)

Energy



(B) The graph shows how the electronegativity of elements in the third period of the periodic table varies.

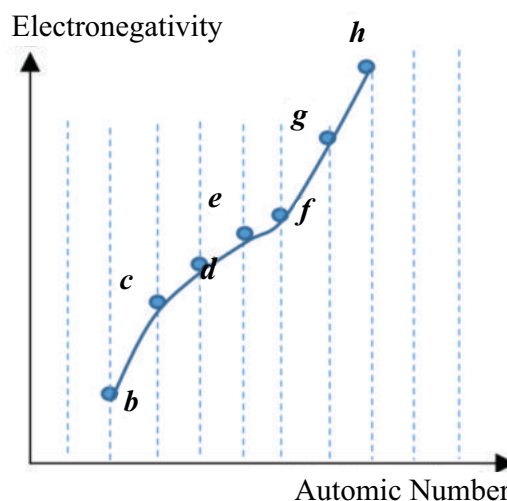
(i) Select two elements from the graph belonging to the activity series and arrange them in order of increasing electro negativity. (01m.)

.....

.....

.....

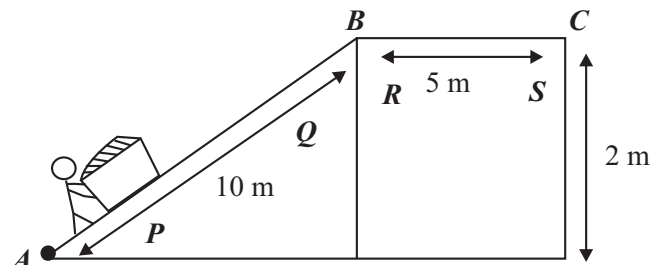
(ii) Mark the element **j** that comes after element **h** in the graph. (01m.)



(04)



- (04) (A) The figure shows an inclined plane designed to transport soil from a lower position to a higher position. A wooden box filled with soil is moved from A to C by applying a constant force of 200 N. The box moves from A to B with a uniform velocity and from B to C with an acceleration of 0.1 ms^{-2} .



- (i) Choose and underline the words that match the blanks in the paragraph below. (03m.)
 When moving from A to B , the resultant force is(zero/non-zero) and the motion can be explained using Newton's (first/second) law. The frictional force acting in this case is called(static/dynamic) frictional force.
- (ii) If the total mass of the box with the soil is 50 kg, calculate the unbalanced force in moving from B to C . (02m.)

- (iii) Indicate in which direction, AB or BA , the friction force acts in the following situations at the position shown in the figure. (02m.)
 - (a) When the man pushes the box up :.....
 - (b) If the man stops pushing the box and leaves :.....
- (iv) Suggest a method to minimize the friction force between the box and the inclined plane without changing the mass of the soil in the box. (01m.)

- (v) Calculate the amount of work done by the man in pushing the box from A to B . (02m.)

- (vi) Among the places P , Q , R and S , (03m.)
 - (a) What are the two places where the kinetic energy of the box is equal ?

 - (b) What are the two places in the box where the potential energy is equal?

 - (c) What are the two places where the momentum of the box is equal?

- (vii) How would the motion of the box change if the resultant force acting on the box was zero before it reached position C ? What is the reason for your answer? (02m.)

(05) (A) The image shows a flowchart showing how three organs belonging to three systems of the human body are connected by blood vessels.

(i) Name **P** and **Q** are two excretory organs of the human body.

(a) What is excretion? (01m.)

(b) Name **P** and **Q** excretory organs respectively. (02m.)

(c) State the three main stages of urine production in kidney. (03m.)

(ii) In the flowchart, **k** is the right atrium and **l**, **m**, and **n** are the other chambers of the heart, and 1, 2, 3, and 4 are the blood vessels connected to the heart.

(a) What is the main difference in the composition of blood between the **l** and **m** chambers? (01m.)

(b) What are the two blood vessels contribute for pulmonary circulation? (02m.)

(iii) Mention one habit each that adversely affects the health of both organs **P** and **Q**. (01m.)

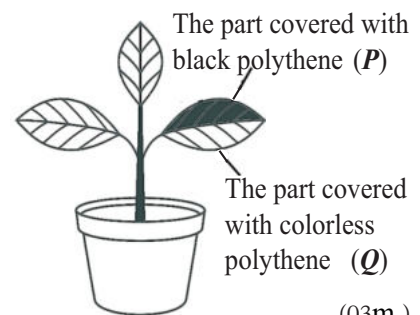
(B) The figure shows a setup prepared to test the factors affecting photosynthesis. A symmetrical leaf is taken, half of it is covered with black polythene and the other half with colorless polythene, and placed in a place where it receives sunlight.

(i) Which factor affects photosynthesis, is this activity designed to test? (01m.)

(ii) What is the purpose of covering half of this with transparent polythene? (01m.)

(iii) Write a three-step method for testing starch for the leaf. (03m.)

(iv) Draw a diagram to illustrate the observations of parts **P** and **Q** after the starch test. (02m.)

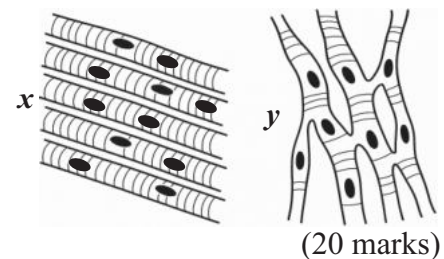


(C) The image shows two types of tissues found in the human body.

(i) Name the tissues **x** and **y** respectively. (02m.)

(ii) Name a characteristic that only cells of tissue **x** have to distinguish tissue **x** from tissue **y**. (01m.)

(iii) State a function of **x** tissue. (01m.)



(06) (A) Ammonia is produced industrially by reacting nitrogen gas with hydrogen gas under ideal conditions, and the reaction rate is increased by catalysts.

(i) (a) What are catalysts? (01m.)

(b) What is the catalyst used in the industrial production of ammonia? (01m.)

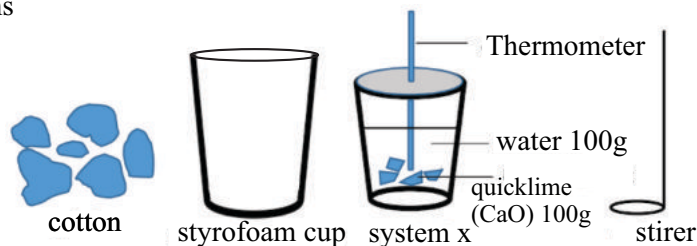
(c) Write two other factors that affect the rate of reaction. (01m.)

(ii) What is the relative molecular mass of a nitrogen molecule? (N=14) (01m.)

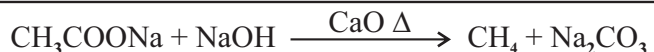
(iii) What is the number of bonding electrons and the number of lone pairs in a nitrogen molecule? (02m.)

(iv) What is the reason for using nitrogen gas as the filling medium in filamental bulbs? (01m.)

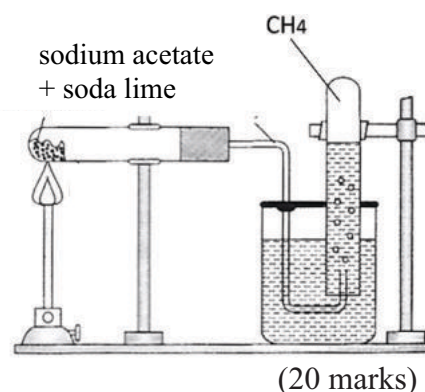
- (B) Following is a setup being prepared by a group of students to study heat changes associated with chemical reactions



- (i) It was observed that the temperature of the system increased by 10°C at the end of the reaction.
 - (a) What type of reaction does this reaction belong to based on the way the heat change occurred? (01m.)
 - (b) Write an expression using the mass of the entire mixture (m), specific heat capacity (c) and temperature difference (Θ) to calculate the heat change (Q) that occurred in the above activity. (01m.)
 - (c) Calculate the amount of heat released during the reaction.
(specific heat capacity of mixture = $1200 \text{ J kg}^{-1} \text{ K}^{-1}$) (02m.)
 - (d) State an assumption you would make here. (01m.)
 - (ii) Write the chemical reaction between quicklime (CaO) and water (H_2O). (02m.)
 - (iii) Using the above equipment, demonstrate the setup that needs to be made to perform the activity correctly. (02m.)
- (C) Below is a diagram of a scientific journal article on how methane gas is produced in the laboratory, along with the balanced chemical equation for the reaction.
(C = 12, Na = 23, O = 16, H = 1)

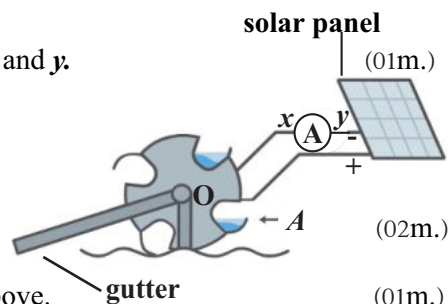


- (i) Find the molar mass of CH_3COONa ? (01m.)
- (ii) What is the molar ratio between CH_3COONa and CH_4 ? (01m.)
- (iii) What is the name given to the way the gas tube is placed in the above process to collect CH_4 ? (01m.)
- (iv) Write one situation each in which CH_4 gas is beneficial and one situation in which it is harmful to humans. (02m.)



- (07) (A) The figure shows a device that uses a waterwheel connected to a solar panel and a motor to move water to a gutter in higher position. An ammeter is connected to measure the current drawn when the device is operating.

- (i) Indicate the direction of electric current flow using x and y . (01m.)
- (ii) The potential difference increases with the intensity of light received by the solar panel, and accordingly, show the variation of current in a rough graph. (02m.)

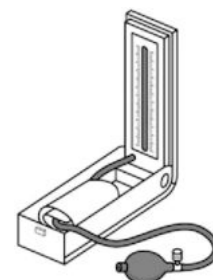


- (iii) State the law that can explain the phenomenon (ii) above. (01m.)
- (iv) When the potential difference across the solar panel is 24 V, the ammeter reading is 3 A.
 - (a) Calculate the power of the motor. (02m.)
 - (b) State one way of energy loss when the motor is in operation. (01m.)

(02)

- (v) It is suggested to add a fuse in series to this circuit. What is the purpose of this? (01m.)
- (vi) If the radius of this water wheel is 0.5 m and the weight of the water filled in *A* is 5 N, calculate the moment of force exerted by the water around the *O* axis. (02m.)

(B) The image shows a mercury sphygmomanometer, which measures blood pressure by measuring the height of the mercury column.



- (i) The factors that affect the pressure exerted by the mercury column are the height of the mercury column (*h*), the density of the mercury (ρ), and the force of gravity (*g*).
- (a) Write an expression for the pressure (*P*) exerted by the mercury column using ρ , *g* and *h*. (01m.)
- (b) When a patient's blood pressure was measured, the height of the mercury column was 100 mm. find the pressure in Pascals (Pa) at this time. (02m.)
- (ii) A student plans to create a model using a liquid that is less dense than mercury instead of mercury. Will the reading be lower or higher than the height of the mercury column? What is the reason for this? (02m.)

(C) Below is how the velocity of an object changes with time.

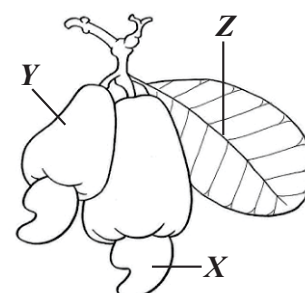
Time (s)	0	1	2	3	4	5	6
Velocity m s^{-1}	0	2	4	6	6	6	6

- (i) Draw a velocity-time graph using the above data. (02m.)
- (ii) State the time interval during which this object traveled at a uniform velocity. (01m.)
- (iii) Calculate the displacement of the object during the first 3 s using the graph. (02m.)

(20 marks)

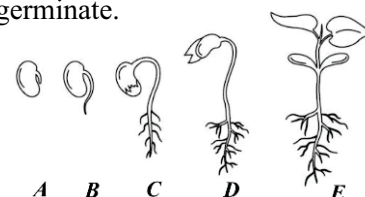
(08) (A) The image shows a section of a branch of a plant with well-ripened cashew nuts.

- (i) How can you identify the cashew tree as a dicotyledonous plant based on the image? (01m.)
- (ii) Indicate correctly where Parenchyma, Collenchyma and Sclerenchyma are most abundant at locations *X*, *Y* and *Z*. (03m.)
- (iii) How do cashew seeds disperse? (01m.)
- (iv) Write an adaptation for dispersing seeds from the way you mentioned above. (01m.)
- (v) What is the globally importance of dispersing fruits and seeds? (01m.)



(B) The image shows several different stages of a seed that has begun to germinate.

- (i) Write one internal and one external factor each that is essential for the development from *A* to *D* above. (02m.)
- (ii) Name another factor that is essential for growth from *E* onwards. (01m.)



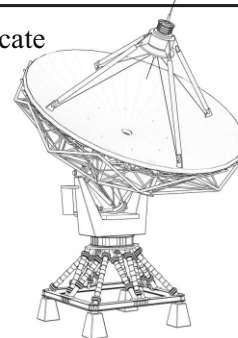
(C) The image shows a beaker containing 500g of water being heated using a Bunsen burner.

- (i) What are the two heat transferring methods that transfer heat from the Bunsen burner to the beaker? (02m.)
- (ii) Calculate the amount of heat that must be supplied to water to raise its temperature by 2°C. (02m.)
- (iii) When heat is continuously supplied, at some moment the temperature does not change any further and remains constant. What is the name given to the heat obtained at that point? (01m.)



- (D) The figure shows a radar system that uses electromagnetic waves to communicate with artificial satellites.

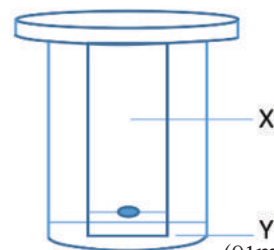
- (i) What is the electromagnetic wave form used in radar systems? (01m.)
- (ii) Name another application where this waveform is used practically. (01m.)
- (iii) Write a common characteristic of electromagnetic waves. (01m.)
- (iv) "Using a mobile phone that is not connected with the domestic electric circuit during lighting, is less dangerous than using landline telephone." was the idea of a student. Do you agree with him? What is the reason for your answer? (02m.)



(20 marks)

- (09) (A) The figure shows a setup prepared to separate the active ingredients contained in a medicinal plant.

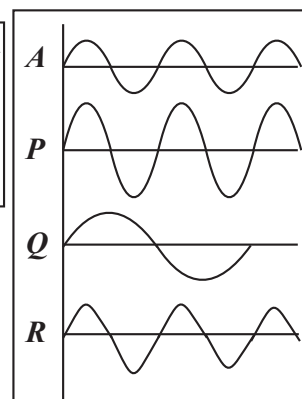
- (i) (a) What is the name of this technique used to separate non-volatile components? (01m.)
- (b) Write the names of the *X* and *Y* phases respectively. (02m.)
- (ii) Mention another instance where this technique is used in practice. (01m.)
- (iii) State the separation technique used in each of the following cases.
 - (a) Production of local medicines such as Arishta and Asava. (01m.)
 - (b) Obtaining cinnamon oil from cinnamon leaves. (01m.)
- (iv) One of the main steps in the process of obtaining pure CuSO_4 from impure solid is to saturate the solution.
 - (a) What observation would lead to know that the solution is saturated? (01m.)
 - (b) What is the change in the water solubility of CuSO_4 when the temperature is increased? (01m.)
 - (c) Name two uses of CuSO_4 in day today life. (02m.)
- (v) It is possible to dissolve sugar more quickly when making an equal volume of tea than when making a glass of soft drink. Simply explain the reason. (01m.)



- (B) The following are some physical quantities related to a wave, and the graph shows the shape of the wave obtained by oscilloscopes from three different sound sources. All graphs are drawn to the same scale.

Physical quantities related to wave

- ♦ Frequency
- ♦ Wave length
- ♦ Amplitude
- ♦ Speed



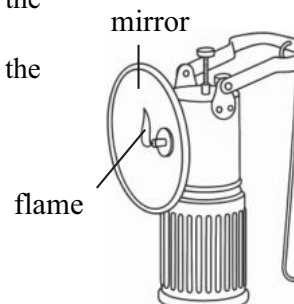
- (i) State the physical quantity that has changed in the *P*, *Q* and *R* waves compared to *A* and the characteristic of the sound that changes accordingly. (03m.)

Wave	Physical quantity	Characteristic of sound
<i>P</i>	a)	b)
<i>Q</i>	c)	d)
<i>R</i>	e)	f)

- (ii) What would happen to the speed of this wave if water were used as the medium instead of air? (01m.)
- (iii) If the frequency of the *P* wave is 35 Hz, What should be the infrasound wave mentioned here. (01m.)

- (C) The image shows an ancient acetylene gas torch. When the torch is lit, the mirror produces a parallel beam of light.

- (i) What type of mirror is used here? (01m.)
- (ii) Show with a ray diagram how this mirror produces a parallel beam of light. (02m.)
- (iii) What type of lens can convert a divergent beam of light into a parallel beam of light? (01m.)



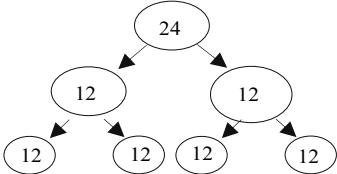
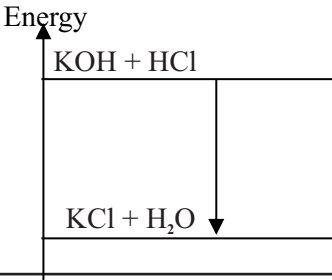
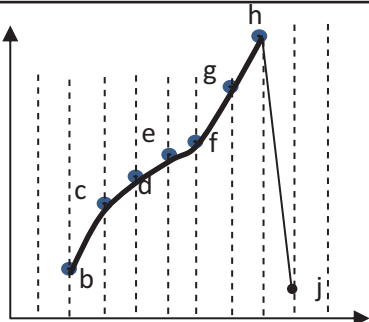
(20 marks)

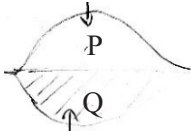
1	3	5	1	9	3	13	1	17	4	21	2	25	1	29	4	33	1	37	2
2	1	6	3	10	1	14	3	18	3	22	2	26	2	30	4	34	2	38	3
3	3	7	2	11	1	15	4	19	1	23	4	27	1	31	3	35	4	39	3
4	3	8	1	12	1	16	3	20	3	24	3	28	3	32	1	36	1	40	3

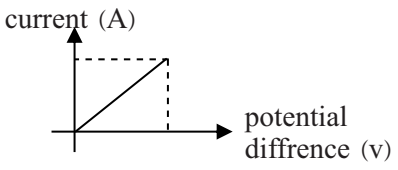
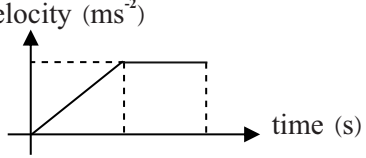
(02 marks for each answer)

Part A – Structured Essay

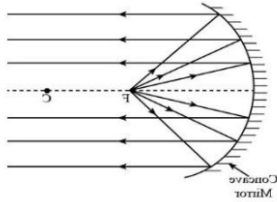
1				
(A)	i.	a)	Sea anemone	01
		b)	Bivalve	01
		c)	Turtle	01
		d)	Sea Plants	01
	ii.		Magnesium Chloride / Magnesium sulphate	01
	iii.		Homogeneous Mixture	01
	iv.	a)	$\frac{23}{100}$	01
		b)	No of Moles = mass / Molar mass = 23 g / 46 g mol ⁻¹ = 0.5 mol Concentration = no of moles / volume = 0.5 mol / 0.1 dm ³ = 5 mol dm ⁻¹	02
	v.	a)	Weight of the ship = upthrust	01
		b)	Because when a ship fills with water, its weight exceeds the upthrust	01
	vi.		Destruction of marine organisms/Reduction of biodiversity/Loss of Natural beauty	01
(B)	i.		1910 - 1920	01
	ii.		1970	01
	iii.		20 years	01
				15
2				
(A)	i.		All organisms are made up of one or more cells. New cells are formed from pre existing cells	02
	ii.	a)	C	01
		b)	B	01
		c)	D	01
		d)	A	01
	iii.	a)	12	01

		b)	for 4 circles with number 12		02															
(B)	iii		<table border="1" data-bbox="442 483 973 703"><thead><tr><th>virus</th><th>bacteria</th><th>mushroom</th><th>mimosa</th></tr></thead><tbody><tr><td>✗</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>✓</td><td>✗</td><td>✗</td><td>✗</td></tr><tr><td>✗</td><td>✗</td><td>✓</td><td>✗</td></tr></tbody></table>	virus	bacteria	mushroom	mimosa	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✗	06
virus	bacteria	mushroom	mimosa																	
✗	✓	✓	✓																	
✓	✗	✗	✗																	
✗	✗	✓	✗																	
				15																
03																				
(A)	i		Blue	01																
	ii		Acids	01																
	iii	a)	Blue	01																
		b)	7	01																
	iv		NaCl - Salt HCl - Acid KOH - Base	03																
	v		$\text{H}-\ddot{\text{Cl}}:$	02																
	vi		$\text{HCl} + \text{KOH} \longrightarrow \text{KCl} + \text{H}_2\text{O}$	02																
	vii			02																
(B)	i		d,c/c,b	01																
	ii		 • should be marked below b	01																
				15																

04				
(A)	i		Zero, first, static	03
	ii		$F = ma$ $F = 50\text{kg} \times 0.1 \text{ ms}^{-1}$ $F = 5\text{N}$	02
	iii	a)	BA	01
		b)	AB	01
	iv		Smoothing the surfaces/fixing wheels/applying lubricants	01
	v		Work done = Force x distance moved in the direction of force $W = 200 \text{ N} \times 2 \text{ m}$ $W = 400 \text{ J}$	02
	vi	a)	p and q	01
		b)	r and s	01
		c)	p and q	01
	vii		Moving with uniform velocity. Until an unbalanced force is applied on it, bodies in motion continue to move at uniform velocities	02
				15
PART B - ESSAY				
05 (A)	i	a)	Removal of excretory products produced during metabolism from the body is called excretion	01
		b)	Lungs, Kidney	02
		c)	Ultrafiltration, Selective reabsorption, Secretion	03
	ii	a)	Concentration of oxygen in L is greater than m./ Concentration of carbondioxide in m is greater than L	01
		b)	1 and 2	02
	iii		Smoking	
(B)	i		Light energy	01
	ii		As the control setup/ providing equal conditions/ As its transparent	01
	iii		Boiling in water Boiling in Alcohol Wash with water and adding Iodine solution by keeping it on a white porcelain	03
				02
(C)	i		X - Skeletal Muscle Y = Cardiac muscle	02
	ii		Voluntary Muscle	01
	iii		Helps in maintain support and movements	01
				20
06				
(A)	i	a)	Catalysts are the substances that increase the rate of a reaction, without being chemically consumed during the reaction	01
		b)	Porous iron	01
		c)	Temperature, surface area of reactants, concentration	02

	ii		28	01
	iii		Bonding electrons - 6 , lone pairs - 2	02
	iv		Because it is a Chemically inert gas/prevent oxidation/ strong thrapple bond of N2.	01
(B)	i	a)	Exothermal reaction	01
		b)	$Q = m c \theta$	01
		c)	$Q = 0.2 \text{ kg} \times 1200 \text{ J kg}^{-1} \text{ K}^{-1} \times 10 \text{ K}$ $Q = 2400 \text{ J}$	02
		d)	No heat loss during the reaction	01
	ii		For correct drawing	02
(C)	i		82 gmol^{-1} (No units, No marks)	01
	ii		1 : 1	01
	iii		Downward displacement of water	01
	iv		Useful – as a fuel Harmful – as it's a green house gas/ harmful gas	02
				20
07				
(A)	i		X to Y	01
	ii		for naming axis (01) for correct graph (01)	02
				
	iii		Ohms law	01
	iv	a)	$P = VI$ $P = 24 \text{ V} \times 3 \text{ A}$ $P = 72 \text{ W}$	02
		b)	Heat/ Sound	01
	v		Prevent burning out of the motor./reduce the electric current drawn.	01
	vi		Moment = Force x perpendicular distance $= 5 \text{ N} \times 0.5 \text{ m}$ $= 2.5 \text{ Nm}$	02
(B)	i	a)	$P = h\rho g$	01
		b)	$P = h\rho g$ $P = (200/1000) \text{ m} \times 13600 \text{ kg m}^{-3} \times 10 \text{ ms}^{-1}$ $P = 2 \times 13600$ $= 27\,200 \text{ Pa}$	02
	ii		Increases the height. To make the pressure equal/ as the density of liquid is less.	02
(C)	i			02

	ii		3s - 6s	01
	iii		Distance traversed = area of the triangle = $\frac{1}{2} \times \text{base} \times \text{perpendicular height}$ = $\frac{1}{2} \times 3 \times 6$ = 9 m	02
				20
08				
(A)	i		Possesses leaves with reticulate venation	01
	ii		Parenchyma - Y Collenchyma - Z Sclerenchyma - X	03
	iii		By animals	01
	iv		Having attractive colours / having edible fleshy parts (etc)	01
	v		Increasing the biodiversity/ minimize the competition for essential factors (etc)	01
(B)	i		Internal factor- viability of seed External factor – Oxygen/ Moisture	02
	ii		Light energy / sunlight	01
(C)	i		Conduction and radiation	02
	ii		$Q = m c \theta$ $Q = 0.5 \text{ kg} \times 4200 \text{ J kg}^{-1} \text{ K}^{-1} \times 2 \text{ K}$ $Q = 4200 \text{ J}$	02
	iii		Latent heat	01
(D)	i		Micro waves	01
	ii		Mobile phones/ Microwave ovens	01
	iii		Electromagnetic waves are not affected by external electric or magnetic fields. They do not require a material medium for propagation. They travel at a speed of $3 \times 10^8 \text{ m s}^{-1}$ in a vacuum.	01
	iv		Yes. Mobile phones do not attract lightning. (Lightning is attracted to the tallest objects or the most conductive path to the ground. The small amount of metal in a mobile phone is insignificant in comparison to trees or tall buildings.)	02
				20
09				
(A)	i	a)	Chromatography	01
		b)	X - Stationary Phase Y – Mobile Phase	02
	ii		To Find whether poisonous chemicals are mixed with water. To Check whether harmful substances are associated with food items.	01
	iii	a)	Solvent extraction	01
		b)	Steam distillation	01
	iv	a)	Precipitation of copper sulphate without dissolving further in water.	02
		b)	Increases	01
		c)	As a fungicide, electroplating, in paint industry.	01
	v		As the increasing of solubility of sugar in water when the temperature increases.	01

(B)	i		<table><tr><td>wave</td><td>Physical quantity</td><td>Characteristic of sound</td></tr><tr><td>P</td><td>a) Amplitude</td><td>b) Loudness</td></tr><tr><td>Q</td><td>c) Frequency</td><td>d) Pitch</td></tr><tr><td>R</td><td>e) Shape of the wave</td><td>f) Quality of sound</td></tr></table>	wave	Physical quantity	Characteristic of sound	P	a) Amplitude	b) Loudness	Q	c) Frequency	d) Pitch	R	e) Shape of the wave	f) Quality of sound	03
	wave	Physical quantity	Characteristic of sound													
	P	a) Amplitude	b) Loudness													
	Q	c) Frequency	d) Pitch													
	R	e) Shape of the wave	f) Quality of sound													
	ii		Increases	01												
	iii		wave length of Q is relatively high/ Frequency is relatively low	01												
(C)	i		Concave mirror	01												
	ii			02												
	iii		convex lens	01												
				20												

Important :

- Provide marks if the correct answer is supplied other than the answer given in the script (Answer written by understanding the concept relevant to the question) '
- Do not provide marks if the unit is not indicated with the final answer where it is must.
- Consider this is as a pre practice for G.C.E'(O/L) examination when providing marks and discussing the answers with students after correcting