

முழுப்பதிப்புரிமையுடையது / All Rights Reserved / සියලුම හිමිකම් ඇවිරිණි

கல்வித் திணைக்களம், கிழக்கு மாகாணம்  
 Provincial Department of Education, Eastern Province  
 கல்வித் திணைக்களம், கிழக்கு மாகாணம்  
 Provincial Department of Education, Eastern Province

கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண-தர) மாதிரி கணிப்பீடு - நவம்பர், 2024  
 General Certificate of Education (Ord. Level) Model Assessment - November, 2024

විද්‍යාව I  
 விஞ்ஞானம் I  
 Science I

34 T I

පැයක්  
 ஒரு மணித்தியாலம்  
 One hour

**Instructions:**

- \* Answer all questions.
- \* In each of the questions 1 to 40, pick one of the alternatives (1), (2), (3), (4) which you consider is correct of most appropriate.
- \* Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.
- \* Further instructions are given on the back of the answer sheet and follow them carefully.

01. Which of the following animal belongs to the amphibian group?  
 (1) Snail (2) Toad (3) Water snake (4) Tortoise
02. Which substance is most effective for neutralizing the venom of a wasp sting?  
 (1) Acetic acid (2) Baking soda (3) Coconut oil (4) Soap
03. In which of the following reactions is heat released into the environment?  
 (1) Photosynthesis (2) Dissolving solid urea in water  
 (3) Thermal decomposition of limestone (4) Dissolving solid sodium hydroxide tablets in water
04. What is the momentum of a bird with a mass of 600 g flying at a speed of  $6 \text{ ms}^{-1}$ ?  
 (1)  $3.6 \text{ kg ms}^{-1}$  (2)  $36 \text{ kg ms}^{-1}$  (3)  $100 \text{ kg ms}^{-1}$  (4)  $3600 \text{ kg ms}^{-1}$
05. An atom has three energy levels filled with electrons, and the outermost energy level contains four electrons. In which Period and Group is the element located?  
 (1) 2, ii (2) 3, iii (3) 3, iv (4) 4, iii
06. Based on the images of the seed provided, What is the mode of seed dispersal?  
 (1) By animals (2) By wind  
 (3) By water (4) By explosion
07. The mass of a sodium atom is  $3.189 \times 10^{-23} \text{ g}$  and the value of one atomic mass unit is  $1.67 \times 10^{-24} \text{ g}$ . What is the relative atomic mass of sodium?  
 (1)  $\frac{1.67 \times 10^{-24} \text{ g}}{3.189 \times 10^{-23} \text{ g}}$  (2)  $\frac{3.189 \times 10^{-23} \text{ g}}{1.67 \times 10^{-24} \text{ g}}$  (3)  $\frac{1.67 \times 10^{-24} \text{ g}}{3.189 \times 10^{-23} \text{ g} \times 12}$  (4)  $\frac{3.189 \times 10^{-23} \text{ g}}{1.67 \times 10^{-24} \text{ g} \times 12}$
08. Limiting frictional force,  
 (1) It depends on the nature of the contact surfaces between two objects.  
 (2) As the mass increases limiting frictional force decreases  
 (3) Changes in the surface area of an object affect the limiting frictional force.  
 (4) It is inversely proportional to the normal reaction force.
09. At a certain location, the atmospheric pressure is measured by the height of a mercury column, Which is 70 cm. What is the atmospheric pressure at this location in SI units? (Density of mercury =  $13600 \text{ kg m}^{-3}$ )  
 (1)  $70 \times 13600 \times 10$  (2)  $0.7 \times 13600 \times 10$  (3) 13600 (4)  $10 \times 70$   
 $\frac{0.7 \times 100}{13600}$

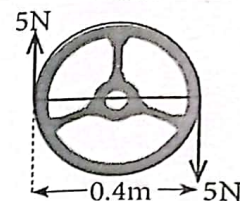


[See pages two

(2)

10. Based on the information provided in the figure,  
What is the magnitude of the couple forces acting in this situation?

- (1) 2 N m                      (2) 4 N m  
(3) 20 N m                    (4) 40 N m



- Here are some characteristics of plant tissues.
- A - Inter cellular spaces are present and the cells are living.
  - B - Composed of many cells each differing
  - C - Consists of dead cells
  - D - The corners of the cells are thickened with cellulose

Answer the questions 11 and 12 based on the features mentioned above.

11. Which characteristics is most commonly found in the stem of a potato?  
(1) A                      (2) B                      (3) C                      (4) D
12. What letter indicates the characteristic of tissue that only conduct substances?  
(1) A                      (2) B                      (3) C                      (4) D
13. Which of the following represents a physical change?  
(1) Rusting of iron                      (2) Burning of firewood  
(3) Reaction of Magnesium with acid                      (4) Boiling of water and evaporation

14. Select the correct answer based on the changes that occur in the uterus during the menstrual cycle.

	Phase	Function	Influencing hormone
(1)	Follicular phase	Primary follicle develops	LH
(2)	Follicular phase	Ovulation	FSH
(3)	Luteal phase	Ovulation	LH
(4)	Luteal phase	Primary follicle develops	FSH

15. Which of the instance where genetic technology in applied?  
(1) Producing insulin using bacteria  
(2) Hybridizing various plants species with similar characteristics  
(3) Utilizing micro organisms in the dairy industry  
(4) Cultivating plants through tissue culture
16. In the experiment demonstrating that carbon dioxide is essential for photosynthesis; what is the role of potassium hydroxide?  
(1) It maintains the balance of gases                      (2) It increases the rate of photosynthetic reaction  
(3) It absorbs carbon dioxide                      (4) It absorbs oxygen
17. Which of the following is an example of the beneficial use of solid expansion?  
(1) Mercury thermometer in glass                      (2) Bimetallic strip  
(3) Mercury barometer                      (4) Immersion heater
18. Which of the following statement about thalassemia is correct?  
A - It is a sex linked chromosome disorder  
B - The production of haemoglobin is affected in patients  
C - It is caused by mutations in the recessive chromosome.  
(1) Only A                      (2) A, B Only                      (3) B, C Only                      (4) All A, B and C

19. The figure depicts an organelle found in living cells. The correct pairing of organelle and its function is,

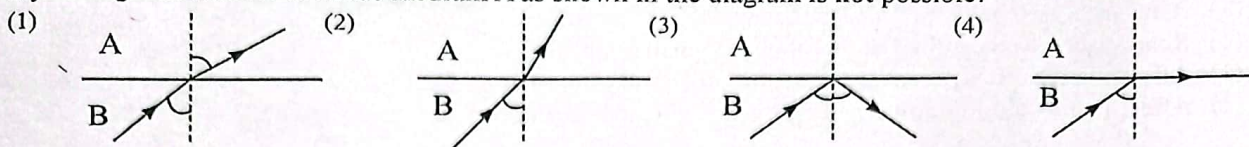
- (1) Chloroplast - Photosynthesis                      (2) Chloroplast - Protein synthesis  
(3) Mitochondria - Photosynthesis                      (4) Mitochondria - Cellular respiration



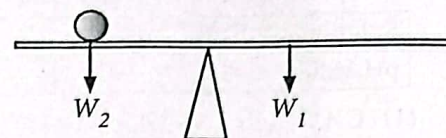
[See pages three

(3)

20. The refractive index of medium B relative to medium A is 1.33. Based on this which path of the light ray through medium B towards medium A as shown in the diagram is **not** possible?



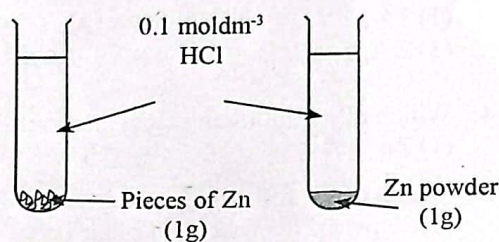
21. A uniform rod with a weight of  $W_1$  is balanced by an object with a weight of  $W_2$  as shown in the diagram. The most accurate statement regarding the balance is,



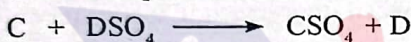
- (1) The two coplanar forces are in equilibrium
- (2)  $W_1$  is greater than  $W_2$
- (3) The moments caused by  $W_1$  and  $W_2$  are equal
- (4) The resultant force is not zero

22. This set up was designed to test which factor affects the rate of reaction?

- (1) Concentration
- (2) Catalyst
- (3) Temperature
- (4) Surface area of reactants



23. C and D represent two metals in the reactivity series.



The possible metals for C and D respectively could be,

- (1) Cu, Zn
- (2) Mg, Zn
- (3) Al, Zn
- (4) Fe, Mg

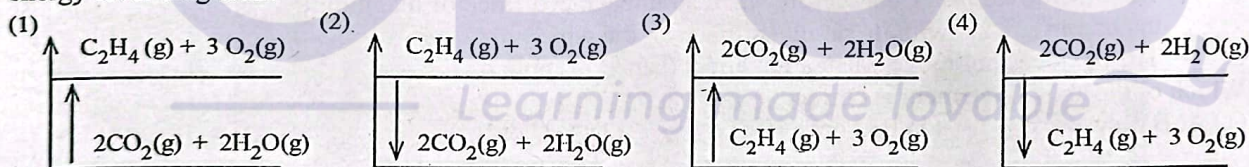
24. The point in the digestive system where the most water is absorbed from the digestive residue is,

- (1) Stomach
- (2) Duodenum
- (3) Large intestine
- (4) Rectum

25. The most suitable method to increase the solubility of salt in water is,

- (1) Powdering the salt before use
- (2) Increase the amount of solute
- (3) Raising the temperature
- (4) Increase the amount of solvent

26. The burning of ethene ( $C_2H_4$ ) is an exothermic reaction. This is correctly illustrated in which of the following energy level diagrams?



● An object A with a mass of 4 kg is lifted vertically and placed on a rock with a height of 7.2 m is shown in the figure.

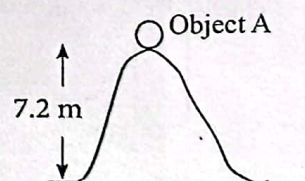
Based on this information answer the questions 27 and 28

27. What is the amount of potential energy stored in the object placed on the rock?

- (1) 28.8 J
- (2) 144 J
- (3) 288 J
- (4) 2880 J

28. What is the maximum velocity of the object just before it hits the ground after falling.

- (1)  $0.6 \text{ m s}^{-1}$
- (2)  $1.2 \text{ m s}^{-1}$
- (3)  $6 \text{ m s}^{-1}$
- (4)  $12 \text{ m s}^{-1}$



29. Which of the following blood vessels carries oxygenated blood?

- (1) Pulmonary vein
- (2) Pulmonary artery
- (3) Inferior venacava
- (4) Subclavian vein

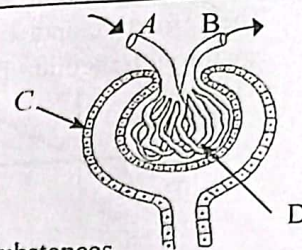
30. Which of the following has the same electronic configuration as the  $K^+$  ion?

- (1)  $Ca^{2+}$
- (2) Ne
- (3)  $O_2$
- (4)  $Na^+$

[See pages four

(4)

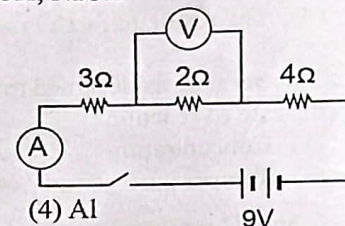
31. The diagram depicts a part of the nephron, where A, B, C and D are respectively identified as,
- Renal artery, Renal vein, Bowman's capsule, Glomerulus
  - Renal artery, Renal vein, Glomerulus, Bowman's capsule
  - Afferent arteriole, Efferent arteriole, Bowman's capsule, Glomerulus
  - Afferent arteriole, Efferent venule, Bowman's capsule, Glomerulus



32. The pH values of the four substances A, B, C and D are provided in the table. The substances corresponding to A, B, C and D are respectively

Solution	A	B	C	D
pH Value	2	7	3.5	13

- $\text{CH}_3\text{COOH}$ ,  $\text{NaOH}$ ,  $\text{H}_2\text{O}$ ,  $\text{HCl}$
  - $\text{CH}_3\text{COOH}$ ,  $\text{H}_2\text{O}$ ,  $\text{HCl}$ ,  $\text{NaOH}$
  - $\text{H}_2\text{O}$ ,  $\text{HCl}$ ,  $\text{CH}_3\text{COOH}$ ,  $\text{NaOH}$
  - $\text{HCl}$ ,  $\text{H}_2\text{O}$ ,  $\text{CH}_3\text{COOH}$ ,  $\text{NaOH}$
33. The reading of ammeter and voltmeter when the switch is closed.
- 1A, 2 V
  - 1A, 4.5 V
  - 2 A, 9 V
  - 9 V, 2A



34. Which of the following elements forms an acidic oxide.
- Zn
  - Cl
  - Mg
  - Al
35. Which of the following method or methods for collecting hydrogen gas when it produced in the laboratory
- Upward displacement of air only.
  - Downward displacement of water, Downward displacement of air.
  - Downward displacement of water, Upward displacement of air.
  - Downward displacement of air, Upward displacement of air.

36. The box with a mass of 4 kg is placed on a table as shown in the diagram. The box moves when an unbalanced force 'P' parallel to the surface of the table is applied. The frictional force between the box and the table is 'Q' Newtons.—



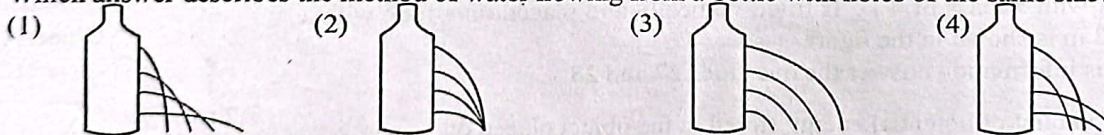
Consider the following statements.

- A - When the box is moving the energy supplied by the spring balance is equal to the sum of forces P and Q.
- B - The box moves faster than before when an unbalanced force of magnitude 'P' is applied, while keeping the box in contact with its smaller surface on the table.
- C - The box does not move when a force less than Q is applied.

Which of the above statement is correct?

- A, B only
- B, C only
- A, C only
- All A, B and C

37. Which answer describes the method of water flowing from a bottle with holes of the same size?



38. Which answer includes animals that belong to the same group?
- Elephant, Rat
  - Crocodile, Fish
  - Human, Shark
  - Tortoise, Frog
39. What distinguishes the sound produced by two different musical instruments even when they share the same frequency,
- Pitch
  - Loudness
  - Velocity
  - Quality of sound
40. Which of the following can not be considered a benefit of organic farming?
- Maintaining soil structure
  - Increasing microbial activities
  - Aiding in waste management
  - Increasing soil acidity

\*\*

முழுப்பதிப்புரிமையுடையது / All Rights Reserved / සියලුම හිමිකම ඇවිරිණි

පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව, නැගෙනහිර පළාත  
 Provincial Department of Education, Eastern Province  
 மாகாணக் கல்வித் திணைக்களம், கிழக்கு மாகாணம்  
 Provincial Department of Education, Eastern Province

கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர) மாதிரி கணிப்பீடு - நவம்பர், 2024  
 General Certificate of Education (Ord. Level) Model Assessment - November, 2024

විද්‍යාව II  
 விஞ்ஞானம் II  
 Science II

34 T II

පැය තුනේ  
 மூன்று மணித்தியாலங்கள்  
 Three hours

අමතර කියවීමේ කාලය - වනාන්ත 10 මි  
 மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்  
 Additional Reading Time - 10 minutes

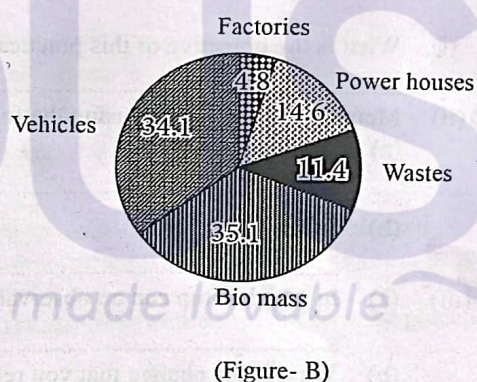
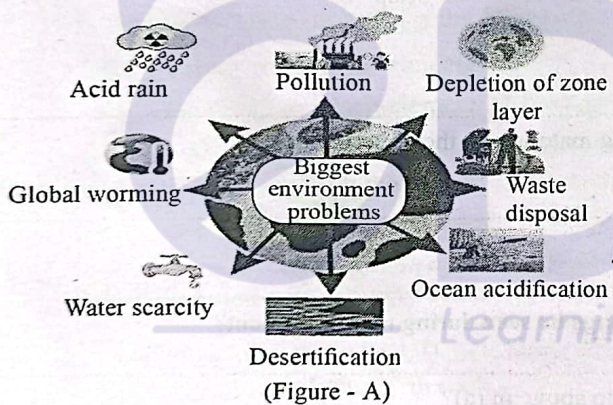
Use additional reading time to go through the question paper, select the questions you will answer and decide which of them you will prioritise.

**Instructions:**

Index : .....

- \* Write the answer in legible hand writing.
- \* Write answers to the questions given in part A.
- \* Write answer only to the **three** questions out of **five** questions given in part B.
- \* After writing answers, hand over the answer scripts of both part A and Part B joining together.

1. (A) Two topics featured in a magazine concerning the threats faced by living organisms on Earth are depicted in the figures below. Figure 'A' highlights details related to environmental issues, While figure 'B' presents a graph illustrating the main factors contributing to environmental pollution. Answer the following questions based on these figures.



- (i) Provide two environmental issues that are not addressed here.
  1. ....
  2. ....
- (ii) Identify a human activity that contributes to the depletion of the ozone layer?  
 .....
- (iii) Identify two gases that contribute to the formation of acid rain.
  1. ....
  2. ....
- (iv) Describe the progression of the following situations. Selecting one main problem for each from the from the figure 'A'
  - (a) Land becoming unsuitable for cultivation : .....
  - (b) Reduced yield from crops : .....
  - (c) Rising sea levels : .....
- (v) Mention a four 'R' Method to purify polluted water.  
 .....

[See pages two

(2)

(B) Answer the questions based on Graph 'B' focussing on the key elements contributing to environmental pollution

(i) What is the primary environmental issue caused by the energy sources displayed in the graph.  
.....

(ii) Identify the two main energy sources responsible for the issue mentioned above

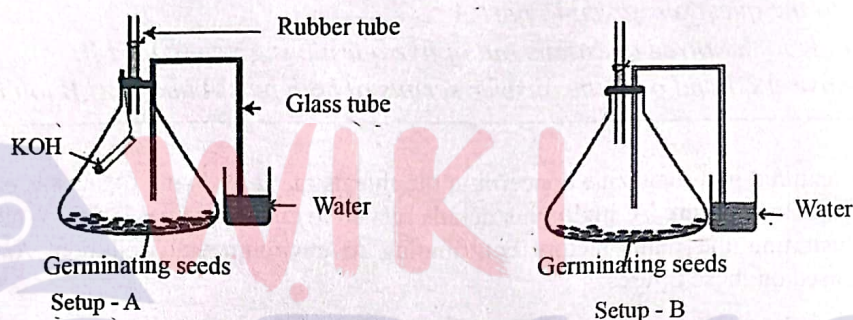
1. .... 2. ....

(iii) The generation of electricity in Sri Lanka also results in certain environmental issues

(a) Identify the electricity production method that causes the most environmental problems  
.....

(b) Which energy source is used in the method that you mentioned above in (a)?  
.....

2. (A) The diagrams depict an experimental setup designed to test the intake of a gas during a biological process of organism



(i) What is the objective of this practical?  
.....

(ii) Mention the reasons for using the following materials in the experiment

(a) Germinating seeds  
.....

(b) KOH  
.....

(iii) (a) In which setup can an observable change be seen during the experiment?  
.....

(b) What is the change that you referred to above in (a)?  
.....

(B) Students design an experiment to identify the main biological molecule present in living organisms. The table below shows the testing reagents the corresponding biological molecules found in food, and the food items used in the experiment

(i) Fill in the blanks with appropriate objects

Food items	Main biological molecule found	Testing reagents
String hopper	Starch	(a) .....
Egg white	(b) .....	(c) .....
Oil	Lipid	(d) .....

[See pages three

(3)

(ii) The figure illustrate one of the two types of nucleic acid.

(a) What are the elements that make up nucleic acid?

.....

(b) What type of nucleic acid is described in the figure?

.....

(c) State one importance of this type of nucleic acid.

.....

(iii) Water is essential for the existence of living organisms due to its unique characteristics. The following outlines show how water contributes to the survival of organisms. Mention its key characteristics.

(a) It helps regulate body temperature preventing it from fluctuating with changes in the environment.

.....

(b) It facilitates the easy elimination of waste and excretory matter from organisms.

.....



3. (A) Here are the Louis structure of compounds formed by elements *A*, *D*, *E* and *Q* in combination with hydrogen and chlorine. One of the *A*, *D*, *E* and *Q* is a metal while the others belong to the second period of the periodic table.

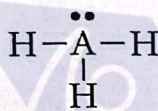


Figure 1

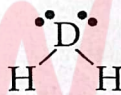


Figure 2

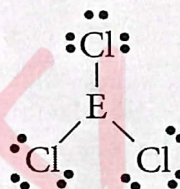


Figure 3

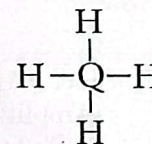


Figure 4

Provide suitable answers for the following

- (i) Atomic number of element 'A' : .....
- (ii) The group to which element 'D' belongs in the periodic table : .....
- (iii) The element with the highest electronegativity among *A*, *D*, *E* and *Q* : .....
- (iv) The element with the highest first ionization among *A*, *D*, *E* and *Q* : .....
- (v) Identify one metal from *A*, *D*, *E* and *Q* : .....
- (vi) The molecular formula of the compound formed by combination of *D* and Hydrogen : .....
- (vii) The elements naturally occurring as diatomic gases from *A*, *D*, *E* and *Q* : .....

(B) Solutions of NaOH, NaCl, H<sub>2</sub>SO<sub>4</sub> each with the concentration of 1.5 mol dm<sup>-3</sup>, were placed in beakers X, Y and Z with 100 cm<sup>3</sup> in each.

(NaOH = 40 g mol<sup>-1</sup>, NaCl = 58.5 g mol<sup>-1</sup>, H<sub>2</sub>SO<sub>4</sub> = 98 g mol<sup>-1</sup>)

- (i) Which solution has the highest concentration of H<sup>+</sup> ions?.....
- (ii) The table below shows the experiments conducted by the students to identify and differentiate each of these solutions along with their observations

Experiment	Observation
Red and blue litmus papers were placed in the solution in beaker X	No colour change can be observed in blue litmus paper. The red litmus paper turned blue
Red and blue litmus papers were placed in the solution in beaker Y	No colour change was observed in either the blue or red litmus papers

Identify the solutions in beakers X, Y and Z.

X: ..... Y: ..... Z: .....

[See pages four

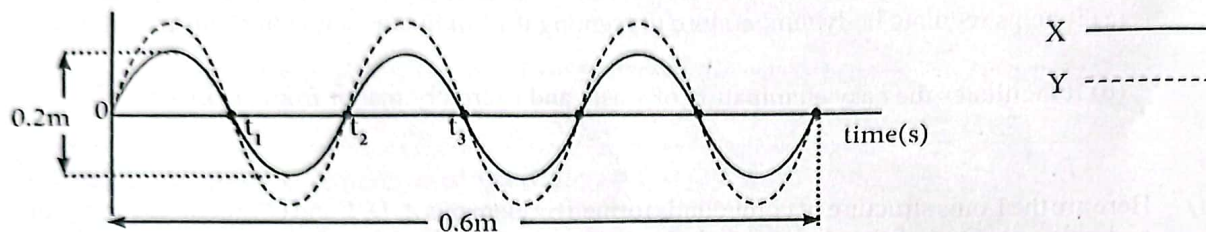
(iii) Determine the number of moles of NaOH in the NaOH solution.

.....  
 .....

(iv) The mole fraction of NaOH in the solution is given as  $(n/n)$  is equal to  $1/4$ . Calculate the mole fraction of water in this solution

.....  
 .....

4. (A) Waves X and Y originating from different sound sources, travel through the air. The patterns of displacement changes over time is shown below.



(i) What type of mechanical wave is sound? .....

(ii) How does the movement of particles differ from the movement of wave type you mentions above?  
 .....

(iii) Consider wave X and answer the following questions

(a) Amplitude of the wave : .....

(b) Wavelength : .....

(c) Period ( $t_1, t_2, t_3$ ) : .....

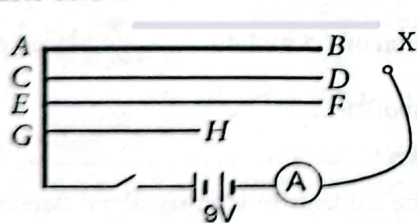
(iv) Which of the sounds X or Y can travel farther? .....

(v) We can derive benefits from sounds that are beyond the hearing range of humans.

(a) What term is used to describe sounds with frequencies that fall outside the human hearing range?  
 .....

(b) Provide an example of how this type of sound is utilized in the medical field?  
 .....

(B) The diagram illustrates the experimental setup created by a group of students to investigate the factors that influence the resistance of a conductor. The details of the wires used in this experiment are summarized in the table below.



Wires	Material by which wire is made	Cross sectional area (cm <sup>2</sup> )	Length (cm)
AB	Nichrome	0.08	10
CD	Nichrome	0.04	10
EF	Copper	0.04	10
GH	Copper	0.04	5

After closing the switch, the end X was connected to the ends B, D, F and H, and the readings of the ammeter were recorded.

(i) Which wire exhibited the highest resistance? .....

(ii) Identify which factor affecting resistance was determined based on the ammeter readings for which of the following pairs of wires

Pair of wires      Factors effecting resistance

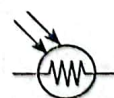
(a) AB, CD      .....

(b) CD, EF      .....

(c) EF, GH      .....

(iii) Identify the nearby resistor using its symbol

.....



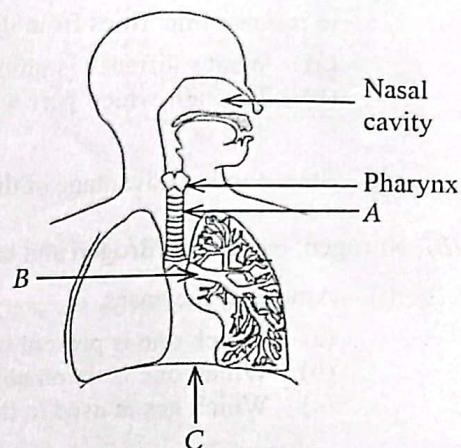
[See pages five

(5)

Part - B

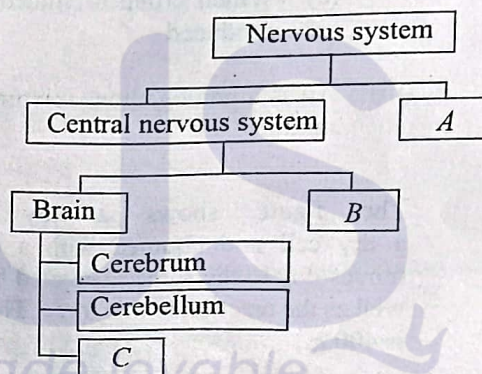
5. (A) The figure illustrate the organ involved in the human respiratory process

- (i) Name the parts labeled A B and C
- (ii) The internal surface of the nasal cavity is moist due to mucus. What is the advantage of this?
- (iii) During the inhalation process, the volume of the chest cavity increases. What actions are occurring to facilitate this increase in volume?
- (iv) The alveolar surfaces functions as the site of gas exchange.
  - (a) Name three substances that primarily diffuse across the human respiratory surface.
  - (b) List two key features of the respiratory surface that enable efficient gas exchange.
- (v) In a certain disease, bacteria enter the lungs and multiply , leading to lung tissue damage . As a result, sputum and blood are eventually expelled when coughing
  - (a) What is the name of this disease?
  - (b) What is one method to prevent it?



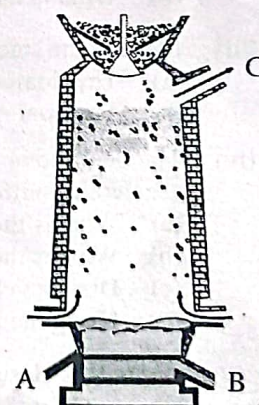
(B) A diagram showing the categorization of the human nervous system is provided nearby.

- (i) Name the parts labelled A,B and C.
- (ii) Using the parts A,B,C as well as the cerebrum and cerebellum from the diagram , name the regions responsible for the following functions
  - (a) Controlling the heart beat.
  - (b) Identify senses like vision and hearing.
  - (c) Performing reflex actions that provide immediate responses.



6. (A) This figure illustrate the structure of a blast furnace used for iron extraction. Haematite ( $Fe_2O_3$ ) and lime stone ( $CaCO_3$ ) are among the raw materials used.

- (i) What is the another raw material involved in the extraction of iron beside those mentioned above
- (ii) The raw materials are ground into small pieces to increase the rate of chemical reactions here.
  - (a) Which factor influencing the rate of reaction is altered here?
  - (b) Briefly explain how the chemical reaction increases when increasing the factor that you mentioned above.
- (iii) Provide the appropriate balanced chemical equation for the reaction that haematite undergoes during iron extraction.



[See pages six

- (iv) What is the method of iron extraction called, based on this position in the reactivity series.
- (v) The substance formed by the thermal decomposition of limestone reacts with metal oxides in iron ore to remove impurities from the metal.
  - (a) What substance is produced by the thermal dissociation of limestone.
  - (b) Through which part are the impurities formed during extraction in the blast furnace removed A, B or C
- (vi) State another advantage of the reactivity series besides determining the method of metallic extraction.

(B) Nitrogen, oxygen, hydrogen and carbon dioxide are some of the gases found in the atmosphere.

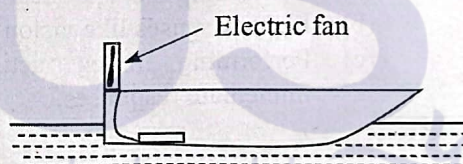
- (i) Among these gases.
  - (a) Which one is present in the highest amount in the atmosphere?
  - (b) Which one is flammable
  - (c) Which gas is used in the industrial production of sulphuric acid.
- (ii) Some chemical substances were provided to the students for the preparation of specific gas in the laboratory. Each group of student was instructed to use only the necessary substances required for producing the particular gas.

Group 01 - A piece of zinc, dilute hypochloric acid, Sodium hypoxide, Phenolphthalein.  
 Group 02 - Magnesium dioxide, Potassium permanganate, Sodium hydroxide.  
 Group 03 - Calcium carbonate, Calcium hydroxide, Dilute hydrochloric acid.

- (a) List the gases prepared by each group of students.
- (b) Specify the substances used by group (1) students.
- (c) Which group of students was provided with the chemical substances to identify the gas they produced

(iii) Air is a homogenous mixture. What is the industrial method used to separate oxygen gas from this mixture?

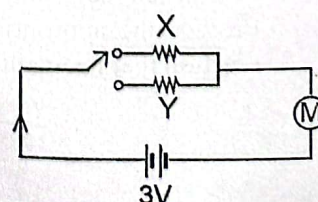
7. The figure shows a toy boat powered by a dry cell and equipped with a small fan. The boat moves due to the force generated by the fan's airflow, as well as the reaction to this force. The total mass of the boat is 400 g.



- (i) What is the weight of the boat?
- (ii) (a) Name another force acting on the boat when it is stationary besides its weight.  
 (b) What is the magnitude of the force you mentioned?
- (iii) Identify the scientific laws that can explain each of the following events.
  - (a) The floating of a boat on water
  - (b) The boat moving forward due to the action of the fan.
- (iv) The boat moves as a result of an unbalanced force acting on it. Due to this, the boat initially at rest, accelerates uniformly by 4 seconds and reaches a velocity of  $8 \text{ ms}^{-1}$ .
  - (a) What is the acceleration of the boat?
  - (b) What is the magnitude of the unbalanced force acted on the boat?
  - (c) Draw a velocity time graph to represent the motion of the boat during the first four seconds.
  - (d) Using the graph determine the boat's displacement over that period of time.

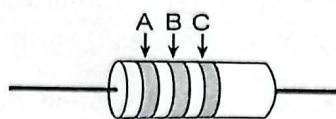
(v) A student designed an electric circuit with two resistors of different values to control the speed of a boat.

- (a) What is the name of the method used to connect the two resistors in this circuit ?



[See pages seven

- (b) The external appearance of resistor 'X' is shown below with a resistance of  $320 \Omega$ . Indicate the colours of bands A, B and C accordingly



Colour	Value
Black	0
Brown	1
Red	2
Orange	3

- (c) State the advantage of using a variable resistor instead of a fixed resistor.

8. (A) Organisms must produce another generation before they die. Below are some structures involved in this process

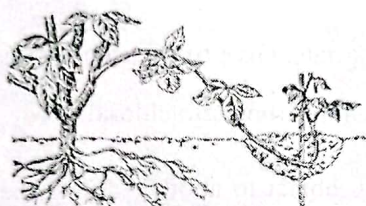


Figure - 1

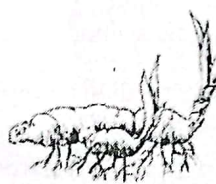


Figure - 2

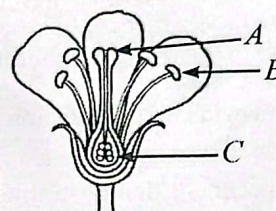
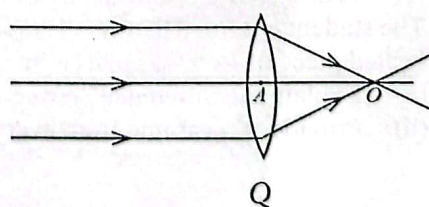
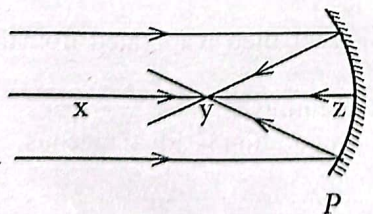


Figure - 3

- (i) What is the biological process of producing new organisms called?
- (ii) Identify the figure that represents the following method of reproduction,
  - (a) Sexual reproduction.
  - (b) Artificial layering method of reproduction.
- (iii) Name the artificial layering method of reproduction shown here.
- (iv) Among the structures A, B and C depicted in 3 figures.
  - (a) In which structure pollen grains are formed?
  - (b) Which part develops into a fruit after fertilization?
- (v) What type of flower is shown in figure 3 based on the presence of both the androecium and gynoecium
- (vi) Mention one function of the structure shown in figure-2, apart from reproduction.
- (vii) State one advantage of sexual reproduction over asexual reproduction.

- (B) The ray diagrams illustrate the optical behaviours of three parallel light rays as they form a light beam and strike the optical objects P and Q. The distance  $xy = yz$



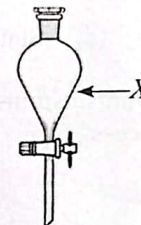
- (i) Identify the optical objects P and Q.
- (ii) What are the points A and X referred to as?
- (iii) Draw a ray diagram to show the image formed when an object is placed between points y and z.
- (iv) State two characteristics of image you obtained above.
- (v) Mention one instance where object P is used in the field of medicine.

[See pages eight

9. (A) Solid iodine dissolves sparingly in water but it dissolves well in carbon tetrachloride. A group of students prepared  $100 \text{ cm}^3$  of a solution by dissolving  $0.5 \text{ g}$  of solid iodine in water. However, undissolved iodine crystals were observed at the bottom of the container.

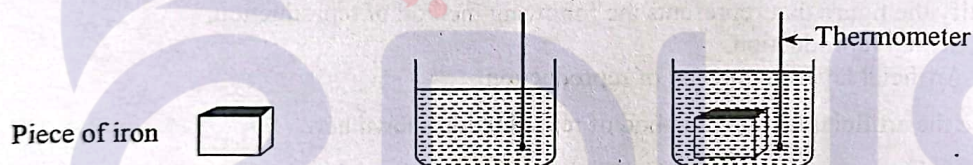
- (i) Suggest a method to separate the undissolved iodine crystals from the solution.
- (ii) After separating the undissolved iodine crystals. Their mass was measured to be  $0.3 \text{ g}$ .
  - (a) What special term is used to describe the solution from which undissolved iodine has been separated?
  - (b) Assuming there was no change in the volume of the solution after removing the undissolved iodine. Calculate the concentration of the solution in  $\text{g dm}^{-3}$ ?

(iii) The students were asked to separate the dissolved iodine from the solution they had prepared. They successfully separated it using a small amount of carbon tetrachloride solution and the apparatus shown in the figure 'X'.



- (a) What is the apparatus 'X' called?
  - (b) Name the above separation technique.
  - (c) Using carbon tetrachloride in this technique is appropriate. Give two reasons for this.
- (iv) Provide an observation to confirm that iodine has mixed with carbon tetrachloride.

(B) An experiment demonstrating that heat is transferred from one object to another due to the temperature difference between them is described below. The experiment was conducted by a group of students. A  $400 \text{ g}$  piece of iron was heated and then placed into a beaker containing water and the temperature was measured.



- (i) Identify the method of heat transfer in each of the following instances.
  - (a) The transfer of heat from the surface of the iron to all its parts.
  - (b) The heat gained by the water from the piece of iron, which is then distributed throughout the water.
  - (c) The transfer of heat from the water to the mercury in the thermometer.
- (ii) What method is used to determine thermal equilibrium in this experiment?
- (iii) If the temperature of the piece of iron increases by  $200^\circ\text{C}$  when it is heated,
  - (a) State the increase in temperature of the iron in the international system unit for temperature measurement.
  - (b) What is the amount of heat gained by the piece of iron?  
(The specific heat capacity of iron is  $450 \text{ J kg}^{-1} \text{ K}^{-1}$ )
- (v) The student observed that small amount of water boiled and then evaporated from the surface when the heated piece of iron was placed into the water.
  - (a) Explain the difference between boiling and evaporating.
  - (b) Provide an example from everyday life where evaporation is advantageous.

\*\*\*