29.7 GENERAL SCIENCE (237)

29.7.1 General Science Paper 1 (237/1)

SECTION A: BIOLOGY (34 marks)

*Answer **all** the questions in the spaces provided.*

1 State **three** functions of human blood. (3 marks)

2 (a) State the role of light in the process of photosynthesis. (1 mark)

(b) Name the end product of dark reaction in photosynthesis that gives positive result with Benedict's solution. (1 mark)

(c) How is the human molar tooth adapted to its functions? (1 mark)

**3** The diagram below represents a certain organism.
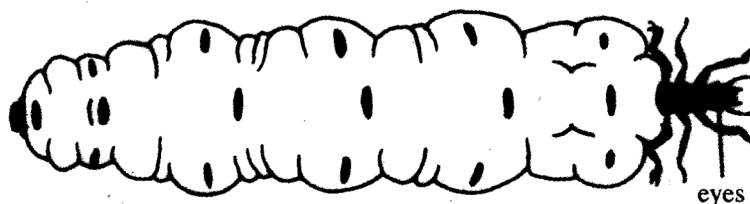
(a) Name the phylum and class to which the organism belongs. (2 marks)

Phylum ....

Class ....

(b) Give **two** end products of aerobic respiration in animals. (2 marks)

4 (a) Name **two** diseases of the liver. (2 marks)

(b) What is the importance of homeostasis in mammals? (1 mark)

5 The diagram below represents a model often used to illustrate a process in human beings.
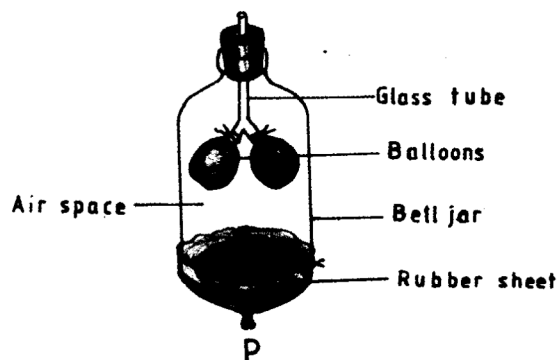
What would happen if the rubber sheet was pulled down at the point labelled **P**? (3 marks)

**6** The diagram below represents a vertical section of a mammalian organ.
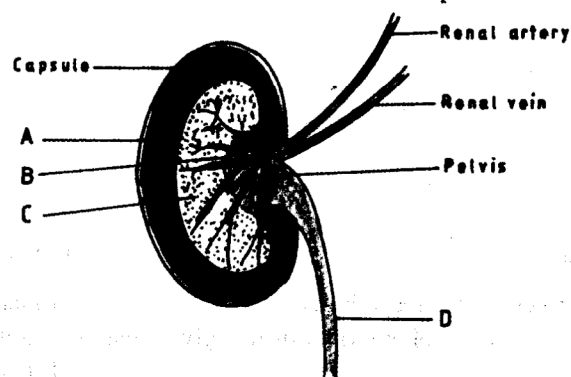
(a) Name the parts labelled **A**, **B** and **C**. (3 marks)

A ....

B ....

C ....

(b) Which organ does the part labelled **D** lead to? (1 mark)

7 (a) State the importance of biology to humans. (1 mark)

(b) State **one** function of each of the following substances in the human body.

(3 marks)

(i) Proteins ....

(ii) Vitamins ....

(iii) Water ....

8 (a) Name **three** structures of a human cheek cell that can be seen under the low power of a light microscope. (3 marks)

(b) Work out the magnification of a specimen seen under a light microscope with an eye-piece lens x 10 and objective lens x 40. (1 mark)

9 Explain what would happen if the epidermal cells of an onion leaf were placed in sodium chloride solution and left for ten minutes. (3 marks)

10 (a) Name **two** materials that are translocated in plants. (2 marks)

(b) What is meant by the term transpiration? (1 mark)

SECTION B - CHEMISTRY (33 marks)

Answer ALL the questions in this section in the spaces provided.

11 Describe how crystals of sodium sulphate can be obtained from a solid mixture of sodium sulphate and lead (II) sulphate.

(3 marks)

12   The diagram below represents a Bunsen burner.
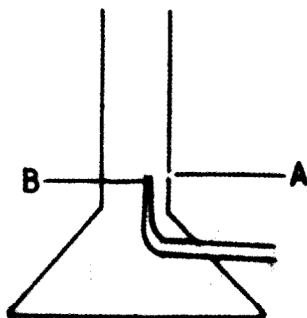
Name the parts labelled:

(i)   A .... (1 mark)

(ii)   B .... (1 mark)

13   The table below shows P^H values of solutions C, D, E and F.

| Solution	C	D	E	F
P^H value	10	5	7	13

Select the solution which when reacted with F would produce salt and water. Give a reason.
                                                                        (2 marks)

14   Magnesium burns in air with a bright flame.

(a)   State another observation made when magnesium burns in air.   (1 mark)

(b)   Write the equation for the reaction that occurs.   (1 mark)

15   The diagram below represents the set up that was used to prepare and collect gas G.
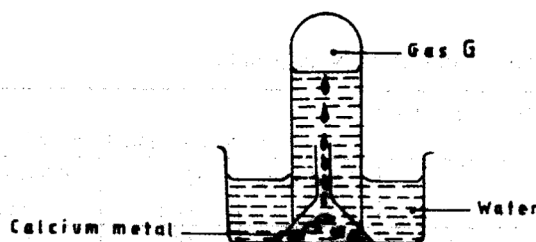
(a)   Give one property of gas G that enables it to be collected as shown.   (1 mark)

(b)   Write the equation for the reaction that produced gas G.   (1 mark)

(c)   Give one use of gas G   (1 mark)

16 The table below gives information about atoms of H, J, K, L and M. Use it to answer the questions that follow:

Atom	Number of Protons	Number of electrons	Number of neutrons
H	5	5	6
J	8	8	10
K	10	10	12
L	8	8	8
M	12	12	12

(a) Select an atom:

    (i)   of an element in group 8 of the periodic table;   (1 mark)

    (ii)   whose mass is 11.   (1 mark)

(b) Select atoms which represent isotopes of an element. Give a reason.   (2 marks)

17 (a) Give the general name of the elements in group 7 of the periodic table.   (1 mark)

(b) Below is a representation of trends in atomic radius across a period and down a group.

Trend 1

Trend 2

    Which trend represents a period? Explain why the trend chosen occurs.
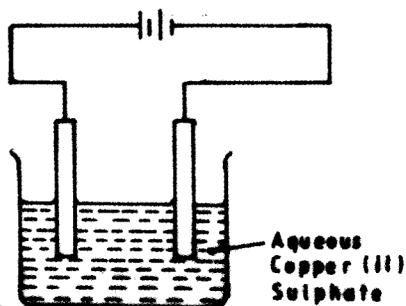
        (3 marks)

18 The table below gives information about substances N, P, Q and R.

Substance	Melting point (°C)	Boiling point (°C)	Electrical conductivity when		
			Solid state	Molten state	Dissolved in water
N	-115	-85	Poor	Poor	Good
P	801	1467	Poor	Good	Good
Q	98	890	Good	Good	Good
R	-117	78.5	Poor	Poor	Poor

(a) Select a substance that is likely to be hydrogen chloride.   (1 mark)

(b) Which letter represents a substance that is likely to have:

    (i)   metallic bonding;   (1 mark)

    (ii)   ionic bonding?   (1 mark)

19 The diagram below represents a set up that was used to show the effect of an electric current on aqueous Copper (II) Sulphate using carbon electrodes.

(a) On the diagram, label the cathode.   (1 mark)

(b) State and explain the observation made at the anode.   (2 marks)

20 (a) What is meant by hardness in water?   (1 mark)

(b) A Form IV class discovered that after boiling water in a "Sufuria" for a long time a white deposit forms on the "Sufuria".

(i) Write the formula of the compound responsible for the white deposit.

                                                                                      (1 mark)

(ii) Give **one** disadvantage of the white deposit on the "Sufuria".   (1 mark)

(b) How would one ensure that the only product formed is iron (III) chloride?

                                                                                      (1 mark)

22 The diagram below shows the results obtained when wet iron filings in a gas jar inverted over water were left standing for 3 days.
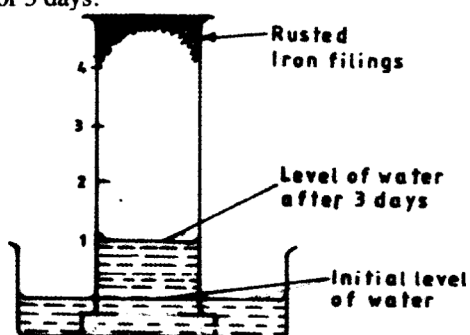
Given that the wet iron filings were in excess, what would be the effect of leaving the set up to stand for a further 3 days?   (1 mark)

SECTION C - PHYSICS (33 marks)

*Answer **all** the questions in this section in the spaces provided.*

23 When thirty(30) drops of a liquid were released from a burette, the liquid level changed from the 25 ml mark to the 40 ml mark. Determine the volume of each drop.   (2 marks)

24 A measuring cylinder contained 19.00 cm³ of water. After some iron nails of mass 48 g were submerged into the water, the total volume was 25.0 was cm³. Determine the density of iron.
                                                                                      (3 marks)

25 A uniform metre rule pivoted at the 30 cm mark, was balanced by a weight of 2 N suspended from the 5 cm mark. Determine the mass of the metre rule. (take g = 10N/kg)   (3 marks)

26   A student, looking through a microscope focussed on smoke in an illuminated smoke cell, observed bright specks moving in random motion. Explain why the specks moved this way.

(2 marks)

27   A bimetallic strip is made by riveting together two strips of different metals E and F. When hot, the strip is straight as shown in **figure 1a**. When it is allowed to cool to room temperature, the strip bends as shown in **figure 1b**.
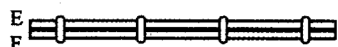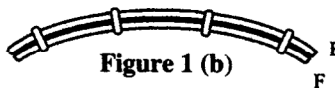

Figure 1 (a)   **Figure 1 (b)**   E
                                                                                                      F

Explain the cause of the bending.   (2 marks)

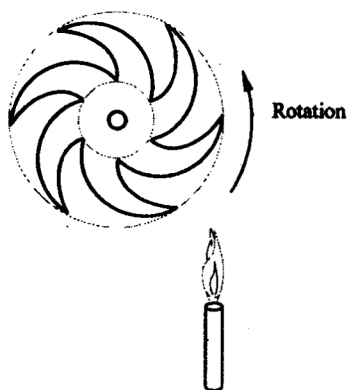**28**   **Figure 2**, shows a paper windmill on a vertical axis and a candle placed below.

Rotation

Figure 2

State with a reason what happens to the paper windmill when the candle is lit.   (2 marks)

29   (a)   **Figure 3**, shows a pin being pushed into a block of wood using a thumb.
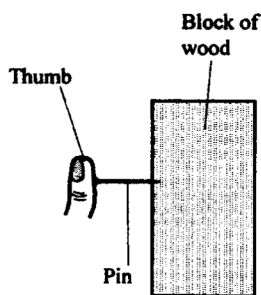

Block of wood

Thumb

Pin

Figure 3

Explain why the pin penetrates the wood and not the thumb.   (2 marks)

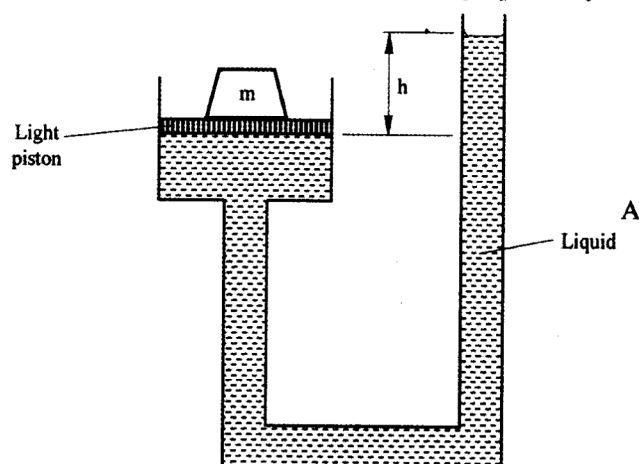(b) **Figure 4**, shows a mass m balanced on a light piston by a column h of liquid A.

Figure 4

When the liquid was replaced by another liquid B, the value of h increased while the position of m remained the same. State the reason why liquid B must have a lower density than liquid A. (1 mark)

30 A thin copper wire was stretched by loading it with increasing forces and the extension in millimeters measured. The results obtained are shown in the table below.

Force (N)	0	5	10	15	20	25
Extension (mm)	0	0.6	1.2	L	2.4	4.2

(a) Determine the value of L in the table. (1 mark)

(b) State with a reason what is observed on the length of the wire when all the weights are removed. (2 marks)

31 A ball was projected vertically upwards. On the axes in **figure 5**, sketch a graph of velocity against time during its flight. (2 marks)
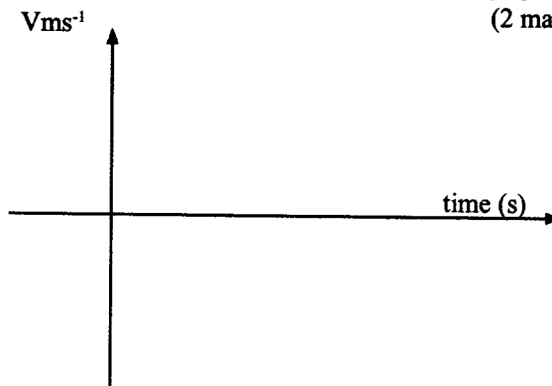

Vms⁻¹

time (s)

Figure 5

32 **Figure 6**, shows a force of 40N acting on a body of mass 5 kg. The frictional force on the body is 5N.

Figure 6

Determine the acceleration of the body. (3 marks)

275

33 The graph in **figure 7**, shows how the potential energy of a ball varies with the height of the ball above the ground, when it is thrown vertically upwards.
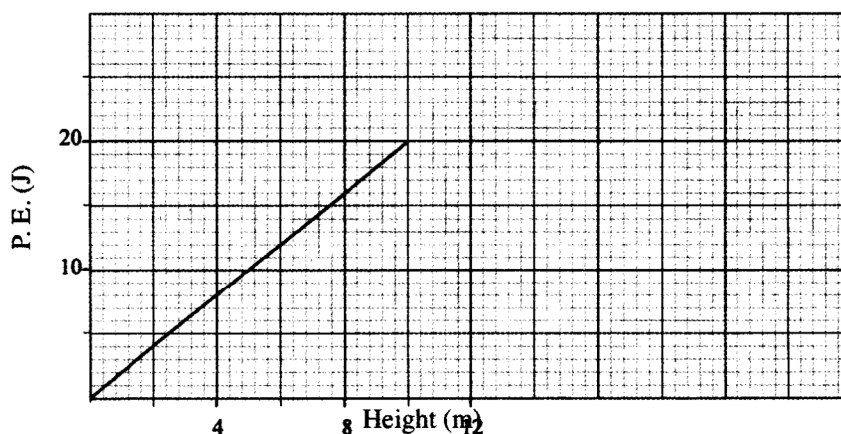

Figure 7

(a) Use the graph to:

    (i) find the greatest height reached;   (1 mark)

    (ii) calculate the mass of the ball.   (2 marks)

(b) State the kinetic energy of the ball at the highest point.   (1 mark)

34 A cube of wood of weight 6000 N floats on water. State with a reason the weight of the water displaced.   (2 marks)

35 (a) **Figure 8**, shows a light tennis ball attached to two identical metal bars. Mark with X the approximate position of the centre of gravity of the set up.   (1 mark)
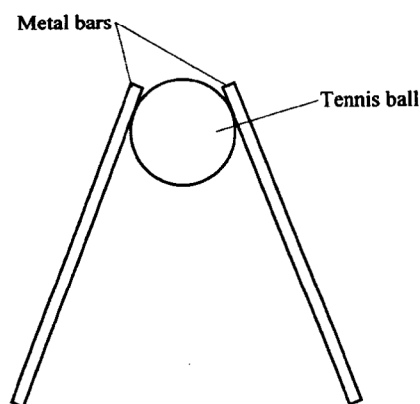

Figure 8

(b) A certain model of a lorry has its centre of gravity 1.5 m above the ground. State how the model can be improved to increase its stability with the centre of gravity remaining at the same height.   (1 mark)

29.7.2 General Science Paper 2 (237/2)

SECTION A: BIOLOGY (34 marks)

Answer ALL the questions in this section in the spaces provided.

1 (a) State **one** survival value of positive phototropism to a plant. (1 mark)

  (b) State **two** functions of the human ear. (2 marks)

2 (a) What is meant by the term community as used in biology? (1 mark)

  (b) Explain how the following adaptations reduce transpiration in xerophytes.
   (i) Sunken stomata: (2 marks)

   (ii) Thick cuticle. (1 mark)

3 (a) State the conditions necessary for germination. (3 marks)

  (b) Distinguish between complete metamorphosis and incomplete metamorphosis.
   (2 marks)

4 State the method of transmission for each of the following diseases:

  (a) cholera; (1 mark)

  (b) malaria. (1 marks)

5 Explain the term survival of the fittest as used in biology. (2 marks)

6 State **three** functions of the human placenta. (3 marks)

7 (a) What is meant by the following:
   (i) genetic counselling; (1 mark)

   (ii) genetic engineering. (1 mark)

  (b) In a family of four children, the father has blood group A while the mother has blood group B.
  One of the children has blood group O.
  State the genotypes of the:

   (i) father; (1 mark)

   (ii) mother; (1 mark)

   (iii) child with blood group O. (1 mark)

8 State **three** ways by which support is important to plants. (3 marks)

9   The diagram below represents a section of the human eye.
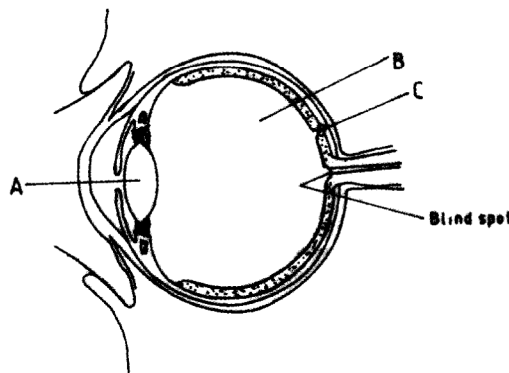
(a)   Name the parts labelled A and B.   (2 marks)

A   ....

B   ....

(b)   What is the importance of the part labelled **C** in vision?   (1 mark)

10   (a)   Name **one** hormone secreted by the ovary that controls the menstrual cycle.   (1 mark)

(b)   State **two** roles of the hormone named in (a) above.   (2 marks)

(c)   Give **one** difference between mitosis and meiosis.   (1 mark)

SECTION B: CHEMISTRY (33 marks)

Answer ALL the questions in this section in the spaces provided.

11   (a)   State Charles' law.   (1 mark)

(b)   A given mass of a gas has a volume of $350cm^3$ at 298K.
       What would be its temperature when the volume is increased to $402.5cm^3$.   (2 marks)

12   In a laboratory experiment, hexane was heated and passed over strongly heated pieces of broken pot, as shown in the diagram below.
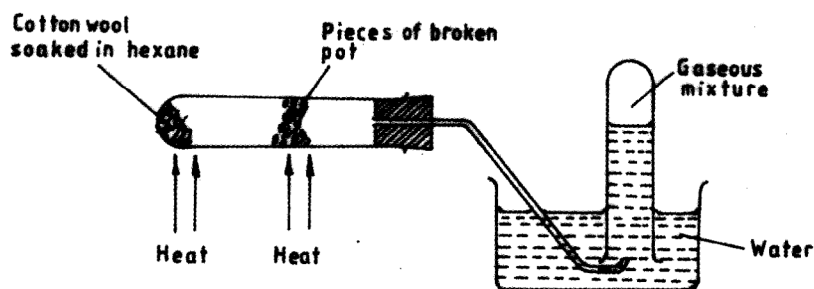
(a)   Name the type of reaction which occurred in the heated boiling tube.   (1 mark)

(b)   Why are the pieces of broken pot used?   (1 mark)

(c)   One of the products in the gaseous mixture is propane. Draw and name the other product in the mixture.   (2 marks)

13 (a) Explain why nitrogen (IV) Oxide causes pollution to the environment. (2 marks)

(b) The figure below represents the set up that was used to prepare nitrogen (IV) Oxide.
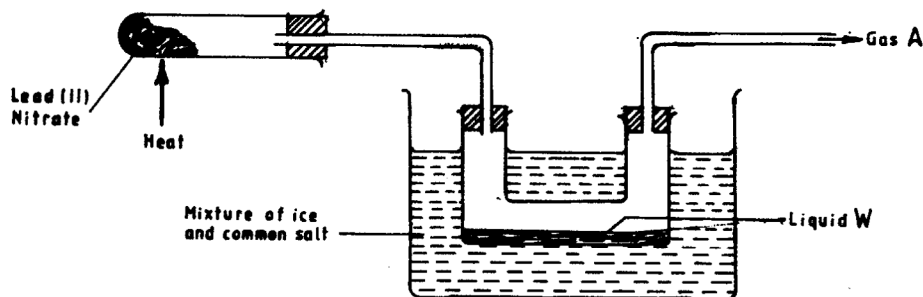
(i) Write a chemical equation for the above reaction that gives nitrogen (IV) Oxide.
(1 mark)

(ii) What is the role of the mixture of ice and common salt? (1 mark)

14 Describe how 1M Sodium Carbonate solution can be prepared. (3 marks)
(Na = 23.0, C = 12.0, O = 16.0)

15 (a) What is meant by molar heat of formation of a substance? (1 mark)

(b) In the industrial production of ammonia, hydrogen and nitrogen react as shown in the equation below:
$$3H_{2(g)} + N_{2(g)} \rightleftharpoons 2NH_{3(g)} ; \Delta H = -92.4 \text{ kj}.$$
(i) What is the molar heat of formation of ammonia in kilojoules? (1 mark)

(ii) Explain the effect of increasing the temperature of the reaction, on the yield of ammonia. (2 marks)

16 Methane is a fuel. When one mole of methane is burnt in air, 890.4 kj of energy is released.
(a) Write an equation for the complete combustion of methane. (1 mark)

(b) Calculate the energy released when 36g of methane were burnt completely in air.
(Relative molecular mass of methane = 16) (2 marks)

17 Graphite and diamond are allotropes of carbon.
(a) What is meant by allotropy? (1 mark)

(b) Explain why graphite is used in making pencil leads. (1 mark)

18 8.4g of magnesium carbonate were reacted with excess dilute hydrochloric acid.
(a) Write the equation for the reaction. (1 mark)

(b) Calculate the mass of the gas produced.
(Mg = 24.0, C = 12.0, O = 16.0) (3 marks)

19 Distinguish between endothermic and exothermic reactions. (2 marks)

20 (a) Aluminium metal is extracted from its oxide by the electrolytic method while iron is extracted by reduction method using carbon. Arrange the elements, aluminium, iron and carbon in the order of reactivity starting with the most reactive. (2 marks)

(b)   During the extraction of aluminium by electrolysis, the mass of the anode decreases. Give a reason.   (1 mark)

(c)   Give **one** reason why aluminium is used in making sauce pans.   (1 mark)

SECTION C: PHYSICS (33 marks)

Answer all the questions in this section in the spaces provided.

21   **Figure 1** shows a pin P placed infront of a plane mirror. Two rays of light are drawn from the pin to the mirror.

Figure 1

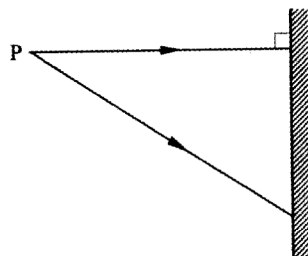(a)   Show on the diagram the paths followed by the rays after reflection by the mirror.
                                                                                 (2 marks)

(b)   Locate the position of the image I formed by the mirror.   (1 mark)

22   State the nature of the image formed when an object is placed infront of a convex mirror.
                                                                                 (1 mark)

23   **Figure 2** shows a ray of light passing through a triangular prism to a screen.
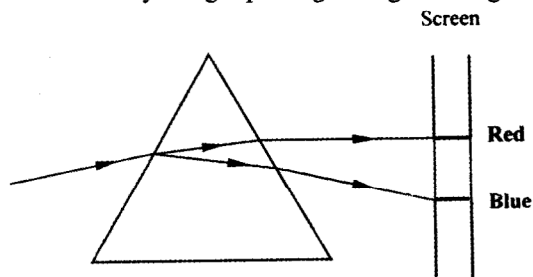
Figure 2

Explain why the colours are dispersed.   (2 marks)

24   A wave of frequency 1000Hz travels a distance of 600m in 2 seconds. Determine its wavelength.   (3 marks)

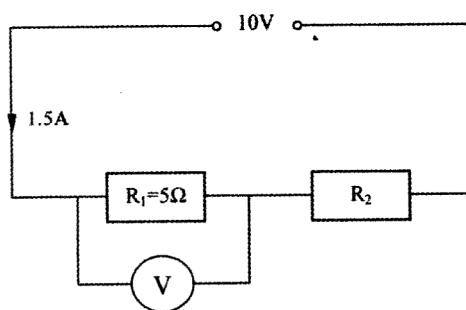25   **Figure 3** shows a power supply passing current through two resistors connected in series.

Figure 3

(a)   Calculate the potential difference V across R_1.   (2 marks)

(b)   Determine the resistance R_2.   (2 marks)

26   Name the substance formed at the positive electrode when a lead-acid cell is charged.

(1 mark)

27   A bar magnet YZ is suspended freely so that it is able to rotate on a horizontal plane. It turns until end Z points southwards. Explain how the suspended magnet can be used to identify the north pole of another unmarked magnet.   (2 marks)

28   State **two** factors which affect the heating of a coil by an electric current.   (2 marks)

29   State how the penetrating power of the X-rays produced in an X-ray tube can be increased.

(1 mark)

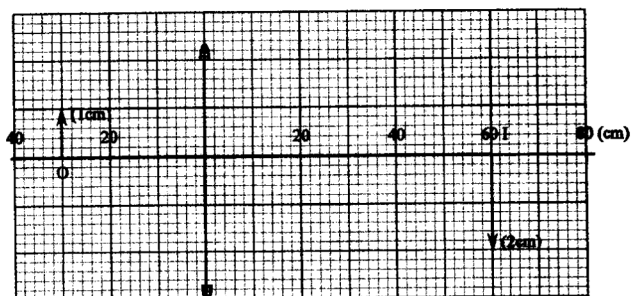30   **Figure 4** shows the image I of the object O produced by a converging lens.

Figure 4

(a)   On the figure, construct a ray diagram to show how the image is formed.   (2 marks)

(b)   Use the ray diagram to determine the focal length of the lens.   (1 mark)

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31 **Figure 5** shows a P-n-junction diode connected in series with a torch bulb, a switch and a battery.

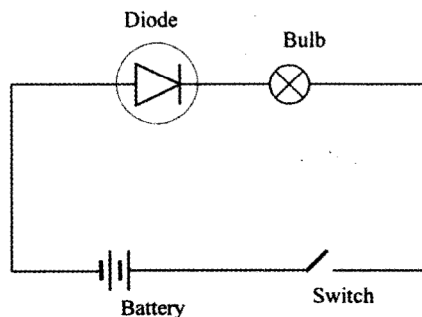

Diode

Bulb

Battery

Switch

Figure 5

State with reason whether the bulb will light when the switch is closed. (2 marks)

32 **Figure 6** shows a negatively charged sphere suspended by an insulating thread. At a distance away from the sphere is a positively charged conductor which has more charge than the sphere.
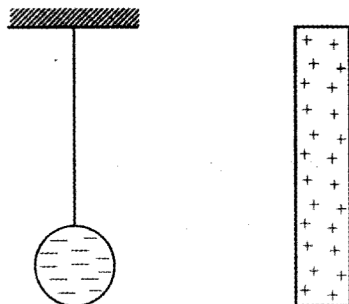
(2 marks)

Figure 6

When the conductor is brought near the sphere, the sphere is first attracted to the conductor but after they touch, it is repelled. Explain this observation.

33 A student standing between two cliffs claps the hands and hears two echoes one after the other. Explain why the echoes are heard at different times. (2 marks)

34 A room uses five bulbs for lighting. Each bulb is rated 240V, 60W. Determine the energy in kWh consumed by the bulbs in 6 hours. (3 marks)

35 The count rate of a radio active substance is initially 100 counts per second. Given that the half life of the substance is 150 seconds. Determine the count rate after 300 seconds.

(2 marks)

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SECTION A: BIOLOGY

1. Transport of food materials/oxygen/carbon IV oxide/hormones/urea/mineral salts;
   Protection/defence;
   Regulation of body temperature; thermoregultion   (3 marks)

2. (a) Provides energy; (needed to combine carbon IV oxide/carbon dioxide and water molecules)
   (b) Glucose;
   (c) It is broad with cusps for chewing/crushing/grinding;   (3 marks)

3. (a) Arthropoda;Rej Anthropoda, Arthropod
      Insecta; Rej insect
   (b) Carbon IV oxide/carbon dioxide;acc.symbol. (mark the 1ˢᵗ two)
      Water; acc. symbols
      Energy;
                  Any two   (4 marks)

4. (a) Liver cirrhosis;
      Hepatitis;
   (b) Maintains a constant internal environment for optimal physiological processes;
                                                                       (3 marks)

5. Internal volume of the bell jar will increase as pressure decreases; air rushes through glass tube into
   balloons; the balloons inflate/fill with air; volume & pressure must be mentioned.
      (3 marks)

6. (a) A – Cortex;
      B – Pyramid;- Rej. pyramind
      C – Medulla;
   (b) Urinary bladder; not only bladder   (4 marks)

7. (a) Solving environmental problems (e.g. food shortage, poor health, misuse of natural
      resources) /entry into careers (e.g. public health, medicine, veterinary practices)/development of
      scientific skills, including planning, observing, recording, classifying and analyzing;

   (b) (i)   -Build new cells/repair damaged tissues;
      (ii)   -prevent vitamin deficiency diseases/they are coenzymes;
      (iii)   -Medium for reactions/solvent/give cells shape/transport/maintaining constant body
              temperature;   (4 marks)

8. (a) Cell membrane;
      Cyloplasm;
      Nucleus;
   (b) Magnification of specimen
      =eye piece lens magnification x objective lens magnification
      =10 x 40
      =x 400;   (4 marks)

9. Water would move out of the cell into the surrounding solution/ sodium chloride solution; down a
   concentration gradient; hence cells shrink/ become plasmolysed;   (3 marks)

10. (a) Sugar;
       Amino acids;
    (b) Loss of water from aerial parts of a plant by evaporation; Leaves   (3 marks)

SECTION B: CHEMISTRY

11. Add water to dissolve sodium sulphate. $\checkmark^1$

Filter to separate lead (II) sulphate as residue and sodium sulphate as filtrate. $\checkmark^1$

Evaporate the filtrate to concentrate $\checkmark^{1/2}$it. Cool to obtain crystals of sodium sulphate $\checkmark^{1/2}$.

Dry the crystals with filter paper. (3 marks)

12. A – Air Hole$\checkmark^1$

B - Jet$\checkmark^1$ (2 marks)

13. D, $\checkmark^1$Reason is F is basic $\checkmark^{1/2}$ while D is acidic. $\checkmark^{1/2}$

14. (a) White solid is formed $\checkmark^1$ (2 marks)

(b) $2Mg_{(s)} \rightarrow O_{2(g)} \rightarrow 2MgO_{(s)}$ $\checkmark^1$ (2 marks)

15. (a) Gas G is insoluble in water. $\checkmark^1$

(b) $Ca_{(s)} + 2H_2O_{(L)} \rightarrow Ca(OH)_{2(aq)} + H_{2(g)}$ $\checkmark^1$

(c) G is used as a fuel in balloon $\checkmark^1$ hardening of oils/raw materials in production of Hcl.

(3 marks)

16. (a) (i) K $\checkmark^1$

(ii) H $\checkmark^1$

(b) J and L; $\checkmark^1$ have the same atomic numbers but different atomic masses. $\checkmark^1$

(4 marks)

17. (a) Halogens $\checkmark^1$

(b) Trend 1, $\checkmark^1$Electrons are being added to the same energy level and yet there is increase in nuclear change$\checkmark^1$ making the atomic radius to shrink across the period. $\checkmark^1$ (4 marks)

18. (a) N$\checkmark^1$

(b) (i) Q$\checkmark^1$

(ii) P$\checkmark^1$ (3 marks)

19. (a) See the diagram. $\checkmark^1$ (electrone on the left side).

(b) The anode becomes smaller. $\checkmark^1$

This is because it dissolves. $\checkmark^1$ (3 marks)

20. (a) Inability of water to lather easily with soap. $\checkmark^1$

(b) (i) Caco₃ or MgCo₃$\checkmark^1$

(ii) It wastes fuel. $\checkmark^1$ (3 marks)

21. (a) Calcium Chloride or Calcium Oxide. $\checkmark^1$

Iron (III) Chloride is deliquescent. Therefore the drying agent prevents hydration of the salt. $\checkmark^1$

(b) Pass Chlorine gas through the apparatus to drive out air. $\checkmark^1$ (3 marks)

22. The level of the water will not change since all the oxygen will have been used up. $\checkmark^1$

(1 mark)

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SECTION C: PHYSICS

23.   Volume of 30 drops   = 40 – 25 = 15 ml $\checkmark^1$

           1 drop = $\underline{15}$ = 0.5 ml $\checkmark^1$
                      30

24.   Volume = 25 – 19 = 6 cm^3 $\checkmark^1$

    $\varphi = \dfrac{m}{v} = \dfrac{48}{6} = 8$ g/cm^3 $\checkmark^1$

25.

Figure 1

W x 20 = 2 x 25 $\checkmark^1$

$W = \dfrac{2 \times 25}{20}$ = 2.5 N $\checkmark^1$

W = mg
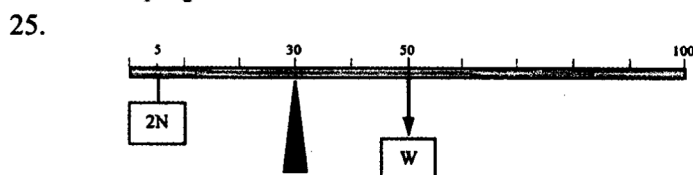
$M = \dfrac{2.5}{10}$ = 0.25 kg $\checkmark^1$

26.   Smoke particles are hit randomly $\checkmark^1$ by the molecules of air $\checkmark^1$ moving randomly.

27.   F. contracts more than $\checkmark^1$ E hence becomes shorter $\checkmark^1$ than E.

28.   The wind mill rotates, air around the flame becomes less dense $\checkmark^1$ when heated and rises pushing the wind mill.

29.   (a)   The cross-sectional area of the <u>tip of the pin</u> $\checkmark^1$ is much smaller than the pin head.

             Hence for the same force of the thumb, pressure is <u>higher</u> $\checkmark^1$ at the pin point.

    (b)   Pressure in liquids = φhg

             For constant <u>pressure,</u> $\checkmark^1$ when h increases φ must decrease since g is constant.

30.   (a)   L=1.8 mm

    (b)   Wire will be <u>longer</u> $\checkmark^1$ than the original length because the force had exceeded the elastic limit.
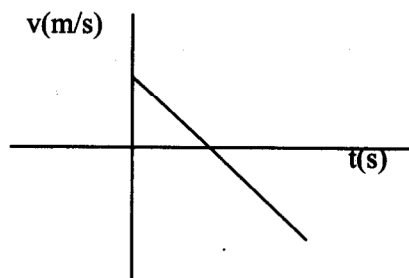

Figure2

$\checkmark^1$ V starts at a point drops down to zero and to negative.

$\checkmark^1$ straight line of negative gradient.

31. $40 - 5 = 35$ = resultant force.

from $f = Ma$

$35 = 5a$ $\checkmark^1$

$a = \dfrac{35}{5} = 7$ m/s2. $\checkmark^1$

32. (a) (i) Greatest height = 10m. $\checkmark^1$

(ii) $mgh = P.E$ $\checkmark^1$

$M = \dfrac{20}{100} = 0.2$ kg $\checkmark^1$

(b) Kinetic energy at heighest point = O.

33. $W = u = 6000$ N $\checkmark^1$

A floating body displaces its own weight of the fluid in which it floats. $\checkmark^1$

34. (a)
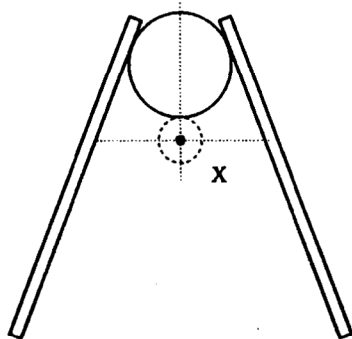
Allow approximate value of X

Figure 3

(b) Increase the <u>wheel base</u> $\checkmark^1$/ base area.

30.7.2 General Science Paper 2 (237/2)

SECTION A: BIOLOGY (34 marks)

1. (a) Enables a plant to expose its shoot/leaves to light (for photosynthesis);

(1 mark)

(b) Hearing;
Balance/posture; (2 marks)

2. (a) All organisms that live and interact within a particular habitat; (1 mark)

(b) (i) Accumulates moisture in the sub-stomatal air spaces leading to reduced diffusion gradients;

(ii) Increases the diffusion distance; (2 marks

3. (a) Water;
Oxygen;
Optimum temperature/warmth; (3 marks)

(b) Complete metamorphosis – distinct development stages are egg, larva pupa and adult;
Incomplete metamorphosis – developmental stages are egg, nymph and adult in which the nymph resembles the adult but is small and sexually immature; (2 marks)

4. (a) Ingestion of contaminated food/water; (mark)

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(b)   Bites by female anopheles mosquito carrying malaria parasites: (1 mark)

5.   Individuals with advantageous variations; and selected for hence they survive and reproduce;
                                                                              (2 marks)

6.   Allows passage of dissolved food substances from the mother to the foetus;
       Allows passage of oxygen from the mother's blood to the foetus;
       Allows passage of antibodies from the mother's blood to the foetus;
       Allows passage of metabolic waste products from the foetus' blood to the mother;
                              (; ; ; ; any three)   (3 marks

7.   (a)   (i)   Genetic counseling – giving hereditary information for informed decision
                      making;   (1 mark)
              (ii)   Genetic engineering – the alteration/manipulation of the structure of DNA by man for
                      beneficial use;   (1mark)
       (b)   (i)   Father – AO;
              ((ii)   Mother – BO;
              (iii)   Child   - OO;   (3 marks)

8.   To obtain resources from the environment (e.g light, water and nutrients);
       In support of heavy load of their own mass, including animals that climb or live on them;
       To withstand forces in the environment (e.g gravity, air currents/wind/storms);
       Approriate positioning of parts for photosynthesis, pollination and dispersal;
                              (;;; any three)   (3 marks)

9.   (a)   A – Lens;
              B – Vitreous humour;   (2 marks)
       (b)   Is where the image is formed;   (1 mark)

10.   (a)   Oestrogen/progesterone;   (1 mark)
       (b)   Oestrogen – repair and healing of uterine wall;
                      - stimulates anterior pituitary gland to secrete
                        Luteinising hormone;/

              Progesterone -   thickening of the uterine wall
                              - Inhibits production of FSH/LH;   (2 marks)
       (c)

Mitosis	Meiosis
Two daughter cells are produced	-Four daughter cells are produced;
Occurs in somatic/body cells	-Occurs in reproductive cells;
Daughter cells are diploid (2n)	-Daughter cells re haploid(n);

              (Any one, fully contrasted)   (1 mark)

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11.   (a)   The volume of a fixed mass of a gas is directly proportional to its absolute temperature at constant pressure;

       (b)

$$\frac{V1}{T1} = \frac{V2}{T2}$$

$$T_2 = \frac{V_2 T_1}{V_1} = \frac{402.5 \times 298}{35};$$

$$= 342.7k;$$

12.   (a)   Cracking;
       (b)   acting as a catalyst;

       (c)   Propene;

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13.   (a)   It form acid rain;
             Acid rain kills organism/corrodes
             Metallic structures;

       (b)   (i)   Oxygen;
                (ii)   to separate NO_2 from Oxygen;

14.   R.f.m. of $Na_2CO_2 = (2 \times 23 + 12 \times 1 + 12 \times 3) = 106g$
      Weigh 106g of sodium hydroxide;
      Dissolve it in distilled water and top it up to make 1 litre of solution;

15.   (a)   The heat change when one mole of a substance is formed from it's constituent elements at standard conditions;

       (b)   (i)   -46.2 KJ/mole;
                (ii)   -the yield of ammonia will reduce;
                       -increase in temperature favours the reverse reaction which is the formation of hydrogen and nitrogen. (This is because reaction for formation of ammonia is exothermic);

16.   (a) $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$;
       (b)   1 mole of methane $= 16g$
             16g CH_4 gives 890.4 KJ
             36g CH_4 gives $\frac{890.4 \times 36}{16}$;
                    $= 2003.4KJ$;

17.   (a)   The existence of an element in more than one form but in the same physical state;
       (b)   Layers are held by weak vander waals forces which make them slide over one another hence leave a mark on paper;

18.   (a) $MgCO_{3(s)} + 2HCl_{(aq)} \rightarrow MgCl_{(aq)} + H_2O_{(l)} + CO_{2(g)}$

     (b)   R.M.M. of $MgCO_3 \equiv 84$

             R.M.M. of $CO_2 \equiv 44$ } Both must be correct

             Moles of MgCO3 $= \dfrac{8.4}{84} = 0.1$

             Moles of $CO_2 = 0.1$

             Mass of CO_2 produced $= 0.1 \times 44$
                                      $= 4.4g$

19.   Endothermic reactions are those in which heat energy is absorbed from the surroundings while exothermic reactions are those in which heat is released to the surroundings;

20.   (a)   Aluminium, Carbon, Iron.   (2 marks
               (if order is wrong but carbon is in the middle (1 mark)
     (b)   Oxygen produced at the anode reacts with the anode, thus depleting it;
     (c)   Aluminium is a good conductor of heat;

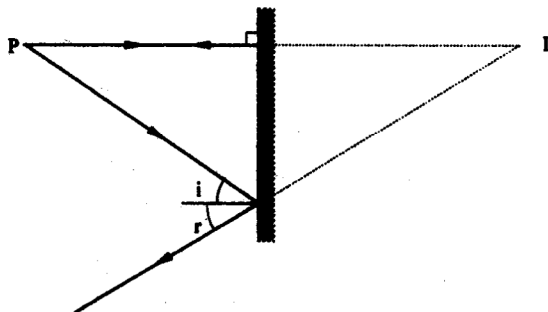### SECTION C: PHYSICS (33 marks)

21.

Figure 1

22.   Virtual, upright and diminished. (1) (any correct)
23.   Different colours are refracted differently. (1)
       Blue is refracted more than red.(1)

24. $V = \dfrac{600}{2} = 30 m/s$ (1)
      $V = \lambda f$ (1)

      $300 = \lambda\, 1000$
      $\lambda = 0.3m$ (1)

25.   (a) $V = IR$ (1)   (b) $V = 10 - 7.5$
                 $= 1.5 \times 5$ $= 2.5V$ (1)
                 $= 7.5V$ $R = \dfrac{2.5}{1.5} = 1.67$ ohms (1)

26.   Lead (IV) oxide OR lead dioxide.

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27. Z is south pole (1) since it points southwards.
Bring the unmarked magnet close to Y, and observe the end where (1) repulsion occurs to conform the polarity as north.

28. -amount of current. (1)
-resistance of the coil (1)

29. By increasing the accelerating voltage. (1)
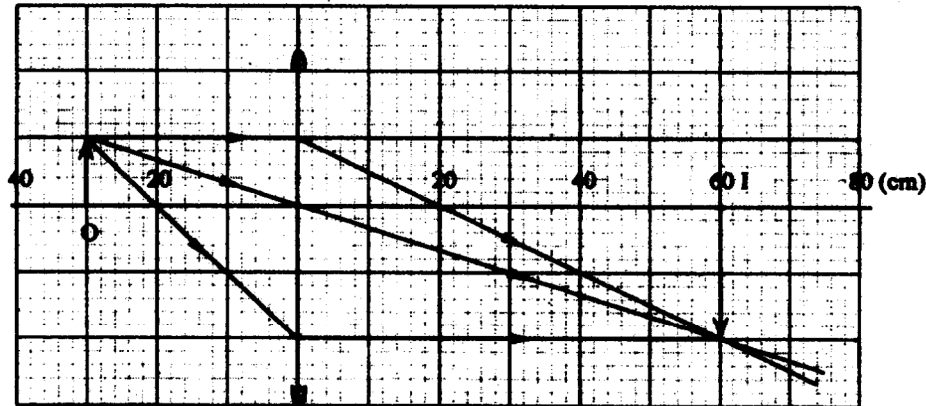
30.

Figure 2

31. - the bulb will not light. (1)
- the pin junction is reverse biased. (1)

32. Unlike charges attract (1), when they touch the negative charges move to the conductor to neutralize (1) it. Since positive charges are more, the conductor charges the sphere positively and repels (1) it.

33. Student is nearer one cliff. (1)
The first echo is a reflection from the (1) nearest cliff and the second echo is a reflection from the furthest cliff.

34. Energy = P x t (1)
        =60 x 10^{-3} x 5 x 6
        = 1.8 Kwh (1)

35. 100 $\overset{(1)}{\underset{150s}{\rightarrow}}$ 50 $\overset{(1)}{\underset{150s}{\rightarrow}}$ 25 after 300 seconds count rate is 25 counts/sec.

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