Deeksha

Sample Paper 1

TIME: 3 Hrs. **M.M.: 80**

General Instructions:

1. The question paper comprises three sections – A, B and C. Attempt all the sections.
2. All questions are compulsory.
3. Internal choice is given in each section.
4. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
5. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
6. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
7. This question paper consists of a total of 30 questions.

SECTION A

1 Define catenation. 1

2 How does valency of an element vary across a period? 1

3 **Answer question numbers 3(a) - 3(d) on the basis of your understanding of the following paragraph and the related studied concepts.**

Renewable energy sources such as wind energy are vital for the Indian economy, not only from the point of view of supply, but also from the perspective of environmental and social benefits. India is the world's fifth largest wind-power producer and the largest windmill facilities in India are installed in Tamil Nadu. Muppandal is a small village of Tamil Nadu and one of the most important sites of wind-farm in the state. It uses wind from the Arabian Sea to produce renewable energy. The suitability of Muppandal as a site for wind farms stems from its geographical location as it has access to the seasonal monsoon winds.

The electrical generators used on wind turbines in sites like Muppandal, produce an output AC of 240 V and a frequency of 50 Hz even when the wind speed is fluctuating. A

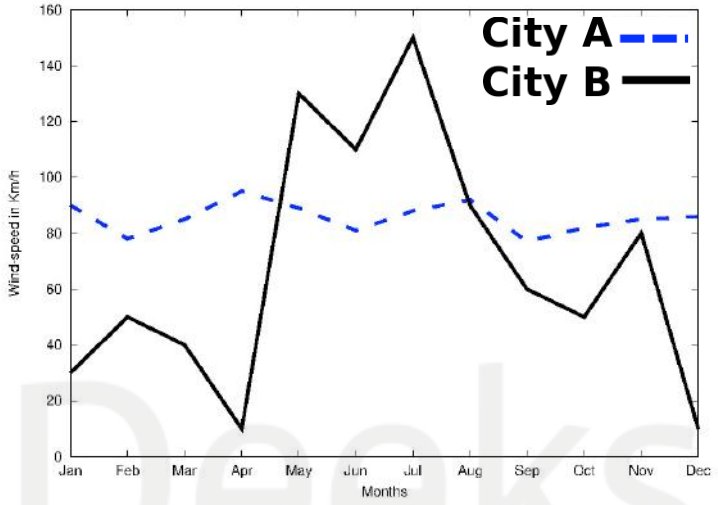
transformer may be required to increase or decrease the voltage so it is compatible with the end usage, distribution or transmission voltage, depending on the type of interconnection.

3(a) State the principle behind electric generator. 1

3(b) The output frequency of wind turbine is 50 Hz. What is meant by this statement? 1

3(c) Why do you think Muppandal is at an advantageous position for this project? 1

3(d) Based on the data represented in the graph below, which of the two cities A or B would be an ideal location for establishing a wind-farm and why? 1



4 **Question numbers 4(a) - 4(d) are based on the two tables given below. Study these tables related to blood sugar levels and answer the questions that follow.**

Table A (Blood glucose chart)

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115
	80
	50

Table B (Blood Report of Patient X and Y)

Time of check	Blood Glucose ranges (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	< 100	70 – 130
Before lunch, supper and snack	< 110	70 – 130
Two hours after meals	< 140	< 180
Bedtime	< 120	90- 15

4(a) Refer to Table B showing the blood report of the levels of glucose of patients X and Y. Infer the disease which can be diagnosed from the given data. 1

4(b) Identify the hormone whose level in the blood is responsible for the above disease. 1

4(c) Which one of the following diets would you recommended to the affected patient? 1

i) High sugar and low fat diet.

ii) Low sugar and high protein diet.

iii) High Fat and low fiber diet.

iv) Low sugar and high fiber diet.

4(d) Refer to the Table A and suggest the value of the mean blood glucose level beyond which doctor's advice is necessary: 1

i) 180 mg/dL

ii) 115 mg/dL

iii) 50 mg/dL

iv) 80 mg/dL

5 When we enter a dark room coming from outside, immediately the things inside the room do not appear clear to our eyes. This is because 1

i) pupils do not open at all in the dark.

ii) pupils take time to adjust.

iii) light travels slower in a dark room.

iv) pupils open very quickly in the dark.

OR

The phenomena of light responsible for the working of the human eye is

i) reflection

ii) refraction

iii) power of accommodation

iv) persistence of vision

1

6 When a 4V battery is connected across an unknown resistor there is a current of 100 mA in the circuit. The value of the resistance of the resister is:

i) 4 Ω

ii) 40 Ω

iii) 400 Ω

iv) 0.4 Ω

7 Unit of electric power may also be expressed as: 1

i) volt-ampere

ii) kilowatt-hour

iii) watt-second

iv) joule-second

8 It was found that water from a river was contaminated with Coliform bacteria. Which one of the following pollutant might have got mixed with the water? 1

i) Fertilizer run off

ii) Industrial waste

iii) Pesticides

iv) Human faecal matter

OR

Which one of the following stakeholders of forests causes the maximum damage to forest?

i) People who live in or around the forest

ii) The forest department of the government

iii) The wildlife and native enthusiasts

iv) The industrialists

9 Which one of the following green house gases is a contributor due to incomplete combustion of coal and petroleum? 1

i) Oxides of nitrogen

ii) Methane

iii) Carbon monoxide

iv) Carbon dioxide

10 Which of the following reactions is an endothermic reaction? 1

i) Burning of coal.

ii) Decomposition of vegetable matter into compost.

iii) Process of respiration.

iv) Decomposition of calcium carbonate to form quick lime and carbon dioxide.

11 Identify the basic salt from the following salts: 1

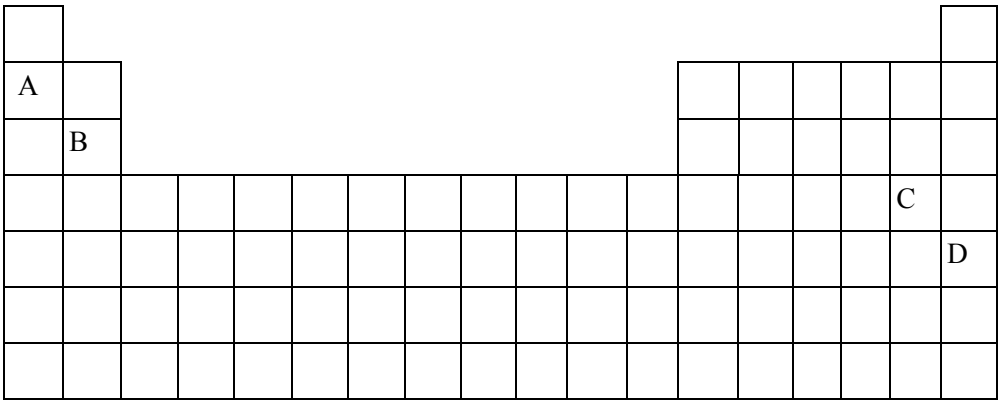
i) Na_2CO_3

ii) NH_4Cl

iii) $NaNO_3$

iv) KCl

12 The positions of four elements A, B, C and D in the modern periodic table are shown below. Which element is most likely to form an acidic oxide? 1



i) A

ii) B

iii) C

iv) D

OR

Elements P, Q, R and S have atomic numbers 11, 15, 17 and 18 respectively. Which of them are reactive non-metals?

i) P and Q

ii) P and R

iii) Q and R

iv) R and S

For question numbers 13 and 14, two statements are given- one labeled *Assertion* (A) and the other labeled *Reason* (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

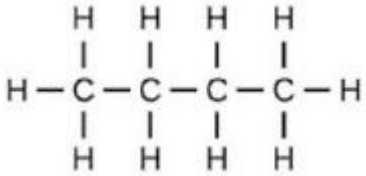
i) Both A and R are true and R is correct explanation of the assertion.

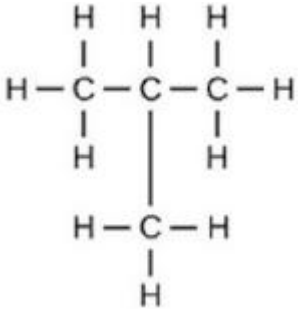
ii) Both A and R are true but R is not the correct explanation of the assertion.

iii) A is true but R is false.

iv) A is false but R is true.

13 **Assertion:** Following are the structural isomers of butane. 1





Reason: Structural isomers have the same molecular formula but they differ in their structures.

14 **Assertion:** A fuse wire is always connected in parallel with the mainline. 1

Reason: If a current larger than the specified value flows through the circuit, fuse wire melts.

SECTION B

15 (i) Write two observations when lead nitrate is heated in a test tube. 3

(ii) Name the type of reaction.

(iii) Write a balanced chemical equation to represent the above reaction.

16 A compound 'X' of sodium is used as an antacid and it decomposes on strong heating. 3

(i) Name the compound 'X' and give its chemical formula.

(ii) Write a balanced chemical equation to represent the decomposition of 'X'.

(iii) Give one use of compound 'X' besides an antacid.

OR

You are provided with 90 mL of distilled water and 10 mL of concentrated sulphuric acid to prepare dilute sulphuric acid.

(i) What is the correct way of preparing dilute sulphuric acid? Give reason.

(ii) How will the concentration of H_3O^+ ions change on dilution?

17 Two elements X and Y have atomic numbers 12 and 16 respectively. To which period of the modern periodic table do these two elements belong? What type of bond will be formed between them and why? Also give the chemical formula of the compound formed. 3

18 (i) Create a terrestrial food chain depicting four trophic levels. 3

(ii) Why do we not find food chains of more than four trophic levels in nature?

OR

How will you create an artificial aquatic ecosystem, which is self-sustainable?

19 Explain the processes of aerobic respiration in mitochondria of a cell and anaerobic respiration in yeast and muscle with the help of word equations. 3

20 In a pea plant, the trait of flowers bearing purple colour (PP) is dominant over white colour (pp). Explain the inheritance pattern of F1 and F2 generations with the help of a cross following the rules of inheritance of traits. State the visible characters of F1and F2 progenies. 3

21 Explain giving reasons the bending of the shoot tip of a plant towards light source coming from one side of the plant. 3

22 It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm. 3

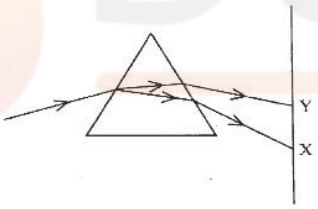
(i) What should be the range of the object distance in the above case?

(ii) Will the image be smaller or larger than the object? Draw a ray diagram to show the formation of image in this case.

(iii) Where will the image of this object be, if it is placed 24 cm in front of the mirror?

23 Suppose your parents have constructed a two room house and you want that in the living room there should be a provision of one electric bulb, one electric fan, a refrigerator and a plug point for appliances of power up to 2 kilowatt. Draw a circuit diagram showing electric fuse and earthing as safety devices. 3

24 In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum XY on the screen. 3



(i) Name the phenomenon.

(ii) State the colours seen at X and Y.

(iii)Why do different colours of white light bend at different angles through a prism?

OR

(i) What is visible spectrum?

(ii) Why is red used as the stopping light at traffic signals?

(iii)Two triangular glass prisms are kept together connected through their rectangular side. A light beam is passed through one side of the combination. Will there be any dispersion? Justify your answer.

SECTION C

25 Metal X is found in nature as its sulphide XS. It is used in the galvanisation of iron articles. Identify the metal X. How will you convert this sulphide ore into the metal? Explain with equations. 5

OR

State the reason for the following:

(i) Aluminium oxide is called an amphoteric oxide.

(ii) An iron strip dipped in a blue copper sulphate solution turns the blue solution pale green.

(iii) Hydrogen gas is not evolved when most metals react with nitric acid.

(iv) Calcium does not occur in free state in nature.

(v) Sodium or potassium metals are kept immersed under kerosene.

26 The formulae of four organic compounds are given below: 5

A	B	C	D
C_2H_4	CH_3COOH	C_2H_5OH	C_2H_6

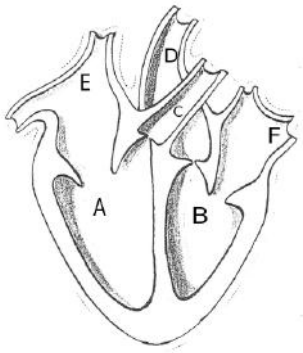
(i) Which one of these compounds A, B, C or D is a saturated hydrocarbon?

(ii) Identify the organic acid and give its structural formula.

(iii) Which of the above compounds when heated at 443K in the presence of concentrated H_2SO_4 forms ethene as the major product? What is the role played by concentrated H_2SO_4 in this reaction? Also write the chemical equation involved.

(iv) Give a chemical equation when B and C react with each other in presence of concentrated H_2SO_4. Name the major product formed and mention one of its important use.

27 5



(i) Identify any two parts from the above diagram which carry oxygenated and deoxygenated blood.

(ii) Explain the process of double circulation with the help of a flow chart.

28 (i) Describe the various steps involved in the process of binary fission with the help of a diagram. 5

(ii) Why do multicellular organisms use complex way of reproduction?

OR

(i) Describe the role of prostate gland, seminal vesicle and testes in the human male reproductive system.

(ii) How is the surgical removal of unwanted pregnancies misused?

(iii) Explain the role of oral contraceptive pills in preventing conception.

29 (i) Consider a conductor of resistance 'R', length 'L', thickness'd' and resistivity 'ρ'. Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why? 5

(ii) Find the resistance if all of these parts are connected in:

(a) Parallel

(b) Series

(iii) Out of the combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why?

30 (i) A lens produces a magnification of -0.5. Is this a converging or diverging lens? If the focal length of the lens is 6 cm, draw a ray diagram showing the image formation in this case. 5

(ii) A girl was playing with a thin beam of light from a laser torch by directing it from different directions on a convex lens held vertically. She was surprised to see that in a particular direction, the beam of light continues to move along the same direction after passing through the lens. State the reason for her observation. Draw a ray diagram to support your answer.

OR

(i) On entering in a medium from air, the speed of light becomes half of its value in air. Find the refractive index of that medium with respect to air?

(ii) A glass slab made of a material of refractive index n_1 is kept in a medium of refractive index n_2.

A light ray is incident on the slab. Draw the path of the rays of light emerging from the glass slab, if (i) $n_1 > n_2$ (ii) $n_1 = n_2$ (iii) $n_1 < n_2$

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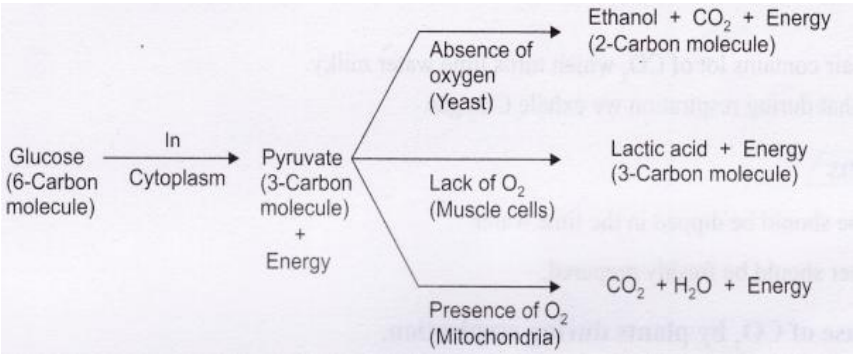
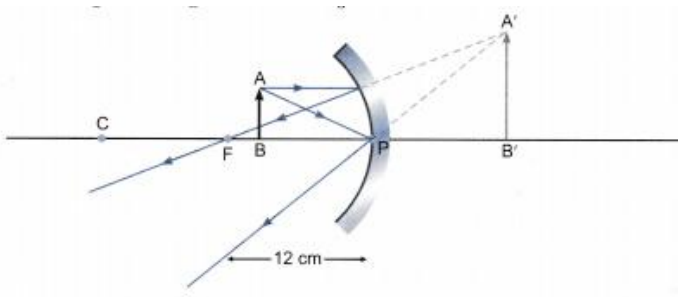
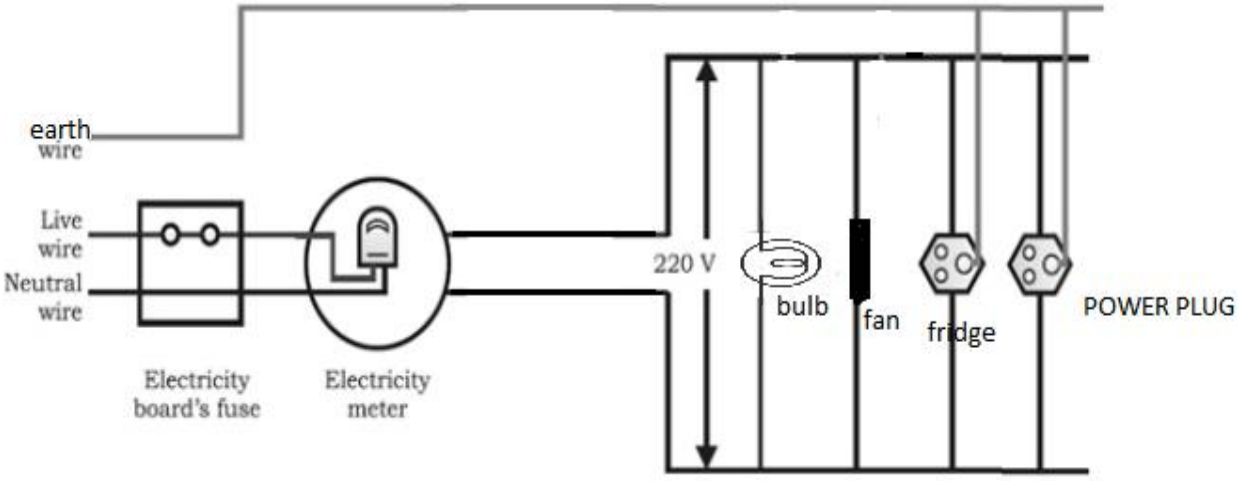
Central Board of Secondary Education

SECTION A		
1	The property of self-linking of atoms of an element through covalent bonds in order to form straight chain, branched chains or cyclic chains of different sizes is called catenation.	1 mark
2	The valency of an element first increases and then decreases across a period.	1 mark
3(a)	The principle behind electric generator is Electromagnetic Induction- the phenomenon of producing current in a coil by changing the magnetic field associated with it.	1 mark
3(b)	The polarity of the output alternating current changes every 1/100 seconds. Alternately: In 1 second the output (AC) completes 50 cycles.	1 mark
3(c)	The suitability of Muppandal as a site for wind farms stems from its geographical location as it has access to the seasonal monsoon winds.	1 mark
3(d)	City A It is more suitable for a wind-farm as there is consistently high wind-speed in that city throughout the year.	0.5 mark 0.5 mark
4(a)	Diabetes	1 mark
4(b)	Insulin	1 mark
4(c)	iv) low sugar high fibre diet	1 mark
4(d)	i) 180mg/dL	1 mark
5	ii) pupils take time to adjust **OR** ii) refraction	1 mark
6	ii) = 40 Ω. V=IR, V = 4V, I = 100 mA = 0.1 A Hence R = V/I = 4/0.1 Ω = 40 Ω.	1 mark
7	i) volt-ampere Power = Voltage x Current.	1 mark
8	iv) Human faecal matter **OR** iv) The Industralist	1 mark
9	iii) Carbon monoxide	1 mark
10	iv) Decomposition of calcium carbonate to form quick lime and carbon dioxide.	1mark
11	i) Na_2CO_3	1mark

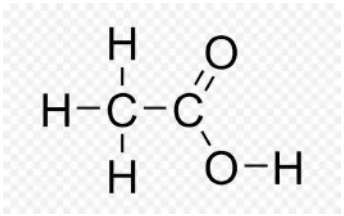
12	iii) C **OR** iii) Q and R	1mark
13	i) Both assertion and reason are true and reason is the correct explanation of assertion.	1mark
14	iv) Assertion is false but reason is true.	1 mark
	SECTION B	
15	(i) It turns yellow due to formation of lead oxide and Reddish brown fumes evolve. (ii) Thermal decomposition reaction. (iii) $2Pb(NO_3)_2 \xrightarrow{heat} 2PbO + 4NO_2 + O_2$	0.5 + 0.5 mark 1 mark 1 mark
16	(i) Sodium bicarbonate/Sodium hydrogencarbonate/ baking soda and its formula is $NaHCO_3$ (ii) $2NaHCO_3 \xrightarrow{heat} Na_2CO_3 + CO_2 + H_2O$ (iii) It is used in fire extinguisher and for baking. (any one) **OR** (i) Add 10 mL of concentrated sulphuric acid slowly to 90 mL of water with constant stirring. Dilution of acid is a highly exothermic process. If water is added to concentrated sulphuric acid, heat generated causes the mixture to splash leading to burns and the glass container can break. (ii) Decreases per unit volume.	0.5 + 0.5 mark 1 mark 1 mark 1 mark 1 mark 1 mark
17	Electronic configuration of X: 2,8,2, Y: 2,8,6 Both X and Y belong to 3rd period. Ionic bond will be formed. Reason: X will lose 2 electrons and Y will gain 2 electrons to complete their octet and become stable. Formula is XY	0.5 + 0.5 mark 0.5 mark 1 mark 0.5 mark
18	A food chain showing Ist tropic level (½ mark), IInd tropic level (½ mark), IIIrd tropic level (½ mark) and IVth tropic level (½ mark). *A flow chart or a diagrammtic representation showing all the four tropic levels would also be accepted* According to the 10% law, the amount of energy available will not be sufficient for the survival of the organism in the 5th trophic level. **OR** • Large jar filled with water, oxygen, food and aquatic plants and animals. • Oxygen/oxygen pump. • Fish food. • Aquatic plants/Producers provide O_2 during photosynthesis. • Aquatic animals/Consumers release CO_2 for the process of photosynthesis. • Decomposers are also important for natural cleaning of the aquarium. (0.5 mark for each point)	2 mark 1 mark 3 mark

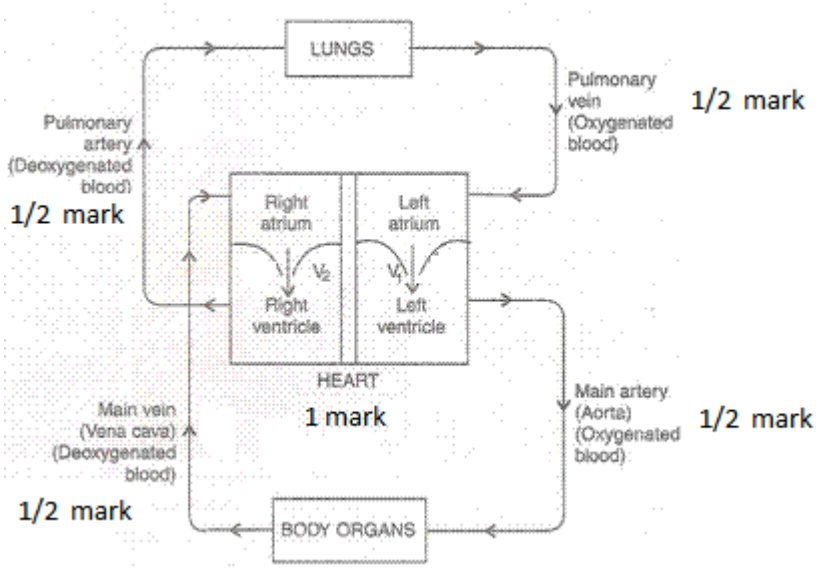
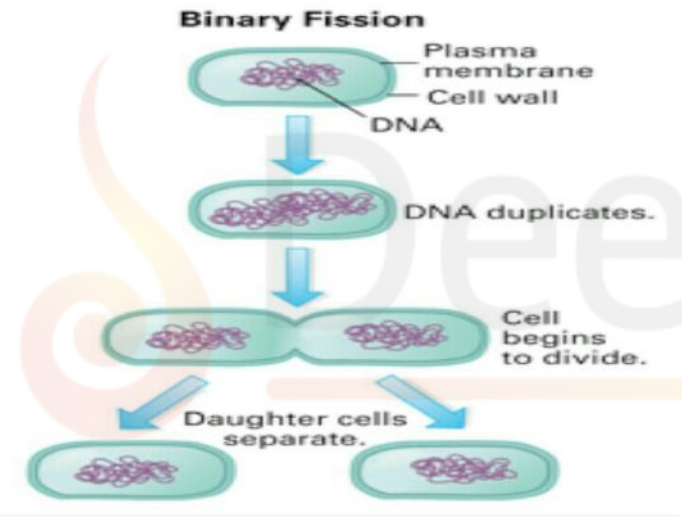
19		1+1+1 mark
20	Let purple trait be represented by: PP White trait be : pp parental PP X pp ↓ F_1 Pp X Pp (Selfing) F_2 ↓ Gametes P p P PP Pp p Pp pp Visible characters of F1 progeny all flowers are purple coloured and in F2 progenies 3 are purple coloured and 1 is white coloured flower	0.5 + 1 + 0.5 mark 0.5 + 0.5 mark
21	When growing plant shoot tip detects light a hormone called auxin is synthesised in the shoot tip which is sensitive to light. Auxin diffuses towards the shady side of the stem. It stimulates the growth of cells on the shady side of the plant which causes bending of the plant to the other side. This gives the appearance that the stem of the plant bends in the direction of light.	1 mark 0.5mark 1 mark 0.5 mark
22	(i) Range of distance should be 0 cm to < 12 cm. (ii) The image will larger than the object.  *(0.5 mark to be deducted if no arrows marked or wrongly marked arrows)* (iii) Image will be at 24cm in front of the mirror or the image is formed at C	0.5 mark 1.5 mark 1 mark

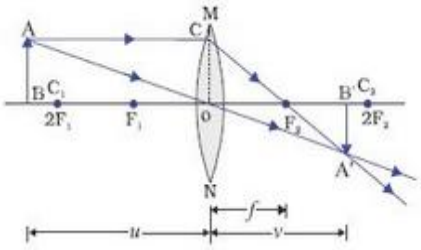
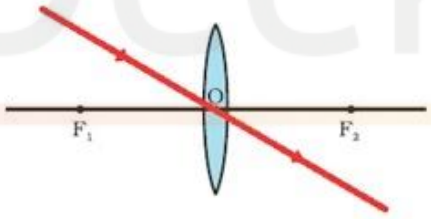
23	 (i) Four components should be labelled. (ii) All of them should be in parallel and there should be a fuse for safety. (iii) Live and earth wires should be there. *(0.5 mark to be deducted if all parts of the diagram are not labeled)*	1 mark 0.5 + 0.5 mark 1 mark
24	(i) The phenomenon is called dispersion. (ii) X — Violet Y — Red (iii) Different colours of white light bend through different angles with respect to the incident beam of light due to difference in speed of light of different wavelengths. **OR** (i) Visible spectrum is the band of coloured components of a white light beam . (ii) Red light is scattered the least by air molecules and has longer wavelength. It travels the longest distance. (iii) The given setup will behave like a glass slab, resulting in recombination of the seven colours to produce white light.	1 mark 0.5 + 0.5 mark 1 mark 1 mark 1 mark 1 mark

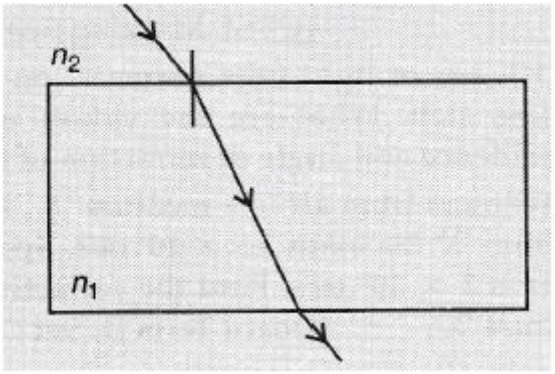
SECTION C

25	Metal X is Zinc The sulphide ore is first heated strongly in supply of oxygen and changed into its oxide. This process is called roasting. $2ZnS + 3O_2 \xrightarrow{\text{heat}} 2ZnO + 2SO_2$ Zinc oxide is then reduced to zinc metal by heating it with carbon. This process is called reduction. $2ZnO + C \longrightarrow 2Zn + CO_2$	1 mark 1 mark 1 mark 1 mark 1 mark

	OR (i) As it reacts with both acids as well as bases to form salts. (ii) Iron being more reactive than copper displaces copper from copper sulphate to form green ferrous sulphate solution. (iii) Nitric acid is a strong oxidising agent. Hydrogen gas produced gets oxidised to H_2O. (iv) Calcium is a very reactive metal. It reacts with the chemicals in surroundings and occurs in combined state. (v) Sodium and potassium are highly reactive metals and react vigorously with oxygen in air and may even catch fire. They do not react with kerosene.	1 mark 1 mark 1 mark 1 mark 1 mark
26	(i) D is a saturated hydrocarbon (ii) B is an organic acid. Structural formula  (iii) C is the compound. It acts as a dehydrating agent and removes a water molecule from ethanol. $C_2H_5OH \xrightarrow{\text{hot conc. } H_2SO_4} C_2H_4 + H_2O$ (iv) $CH_3COOH + C_2H_5OH \xrightarrow{\text{conc } H_2SO_4} CH_3COOC_2H_5 + H_2O$ Major product is Ester and it is used in making perfumes / flavouring agents.	0.5 mark 0.5 mark 0.5 mark 0.5 mark 0.5 mark 1 mark 1 mark 0.5 mark
27	(i) Oxygenated : B/D/F [B= left ventricle/D=aorta/F=left auricle/pulmonary vein] Deoxygenated: A/C/E [A= right ventricle/C= pulmonary artery/E=right auricle/vena cava] *(any two)*	0.5 + 0.5 + 0.5 +0.5 mark

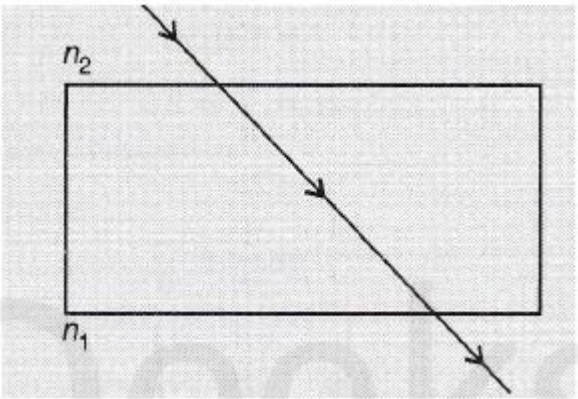
	(ii)  (*1 mark should be deducted if the arrows are not correctly marked*)	3 mark
28	(i)  (ii) Multicellular organisms cannot reproduce by cell because they are not simple random collection of cells. In them, specialized cells are organized as tissues which are organized into organs. Cell-by-cell division would be impractical. Multicellular organisms, therefore, require to use more complex ways of reproduction. **OR** (i) Prostate glands and seminal vesicle : add their secretions so that the sperms are in a fluid and it makes their transport easier and also provides nutrition.Testes secrete testosterone which brings about changes in the appearances in the boys at the time of puberty. (ii) Female foeticides/illegal sex selected abortion of female foeticide. (iii) Interfere in release of egg and eggs are not released.	3 mark 2 mark 3 mark 1 mark 1 mark
29	(i) Resistivity will not change as it depends on the nature of the material of the conductor. (ii) The length of each part becomes L/4. ρ,A constant. R=ρL/A. Resistance of each part = R_{part}= (ρL/4)/A = R/4.	1 mark 0.5 mark

	(a) In parallel the $\frac{1}{R_{eqv}} = \frac{1}{R_{part}} + \frac{1}{R_{part}} + \frac{1}{R_{part}} + \frac{1}{R_{part}} = \frac{4}{R_{part}} = \frac{16}{R} \rightarrow R_{eqv} = R/16\ \Omega$ (b) In series the $R_{eqv} = R/4 + R/4 + R/4 + R/4 = R\ \Omega$ (iii) $P = V^2/R$. If R_{eqv} is less, power consumed will be more. In the given case, R_{eqv} is lesser in the parallel and power consumed will be more.	0.5 mark 1 mark 1 mark 0.5 mark 0.5 mark
30	(i) The image will be real and inverted, since the magnification has negative value. The lens that can produce a real and inverted image is a converging/ convex lens.  (1/2 *mark should be deducted* i In the figure $OF_1 = OF_2 = 6$ cm. (Marks will be deducted if arrows are not shown) (ii) The girl must have directed the ray of light along the direction of the optical centre of the lens because the ray of light passes straight through the optical centre of the lens.  **OR** (i) Refractive Index of a medium (μ) = Velocity of light in vacuum / Velocity of light in the medium. Let the velocity of light in vacuum be v_1 and velocity of light in the medium be v_2. $v_1/2 = v_2$. Hence $\mu = v_1 / v_2$. $= v_1 / (v_1/2)$. $= 2$ (ii) (a) The ray moves towards the normal.	1 mark 2 mark 1 mark 1 mark 0.5 mark 1 mark 0.5 mark



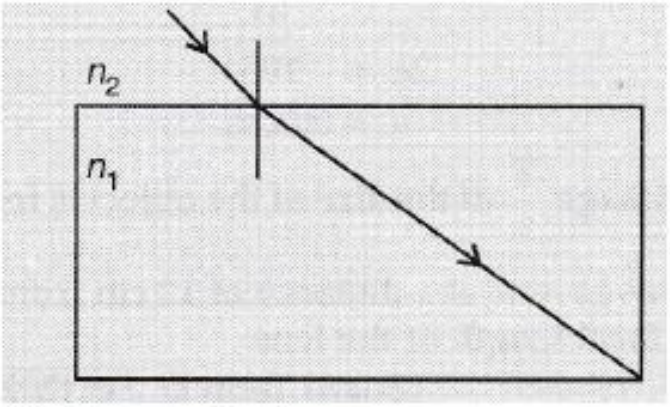
1 mark

(b) The ray moves undeviated.



1 mark

(c) The ray moves away from the normal.



1 mark