

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved

නව නිර්දේශයාදුම් පාලන ක්‍රමය / New Syllabus

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
 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
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NEW

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අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2016 දෙසැම්බර්
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2016 டிசெம்பர்
 General Certificate of Education (Ord. Level) Examination, December 2016

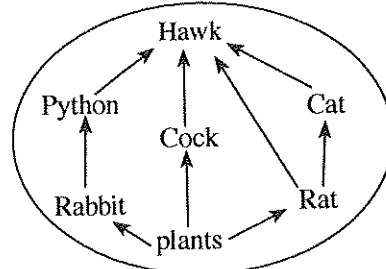
විද්‍යාව I
 விஞ்ஞானம் I
 Science I

පැය එකයි
 ஒரு மணித்தியாலம்
 One hour

Important :

- * Answer all questions.
- * In each of the questions 1 to 40, pick one of the alternatives (1), (2), (3), (4) which you consider as correct or most appropriate answer.
- * 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.

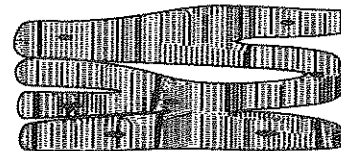
1. Which of the following is a vector quantity?
 (1) weight (2) time (3) speed (4) distance
2. According to the standards of binomial nomenclature, select the option which gives correctly the scientific name of Jungle Fowl.
 (1) Gallus Lafayetti (2) GALLUS LAFAYETTI
 (3) Gallus lafayetti (4) Gallus Lafayetti
3. The gas which is used to produce margarine from vegetable oils is
 (1) O₂ (2) H₂ (3) CO₂ (4) N₂
4. Which of the following seeds is adapted for dispersal by wind?
 (1) Rubber (2) Epala (3) Bitter gourd (4) Wara
5. What is the colour of phenolphthalein in the basic medium?
 (1) Red (2) Pink (3) Yellow (4) Blue
6. What is the acid that is used for coagulation of rubber latex?
 (1) HCl (2) H₂SO₄ (3) CH₃COOH (4) HNO₃
7. Which of the following is an amphoteric oxide?
 (1) Na₂O (2) P₂O₅ (3) Al₂O₃ (4) Cl₂O₇
8. Which of the following can be used as a disinfectant?
 (1) Chlorine (2) Iodine (3) Boric acid (4) Magnesium hydroxide
9. The catalyst which is used in the manufacture of sulphuric acid by the contact method is
 (1) Copper. (2) Nickel. (3) Iron. (4) Vanadium pentoxide.
10. Monocotyledonae plants
 (1) bear trimerous flowers. (2) show secondary growth.
 (3) possess leaves with a reticulate venation. (4) have a tap root.
11. In which of the following instances does a chemical change occur?
 (1) In vaporization of water (2) In burning of fire wood
 (3) In melting of wax (4) In melting of moth balls
12. Who is the tertiary consumer in this food web?
 (1) Cock
 (2) Python
 (3) Hawk
 (4) Cat



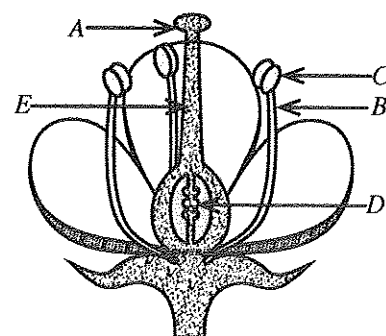
13. Select the option which gives a type of non-granulocytes and a type of granulocytes respectively.
 (1) neutrophils, eosinophils (2) neutrophils, monocytes
 (3) lymphocytes, monocytes (4) monocytes, basophils
14. The number of lone pair electrons around O atom in a H₂O molecule is
 (1) 2 (2) 4 (3) 6 (4) 8
15. On a certain day, in Nuwara Eliya town, the daytime temperature was 16 °C and night-time temperature was 4 °C. What is the temperature difference between day and night in Nuwara Eliya town on that day, in Kelvin?
 (1) 12 K (2) 277 K (3) 285 K (4) 289 K
16. What is the number of double bonds in an isoprene molecule?
 (1) 1 (2) 2 (3) 3 (4) 4
17. Kamal works in a glass factory for a long period of time. In a medical test, it was revealed that his lung tissues are getting deteriorated gradually. Accordingly, which disease is Kamal suffering from?
 (1) Asbestosis (2) Bronchitis (3) Gastritis (4) Silicosis
18. In the asexual reproduction,
 (1) a large number of offspring is produced in a short period of time.
 (2) meiosis occurs.
 (3) gametes are produced.
 (4) new species with better adaptation to environment are produced.
19. The focal length of a mirror is 30 cm. When an object is kept on the principal axis of the mirror, the image formed by the mirror is real and its size is equal to the size of the object. The distance from the mirror to the object is
 (1) 30 cm. (2) 60 cm. (3) 120 cm. (4) 150 cm.

20. A diagram of a muscle tissue is given below. Select the option which gives correctly the name of this muscle tissue and its function.

	Muscle tissue	Function
(1)	Cardiac muscles	Voluntarily controlled
(2)	Skeletal muscles	Involuntarily controlled
(3)	Skeletal muscles	Voluntarily controlled
(4)	Cardiac muscles	Involuntarily controlled

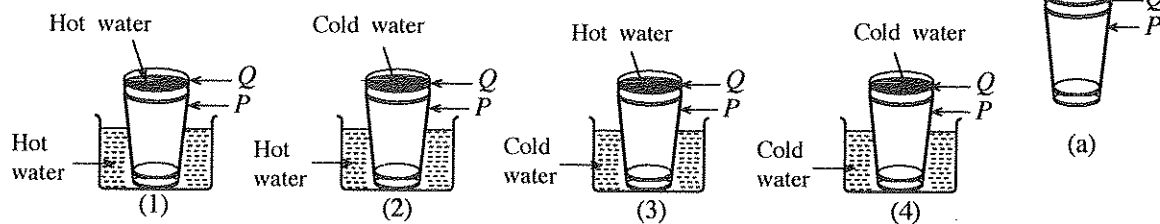


21. What is the pressure exerted by water at a point located 2 m vertically below the water level in a lake?
 (Take the density of water as 1 000 kg m⁻³ and acceleration due to gravity as 10 m s⁻²)
 (1) 1 000 N m⁻² (2) 2 000 N m⁻² (3) 10 000 N m⁻² (4) 20 000 N m⁻²
22. Amali's skin is dry and blisters have appeared on her knee and elbows. Further, Bitto spots are in her eyes. From which of the following deficiencies of Vitamins is Amali suffering?
 (1) Vitamin A (2) Vitamin B (3) Vitamin C (4) Vitamin D
23. Which of the following statements is **false** regarding photosynthesis?
 (1) Photosynthesis can be done artificially.
 (2) Solar energy is converted into chemical energy during photosynthesis.
 (3) O₂ gas is produced as a by-product of photosynthesis.
 (4) Glucose produced during photosynthesis is temporarily stored in plant leaves as starch.
24. A diagram of a longitudinal section of a bisexual flower is given below. Select the option which gives two parts belonging to gynoecium and androecium respectively.



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

25. As shown in the figure (a), the glass *Q* stick inside the glass *P*. Which of the following strategies is suitable to separate the two glasses easily?



26. Consider the following statements made by a student.

- A - Cinnamon oil can be extracted from Cinnamon leaves by using steam distillation.
- B - Petrol can be obtained from crude oil by using fractional distillation.
- C - Distilled water can be obtained from well water by using simple distillation.

Of the above statements,

- (1) only A and B are true.
 - (2) only B and C are true.
 - (3) only A and C are true.
 - (4) all A, B and C are true.
27. Which of the following reactions is a neutralization reaction?
- (1) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
 - (2) $\text{FeSO}_4 + 2\text{NaOH} \rightarrow \text{Fe}(\text{OH})_2 + \text{Na}_2\text{SO}_4$
 - (3) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 - (4) $\text{CaCl}_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + 2\text{NaCl}$

28. The chemical formula of the carbonate of an element *M* is M_2CO_3 . What is the chemical formula of the chloride of *M*?

- (1) MCl
- (2) M_2Cl
- (3) MCl_2
- (4) M_3Cl_2

29. What is the number of O atoms in 22 g of CO_2 gas? (C = 12, O = 16)

- (1) 2
- (2) 6.022×10^{23}
- (3) $2 \times 6.022 \times 10^{23}$
- (4) $22 \times 6.022 \times 10^{23}$

30. Three properties of a particular element are given below.

- Occurs in crystalline form as well as in amorphous form.
- Insoluble in water, but very soluble in CS_2 solvent.
- Burns with a blue flame in air.

Which of the following could be the element with above properties?

- (1) Na
- (2) Mg
- (3) C
- (4) S

31. The limiting frictional force between two objects with rough surfaces in contact depends on

- (1) the area of the contact surfaces.
- (2) the normal reaction and the nature of the contact surfaces.
- (3) the nature of the contact surfaces and the area of the contact surfaces.
- (4) the area of the contact surfaces and the normal reaction.

32. The gravitational acceleration on the moon is $\frac{1}{6}$ th that of the earth. If the gravitational acceleration on the earth is 10 m s^{-2} , what would be the weight of an astronaut of mass 60 kg, on the moon?

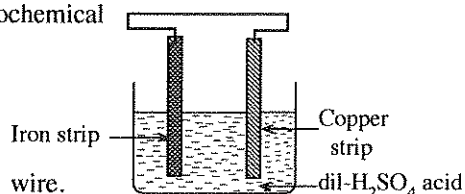
- (1) $\frac{1}{6} \text{ N}$
- (2) 10 N
- (3) 100 N
- (4) $\frac{1000}{6} \text{ N}$

33. The mole fraction of NaOH in a solution formed, when 2 moles of NaOH is dissolved in 10 moles of water is

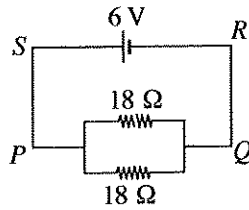
- (1) $\frac{1}{10}$
- (2) $\frac{1}{6}$
- (3) $\frac{1}{5}$
- (4) $\frac{5}{6}$

34. Which of the following statements is **false** regarding the electrochemical cell given in the figure?

- (1) Iron strip acts as the anode.
- (2) A reduction reaction occurs at the copper strip.
- (3) Gas bubbles evolved rapidly at the iron strip.
- (4) Electrons flow towards the copper strip across the external wire.



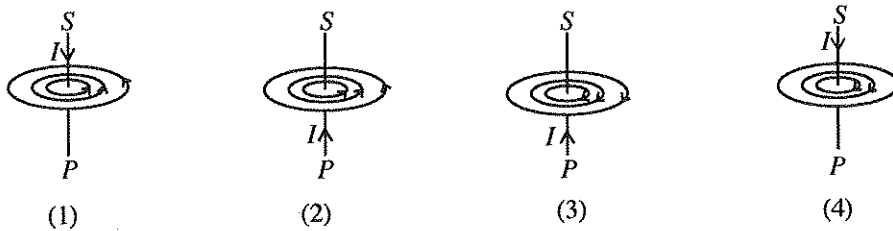
● Answer questions No. 35 and 36 using the circuit given below.



35. What is the current (I) produced by the cell?

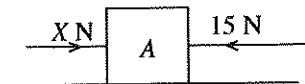
- (1) $\frac{1}{6}$ A (2) $\frac{2}{3}$ A (3) 3 A (4) 6 A

36. Due to the current (I) flows through the straight conducting part SP , a magnetic field is formed around SP . Select the option which indicates correctly the direction of the magnetic field.



37. Consider the object A which is kept on a smooth horizontal surface as shown in the figure. Two horizontal forces of 15 N and X N are acting on A as shown in the figure. If the object is moving in the direction of the force X with a resultant force of 10 N, what is the value of X ?

- (1) 15 (2) 25
(3) 35 (4) 45



38. Consider the following data relevant to the motion of a child in a straight line path from a certain point.

Time (s)	0	1	2	3	4	5	6	7	8	9	10	11
Displacement (m)	0	2	4	6	6	6	8	8	7	4	2	0

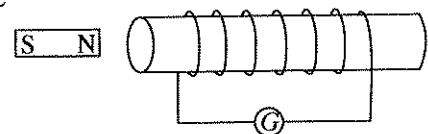
Which of the following statements is **false** regarding the motion of the child in the given time?

- (1) The child has moved at a uniform velocity in the first three seconds.
(2) The total time that the child remained at rest is 5 seconds.
(3) The child has returned to the starting point.
(4) The total distance that the child has moved is 16 m.

39. A figure of an arrangement to demonstrate the electromagnetic induction is given here.

In which of the following instances the galvanometer G does **not** indicate a deflection?

- (1) When moving the magnet towards the coil while keeping the coil stationary.
(2) When keeping both the magnet and the coil stationary.
(3) When moving the magnet away from the coil while keeping the coil stationary.
(4) When moving the coil away from the magnet while keeping the magnet stationary.



40. Anil, Jagath, Sujith and Namal living in Kurunegala town have had their breakfast on a certain day as shown in the following table.

Name	Anil	Jagath	Sujith	Namal
Food	Rice	String hoppers (made up of rice flour)	Bread (made up of wheat flour)	Rotti (made up of wheat flour)
	Dhal curry	Dhal curry	Dhal curry	Potato curry
	Coconut sambol	Fish curry	Coconut sambol	Coconut sambol

Rice and coconut had been obtained from Kurunegala area and potatoes had been obtained from Nuwara Eliya area. Rice flour had been obtained from Polonnaruwa area and fish from Negambo. Dahl and wheat flour had been obtained from India and America respectively.

Accordingly, who has taken the meal with the lowest food mile?

- (1) Anil (2) Jagath (3) Sujith (4) Namal

නව කිර්දේශය/புதிய பாடத்திட்டம்/New Syllabus

NEW
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II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2016 දෙසැම්බර්
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2016 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2016

විද්‍යාව **II**
 விஞ்ஞானம் **II**
Science **II**

පැය තුනයි
 மூன்று மணித்தியாலம்
Three hours

Index Number:

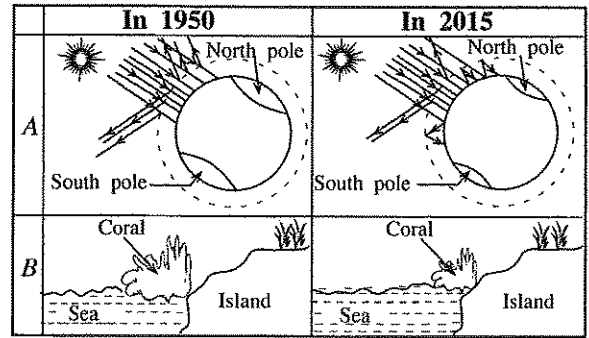
- Instructions:**
- * Write your answers in neat handwriting.
 - * Answer the four questions in Part A, in the space provided.
 - * Of the five questions in Part B answer three questions only.
 - * After answering, tie Part A and the answer script of Part B together and hand over.

Part A

1. Ozone layer depletion, global warming, eutrophication, biomagnification and acid rains are a few direct effects of environmental pollution.

- (i) What is meant by biomagnification?
.....
- (ii) What is the function of the ozone layer?
.....
- (iii) During the past century, the sea level has risen by about 10-20 cm. Which of the above effects was directly responsible for this?
.....

- (iv) Consider the figures A and B. (These are rough diagrams.)
- (a) State which of the above **two** effects are shown by A and B.
- A:
- B:



- (b) State **two** gases responsible for B and state **one** method for each that releases each of these gases. (Write the relevant method in front of the name of the gas.)
-
-

(v) Some solid waste material responsible for environmental pollution are as follows.

Florescent lamps, polythene, chemical fertilizers, detergents, animal excretory matters

- (a) Of the above, state a material which causes eutrophication.
.....
- (b) From which of the above materials, mercury could mostly be released to the environment?
.....

(c) For which of the 4R waste handling techniques can each of the following activities be considered as an example?

I. Use of organic fertilizer instead of chemical fertilizer:

II. Production of biogas using animal excretory matter:

(vi) Write down **two** renewable energy resources which are eco-friendly.

.....

2. (A) Invertebrates are separated into phyla based on their features.

(i) In the second column of the table given below, state the phylum which has each of the features indicated as *a*, *b*, *c* and *d* in the first column.

Feature	Phylum
<i>a</i> - Multicellular body build up of two germinal layers	
<i>b</i> - Presence of a muscular foot	
<i>c</i> - Living only in marine habitats	
<i>d</i> - Presence of a chitinous cuticle	

(ii) Name an animal that possesses the feature (a) given in the above table.

(iii) Write down the kingdom and domain to which the phyla stated in (i) above belong.

Kingdom: Domain:

(B) Respiration is a process of living organisms.

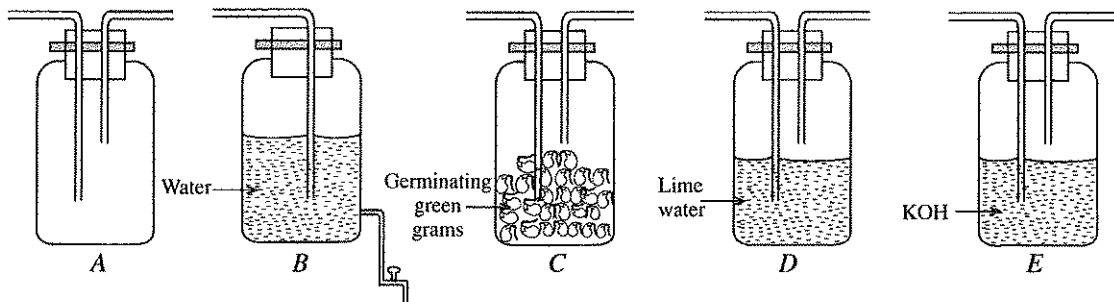
(i) (a) State the **two** types of respiration that can take place in organisms.

.....

(b) Which one of the two types of respirations stated in (a) above produces more energy?

.....

(ii) The apparatus needed to arrange a set-up to show experimentally, that carbon dioxide gas is released during the respiration are given below without a sequential order.



(a) What is the solution that should be put into the bottle A?

(b) After putting the relevant solution into the bottle A, write down the correct sequence in which the above bottles (A, B, C, D and E) should be connected.

(c) State what should be done after connecting all the bottles correctly.

.....

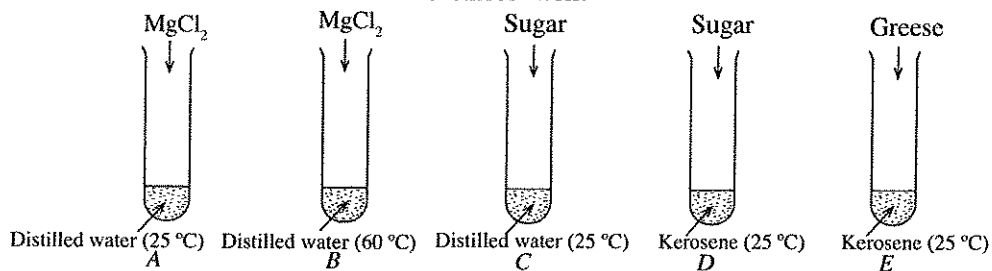
(d) After the step mentioned in (c) above, state the change that could be observed in the set-up.

.....

(e) State the change that should be done to the above set-up to arrange a control set-up relevant to the above experiment.

.....

3. As shown in the following figures, $MgCl_2$, sugar and grease are added to the test tubes A, B, C, D and E. After that the substances in the tubes are stirred well.



- (i) (a) In which test tube a solid-liquid heterogeneous mixture is formed?
- (b) Write respectively, the solute and the solvent in this mixture.

.....

- (ii) (a) Define 'solubility of a solute'.

.....

- (b) What factor that affects the solubility can be shown by each of the following pairs of test tubes?

I. A and B:

II. C and D:

III. D and E:

- (iii) In the above experiment, 1.9 g of $MgCl_2$ was added to the tube A and the total volume of the solution formed was 10 cm^3 .

- (a) Find the number of moles of $MgCl_2$ added. (Mg = 24, Cl = 35.5)

.....

- (b) Calculate the concentration of $MgCl_2$ in the solution.

.....

- (iv) Water is a good solvent. Write **two** special properties possessed by water due to the intermolecular forces.

.....

4. Consider the following types of waves.

- Ultraviolet rays
- Infra-red rays
- Micro waves
- X-rays
- Gamma rays
- Visible light
- Sound waves
- Ultrasound waves

- (i) Of the above waves, mention a wave that propagates with compressions and rarefaction.

.....

- (ii) Write down a special characteristic of ultrasound waves.

.....

- (iii) In the field of medicine, which type of the above waves is generally used to observe the conditions of the fetus inside the womb of a pregnant mother?

- (iv) A part of the electromagnetic spectrum is given below.

A	B	Visible Light	Ultraviolet rays	C	Gamma rays
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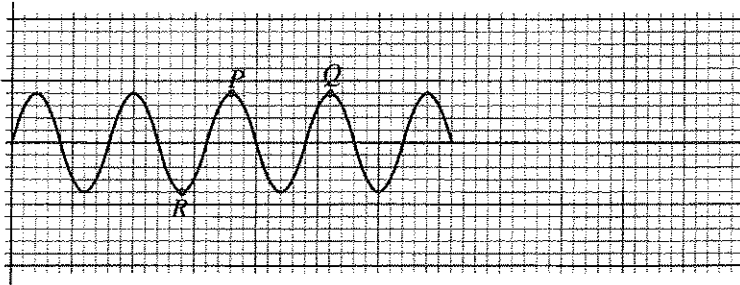
- (a) Considering the sequence of above waves, write down the types of waves that should be in the places A, B and C.

A:

B:

C:

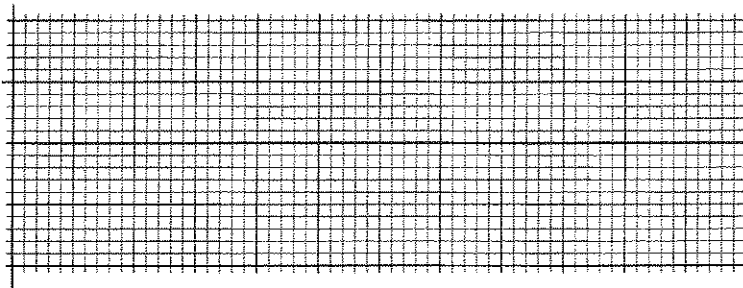
(b) A waveform relevant to Gamma rays is given below.



I. By which name the point *R* of the wave can be identified?

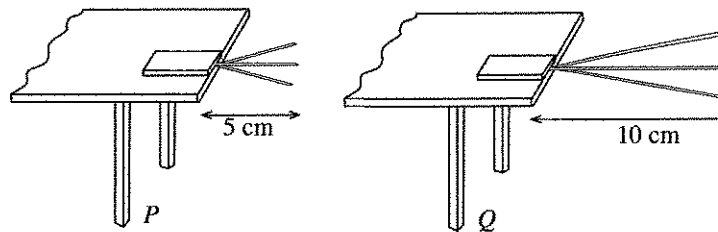
II. Which physical quantity of the wave is equal to the distance between the points *P* and *Q* of the wave?
.....

III. Considering the features of the waveform given above for Gamma rays, draw a typical waveform in the following grid, for the type of waves represented by *C* in the spectrum above when the amplitudes are equal.



IV. Of the six waves given in the electromagnetic spectrum above, which wave has the highest frequency?
.....

(v) A diagram depicting two instances *P* and *Q* of an activity done in the laboratory to study a certain characteristic of sound waves is given below. A hacksaw blade is kept on the table and a heavy metal block is kept on the blade when this activity was done as shown in the figure. Then the blade was vibrated.



(a) Which characteristic of a sound wave can be studied from this activity?
.....

(b) On which physical quantity does the characteristic you mentioned (a) above depend?
.....

(c) What conclusion can be arrived at through this activity?
.....

(vi) How does the speed of sound in air vary with the temperature?
.....

* *

Part B

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

5. (A) Average masses of macronutrients present in a biscuit of a particular brand are given in the following table.

Macronutrient	Mass
Proteins	0.81 g
Carbohydrates	5.67 g
Fat	1.55 g

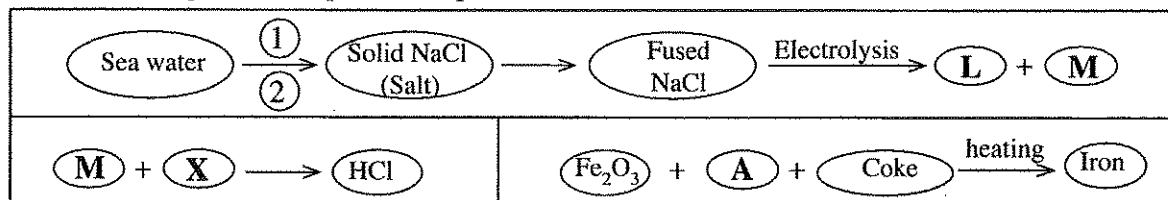
- What are the elements present in proteins?
- (a) When a person consumes a biscuit of the above brand, in which part of the digestive system does its digestion start?
 - Name the enzyme that is added to food in the part stated in (a) above, and state the nutrient on which that enzyme acts.
 - State the **two** substances that are mainly added to this food in the stomach.
 - In which part of the digestive system is the digestion of this food completed?
 - State the end products of this digestive process.
 - Write one adaptation of the human digestive system for efficient absorption of end products of digestive process.

(B) Reproduction is the process of production of a new generation from one generation.

- State respectively, the names given to male and female gametes that contribute to human reproductive process.
- In a human somatic cell, how many pairs of sex chromosomes are present?
- Considering the sex chromosomes, show, using a diagram, how sex is determined in humans.
- (a) What is the sex-linked disorder that occurs only in males?
 - What is the genetic reason for this disorder?

(Total marks 20)

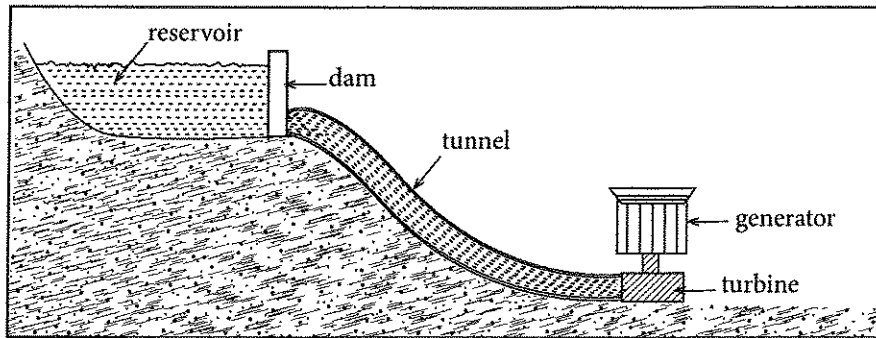
6. Consider the following industrial production processes.



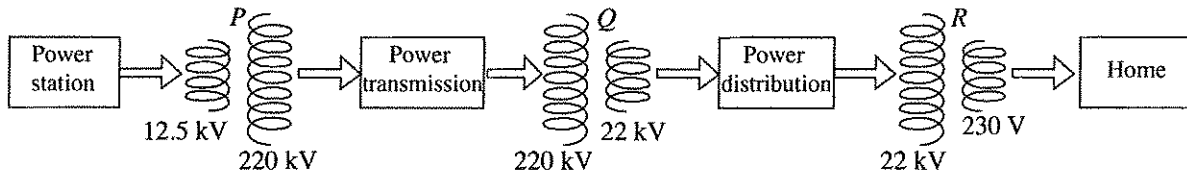
- Name A, L, M and X respectively.
- Write a physical property of X.
- Write down the **two** separating techniques (1) and (2) relevant to production of salt from sea water.
- About 40% CaCl_2 is added to NaCl when obtaining fused NaCl from solid NaCl. What is the reason for that?
- What is the strategy used in the cell to prevent the reaction between L and M produced by the electrolysis process?
- (a) Is the chemical reaction occur in A in the process of iron extraction, exothermic or endothermic?
 - Draw the energy level diagram for this reaction and state reactants and products.
- (a) Write the balanced chemical equation relevant to the production of iron from Fe_2O_3 .
 - In this process 1680 kg of pure molten iron was obtained from a 2520 kg of mixture of Fe_2O_3 with impurities. (In this case, assume that all Fe_2O_3 reacted completely.)
 - Find the number of moles of molten iron obtained and calculate the mass of Fe_2O_3 reacted. (Fe = 56, O = 16)
 - What is the mass of impurities presented in the mixture?

(Total marks 20)

7. (A) Consider the following figure pertaining to a hydro-power plant. As shown in the figure, the water is brought from a place in the reservoir to the power plant located below the reservoir through a tunnel. Electric power is generated by rotating a turbine with that water.



- (i) According to the above information, write down the energy transformation that takes place in generating hydroelectric power.
 (ii) The following diagram shows the way in which the alternating current electricity is generated in the power station and supplied to homes after transmission. (*P*, *Q* and *R* are transformers.)



- (a) What is the type of transformer shown as *P*?
 (b) If the number of turns in the primary coil of *R* is 8 800, find the number of turns in its secondary coil.
- (B) Two similar arrangements, *X* and *Y* which have been used in a house to heat water using the voltage of 230 V are given below. However in *Y*, the immersion coil is immersed to a greater depth.
- (i) When the immersion heaters are connected to the voltage supply, in which arrangement is the water heated upto the required temperature in a lesser time?
 (ii) Briefly explain, the reason why the water in one vessel is heated quicker than the other.
-
- The diagram shows two identical immersion heaters, labeled *X* and *Y*, each in a cup of water. Heater *X* is partially submerged, with only the bottom part of the coil in the water. Heater *Y* is fully submerged, with the entire coil in the water.
- (iii) 1.5 kg of water in 27 °C is put into the vessel in the arrangement which heats up water in a quicker time and the immersion heater is connected to the voltage supply.
- (a) If the water was heated upto 97 °C, find the amount of heat absorbed by water. (Take the specific heat capacity of water as 4 200 J kg⁻¹ K⁻¹)
 (b) The power of the heater is 1 kW. If the time taken to heat the water upto 97 °C was 8 minutes, calculate the energy consumed by the immersion heater during that time.
 (c) In that house, water is heated 4 times per day as above. Find the number of units of electricity they have consumed in a month of 30 days.
- (C) There is a greater attention at present to generate electricity using solar cells.
- (i) What is the basic electronic component which is used to construct a solar cell?
 (ii) What will happen when the sun light is incident on that component?
 (iii) What type of an arrangement is known as a solar panel?
 (iv) Write down an advantage of using solar cells to generate electricity.

(Total marks 20)

[See page seven

8. (A) Some main endocrine glands in the human body are given below.

Pituitary, Thyroid, Pancreas, Adrenal glands, Gonads

- (i) Which of the above glands is located below the hypothalamus?
- (ii) Write down, in correct sequence, the glands that secrete calcitonin and oestrogen and state the main function of each hormone in correct sequence.
- (iii) (a) What is the gland that secretes the hormone which converts glucose to glycogen?
 (b) In which organ of body, glycogen is mainly stored?
 (c) What is the disease condition that occurs due to non-secretion of the hormone stated in (a) above?
- (iv) Write **two** features of the hormones secreted by the glands stated above.

(B) Following diagrams show some play items in a children park.

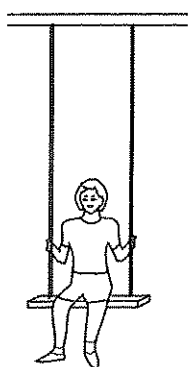


Figure (1) a

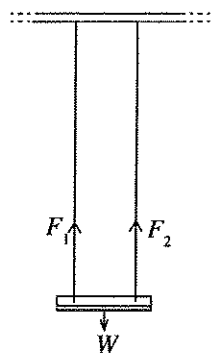


Figure (1) b

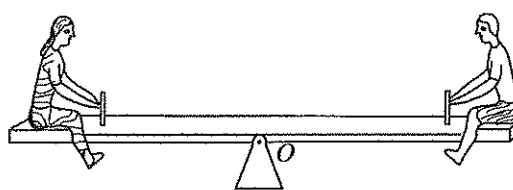


Figure (2)

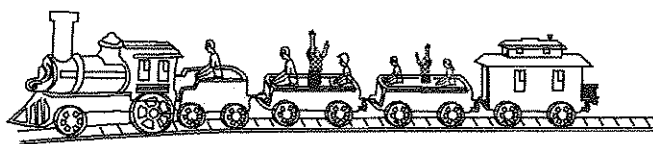
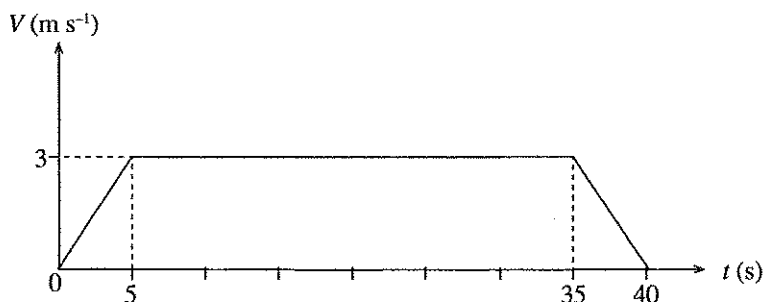


Figure (3)

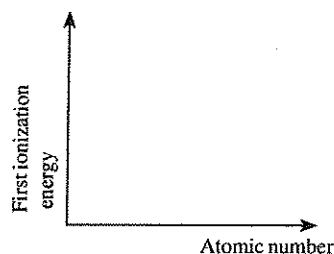
- (i) As shown in the figure (1) a, a child is sitting in equilibrium and stationary in a swing. Figure (1) b shows the corresponding force diagram for this situation. Write a relationship among F_1 , F_2 and W . Here, F_1 and F_2 are the forces exerted by ropes, and W is the weight of the child and the seat.
- (ii) In figure (2), the mass of each child who is sitting on the two sides of the see-saw is 25 kg.
 - (a) What can be said about the resultant of the system of forces acting on the see-saw?
 - (b) The distance from the rotating point O to the place where each child is sitting is 1.5 m. Find the moment of the couple of forces acting there.
- (iii) Figure (3) shows a play train in the park that moves in a straight line path. The velocity-time ($V - t$) graph for its motion from the starting point to the ending point is given below.



- (a) Briefly explain the nature of the motion of the play-train.
- (b) The total mass of the train with the children is 1500 kg. Find the momentum of the train in the time duration from 5 seconds to 35 seconds.
- (c) If the length of the play-train is 18 m, calculate the length of the railway.

(Total marks 20)

9. (A) **A, E, G, J, L, M, Q** and **R** are 8 consecutive elements in the periodic table. The atomic number of all these elements are less than 20. **E** naturally occurs in allotropic forms and one of the forms conducts electricity. (Here, the given symbols are **not** the standard symbols of the elements.)
- What is the element **E**?
 - Of the above elements,
 - which element occurs as a noble gas at room temperature?
 - which element has the highest electro negativity?
 - which element is at the top most level of the activity series?
 - Draw the Lewis dot diagram of a molecule formed by the element **G** with Hydrogen.
 - Of the above elements, which element is most suitable to produce a sample of H_2 gas in the laboratory?
 - Write the balanced chemical equation for the reaction of **R** with steam.
 - Copy the diagram given below into your answer script and draw a sketch of the variation of first ionization energy of the above elements. (It is **not** necessary to show the atomic number and the values of ionization energy. It is sufficient to mention only the elements.)



(B) In the following occasions ①, ②, ③ and ④, optical items/instruments were used.

- A dentist examining teeth in a mouth of a patient
- A surgeon observing the internal organs in the body of a patient
- A student observing cells in a blood sample in the laboratory
- A cricket lover watching a cricket match from a far end of a pavilion

- In which occasion a concave mirror was used?
 - Represent with a ray diagram, the way in which an image is formed in such a situation (Here, take the object as $\begin{matrix} A \\ \uparrow \\ O \end{matrix}$).
- What was the occasion where an instrument with optical fibres was used?
 - What is the name used for the phenomenon that the light rays undergo when light passes through an optical fibre?
 - State the conditions that should be fulfilled to occur the phenomenon that is mentioned in (b) above.
 - Another instrument where the phenomenon mentioned in (b) above occurs, was also used in another occasion given above. Mention that occasion and write down the name of the instrument that was being used in that occasion.

(Total marks 20)

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