

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
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34 E I

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2023(2024)
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2023(2024)
 General Certificate of Education (Ord. Level) Examination, 2023(2024)

විද්‍යාව I
 விஞ்ஞானம் I
 Science I

පැය එකයි
 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 or 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. Follow them carefully.

1. Urea which is an excretory product is produced in
 (1) kidneys. (2) liver. (3) urinary bladder. (4) nephrons.
 2. What is the unit of power?
 (1) Ws (2) Ws⁻¹ (3) Js (4) Js⁻¹
 3. The formula of an isopropyl alcohol molecule is (CH₃)₂CHOH. What is the number of atoms in this molecule?
 (1) 8 (2) 10 (3) 11 (4) 12
 4. What is the tissue that transports food produced in plant leaves throughout the plant body?
 (1) xylem (2) phloem (3) cambium (4) sclerenchyma
 5. When two objects are rubbed together and one of them gets positively charged, transferred to the other are
 (1) electrons. (2) protons. (3) neutrons. (4) electrons and protons.
 6. Which of the following includes an acidic oxide, an amphoteric oxide and a basic oxide in respective order?
 (1) SO₃, Al₂O₃, SiO₂ (2) SO₃, Al₂O₃, MgO
 (3) CO₂, SiO₂, MgO (4) SiO₂, CO₂, Al₂O₃
 7. In a plant cell can be called a non-living structure.
 (1) cell wall (2) plasma membrane (3) ribosomes (4) Golgi body
 8. Another morphological feature of a plant bearing the leaves with the venation shown in the diagram is
 (1) presence of a tap root system.
 (2) having a branched stem.
 (3) having one cotyledon in the seed.
 (4) bearing tetramerous or pentamerous flowers.
- 
9. Which of the following statements on electromagnetic waves is false?
 (1) They transmit energy.
 (2) They travel with a speed of 3×10⁸ m s⁻¹ in vacuum.
 (3) Frequency is less in a material medium than in vacuum.
 (4) Speed is less in a material medium than in vacuum.
 10. Which of the following statements is true about ionic compounds?
 (1) They conduct electricity in the solid state.
 (2) All dissolve well in water.
 (3) Boiling points and melting points take high values.
 (4) They do not conduct electricity in the fused state.

[See page two]

11. Following symptoms are seen in a person suffering from a disease in the respiratory system.

- release of blood with cough
- loss in body weight
- high fatigue

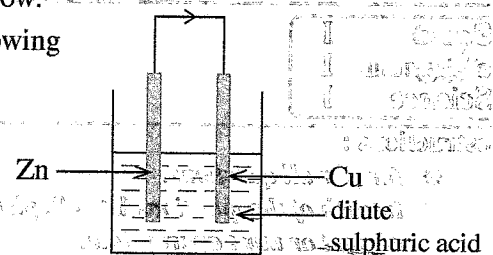
This person would have contracted

- (1) pneumonia. (2) bronchitis. (3) tuberculosis. (4) silicosis.

• Questions 12 and 13 are based on the figure given below.

12. In the direction shown by the arrow, which of the following flow(s) in the external circuit?

- (1) conventional current
(2) electrons
(3) Zn^{2+} ions
(4) Cu^{2+} ions



13. What is the cathodic reaction taking place in the above cell?

- (1) $\text{Zn}^{2+}(\text{aq}) + 2\text{e}^- \longrightarrow \text{Zn}(\text{s})$ (2) $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \longrightarrow \text{Cu}(\text{s})$
(3) $2\text{H}^+(\text{aq}) + 2\text{e}^- \longrightarrow \text{H}_2(\text{g})$ (4) $4\text{OH}^-(\text{aq}) + 4\text{e}^- \longrightarrow \text{O}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$

14. Consider the following statements regarding refraction of light.

- A - Light refracts only when it travels from a rarer medium to a denser medium.
B - Reason for the refraction is the difference in the speed of light in the two media.
C - Frequency of light changes during refraction.

Of the above, true statement(s) is/are

- (1) only A. (2) only B. (3) only A and C. (4) only B and C.

15. The acceleration due to gravity on the Earth is 10 m s^{-2} . On the moon its value is $\frac{1}{6}$ th the value on the Earth. What is the weight of an object on the moon if it weighs 60 N on the Earth?

- (1) 10 N (2) 60 N (3) 100 N (4) 360 N

16. Of the following characteristics, what are the characteristics common only to Aves and Mammalia belonging to the vertebrate animal group?

A - warm bloodedness

B - skin covered with hair

C - bony internal skeleton

D - four chambered heart

- (1) A and B (2) A and D (3) B and C (4) C and D

17. Which of the following is false about metals?

- (1) Majority of the elements are metals.
(2) All metals conduct electricity.
(3) Metal atoms lose electrons and form positive ions.
(4) All metals react with acids and liberate hydrogen.

18. When a few drops of methyl orange were added to a certain solution, it turned red. Which of the following is most likely to be the pH value of that solution?

- (1) 2 (2) 7 (3) 12 (4) 14

19. It takes four seconds for an ultrasonic wave sent by a ship to the bottom of the sea to be reflected and come back to the ship. If the depth to the bottom of the sea is 2880 m, what is the speed of the ultrasonic wave in sea water?

- (1) 720 m s^{-1} (2) 1440 m s^{-1} (3) 2880 m s^{-1} (4) 3700 m s^{-1}

20. Given below are some properties of a gas.

- can be burnt easily
- density is less than that of air
- slightly soluble in water

This gas is

- (1) hydrogen. (2) nitrogen. (3) oxygen. (4) carbon dioxide.

21. What is the part belonging to the central nervous system which controls the rate of heart beat?

- (1) cerebrum (2) cerebellum (3) spinal cord (4) medulla oblongata

[See page three

22. Consider the following statements about the resistance of a conductor, R of a conductor.
- A - depends on the potential difference between the two ends of the conductor.
 - B - directly proportional to the length of the conductor.
 - C - depends on the current flowing through the conductor.

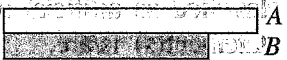
Of the above, the true statement(s) is/are,

- (1) only A. (2) only B. (3) only A and B. (4) only A and C.
23. What is the amount of moles of calcium carbonate in 10 g of calcium carbonate? ($\text{CaCO}_3 = 100$)
- (1) 0.01 (2) 0.1 (3) 1 (4) 10
24. Select the correct statement about carbohydrates.
- (1) All carbohydrates are water-soluble.
- (2) All carbohydrates are crystalline.
- (3) In carbohydrates, ratio between C and H is 1 : 2.
- (4) Glucose is the structural unit of carbohydrates.

25. The figure on the right shows a bimetal strip made of two metals A and B.

Of these, the metal expanding more is A while the metal expanding less is B.

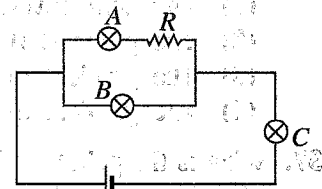
In which of the following ways does the shape of the bimetal strip change when its temperature is increased?

- (1)  (2) 
- (3)  (4) 

26. If an object made up of a solid substance is to float in a liquid,
- (1) the density of the solid substance should be less than the density of the liquid.
- (2) the mass of the solid object should be equal to the mass of the liquid displaced.
- (3) weight of the solid object should be equal to the weight of the liquid volume displaced by it.
- (4) weight of the solid object should be less than the upthrust acting on it.

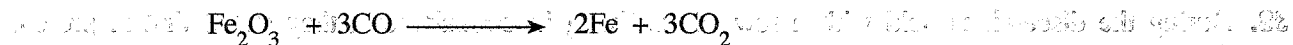
27. Of the offspring produced by the interbreeding of two organisms with the genotype Tt, the numbers of the genotypes and the phenotypes differing from one another respectively are
- (1) 2 and 1. (2) 3 and 2. (3) 4 and 2. (4) 4 and 3.

28. The figure indicates how three identical bulbs A, B and C and a resistor R are connected in a circuit. Which statement correctly indicates the relationship among the brightness of the bulbs A, B and C?



- (1) $A < B < C$ (2) $A = B = C$
- (3) $A = B < C$ (4) $A < C < B$

29. Indicated below is the reaction between haematite and carbon monoxide.



What is the mass of Fe that can be produced using one mole of Fe_2O_3 ? ($\text{Fe} = 56$)

- (1) 28 g (2) 56 g (3) 112 g (4) 168 g

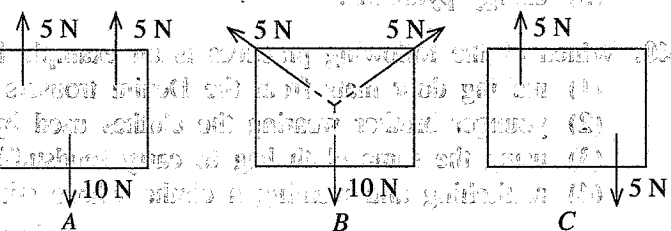
30. The amount of platelets in the blood of a person subjected to a viral infection has decreased below the normal value. As a result of it, in his body,

- (1) transport of oxygen becomes faster. (2) production of antibodies is suppressed.
- (3) clotting of blood does not occur properly. (4) transport of hormones becomes slower.

31. Figures A, B and C show how coplanar forces are applied on three rectangular sheets.

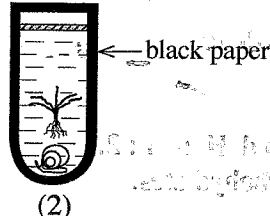
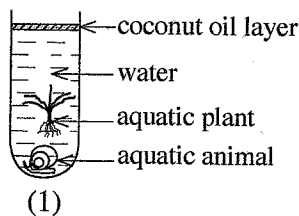
Of the above, the sheet(s) in equilibrium is/are

- (1) only A. (2) only B. (3) only A and C. (4) all A, B and C.



32. A - Catalysts increase the rate of a chemical reaction.
 B - At the end of the reaction, the chemical composition of the catalyst changes.
- Of the above,
- both the statements A and B are true.
 - statement A is true while statement B is false.
 - both the statements A and B are false.
 - statement A is false while statement B is true.

33. The set ups (1), (2), (3) and (4) shown in the figures were prepared by adding equal volumes of water with equal concentration of carbon dioxide to four identical test tubes. In which set up will there be the **lowest** carbon dioxide concentration after exposing these four set ups for three hours to identical conditions of light?



34. Consider the following statements on polymers.

A - have a very high relative molecular mass

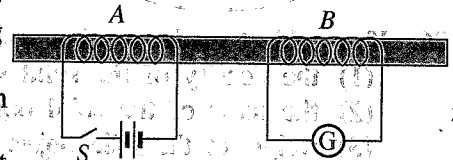
B - small molecules contributing to make them are known as repeating units

C - can be classified as artificial and natural based on origin

Of these, the true statement(s) is/are,

- only A.
- only B.
- only A and C.
- only B and C.

35. The figure illustrates how two insulated copper coils A and B are wound around a soft iron core. Which of the following statement is true about this arrangement?



- The moment the switch S is closed, a current flows in A while no current flows in B.
 - When the switch S is kept continuously closed, a current flows in A and a current flows in B too.
 - Only the moment the switch S is closed, a current flows in B.
 - Only the moment the switch S is opened and is closed, a current flows in B.
36. Of the following statements on the velocity-time graphs, which one is **false**?
- The area covered by the graph gives the displacement of the object.
 - The graph starts from the origin for the objects starting their motion from the state of rest.
 - The gradient of the graph is zero in a motion where the velocity varies with time.
 - The gradient of the graph gives the acceleration / deceleration.

37. What is the pollutant that contributes to the abnormal growth of algae population in oceanic ecosystems?
- heavy metals
 - sulphate
 - nuclear waste
 - phosphate

38. During the discussions held with a few adults living in coastal areas, they stated that at present, they witness an increase in the number of outbreaks of storms occurring per year and their severity while coastal erosion occurs largely. Which of the following environmental phenomenon contributes most to this condition?

- global warming
- greenhouse effect
- ozone layer depletion
- eutrophication

39. The environmental pyramids always indicated in an upright way are,
- biomass pyramids.
 - number pyramids.
 - energy pyramids.
 - energy pyramids and biomass pyramids.

40. Which of the following practices is an example for the principle of recycling?

- making door mats from the Denim trousers no more in use
- younger brother wearing the clothes used by his elder brother
- using the same cloth bag to carry foodstuffs bought day-to-day
- restitching and wearing a clothe whose stitches have gone undone

* * *

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34 E II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2023(2024)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2023(2024)
General Certificate of Education (Ord. Level) Examination, 2023(2024)

විද්‍යාව II
விஞ்ஞானம் II
Science II

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීමේ කාලය - මිනිත්තු 10 යි
மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
Additional Reading Time - 10 minutes

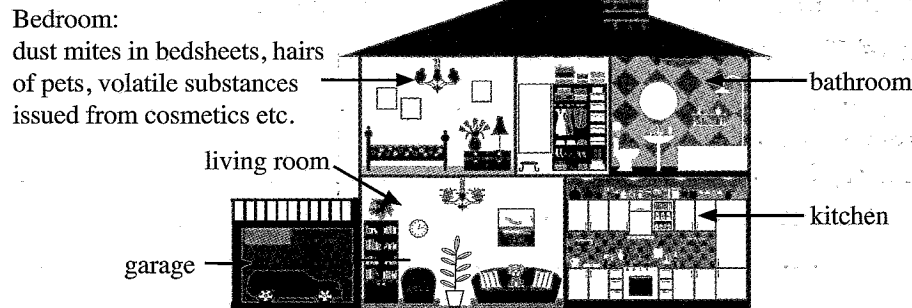
Use additional reading time to go through the question paper, select the questions you will answer and decide which of them you will prioritise.

Index Number:

- Instructions:**
- * Write your answers in neat handwriting.
 - * Answer the four questions in Part A, in the space provided.
 - * Of the five questions in Part B answer three questions only.
 - * After answering, tie Part A and the answer script of Part B together and hand over.

Part A

1. (A) Indoor air pollution is caused by the harmful pollutants released inside homes. Indoor air pollution is several times more harmful than the outdoor air pollution. The following figure indicates various places of a house subject to indoor air pollution and pollutants that may be present in one of those places.



From the above figure, identify a place which is an example for each of the following statements and write it in the box opposite to it.

	Statement	Place
(i)	Poisonous gases contributing to acid rains and global warming and volatile hydrocarbons may accumulate.	
(ii)	Subjected to pollution more by volatile organic pollutants released during the use of perfumes, nail polish, etc.	
(iii)	Contributes to indoor air pollution frequently releasing pathogenic micro-organisms, mould, fungi and foul smell.	
(iv)	Volatile organic pollutants released from furniture and wall paints and solid particulate pollutants issued from carpets may occur in abundance.	

- (v) State a personal addiction that pollutes indoor air and makes the dwellers victims of diseases such as lung cancer, heart attacks and strokes.
.....
- (vi) State an eco-friendly practice adopted in this house to control indoor air pollution naturally.
.....
- (vii) Suggest a measure that could be taken during architectural design to minimize indoor air pollution.
.....

(B) Microplastics mean pieces of any type of plastics that are less than 5 mm in length and have different shapes. Microplastic particles made of the polymer types polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polyester and rayon have been found from a cultivated land.

Figure A indicates the percentage composition of microplastics by polymer type in the cultivated land while figure B indicates the percentage composition of polymer types contained in different forms of microplastics.

Figure A

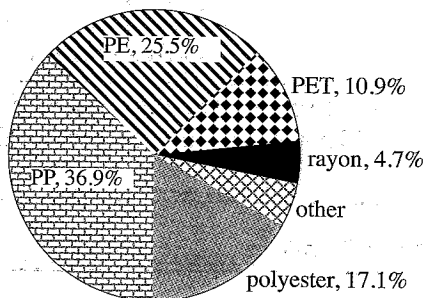
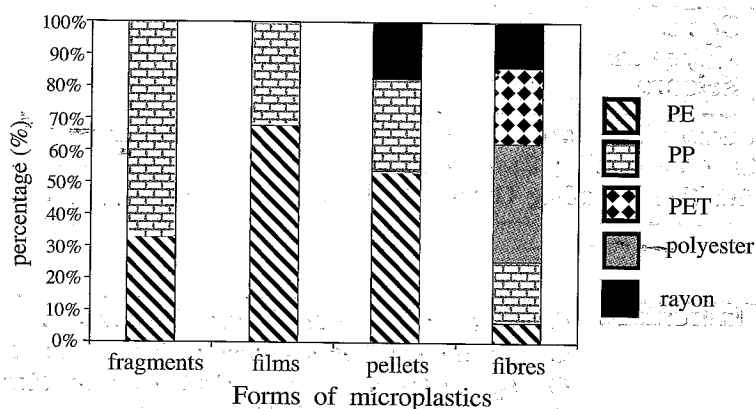


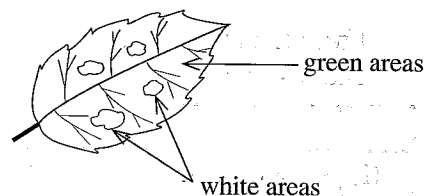
Figure B



Using the information given in the figures, fill in the blanks of the following statements.

- According to figure A, the most abundant polymer type in the cultivated land is
- According to figure A, the sum of the percentage compositions of polymer and polymer is approximately equal to the percentage composition of PP.
- According to figure B, the polymers existing in the cultivated land as microplastics in the form of films are and
- Microplastics in the form of are composed of the highest number of various polymers.
- State a way by which microplastics are added to the cultivated land.
- Suggest a method to separate microplastics contained in a sample of urea fertilizer.

2. (A) A group of students preparing for a practical experiment sketched on a paper the diagram of a leaf with white and green areas of a shoe flower plant growing in a place well exposed to sunlight. The diagram is shown on the right. Later, that leaf was subjected to the starch test following the relevant steps.



- Name the chemical substance used to identify starch.
- Indicate in the following table the observations made after applying the chemical substance you mentioned in (i) above.

Area of the leaf subjected to the test	Observation
(a) Green areas	
(b) White areas	

- What conclusion can be drawn as per the observations made in relation to the green and white areas of the leaf in the above experiment?

(B) Several species of animals that could be seen either in home or in home garden are given below.
 cockroach, gecko, spider, snail, leech, centipede

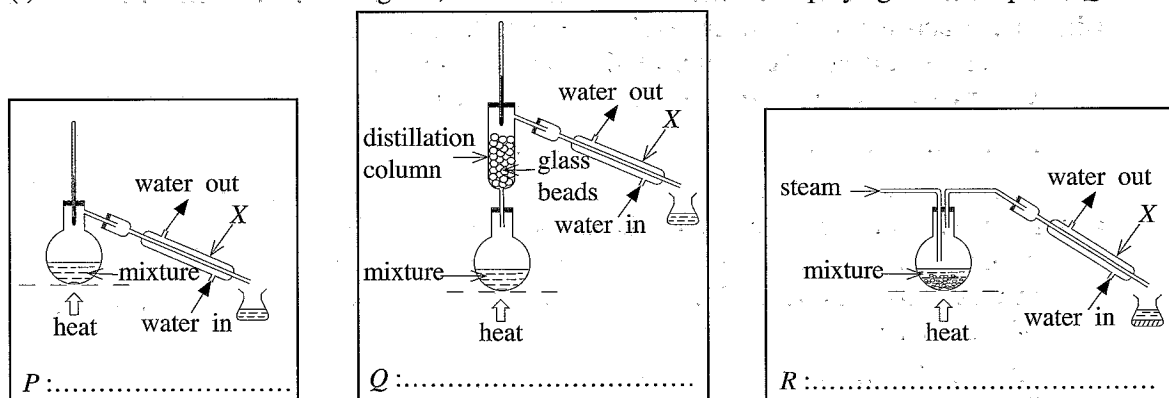
From the above list, select the animal species with each of the following characteristic and write on the dotted line opposite each.

- bears a vertebral column
- has a muscular foot

-
- The diagram illustrates the human reproductive system. On the left, two boxes represent the ovaries and testes. The ovaries produce eggs (Y), and the testes produce sperm (X). These gametes combine in the fallopian tube to form a zygote (Z). The zygote then undergoes mitosis to develop into an embryo.
- ```
graph LR; Ovaries[ovaries] -- production --> Y[Y]; Testes[testes] -- production --> X[X]; Y --> Z[Z]; X --> Z; Z -- mitosis --> Embryo[embryo];
```

- 15

(i) Write below the relevant figures, the methods of distillation employing the set ups  $P$ ,  $Q$  and  $R$ .



- (B) The figure indicates the positions occupied by the elements beryllium, oxygen, chlorine, potassium and calcium in the periodic table.

|   |    |  |  |   |    |  |  |
|---|----|--|--|---|----|--|--|
|   |    |  |  |   |    |  |  |
|   | Be |  |  | O |    |  |  |
|   |    |  |  |   | Cl |  |  |
| K | Ca |  |  |   |    |  |  |

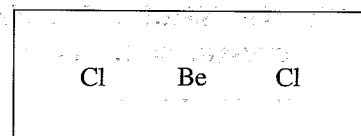
- | Property of the element                           | Example |
|---------------------------------------------------|---------|
| (a) a coloured gas existing as diatomic molecules |         |
| (b) highest in electronegativity                  |         |
| (c) has the lowest first ionisation energy        |         |

- (ii) State whether the compounds formed by the combination of following elements are ionic or covalent.

(a) calcium and chlorine : .....

(b) chlorine and oxygen : .....

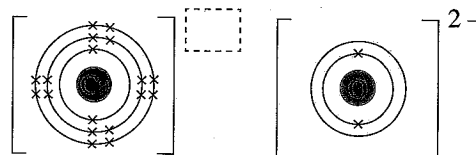
- (iii) Beryllium chloride formed by the combination of beryllium and chlorine is a covalent compound. In the box given, draw the dot and cross structure of the beryllium chloride molecule.



- (iv) Calcium oxide formed by the combination of calcium and oxygen is an ionic compound. Indicate in the figure,

(a) the charge of the calcium ion

(b) all the electrons in the outermost shell of the oxide ion in calcium oxide.

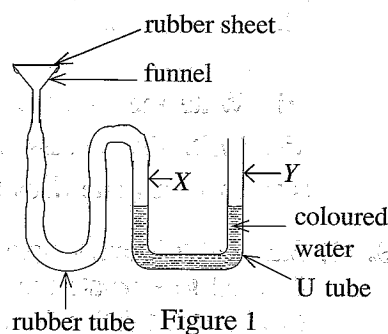


4. (A) The mouth of the funnel shown in figure 1 is fully closed by a tightly stretched sheet of rubber. The other end of the funnel is connected to one arm of a U tube partly filled with coloured water by a rubber tube.

- (i) In the situation shown in the figure 1, how will the water level in the arms of the U tube change when a finger is placed on the top of the rubber sheet and pressed slightly?

(a) arm X ..... (b) arm Y .....

- (ii) Explain the reason for the observation in (i) above.



- (iii) In the above set up, water levels in the U tube remain unchanged though the mouth of the funnel is turned to various sides in air. What is the reason for this?

- (iv) How will the water levels in the arms of the U tube change when the funnel with the rubber sheet is dipped in water shown in figure 2 and moved towards the bottom of the container gradually?

(a) arm X ..... (b) arm Y .....

- (v) State the conclusion that can be drawn according to the observation in (iv) above.

- (vi) In place of water, an equal volume of coconut oil is added to the container with the funnel in figure 2. When the funnel is held close to the bottom of the container, in the presence of which liquid can a greater difference between the liquid levels of the U tube be observed?

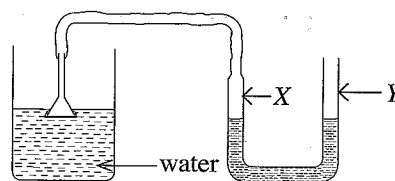
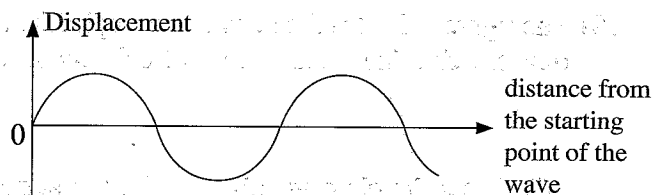


Figure 2

- (B) The figure is the graphical representation of water wave travelling on a water surface.

- (i) As regards the direction in which the water particles vibrate, name the type of waves to which this wave belongs.



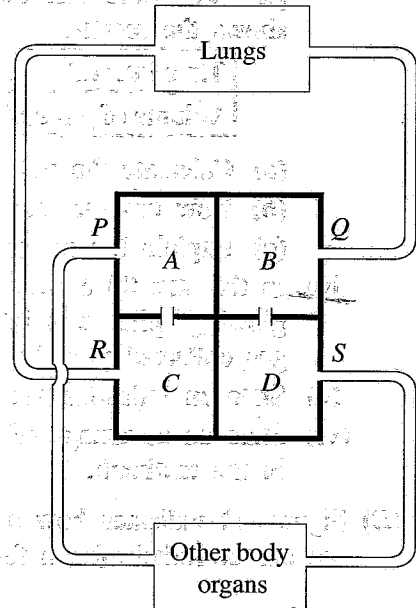
- (ii) Mark and label in the above figure, the wave length and amplitude of the wave represented by the graph.

- (iii) When a light piece of styrofoam (regifoam) was placed on the water surface along which the wave travels, it was observed that it moves up and down. What is the reason for this observation?

## Part B

- Answer only **three** questions from the questions No. 5, 6, 7, 8 and 9.

5. (A) Indicated below is a diagram drawn to depict double circulation of blood in humans. A, B, C and D indicate chambers of the heart while P, Q, R and S indicate the blood vessels connected to those chambers.



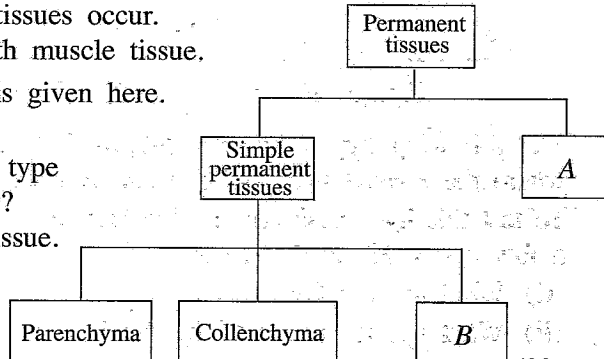
- Why is the human blood circulation known as double blood circulation?
- P represents two vessels. Of them, name the vessel bringing blood from the inferior parts of the body.
- Name the following blood vessels.
  - blood vessel R starting from chamber C
  - blood vessel S starting from chamber D
- Indicate a difference in the composition of blood contained in vessels R and S.
- Name the valve located between the chambers B and D.
- By what name is the pressure exerted when D contracts and pushes blood into S known?
  - What is the value of that pressure of a healthy adult?
  - Even in a healthy adult, that value can change from time to time. State a factor affecting it.

(B) Muscle tissue can be identified as a main tissue type contributing to build up the human body. There are three main types of muscle tissues. One of them is the smooth muscle tissue.

- Name the other **two** main types of muscle tissues found in the human body.
- What is the muscle tissue type having multinucleate cells?
- What is the muscle tissue type that acts voluntarily and rhythmically?
- Name a place where smooth muscle tissues occur.
- Draw a sketch of a cell of the smooth muscle tissue.

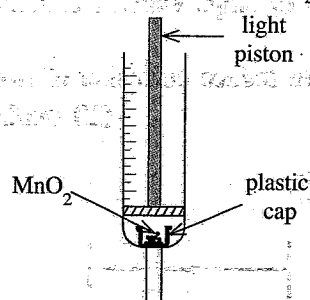
(C) A figure on classification of plant tissues is given here.

- Name A and B.
- What is the simple permanent tissue type most abundantly seen in a plant body?
- State a function of the collenchyma tissue.

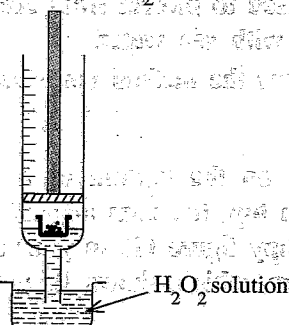


(20 marks)

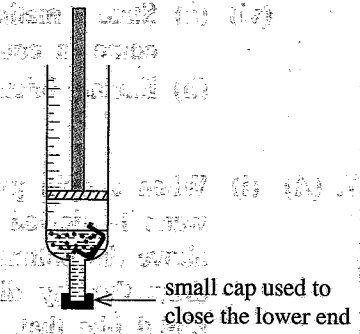
6. (A) The figures illustrate the steps of an experiment conducted by a group of students who studied the following reaction of hydrogen peroxide ( $\text{H}_2\text{O}_2$ ).



step 01  
placing the plastic cap with some  $\text{MnO}_2$  inside the syringe



step 02  
sucking in about 5 ml of  $\text{H}_2\text{O}_2$  solution into the syringe



step 03  
mixing  $\text{H}_2\text{O}_2$  and  $\text{MnO}_2$  and allowing the gas liberated to collect inside the syringe

[See page six]

- (i) According to the classification of reactions you learned, what type of a reaction is the above reaction?
- (ii) What is the function of manganese dioxide ( $\text{MnO}_2$ ) in the above reaction?
- (iii) From the moment the gas started collecting inside the syringe, the volumes of the gas produced were measured in six successive 10 second time intervals. The following table shows the results.

| Time interval               | 1  | 2 | 3 | 4 | 5 | 6 |
|-----------------------------|----|---|---|---|---|---|
| Volume of gas collected /ml | 14 | 9 | 5 | 3 | 1 | 0 |

- (a) Calculate the rate of production of gas during the first time interval.
- (b) How has the rate of production of the gas changed with passage of time?
- (c) Explain the reason for the variation you stated in (b) above.
- (iv) In the step 03 above, when the piston was removed after the collection of the gas and a glowing splint was introduced into the syringe, it lighted brightly. What property of the gas collected was the reason for this observation?
- (v) State an industrial use of the gas collected in the syringe.
- (vi) State an advantage of adopting the above method instead of preparing gases as indicated in the textbook.
- (B) Figure (1) indicates how a straight cylindrical iron pillar planted on the bottom of a shallow sea has corroded after a few years.

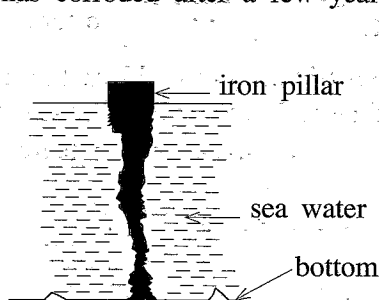


Figure (1)

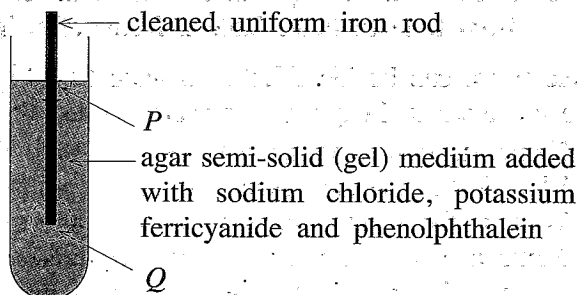


Figure (2)

The following hypothesis was proposed by a student who observed the iron pillar. 'In places where the contact between iron and oxygen is less, the rate of corrosion of iron is high.'

To test this hypothesis, the student assembled the set up shown in figure (2) and observed after a few hours. He could see that the area labelled Q has become blue in colour.

- (i) What are the factors necessary for corrosion of iron?
- (ii) What species produced by the iron rod caused the blue colour in area Q?
- (iii) (a) What colour could be observed in area P in this experiment?
- (b) Write the ion-electron half reaction causing the colour you stated above.
- (iv) What is the use of adding sodium chloride to the jelly medium?
- (v) Does the result of the experiment validate student's hypothesis?
- (vi) (a) State a method used to protect from corrosion, the iron hulls of ships which frequently come in contact with sea water.
- (b) Explain briefly, how the method you stated above contributes to reduce corrosion of iron.

(20 marks)

7. (A) (i) When a coin placed on the bottom of a vessel containing water is viewed from top, the coin appears as if it is raised above the bottom. Copy figure (1) in your answer script and draw the ray diagram which shows how the coin appears raised like that.

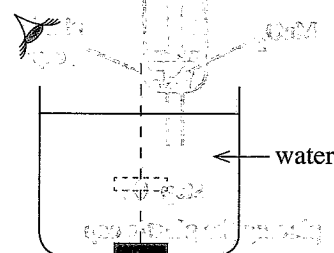


Figure (1)

[See page seven]

- (ii) Figure (2) below illustrates three instances of the incident angle in the denser medium of a light ray travelling from a denser medium to a rarer medium.

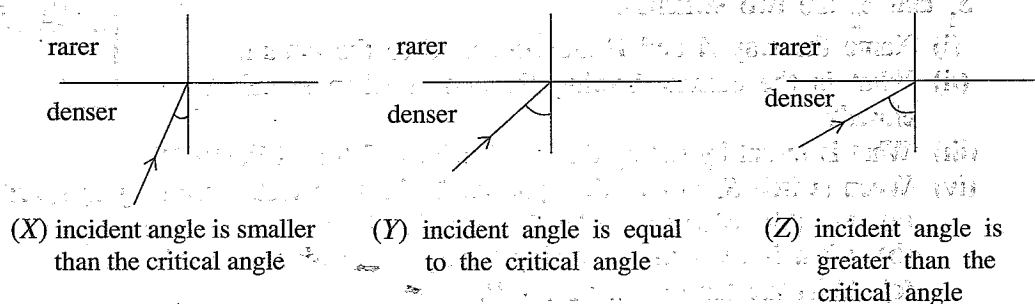
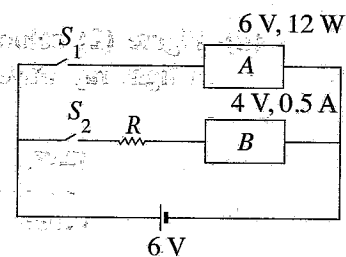


Figure (2)

- What is meant by the critical angle?
  - Copy figure (2) in your answer script and complete the ray diagrams in instances (X), (Y) and (Z) indicating the continued path of the ray.
  - Name the phenomenon occurring in the instance (Z) in figure (2).
  - Give examples for **two** occasions in which the phenomenon stated in (c) above is made use of.
- (B) The time spent for boiling a quantity of water required to prepare four cups of tea using an electric kettle which indicates that its power is 1000 W is three minutes.
- Calculate the amount of electric energy spent here.
  - How much is that amount of electrical energy in kWh? ( $1 \text{ kWh} = 3.6 \times 10^6 \text{ J}$ )
  - How much is the amount of electrical energy wasted in kWh, if an amount of water required to prepare eight cups of tea was boiled to prepare four cups of tea?
- (C) When a motor car runs with a uniform speed of  $10 \text{ m s}^{-1}$  ( $36 \text{ km h}^{-1}$ ) on a rectilinear road, the driver of the car sees a barrier placed at a distance of 4 m. In this instance, he applies brakes to avoid an accident. The time that elapses from the moment of deciding that brakes be applied to putting the application of brakes into effect, that is his reaction time is 0.2 s.
- Find the distance travelled by the car during the time of 0.2 s.
  - The retardation applied by the brakes was  $40 \text{ m s}^{-2}$  and the distance travelled under that retardation till the car stopped was 1.25 m.
    - Could the driver avoid the accident?
    - If the mass of the car was 1000 kg, what was the force applied by the brakes?
    - Explain by a calculation, whether the accident could have been avoided by applying the above force in an instance where the reaction time was 0.3 s of a driver who was sleepy or under the influence of liquor.
- (20 marks)
8. (A) Proteins, lipids and nucleic acids are three basic types of organic compounds contained in living matter.
- Why are proteins, lipids and nucleic acids called organic compounds?
  - State **two** elements that may be contained in proteins but **not** contained in lipids.
  - Name the structural unit of proteins.
  - State a common function of the compounds proteins and lipids.
  - There are two major types of nucleic acids. One of them is called DNA. What is the other type?
  - In a living cell, name the organelle that contains DNA.
  - Explain how the genotype of an organism is changed in gene technology.
  - Name the species of micro-organisms used to produce insulin by means of gene technology.
  - It is required to verify that a crime was committed by the suspect of that crime using a sample of hair collected from the site of that crime. State how gene technology is used for it.

- (B) The figure shows how two electrical appliances *A* and *B* are connected to a 6 V battery. It is indicated that the specifications of *A* are 6 V, 12 W and the specifications of *B* are 4 V, 0.5 A.  $S_1$  and  $S_2$  are two switches.



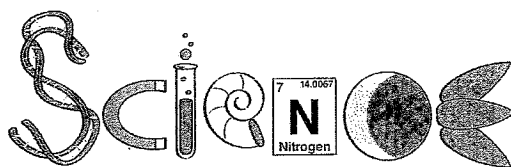
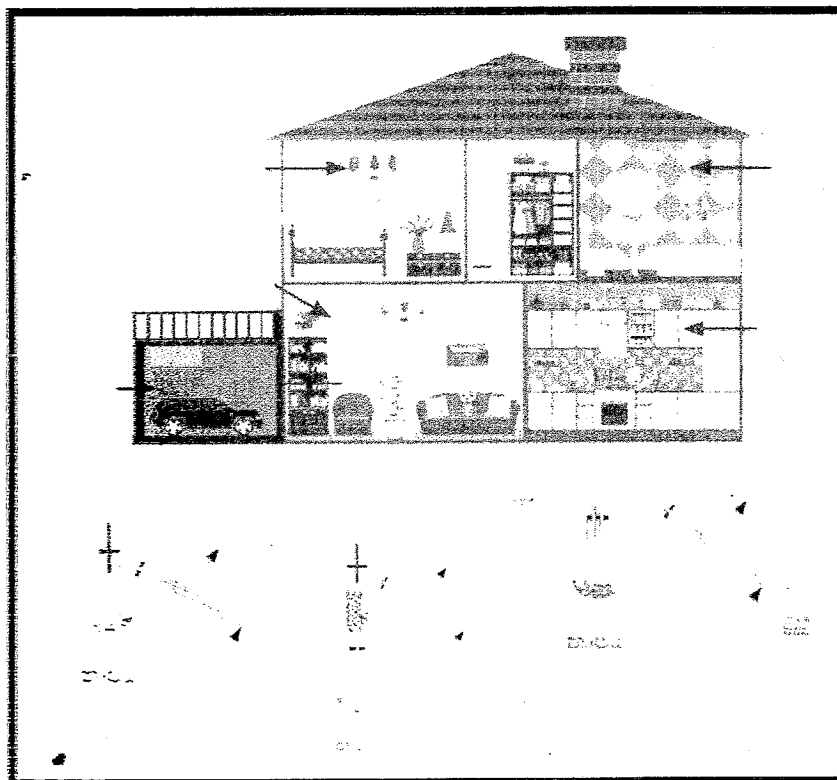
- (i) Name the way *A* and *B* are connected to the circuit.
  - (ii) What is the current flowing through *A* when switch  $S_1$  is closed?
  - (iii) What is meant by stating the specifications of *B* as 4 V, 0.5 A?
  - (iv) When switch  $S_2$  is closed, appliance *B* should operate according to specifications.
    - (a) For this, what should be the potential difference across *R*?
    - (b) What is the current flowing through *R* in this instance?
    - (c) Calculate the due value for *R*.
  - (v) How much is the current drawn from the battery when both the appliances operate? (20 marks)
9. (A) A student added  $50 \text{ cm}^3$  of hydrochloric acid (HCl) solution, concentration  $0.1 \text{ mol dm}^{-3}$  at  $30^\circ\text{C}$  to a polystyrene cup and introduced a thermometer into it. Afterwards,  $50 \text{ cm}^3$  of sodium hydroxide (NaOH) solution, concentration  $0.1 \text{ mol dm}^{-3}$  at  $30^\circ\text{C}$  were added to the same cup.
- 
- (i) The maximum temperature, the mixture reached after mixing the two solutions was  $38^\circ\text{C}$ . Explain the reason for the rise in temperature of the mixture.
  - (ii) State,
    - (a) a change in the above set up
    - (b) a change in the concentration of reactants
 that should have been done to bring the maximum temperature reached by the mixture to a value above  $38^\circ\text{C}$ .
  - (iii) It is expected to repeat the experiment using an amount of solid NaOH which contains the same amount of moles of NaOH that was present in the volume of NaOH solution used in the above experiment. A student states that the maximum temperature the mixture reaches will be  $38^\circ\text{C}$  in this case also.
    - (a) Do you agree with this statement?
    - (b) Explain the reasons for your answer.
  - (iv) (a) Write the balanced chemical equation for the reaction taking place in this experiment.  
 (b) Explain the reason why this reaction is called a neutralization reaction.
  - (v) Why hydrochloric acid is considered a strong acid?
  - (vi) State an industrial use of sodium hydroxide.
- (B) (i) A magnetic field is created around a straight conductor carrying an electric current.
- (a) Using a diagram, illustrate the direction of the current flowing through such a conductor and also the shape and direction of the magnetic lines of force created by it.
  - (b) Present examples for **two** instances where electromagnets are made by modifying the conductor as a coil and sending a current.
- (ii) When a conductor carrying a current is placed perpendicular to a magnetic field as shown in the figure, a force acts on it.
- 
- (a) State **two** factors affecting the magnitude of the force acting on the above conductor.
  - (b) Name the rule used to find the direction of the force acting on the conductor.
  - (c) Present examples for **two** instances in which the force generated as above is made use of.
- (C) The production of electricity in a hydroelectricity power plant is based on the principle of electromagnetic induction.
- (i) Explain briefly what is electromagnetic induction.
  - (ii) Illustrate separately and graphically, how the electric current produced by a hydroelectricity power plant and the electric current produced by a solar panel varies against time. (20 marks)



Department of Examinations – Sri Lanka  
G.C.E. (O/L) Examination – 2023(2024)

# 34 – Science

## Marking Scheme



This document has been prepared for the use of Marking Examiners. Some changes would be made according to the views presented at the Chief Examiners' Meeting.

Amendments are to be included.

**Department of Examinations, Sri Lanka**  
**G.C.E. (Ordinary Level) Examination – 2023(2024)**

**34 - Science**

**Marking Scheme**

**PAPER I**

Number of questions = 40

Marks awarded for the correct answer of each question = 1

Total marks =  $1 \times 40 = 40$

**PAPER II**

**Part A**

Consists of 4 compulsory questions.

Marks awarded for all correct answers of one question = 15

Total marks for the 4 questions  $\text{tfuf} = 15 \times 4 = 60$

**Part B**

Consists of 5 questions.

Only 3 selected questions must be answered.

Marks awarded for all correct answers of one question = 20

Total marks for 3 questions =  $20 \times 3 = 60$

Marks for PAPER I = 40

Marks for the two parts A and B in PAPER II = 120

**Final Marks =  $40 + (120 \div 2)$**

**= 100**

**\*Note : Final mark of each answer script is not calculated in the marking board.**

3. Place the template on the answer script correctly. Mark the right answers with a '✓' and the wrong answers with a 'X' against the options column. Write down the number of correct answers inside the cage given under each column. Then, add those numbers and write the number of correct answers in the relevant cage.

#### **Structured essay type and essay type answer scripts:**

1. Cross off any pages left blank by candidates. **Underline wrong or unsuitable answers and write cross mark. Point-out areas by a check mark, where marks can be offered.**
2. Use the right margin of the overland paper to write down the marks
3. Write down the marks given for each question against the question number in the relevant cage on the front page in **two digits**. Selection of questions should be in accordance with the instructions given in the question paper. Mark all answers and transfer the marks to the front page, and write off answers with lower marks if extra questions have been answered against instructions.
4. Add the total marks carefully and write in the relevant cage on the front page. Turn pages of answer script and add all the marks given for all answers again. Check whether that total tallies with the total marks written on the front page.

#### **Preparation of Mark Sheets.**

Except for the subjects with a single question paper, final marks of two papers will not be calculated within the evaluation board. Therefore, add separate mark sheets for each of the question paper. Enter paper I marks in "Total Marks" column of the mark sheet and write them in words as well. Enter paper II Marks in the " Total Marks" Column and include the relevant details. For the subject 43 Art, Paper I, II and III Marks should be entered numerically in the separate mark sheets and **should also be written in words**.

For subjects 21 Sinhala language and literature and 22 Tamil Language and literature, paper I marks once entered numerically should be written in words. Use separate marks sheets for the papers II and III and enter the total marks in the "Total marks column". Write the relevant detailed marks against each of the total mark.

#### **N.B.:-**

- I. Final marks for paper I, paper II or paper III should always be rounded up to the nearest whole number and they should never be kept as decimal or half values.
- II. Each page of the mark sheet should be compulsorily verified by the Assistant Examiner who entered marks to the mark sheet, Assistant Examiner who checked the mark sheet, the Verifying Examiner of the evaluation marks and Chief Examiner by placing respective code number and the signature.

\*\*\*

අරමුණු

## I පත්‍රය

| ප්‍රශ්න අංකය | ඉගෙනුම් එල                                                                                                                            |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1            | මිනිසාගේ බහිස්ප්‍රාථි අවයව හා බහිස්ප්‍රාථි එල ලැයිස්තු ගත කරයි.                                                                       |
| 2            | විද්‍යුත් ශක්තිය හා ජවය සම්බන්ධ සරල ගැටලු විසඳයි.                                                                                     |
| 3            | සංයුජතාව ඇසුරෙන් සංයෝගවල රසායනික සූත්‍ර ගොඩනගයි.                                                                                      |
| 4            | ශෛලම හා ජලෝයම පටකවල කෘත්‍ය ප්‍රකාශ කරයි.                                                                                              |
| 5            | සමහර පරමාණු ඉලෙක්ට්‍රෝන ලබා ගනිමින් සෑහ අයන බවටත්, ඉලෙක්ට්‍රෝන පිට කරමින් ධන අයන බවටත් පත් වන ආකාරය විස්තර කරයි.                      |
| 6            | ආවර්තිතා වගුවේ තෙ වන ආවර්තයේ ඇති මූලද්‍රව්‍යවල ඔක්සයිඩ පෙන්වන ආම්ලික,                                                                 |
| 7            | සෛල ඉන්ද්‍රියකාවල ව්‍යුහමය සහ කෘත්‍යමය සම්බන්ධතාව සංක්ෂිප්ත ව දක්වයි.                                                                 |
| 8            | ආවේණික ලක්ෂණ භාවිත කර ජීවීන්ගේ හා දේවීන්ගේ ශාක හඳුනා ගනියි.                                                                           |
| 9            | යාන්ත්‍රික තරංග සහ විද්‍යුත් චුම්බක තරංගවල ගුණ පිළිබඳව අන්වේෂණය කරයි.                                                                 |
| 10           | අයනික බන්ධන සෑදෙන්නේ ධන අයන සහ සෑහ අයන අතර ප්‍රබල ස්ථිති විද්‍යුත් ආකර්ෂණයකින් බව පිළිගනියි.                                          |
| 11           | ශ්වසන පද්ධතිය ආශ්‍රිත රෝග, ආබාධ හා ජීවා වළක්වා ගැනීම පිළිබඳ තොරතුරු ඉදිරිපත් කරයි.                                                    |
| 12           | Zn/Cu සරල විද්‍යුත් රසායනික කෝෂය සඳහා ඇනෝඩ, කැතෝඩ සහ සමස්ත ප්‍රතික්‍රියා ලියා දක්වයි.                                                 |
| 13           | Zn/Cu සරල විද්‍යුත් රසායනික කෝෂය සඳහා ඇනෝඩ, කැතෝඩ සහ සමස්ත ප්‍රතික්‍රියා ලියා දක්වයි.                                                 |
| 14           | 'අවධි කෝණය' යන පදය පැහැදිලි කරයි.                                                                                                     |
| 15           | වස්තුවක බර යනු එය පොළොව දෙසට ආකර්ෂණය කර ගැනීමේ බලය බවත්, එහි විශාලත්වය ස්කන්ධයෙන්, ගුරුත්වජ ත්වරණයෙන් ගුණිතයට සමාන බවත් ප්‍රකාශ කරයි. |
| 16           | පෘෂ්ඨවංශීන් පිස්කේස්, අම්පිබියා, රෙප්ටිලියා, ආවේස් හා මමාලියා ලෙස වර්ගීකරණය කරයි.                                                     |
| 17           | නිදසුන් වශයෙන් දී ඇති ලෝහ, (මැග්නීසියම්) අලෝහ (කාබන්), සහ ලෝහාලෝහවල (සිලිකන්) ගුණ සොයා බලයි.                                          |
| 18           | ලිට්මස් කඩදාසි සහ pH කඩදාසි වැනි දර්ශක මගින් අම්ල හස්ම වෙන්කර ගනියි.                                                                  |
| 19           | ශ්‍රව්‍යතා සීමාව, අධෝ ධ්වනි සහ අති ධ්වනි සංඛ්‍යාත පිළිබඳව සඳහන් කරයි.<br>මධ්‍යක වේගය, ගමන් කළ දුර/ගත වූ කාලය                          |
| 20           | හයිඩ්‍රජන්, ඔක්සිජන් සහ කාබන්ඩයොක්සයිඩ් යන වායුවලින් ඇති ප්‍රයෝජන ලැයිස්තුගත කරයි.                                                    |
| 21           | මධ්‍ය ස්නායු පද්ධතියේ (මොළය හා සුෂුම්නාව) මූලික කෘත්‍ය ලැයිස්තු ගත කරයි.                                                              |

|    |                                                                                                                                               |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 22 | සන්නායකයක ප්‍රතිරෝධය සඳහා බලපාන සාධක පෙන්වීමට සරල ක්‍රියාකාරකම් මෙහෙයවයි. (දිග හරස්කඩ වර්ගඵලය සහ ප්‍රතිරෝධකතාව)                               |
| 23 | ස්කන්ධය, ද්‍රව්‍ය ප්‍රමාණය සහ මවුලික ස්කන්ධය අතර සම්බන්ධතා පදනම් කර ගනිමින් ගණනය කිරීම්වල යෙදෙයි.                                             |
| 24 | කාබොහයිඩ්‍රේට්, ප්‍රෝටීන්, ලිපිඩ සහ න්‍යෂ්ටික අම්ලවල සංයුතිය හා උදාහරණ ප්‍රකාශ කරයි.                                                          |
| 25 | ඝන, ද්‍රව හා වායු ප්‍රසාරණය ආදර්ශනය සඳහා ක්‍රියාකාරකම් සිදු කරයි.                                                                             |
| 26 | ද්‍රවයක් තුළ වස්තුවක් ගිලීම හෝ ඉපිලීම එම ද්‍රවය මගින් එම වස්තුව මත ඇති කරනු ලබන උඩුකුරු තෙරපුම් හා එම වස්තුවේ බර අනුව නිර්ණය වන බව පිළිගනියි. |
| 27 | ප්‍රතිවිරුද්ධ ලක්ෂණ යුගලක් යොදා ගනිමින් ආවේණිය සම්බන්ධ මෙන්ඩල්ගේ පරීක්ෂණ පැහැදිලි කරයි.                                                       |
| 28 | සරල උපක්‍රම යොදා ගනිමින්, ප්‍රතිරෝධක සමාන්තරගත ව සහ ශ්‍රේණිගත ව සම්බන්ධ කළ විට ප්‍රතිරෝධයෙහි සිදු වන වෙනස් වීම් ගුණාත්මක ව පෙන්වයි.           |
| 29 | ස්කන්ධය, ද්‍රව්‍ය ප්‍රමාණය සහ මවුලික ස්කන්ධය අතර සම්බන්ධතා පදනම් කර ගනිමින් ගණනය කිරීම්වල යෙදෙයි.                                             |
| 30 | රුධිරයේ සංයුතිය හා කෘත්‍ය ප්‍රකාශ කරයි.                                                                                                       |
| 31 | බල සම්ප්‍රයුක්ත සංකල්පය පැහැදිලි කරයි.                                                                                                        |
| 32 | ප්‍රතික්‍රියා ශීඝ්‍රතාව කෙරෙහි දෙන ලද සාධකයක් බලපාන ආකාරය පැහැදිලි කරයි.                                                                      |
| 33 | ප්‍රභාසංශ්ලේෂණය සඳහා කාබන්ඩයොක්සයිඩ්, ආලෝක ශක්තිය හා හරිතප්‍රදවල අවශ්‍යතාව සනාථ කිරීම සඳහා සරල ක්‍රියාකාරකම් සිදු කරයි.                       |
| 34 | ඒකඅවයවක, බහුඅවයවක, බහුඅවයවීකරණය සහ පුනරාවර්තන ඒකක යන පද පැහැදිලි කරයි.                                                                        |
| 35 | පරිණාමකයක ක්‍රියාව පැහැදිලි කරයි.                                                                                                             |
| 36 | වස්තුවක චලිතය සම්බන්ධ ප්‍රවේග-කාල ප්‍රස්තාරයෙහි අනුක්‍රමණයෙන් එම වස්තුවෙහි ත්වරණය නිරූපණය කෙරෙන බව පැහැදිලි කරයි.                             |
| 37 | පාරිසරික සමතුලිතතාව කෙරෙහි බලපාන කරුණු විස්තර කරයි.                                                                                           |
| 38 | පාරිසරික සමතුලිතතාව කෙරෙහි බලපාන කරුණු විස්තර කරයි.                                                                                           |
| 39 | ආහාර දාම හා ආහාර ජාල තුළින් ශක්තිය හා පෝෂක ගැලීම විස්තර කරයි.                                                                                 |
| 40 | තිරසර සංවර්ධනය සහ පරිසර කළමනාකරණය යන්නෙන් අදහස් කරන්නේ කුමක් දැයි ප්‍රකාශ කරයි.                                                               |

இலங்கைப் பரீட்சைத் திணைக்களம்  
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රහස්‍යයි

අ.පො.ස. (සා.පෙළ) විභාගය - 2023(2024)  
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විෂය අංකය  
பாட இலக்கம்

34

විෂයය  
பாடம்

Science

I පත්‍රය - පිළිතුරු

I பத்திரம் - விடைகள்

| ප්‍රශ්න අංකය<br>வினா இல. | පිළිතුරෙහි අංකය<br>விடை இல. | ප්‍රශ්න අංකය<br>வினா இல. | පිළිතුරෙහි අංකය<br>விடை இல. | ප්‍රශ්න අංකය<br>வினா இல. | පිළිතුරෙහි අංකය<br>விடை இல. | ප්‍රශ්න අංකය<br>வினா இல. | පිළිතුරෙහි අංකය<br>விடை இல. |
|--------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|-----------------------------|
| 01.                      | 2                           | 11.                      | 3                           | 21.                      | 4                           | 31.                      | 1                           |
| 02.                      | 4                           | 12.                      | 2                           | 22.                      | 2                           | 32.                      | 2                           |
| 03.                      | 4                           | 13.                      | 3                           | 23.                      | 2                           | 33.                      | 3                           |
| 04.                      | 2                           | 14.                      | 2                           | 24.                      | 4                           | 34.                      | 3                           |
| 05.                      | 1                           | 15.                      | 1                           | 25.                      | 4                           | 35.                      | 4                           |
| 06.                      | 2                           | 16.                      | 2                           | 26.                      | 3,2                         | 36.                      | 3                           |
| 07.                      | 1                           | 17.                      | 4                           | 27.                      | 2                           | 37.                      | 4                           |
| 08.                      | 3                           | 18.                      | 1                           | 28.                      | 1                           | 38.                      | 1                           |
| 09.                      | (3) All                     | 19.                      | 2                           | 29.                      | 3                           | 39.                      | (3) All                     |
| 10.                      | 3                           | 20.                      | 1                           | 30.                      | 3                           | 40.                      | 1                           |

විශේෂ උපදෙස් } එක් පිළිතුරකට ලකුණු  
විශේෂ අනුමැතියක් } ඉන් එකකට වඩා වැඩි ලකුණු

01

බැගින්  
புள்ளி வீதம்

මුළු ලකුණු / மொத்தப் புள்ளிகள்

01 X 40 = 40

පහත නිදසුනෙහි දැක්වෙන පරිදි බහුවරණ උත්තරපත්‍රයේ අවසාන තීරුවේ ලකුණු ඇතුළත් කරන්න.  
கீழ் குறிப்பிடப்பட்டிருக்கும் உதாரணத்திற்கு அமைய பல்தேர்வு வினாக்களுக்குரிய புள்ளிகளை பல்தேர்வு வினாப்பத்திரத்தின் இறுதியில் பதிக.

නිවැරදි පිළිතුරු සංඛ්‍යාව  
சரியான விடைகளின் தொகை

25

40

I පත්‍රයේ මුළු ලකුණු

பத்திரம் I இன் மொத்தப் புள்ளி

25

40

## 34 – Science

### Paper – II

#### Distribution of marks

|                    |     |       |       |           |    |
|--------------------|-----|-------|-------|-----------|----|
| (1)                | (A) | (i)   |       | 01        |    |
|                    |     | (ii)  |       | 01        |    |
|                    |     | (iii) |       | 01        |    |
|                    |     | (iv)  |       | 01        |    |
|                    |     | (v)   |       | 01        |    |
|                    |     | (vi)  |       | 01        |    |
|                    |     | (vii) |       | 01        |    |
|                    | (B) | (i)   |       | 01        |    |
|                    |     |       | (ii)  |           | 02 |
|                    |     |       | (iii) |           | 02 |
|                    |     |       | (iv)  |           | 01 |
|                    |     |       | (v)   |           | 01 |
|                    |     |       | (vi)  |           | 01 |
| <b>Total Marks</b> |     |       |       | <b>15</b> |    |

|             |     |       |     |    |
|-------------|-----|-------|-----|----|
| (4)         | (A) | (i)   | (a) | 01 |
|             |     |       | (b) | 01 |
|             |     | (ii)  |     | 01 |
|             |     | (iii) |     | 02 |
|             |     | (iv)  | (a) | 01 |
|             |     |       | (b) | 01 |
|             |     | (v)   |     | 02 |
|             |     | (vi)  |     | 01 |
|             |     | (B)   | (i) |    |
|             |     | (ii)  |     | 02 |
|             |     | (iii) |     | 02 |
| Total Marks |     |       |     | 15 |

|             |     |     |       |     |    |
|-------------|-----|-----|-------|-----|----|
| (7)         | (A) | (i) |       | 02  |    |
|             |     |     | (ii)  | (a) | 01 |
|             |     |     |       | (b) | 03 |
|             |     |     |       | (c) | 01 |
|             |     |     |       | (d) | 02 |
|             | (B) | (i) |       | 02  |    |
|             |     |     | (ii)  |     | 02 |
|             |     |     | (iii) |     | 01 |
|             | (C) | (i) |       | 01  |    |
|             |     |     | (ii)  | (a) | 01 |
|             |     |     |       | (b) | 02 |
|             |     |     |       | (c) | 02 |
| Total Marks |     |     |       | 20  |    |

|             |     |       |     |    |
|-------------|-----|-------|-----|----|
| (2)         | (A) | (i)   |     | 01 |
|             |     | (ii)  | (a) | 01 |
|             |     |       | (b) | 01 |
|             |     | (iii) |     | 02 |
|             |     | (B)   | (i) |    |
|             |     | (ii)  |     | 01 |
|             |     | (iii) |     | 01 |
|             |     | (iv)  |     | 01 |
|             |     | (v)   |     | 01 |
|             |     | (C)   | (i) | x  |
|             |     |       | y   | 01 |
|             |     |       | z   | 01 |
|             |     | (ii)  |     | 01 |
|             |     | (iii) |     | 01 |
|             |     |       |     |    |
| Total Marks |     |       |     | 15 |

|     |                    |       |     |           |
|-----|--------------------|-------|-----|-----------|
| (5) | (A)                | (i)   |     | 01        |
|     |                    | (ii)  |     | 01        |
|     |                    | (iii) | (a) | 01        |
|     |                    |       | (b) | 01        |
|     |                    | (iv)  |     | 01        |
|     |                    | (v)   |     | 01        |
|     |                    | (vi)  | (a) | 01        |
|     |                    |       |     | (b)       |
|     |                    |       | (c) | 01        |
|     | (B)                | (i)   |     | 02        |
|     |                    | (ii)  |     | 01        |
|     |                    | (iii) |     | 01        |
|     |                    | (iv)  |     | 01        |
|     |                    | (v)   |     | 02        |
|     |                    | (c)   | (i) |           |
|     | (ii)               |       | 01  |           |
|     | (iii)              |       | 01  |           |
|     | <b>Total Marks</b> |       |     | <b>20</b> |

|             |     |        |     |    |
|-------------|-----|--------|-----|----|
| (8)         | (A) | (i)    |     | 01 |
|             |     | (ii)   |     | 02 |
|             |     | (iii)  |     | 01 |
|             |     | (iv)   |     | 01 |
|             |     | (v)    |     | 01 |
|             |     | (vi)   |     | 01 |
|             |     | (vii)  |     | 01 |
|             |     | (viii) |     | 01 |
|             |     | (ix)   |     | 01 |
|             | (B) | (i)    |     | 01 |
|             |     | (ii)   |     | 02 |
|             |     | (iii)  |     | 02 |
|             |     | (iv)   | (a) | 01 |
|             |     |        | (b) | 01 |
|             |     |        | (c) | 02 |
|             | (v) |        | 01  |    |
| Total Marks |     |        |     | 20 |

|             |     |       |     |     |
|-------------|-----|-------|-----|-----|
| (3)         | (A) | (i)   | P   | 01  |
|             |     |       | Q   | 01  |
|             |     |       | R   | 01  |
|             |     | (ii)  |     | 01  |
|             |     | (iii) | (a) | 01  |
|             |     |       | (b) | 01  |
|             |     |       | (c) | 01  |
|             | (B) | (i)   | (a) | 01  |
|             |     |       | (b) | 01  |
|             |     |       | (c) | 01  |
|             |     | (ii)  | (a) | 01  |
|             |     |       | (b) | 01  |
|             |     | (iii) |     | 01  |
|             |     | (iv)  | (a) | 01  |
|             |     |       |     | (b) |
| Total Marks |     |       |     | 15  |

|             |     |       |     |    |
|-------------|-----|-------|-----|----|
| (6)         | (A) | (i)   |     | 02 |
|             |     | (ii)  | (a) | 02 |
|             |     |       | (b) | 01 |
|             |     | (iii) | (a) | 02 |
|             |     |       | (b) | 02 |
|             | (B) | (i)   |     | 01 |
|             |     | (ii)  |     | 01 |
|             |     | (iii) |     | 02 |
|             |     | (iv)  |     | 02 |
|             |     | (v)   | (a) | 01 |
|             |     |       | (b) | 01 |
|             |     | (vi)  |     | 02 |
|             |     | (vii) |     | 01 |
| Total Marks |     |       |     | 20 |

|             |     |      |       |     |    |
|-------------|-----|------|-------|-----|----|
| (9)         | (A) | (i)  |       | 01  |    |
|             |     |      | (ii)  | (a) | 01 |
|             |     |      |       | (b) | 01 |
|             |     |      | (iii) | (a) | 01 |
|             |     |      |       | (b) | 01 |
|             |     |      | (iv)  | (a) | 01 |
|             |     |      | (b)   | 01  |    |
|             |     | (v)  |       | 01  |    |
|             |     | (vi) |       | 01  |    |
|             | (B) | (i)  | (a)   | 01  |    |
|             |     |      |       | (b) | 02 |
|             |     |      | (ii)  | (a) | 02 |
|             |     |      | (iii) | (b) | 01 |
|             |     |      |       | (c) | 02 |
|             | (C) | (i)  |       | 01  |    |
|             |     | (ii) |       | 02  |    |
| Total Marks |     |      |       |     | 20 |

**II පත්‍රය****A කොටස  
අභිමතාර්ථ**

01

- පස, ජලය හා වායු දූෂණයට බලපාන කරුණු සොයා බලා වාර්තා කරයි.
- විවිධ ප්‍රභවයන් මගින් මුදාහරින පරිසර දූෂක පිළිබඳ වාර්තාවක් සකස් කර ඉදිරිපත් කරයි.
- පරිසර දූෂණය සඳහා පෞද්ගලික දායකත්වය පිළිබඳ තක්සේරු කරයි.
- දී ඇති අභිතකර බලපෑම් සඳහා පරිසර දූෂණය හා සම්බන්ධ විවිධ සංසිද්ධීන් බලපාන ආකාරය විස්තර කරයි.
- සියලුම පරිසර දූෂණ වර්ග අන්තරාදායක පිළිගනියි.
- පරිසර දූෂණය අවම කිරීම සඳහා මිනිසාගේ මැදිහත් වීම අවශ්‍ය බව පිළිගනියි.
- පස, ජලය, හා වාතයේ ඇති අංශුවලට අදාළව අපද්‍රව්‍ය කළමනාකරණය පිළිබඳ විස්තර කරයි.
- විවිධ වෙන් කිරීමේ ක්‍රම ශිල්ප භාවිත කර මිශ්‍රණයක ඇති සංඝටක වෙන් කරයි.
- එදිනෙදා ජීවිතයේ දී සහ කර්මාන්තවල දී බහුඅවයවකවල වැදගත්කම අගය කරයි.

02

- ප්‍රභාසංශ්ලේෂණයේ අන්තඵල හඳුනා ගැනීම සඳහා සරල ක්‍රියාකාරකම් සිදු කරයි.
- ප්‍රභාසංශ්ලේෂණය සඳහා කාබන්ඩයොක්සයිඩ්, ආලෝක ශක්තිය හා හරිතප්‍රදවල අවශ්‍යතාව සනාථ කිරීම සඳහා සරල ක්‍රියාකාරකම් සිදු කරයි.
- අපෘෂ්ඨවංශීන් සිලන්ටර්ටො, අනෙලිඩා, මොලුස්කා, ආත්‍රොපොඩා හා එක් නොඩෙර්මටා ලෙස වර්ගීකරණය කරයි.
- පෘෂ්ඨවංශීන් පිස්කේස්, අම්පිඩියා, රෙප්ටිලියා, ආවේස් හා මමාලියා ලෙස වර්ගීකරණය කරයි.
- සංසේචන ක්‍රියාවලිය සහ අධිරෝපණ ක්‍රියාවලිය විස්තර කරයි.

03

- දී ඇති වෙන් කිරීමේ ක්‍රම ශිල්ප භාවිත වන අවස්ථා සඳහා නිදසුන් ඉදිරිපත් කරයි.
- ආවර්තයක් ඔස්සේ ඉදිරියටත්, කාණ්ඩයක් ඔස්සේ පහළටත් , මූලද්‍රව්‍යවල පළමුවන අයනීකරණ ශක්තිය හා විද්‍යුත් සෘණතාව වෙනස් වන රටා හඳුනා ගනියි.
- සංයුජතාව ඇසුරෙන් සංයෝගවල රසායනික සුත්‍ර ගොඩනගයි.
- රසායනික බන්ධන සෑදීම සඳහා ඉලෙක්ට්‍රෝන සහභාගිවන බව ප්‍රකාශ කරයි.
- සමහර පරමාණු ඉලෙක්ට්‍රෝන ලබා ගනිමින් සෘණ අයන බවටත්, ඉලෙක්ට්‍රෝන පිට කරමින් ධන අයන බවටත් පත් වන ආකාරය විස්තර කරයි.
- ඉලෙක්ට්‍රෝන වින්‍යාසය පදනම් කර ගනිමින් දී ඇති පරමාණුවක් සාදන අයනයක ආරෝපණය නිර්ණය කරයි.
- අයනික බන්ධන සෑදීමේ දී ඉලෙක්ට්‍රෝන ප්‍රදානයක් හා ලබා ගැනීමක් සිදු වන බව ප්‍රකාශ කරයි.
- අයනික බන්ධන සෑදෙන ආකාරය රූපමය ලෙස නිරූපණය කරයි.
- අයනික බන්ධන සෑදෙන්නේ ධන අයන සහ සෘණ අයන අතර ප්‍රබල ස්ථිති විද්‍යුත් ආකර්ෂණයකින් බව පිළිගනියි.
- පරමාණු අතර ඉලෙක්ට්‍රෝන යුගල හවුලේ තබා ගැනීමෙන් සහසංයුජ බන්ධන සෑදෙන ආකාරය පහදයි.
- සරල සහසංයුජ සංයෝගවල ලුච්ස් ව්‍යුහ අදියි.

04

- වායු සහ ද්‍රව මගින් ඇති කෙරෙන පීඩනය ආදර්ශනය සඳහා සරල උපකරණ සාදයි.
- පීඩන සම්ප්‍රේෂණය පෙන්වීමට සරල ක්‍රියාකාරකමක් මෙහෙයවයි.
- ද්‍රව කඳේ සිරස් උස (h) ද්‍රවයේ ඝනත්වය ( $\rho$ ) සහ ගුරුත්වජ ත්වරණය ( $g$ ) යන පද ඇසුරින්, ද්‍රවස්ථිතික
- පීඩනය ( $p$ ) ප්‍රකාශ කරයි.
- තරංගයක ප්‍රස්තාරික නිරූපණය භාවිතයෙන් යාන්ත්‍රික තරංග වලිනයේ ස්වභාවය හා තරංග වලිනය හා සම්බන්ධ භෞතික රාශි පැහැදිලි කරයි.
- තරංග මගින් පදාර්ථ සම්ප්‍රේෂණයකින් තොරව ශක්තිය සම්ප්‍රේෂණය සිදු කරන බව ප්‍රකාශ කරයි.
- තීර්යක් සහ අන්වයාම තරංගවල වෙනස්කම් පැහැදිලි කර සුදුසු උදාහරණ ඉදිරිපත් කරයි.

## B කොටස

05

- පුප්ඵසීය හා සංස්ථානික සංසරණය විස්තර කරයි.
- හෘත් චක්‍රය හා හෘත් ශබ්ද විස්තර කරයි.
- රුධිර පීඩනය ආකූල හා විස්තාර පීඩන ලෙස විස්තර කරයි.
- රුධිර සංසරණ පද්ධතිය ආශ්‍රිත රෝග, ආබාධ සහ ඒවා වැළැබීමේදී තොරතුරු ඉදිරිපත් කරයි.
- පේශි පටක ලෙස සිනිඳු, කංකාල හා හෘත් පේශි පටක ප්‍රකාශ කරයි.
- සිනිඳු, කංකාල හා හෘත් පේශි පටකවල කෘත්‍ය හා පිහිටි ස්ථාන ප්‍රකාශ කරයි.
- සෛලයේ හැඩය අනුව පේශි පටක හඳුනා ගනියි.
- මෘදුස්තර, ස්ප්‍රලකෝණාස්තර සහ දෘඩස්තර යන පටක 'සරල ස්ථිර පටක' ලෙස නම් කරයි.
- ශෛලම සහ ප්ලෝයම යන පටක 'සංකීර්ණ ස්ථිර පටක' ලෙස නම් කරයි.

06

- එක් එක් ප්‍රතික්‍රියා වර්ගය යටතේ, දෙන ලද ප්‍රතික්‍රියා වර්ග කර දක්වයි.
- ප්‍රතික්‍රියා ශීඝ්‍රතාව සඳහා බලපාන සාධක ප්‍රකාශ කරයි.
- ප්‍රතික්‍රියා ශීඝ්‍රතාව අර්ථකථනය කරයි.
- හයිඩ්‍රජන්, ඔක්සිජන් සහ කාබන්ඩයොක්සයිඩ් යන වායුවලින් ඇති ප්‍රයෝජන ලැයිස්තුගත කරයි.
- හයිඩ්‍රජන්, ඔක්සිජන් සහ කාබන්ඩයොක්සයිඩ් යන වායුවල භෞතික ගුණ සඳහන් කරයි.
- යකඩ මල බැඳීම කෙරෙහි බලපාන සාධක පරීක්ෂා කරයි.
- මල බැඳීම සඳහා අවශ්‍ය සාධක සඳහන් කරයි.
- මල බැඳීමේ සීඝ්‍රතාව වෙනස් කරන සාධක නම් කරයි.
- මල බැඳීම පාලනය කරන අයුරු විස්තර කරයි.
- යකඩ සම්බන්ධව කැපකිරීමේ ආරක්ෂක ක්‍රමය විස්තර කරයි.
- යකඩවල කැතෝඩීය ආරක්ෂාව සඳහා සුදුසු ලෝහ සක්‍රියතා ශ්‍රේණිය පදනම් කර ගෙන තෝරා ගනියි.

07

- 'අවධි කෝණය' යන පදය පැහැදිලි කරයි.
- පූර්ණ අභ්‍යන්තර පරාවර්තන සංසිද්ධිය සහ එහි භාවිත පැහැදිලි කරයි.
- විද්‍යුත් ශක්තිය හා ජවය සම්බන්ධ සරල ගැටලු විසඳ යි.
- විද්‍යුත් ශක්ති පරිභෝජනය කාර්යක්ෂම කර ගැනීමේ ක්‍රම පිළිබඳව විස්තර කරයි.
- පහත ප්‍රකාශන යොදා ගනිමින් ගැටලු විසඳයි. මධ්‍යක වේගය, ගමන් කළ දුර/ගත වූ කාලය
- සුදුසු අවස්ථාවල දී ගැටලු විසඳීම සඳහා  $F = ma$  යන සම්බන්ධතාව යොදා ගනියි.

08

- කාබොහයිඩ්‍රේට්, ප්‍රෝටීන්, ලිපිඩ සහ න්‍යෂ්ටික අම්ලවල සංයුතිය හා උදාහරණ ප්‍රකාශ කරයි.
- කාබොහයිඩ්‍රේට්, ප්‍රෝටීන්, ලිපිඩ, න්‍යෂ්ටික අම්ලවල කාර්යභාරය නම් කරයි.
- සෛල ඉන්ද්‍රියකාවල ව්‍යුහමය සහ කෘත්‍යමය සම්බන්ධතාව සංකීර්ණ ව දක්වයි.
- විවිධ ක්ෂේත්‍රවල ජාන තාක්ෂණය යොදා ගන්නා අවස්ථා සඳහන් කරයි.
- සරල උපක්‍රම යොදා ගනිමින්, ප්‍රතිරෝධක සමාන්තරගත ව සහ ශ්‍රේණිගත ව සම්බන්ධ කළ විට ප්‍රතිරෝධයෙහි සිදු වන වෙනස් වීම් ගුණාත්මක ව පෙන්වයි.
- විද්‍යුත් ශක්තිය හා ජවය සම්බන්ධ සරල ගැටලු විසඳයි.
- අවශ්‍ය පරිදි විද්‍යුත් ධාරාව පාලනය කර ගැනීම සඳහා ප්‍රතිරෝධක ශ්‍රේණිගත ව හා සමාන්තරගත ව සම්බන්ධ කිරීම ඉතා ප්‍රදායී උපක්‍රමයක් බව පිළිගනියි.

09

- තාපදායක සහ තාප අවශෝෂක ප්‍රතික්‍රියාවලට උදාහරණ සපයයි.
- තාපදායක සහ තාප අවශෝෂක ප්‍රතික්‍රියා කිහිපයක් ආදර්ශනය කරයි.
- අම්ල සහ භස්ම ප්‍රතික්‍රියා කිරීමෙන් ලවණ සහ ජලය සෑදෙන බව සඳහන් කරයි.
- උදාසීනීකරණය යන පදය පැහැදිලි කරයි.
- ප්‍රබල අම්ල සහ දුබල අම්ල අතර වෙනස සඳහන් කරයි.
- එදිනෙදා ජීවිතයේ දී අම්ල, භස්ම සහ ලවණවල භාවිත අන්වේෂණය කර ලැයිස්තු ගත කරයි.
- චුම්බක ක්ෂේත්‍රයක තබන ලද විද්‍යුත් ධාරා රැගෙන යන සන්නායකයක් මත ක්‍රියාත්මක වන චුම්බක බලය ආදර්ශනය සඳහා ක්‍රියාකාරී සිදු කරයි.
- බලයේ විශාලත්වය කෙරෙහි බලපාන සාධක සඳහන් කරයි.
- බලයේ දිශාව සොයා ගැනීම සඳහා ප්‍රේමිංගේ වමන් නීතිය භාවිත කරයි.
- විද්‍යුත් චුම්බක බලයේ භාවිත අවස්ථා ලෙස සරල ධාරා මෝටරය හා ශබ්ද විකාශකය නිදසුන් ලෙස නම් කරයි.
- විද්‍යුත් චුම්බක ප්‍රේරණ සංසිද්ධිය ගුණාත්මකව පැහැදිලි කරයි.
- සරල ධාරා හා ප්‍රත්‍යාවර්තක ධාරා අතර වෙනස පැහැදිලි කරයි.
- පස, ජලය හා වායු දූෂණයට බලපාන කරුණු සොයා බලා වාර්තා කරයි.

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සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமைபெற்றது [All Rights Reserved]

ශ්‍රී ලංකා විභාග අදායතනයේ ශ්‍රී ලංකා විභාග අදායතනයේ ශ්‍රී ලංකා විභාග අදායතනයේ ශ්‍රී ලංකා විභාග අදායතනයේ ශ්‍රී ලංකා විභාග අදායතනයේ  
 இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்  
 Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka  
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 Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

34 E II

අධ්‍යයන වෛද්‍ය සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2023(2024)  
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2023(2024)  
 General Certificate of Education (Ord. Level) Examination, 2023(2024)

විද්‍යාව II  
 விஞ்ஞானம் II  
 Science II

පැය තුනයි  
 மூன்று மணித்தியாலம்  
 Three hours

අමතර කියවීමේ කාලය - මිනිත්තු 10 යි  
 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.

Index Number: \_\_\_\_\_

**Instructions:** \* Write your answers in neat handwriting.  
 \* Answer the four questions in Part A, in the space provided.  
 \* Of the five questions in Part B answer three questions only.  
 \* After answering, tie Part A and the answer script of Part B together and hand over.

## Part A

1. (A) Indoor air pollution is caused by the harmful pollutants released inside homes. Indoor air pollution is several times more harmful than the outdoor air pollution. The following figure indicates various places of a house subject to indoor air pollution and pollutants that may be present in one of those places.



From the above figure, identify a place which is an example for each of the following statements and write it in the box opposite to it.

|       | Statement                                                                                                                                        | Place                         |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| (i)   | Poisonous gases contributing to acid rains and global warming and volatile hydrocarbons may accumulate.                                          | garage (1 mark)               |
| (ii)  | Subjected to pollution more by volatile organic pollutants released during the use of perfumes, nail polish, etc.                                | bedroom (1 mark)              |
| (iii) | Contributes to indoor air pollution frequently releasing pathogenic micro-organisms, mould, fungi and foul smell.                                | bathroom/<br>kitchen (1 mark) |
| (iv)  | Volatile organic pollutants released from furniture and wall paints and solid particulate pollutants issued from carpets may occur in abundance. | living room (1 mark)          |

- (v) State a personal addiction that pollutes indoor air and makes the dwellers victims of diseases such as lung cancer, heart attacks and strokes.  
 smoking (1 mark)

- (vi) State an eco-friendly practice adopted in this house to control indoor air pollution naturally.  
 Keeping a plant in the living room (indoor plant) (1 mark)

- (vii) Suggest a measure that could be taken during architectural design to minimize indoor air pollution.  
 Installing large windows / Constructing a chimney / Fixing exhaust fans (1 mark)

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(B) Microplastics mean pieces of any type of plastics that are less than 5-mm in length and have different shapes. Microplastic particles made of the polymer types polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polyester and rayon have been found from a cultivated land.

Figure A indicates the percentage composition of microplastics by polymer type in the cultivated land while figure B indicates the percentage composition of polymer types contained in different forms of microplastics.

Figure A

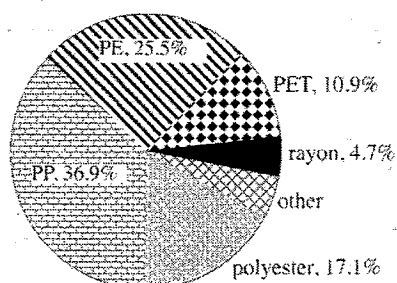
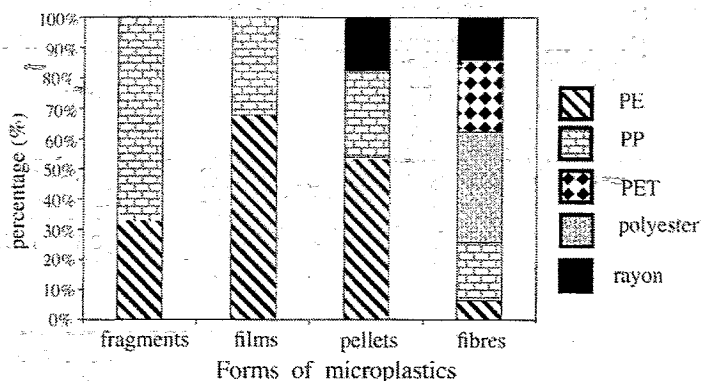


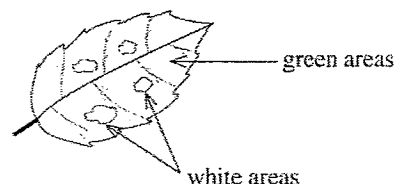
Figure B



Using the information given in the figures, fill in the blanks of the following statements.

- According to figure A, the most abundant polymer type in the cultivated land is **polypropylene / PP**. (1 mark)
- According to figure A, the sum of the percentage compositions of polymer **polyethylene / PE** and polymer **polyethylene terephthalate (PET)** is approximately equal to the percentage composition of PP. (1 mark)
- According to figure B, the polymers existing in the cultivated land as microplastics in the form of films are **polyethylene / PE** and **polypropylene / PP**. (1 mark)
- Microplastics in the form of **fibre** are composed of the highest number of various polymers. (1 mark)
- State a way by which microplastics are added to the cultivated land. **runoff water/ covers/agrochemicals packages/ fr fertilizers/ wind/ water added to the cultivation/ from planting bags** (1 mark)
- Suggest a method to separate microplastics contained in a sample of urea fertilizer. **Dissolving in water and filtering** (1 mark)

2. (A) A group of students preparing for a practical experiment sketched on a paper the diagram of a leaf with white and green areas of a shoe flower plant growing in a place well exposed to sunlight. The diagram is shown on the right. Later, that leaf was subjected to the starch test following the relevant steps.



- Name the chemical substance used to identify starch. **iodine solution / iodine / I<sub>2</sub>** (1 mark)
- Indicate in the following table the observations made after applying the chemical substance you mentioned in (i) above.

| Area of the leaf subjected to the test | Observation                                                 |
|----------------------------------------|-------------------------------------------------------------|
| (a) Green areas                        | <b>brown colour turning blue/ purple / purplish blue</b>    |
| (b) White areas                        | <b>no colour change / pale yellow colour doesn't change</b> |

- What conclusion can be drawn as per the observations made in relation to the green and white areas of the leaf in the above experiment? **chlorophyll / chloroplast (1 mark) is essential for photosynthesis.** (1 mark)
- (B) Several species of animals that could be seen either in home or in home garden are given below. (1 mark)
- cockroach, gecko, spider, snail, leech, centipede

From the above list, select the animal species with each of the following characteristic and write on the dotted line opposite each.

- bears a vertebral column **gecko** (1 mark)
- has a muscular foot **snail** (1 mark)

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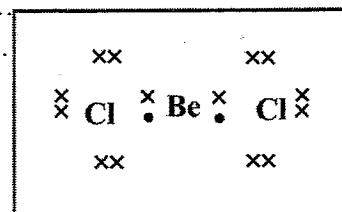
- 4 -

- (ii) State whether the compounds formed by the combination of following elements are ionic or covalent.

(a) calcium and chlorine : **Ionic (1 mark)**

(b) chlorine and oxygen : **Covalent (1 mark)**

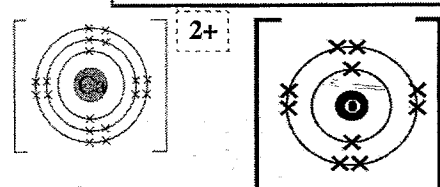
- (iii) Beryllium chloride formed by the combination of beryllium and chlorine is a covalent compound. In the box given, draw the dot and cross structure of the beryllium chloride molecule. **(1 mark)**



- (iv) Calcium oxide formed by the combination of calcium and oxygen is an ionic compound. Indicate in the figure.

(a) the charge of the calcium ion **(1 mark)**

(b) all the electrons in the outermost shell of the oxide ion in calcium oxide. **(1 mark)**



4. (A) The mouth of the funnel shown in figure 1 is fully closed by a tightly stretched sheet of rubber. The other end of the funnel is connected to one arm of a U tube partly filled with coloured water by a rubber tube.

- (i) In the situation shown in the figure 1, how will the water level in the arms of the U tube change when a finger is placed on the top of the rubber sheet and pressed slightly?

(a) arm X **goes down (1 mark)** (b) arm Y **goes up. (1 mark)**

- (ii) Explain the reason for the observation in (i) above.

**increase in the pressure. (In the rubber tube). (1 mark)**

- (iii) In the above set up, water levels in the U tube remain unchanged though the mouth of the funnel is turned to various sides in air. What is the reason for this?

**Atmospheric pressure does not change/ Always Atmospheric pressure assumes the same value (2 marks)**

- (iv) How will the water levels in the arms of the U tube change when the funnel with the rubber sheet is dipped in water shown in figure 2 and moved towards the bottom of the container gradually?

(a) arm X **goes down (1 mark)** (b) arm Y **goes up. (1 mark)**

- (v) State the conclusion that can be drawn according to the observation in (iv) above.

**The pressure increases with the increasing depth in water. (2 marks)**

- (vi) In place of water, an equal volume of coconut oil is added to the container with the funnel in figure 2. When the funnel is held close to the bottom of the container, in the presence of which liquid can a greater difference between the liquid levels of the U tube be observed?

**water (1 mark)**

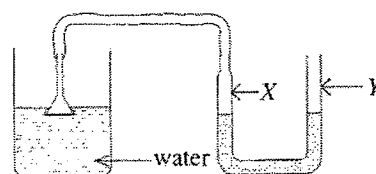
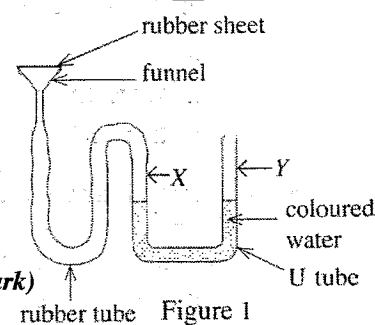
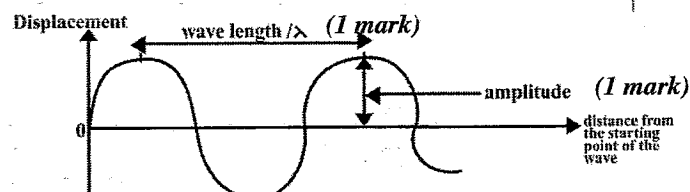


Figure 2

- (B) The figure is the graphical representation of water wave travelling on a water surface.

- (i) As regards the direction in which the water particles vibrate, name the type of waves to which this wave belongs.

**Transverse waves (1 mark)**



- (ii) Mark and label in the above figure, the wave length and amplitude of the wave represented by the graph. **(02)**

- (iii) When a light piece of styrofoam (regifoam) was placed on the water surface along which the wave travels, it was observed that it moves up and down. What is the reason for this observation?

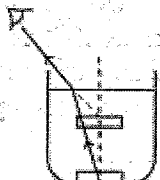
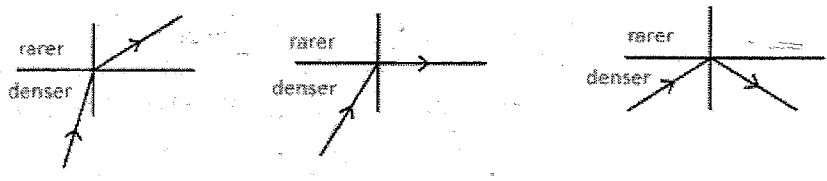
**Particles oscillate perpendicular to the direction of propagation of the wave. (2 marks)**

\* \*

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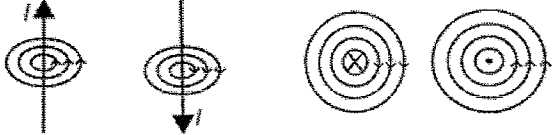
|     |     |       |     |                                                                                                                                                                                                                                                                                                                                                    |           |
|-----|-----|-------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| (5) | (A) | (i)   |     | Blood flows twice through the heart while flowing once through the body                                                                                                                                                                                                                                                                            | 01        |
|     |     | (ii)  |     | Inferior vena cava                                                                                                                                                                                                                                                                                                                                 | 01        |
|     |     | (iii) | (a) | Pulmonary artery                                                                                                                                                                                                                                                                                                                                   | 01        |
|     |     |       | (b) | Systemic aorta/ artery                                                                                                                                                                                                                                                                                                                             | 01        |
|     |     | (iv)  |     | <ul style="list-style-type: none"> <li>• Oxygen (<math>O_2</math>) concentration in <i>S</i> is higher than that in <i>R</i></li> <li>• Carbon dioxide (<math>CO_2</math>) concentration in <i>S</i> is lower than that in <i>R</i></li> <li>• <i>R</i> contains deoxygenated blood while <i>S</i> contains oxygenated blood.</li> </ul> (any one) | 01        |
|     |     | (v)   |     | Bicuspid valve/ mitral valve                                                                                                                                                                                                                                                                                                                       | 01        |
|     |     | (vi)  | (a) | Systolic blood pressure                                                                                                                                                                                                                                                                                                                            | 01        |
|     |     |       | (b) | 110-120 mm Hg / 110 mm Hg / 120 mm Hg                                                                                                                                                                                                                                                                                                              | 01        |
|     |     |       | (c) | Mental stress / Tiring heavily / exercising                                                                                                                                                                                                                                                                                                        | 01        |
|     | (B) | (i)   |     | Skeletal muscles, Cardiac muscles                                                                                                                                                                                                                                                                                                                  | 02        |
|     |     | (ii)  |     | Skeletal muscles                                                                                                                                                                                                                                                                                                                                   | 01        |
|     |     | (iii) |     | A free mark for any                                                                                                                                                                                                                                                                                                                                | 01        |
|     |     | (iv)  |     | Esophagus/ Stomach/ small intestine/ large intestine/ alimentary canal / blood vessels / urinary bladder / uterus / (any one)                                                                                                                                                                                                                      | 01        |
|     |     | (v)   |     | <br>Marking the nucleus (01)<br>Indicating the shape correctly (01)                                                                                                                                                                                             | 02        |
|     | (C) | (i)   |     | A – complex permanent tissues<br>B – sclerenchyma tissue                                                                                                                                                                                                                                                                                           | 02        |
|     |     | (ii)  |     | Parenchyma                                                                                                                                                                                                                                                                                                                                         | 01        |
|     |     | (iii) |     | Mechanical support / photosynthesis                                                                                                                                                                                                                                                                                                                | 01        |
|     |     |       |     | <b>Total Marks</b>                                                                                                                                                                                                                                                                                                                                 | <b>20</b> |

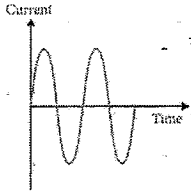
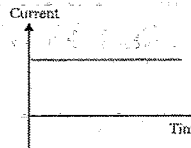
|             |     |       |                                                                                                                                                                                                                                                                                                                                                                        |    |
|-------------|-----|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| (6)         | (A) | (i)   | (Chemical) decomposition reaction                                                                                                                                                                                                                                                                                                                                      | 01 |
|             |     | (ii)  | <ul style="list-style-type: none"> <li>Acting as a catalyst</li> <li>Increasing the rate of the reaction (for any one)</li> </ul>                                                                                                                                                                                                                                      | 01 |
|             |     | (iii) | (a) $\text{Rate} = \frac{\text{volume of gas collected}}{\text{time}}$<br>$= \frac{14 \text{ ml}}{10 \text{ s}} = 1.4 \text{ ml s}^{-1}$<br>(for equation or substitution, 01; for the answer with the unit, 01)<br>(If the final answer is written with the unit, 02)                                                                                                 | 02 |
|             |     |       | (b) Decreased                                                                                                                                                                                                                                                                                                                                                          | 01 |
|             |     |       | (c) <ul style="list-style-type: none"> <li>decrease in the concentration of reactants</li> <li>Decrease in the amount of reactants</li> <li>Spending of reactant/H<sub>2</sub>O<sub>2</sub> (for any one)</li> </ul>                                                                                                                                                   | 01 |
|             |     | (iv)  | A supporter of combustion                                                                                                                                                                                                                                                                                                                                              | 01 |
|             |     | (v)   | <ul style="list-style-type: none"> <li>Welding metals/ Oxy-acetylene flame</li> <li>Production of nitric acid / HNO<sub>3</sub></li> <li>Production of sulphuric acid / H<sub>2</sub>SO<sub>4</sub> (for any one)</li> </ul>                                                                                                                                           | 01 |
|             |     | (vi)  | <ul style="list-style-type: none"> <li>Only a minimum amount of chemical substances is spent/ disposed to the environment</li> <li>Less equipment is needed</li> <li>Mixing with ordinary air is minimized/ Purer sample of gas can be collected</li> <li>Less chances for accidents</li> <li>Less costly</li> <li>Can carry out individually (for any one)</li> </ul> | 01 |
|             | (B) | (i)   | <ul style="list-style-type: none"> <li>Water / water vapour / H<sub>2</sub>O/ moisture</li> <li>Oxygen / O<sub>2</sub> / air</li> </ul>                                                                                                                                                                                                                                | 02 |
|             |     | (ii)  | Fe <sup>2+</sup> / Ferrous (ions) / Iron(II) (ions)                                                                                                                                                                                                                                                                                                                    | 01 |
|             |     | (iii) | (a) Pink                                                                                                                                                                                                                                                                                                                                                               | 01 |
|             |     |       | (b) $2\text{H}_2\text{O(l)} + \text{O}_2\text{(g)} + 4\text{e}^- \rightarrow 4\text{OH}^-\text{(aq)}$ (state symbols are not compulsory)                                                                                                                                                                                                                               | 01 |
|             |     | (iv)  | <ul style="list-style-type: none"> <li>Increasing conductivity (of the jelly medium)</li> <li>Increasing the rate of corrosion/rusting/reaction</li> <li>Creating a condition similar to that of sea water (for any two)</li> </ul>                                                                                                                                    | 02 |
|             |     | (v)   | Yes                                                                                                                                                                                                                                                                                                                                                                    | 01 |
|             |     | (vi)  | (a) <ul style="list-style-type: none"> <li>Applying paint</li> <li>Welding/sticking blocks of magnesium (Mg) or zinc (Zn) on the hull/ using Mg or Zn as sacrificial metals (for any one)</li> </ul>                                                                                                                                                                   | 01 |
|             |     |       | (b) <ul style="list-style-type: none"> <li>Reason (Applying paint) - Prevents iron from coming into contact with water and oxygen</li> <li>Reason (Sacrificial metal Mg/Zn) - Iron acts as the cathode (for any one)</li> </ul>                                                                                                                                        | 02 |
| Total Marks |     |       |                                                                                                                                                                                                                                                                                                                                                                        | 20 |

|     |     |       |                                                                                   |                                                                                                                                                                                                                                                                           |    |
|-----|-----|-------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| (7) | (A) | (i)   |  | for refracted ray (01)<br>for producing the ray                                                                                                                                                                                                                           | 02 |
|     |     | (ii)  | (a)                                                                               | It is the angle of incidence in the denser medium at the instance when the angle of refraction in the rarer medium is $90^\circ$ /the refracted ray travels along the interface between the two media when a ray of light travels from a denser medium to a rarer medium. | 01 |
|     |     |       | (b)                                                                               | <br>(01)                      (01)                      (01)                                                                                                                            | 03 |
|     |     |       | (c)                                                                               | Total internal reflection                                                                                                                                                                                                                                                 | 01 |
|     |     |       | (d)                                                                               | cutting and polishing gems/ prism binocular/ endoscopy instrument/ optical fibers/ decorations/ telecommunication/ observing internal parts of the body (for any two)                                                                                                     | 02 |
|     | (B) | (i)   |                                                                                   | $E = Pt$<br>$= 1000 \text{ (W)} \times 3 \times 60 \text{ (s)}$ (01) (for equation or substitution)<br>$= 180,000 \text{ (J)}$ (01)                                                                                                                                       | 02 |
|     |     | (ii)  |                                                                                   | $= 180,000 \text{ (J)}$ (01)<br>$3.6 \times 10^6 \text{ (J kW h}^{-1}\text{)}$<br>$= 0.05 \text{ (kW h)}$ (01)<br>Or<br>$= \frac{\text{watt value} \times \text{hours}}{1000}$ (01)<br>$= \frac{1000 \times 3}{1000 \times 60} = 0.05 \text{ (kW h)}$ (01)                | 02 |
|     |     | (iii) |                                                                                   | Amount of electrical energy for eight cups of tea $= 0.05 \text{ kW h} \times 2$<br>$= 0.10 \text{ kW h}$<br>The amount of electrical energy wasted $= 0.10 \text{ kW h} - 0.05 \text{ kW h}$<br>$= 0.05 \text{ (kW h)}$                                                  | 01 |
|     | (C) | (i)   |                                                                                   | $\text{speed} = \frac{\text{distance}}{\text{time}}$<br>$\text{distance} = \text{speed} \times \text{time}$<br>$= 10 \text{ (m s}^{-1}\text{)} \times 0.2 \text{ (s)}$<br>$= 2 \text{ (m)}$ (01)                                                                          | 01 |
|     |     | (ii)  | (a)                                                                               | Yes                                                                                                                                                                                                                                                                       | 01 |
|     |     |       | (b)                                                                               | $F = ma$<br>$= 1000 \text{ (kg)} \times 40 \text{ (m s}^{-2}\text{)}$ (01)<br>$= 40,000 \text{ (N)}$ (01)                                                                                                                                                                 | 02 |

|  |  |  |     |                                                                                                                                                                                                                                                                                                                                                                                                                      |           |
|--|--|--|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|  |  |  | (c) | $\text{speed} = \frac{\text{distance}}{\text{time}}$ $\text{distance} = \text{speed} \times \text{time}$ $= 10 \text{ (m s}^{-1}\text{)} \times 0.3 \text{ (s)}$ $= 3 \text{ (m)}$<br>Distance travelled during reaction time = 3 m<br>Distance travelled with retardation = 1.25 m<br><br>$\therefore$ Total distance travelled is 4.25 m (01)<br><br>(As the barrier is 4 m away) vehicle couldn't be stopped (01) | 02        |
|  |  |  |     | <b>Total Marks</b>                                                                                                                                                                                                                                                                                                                                                                                                   | <b>20</b> |

|             |     |        |                                                                                                                                                   |    |
|-------------|-----|--------|---------------------------------------------------------------------------------------------------------------------------------------------------|----|
| (8)         | (A) | (i)    | (because those compounds) contain carbon (C) (as a component)                                                                                     | 01 |
|             |     | (ii)   | Nitrogen /N , Sulphur /S                                                                                                                          | 02 |
|             |     | (iii)  | Amino acids                                                                                                                                       | 01 |
|             |     | (iv)   | Acting as sources of energy / As components of structures                                                                                         | 01 |
|             |     | (v)    | RNA / (Ribonucleic Acid)                                                                                                                          | 01 |
|             |     | (vi)   | Nucleus / mitochondria                                                                                                                            | 01 |
|             |     | (vii)  | Removing some parts of DNA from genes <u>or</u> introducing parts of DNA to genes                                                                 | 01 |
|             |     | (viii) | <i>E.coli</i> or bacteria                                                                                                                         | 01 |
|             |     | (ix)   | Comparing the DNA of those hairs with the DNA of the suspect                                                                                      | 01 |
|             | (B) | (i)    | In parallel                                                                                                                                       | 01 |
|             |     | (ii)   | $P = VI$<br>$12 \text{ (W)} = 6 \text{ V} \times I$ (for equation or substitution 01)<br>$I = 2 \text{ A}$ (01)                                   | 02 |
|             |     | (iii)  | When a potential difference of 4 V (01) is applied across B, the current flowing through it is 0.5 A (01)                                         | 02 |
|             |     | (iv)   | (a) 2 V                                                                                                                                           | 01 |
|             |     |        | (b) 0.5 A                                                                                                                                         | 01 |
|             |     | (c)    | $V = IR$<br>$R = V/I$<br>$= 2 \text{ (V)} / 0.5 \text{ (A)}$<br>$= 4 \text{ (}\Omega\text{)}$<br>(for equation or substitution 01; for answer 01) | 02 |
|             |     | (v)    | $2 \text{ A} + 0.5 \text{ A} = 2.5 \text{ A}$ (for the answer 01)                                                                                 | 01 |
| Total Marks |     |        |                                                                                                                                                   | 20 |

|     |     |       |     |                                                                                                                                                                                                                                                     |    |
|-----|-----|-------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| (9) | (A) | (i)   |     | (Acid-base neutralization) reaction is exothermic. / When the reaction takes place, energy is released to the environment.                                                                                                                          | 01 |
|     |     | (ii)  | (a) | Closing the mouth of the cup with the heat insulating / polystyrene lid / Placing the cup in another cup                                                                                                                                            | 01 |
|     |     |       | (b) | Increasing the concentration of the reactants                                                                                                                                                                                                       | 01 |
|     |     | (iii) | (a) | No                                                                                                                                                                                                                                                  | 01 |
|     |     |       | (b) | <ul style="list-style-type: none"> <li>Evolution of heat when solid NaOH dissolves</li> <li>Change of heat change with the physical states</li> <li>Decrease in the total volume of the mixture</li> </ul> <i>(for any one)</i>                     | 01 |
|     |     | (iv)  | (a) | $\text{NaOH(aq)} + \text{HCl(aq)} \rightarrow \text{NaCl(aq)} + \text{H}_2\text{O(l)}$<br><i>(Disregard physical states)</i>                                                                                                                        | 01 |
|     |     |       | (b) | <ul style="list-style-type: none"> <li><math>\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}</math> /</li> <li>Because <math>\text{H}^+</math> ions and <math>\text{OH}^-</math> ions combine to form water</li> </ul> <i>(for any one)</i> | 01 |
|     |     | (v)   |     | Because it completely ionises in aqueous solution releasing $\text{H}^+$ ions                                                                                                                                                                       | 01 |
|     |     | (vi)  |     | <ul style="list-style-type: none"> <li>Production of soap</li> <li>Production of paper</li> <li>Production of artificial silk and dyes</li> <li>Refining petroleum products</li> </ul> <i>(for any one correct answer)</i>                          | 01 |
|     | (B) | (i)   | (a) | <br><i>(for drawing any diagram correctly)</i>                                                                                                                  | 01 |
|     |     |       | (b) | Electric bell, electric crane, relay switch, door lock, galvanometer, ammeter<br><i>(for any two correct answers 1 x 2)</i>                                                                                                                         | 02 |
|     |     | (ii)  | (a) | <ul style="list-style-type: none"> <li>Strength of the magnetic field</li> <li>Length of the conductor</li> <li>Current flowing / magnitude of the current</li> </ul> <i>(for any two correct answers 1 x 2)</i>                                    | 02 |
|     |     |       | (b) | Fleming's left hand rule<br><i>(give marks for stating the rule also)</i>                                                                                                                                                                           | 01 |
|     |     |       | (c) | <ul style="list-style-type: none"> <li>Electric motor</li> <li>Speaker</li> </ul> <i>(1 x 2)</i>                                                                                                                                                    | 02 |

|  |     |      |                                                                                                                                                                                                                                                                                                             |           |
|--|-----|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|  | (C) | (i)  | Induction of an electromotive force across a conductor when the magnetic field affecting it changes<br>OR<br>generation of an electromotive force across a conductor when it is kept still in a changing magnetic field or when it moves in a steady magnetic field                                         | 01        |
|  |     | (ii) | <p>Electric current produced by a hydroelectricity plants</p>  <p>(01)</p> <p>Electric current produced by a solar panel</p>  <p>(01)</p> | 02        |
|  |     |      | <b>Total Marks</b>                                                                                                                                                                                                                                                                                          | <b>20</b> |

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