

Duration: 3 Hrs

Maximum Marks:80

**General Instructions:**

- i. This question paper consists of 39 questions in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. Section A consists of 20 objective type questions carrying 1 mark each.
- iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

**Section-A**

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for incorrect response.

Q. Nos.	Questions	Marks
1	An example of liquid metal is (a) Bromine (b) Mercury (c) Iodine (d) Silver	1
2	Combustion Reactions are (a) Exothermic (b) Endothermic (c) Either exothermic or endothermic (d) None of the above	1
3	The highest pH value would be found in (a) HCl (b) NaOH (c) Na <sub>2</sub> CO <sub>3</sub> (d) HNO <sub>3</sub>	1
4	Metal A can displace metal B from BO, the oxide of metal B. Metal B can displace C from solution of CSO <sub>4</sub> , the sulphate of metal C. Arrangement of metals A, B and C in the order of increasing reactivity would be :  (a) C < A < B (b) B < A < C (c) A < C < B (d) C < B < A	1

5	<p>Which of the following is not a saturated hydrocarbon ?</p> <p>(a) Cyclohexane</p> <p>(b) Benzene</p> <p>(c) Butane</p> <p>(d) Isobutane</p>	
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6	<p>The structural formula of an ester is :</p> <div style="text-align: center;"> </div> <p>The molecular formula of the alcohol from which it would have been formed is:</p> <p>(a) <math>\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}</math></p> <p>(b) <math>\text{CH}_3\text{CH}_2\text{OH}</math></p> <p>(c) <math>\text{CH}_3\text{OH}</math></p> <p>(d) <math>\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}</math></p>	1
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7	<p>Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of reaction involved?</p> <p>i. Displacement reaction ✗</p> <p>ii. Precipitation reaction</p> <p>iii. Combination reaction ✗</p> <p>iv. Double displacement reaction ✓</p> <p>(a) Only i</p> <p>(b) Only ii</p> <p>(c) Only iv</p> <p>(d) ii and iv</p>	1
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8	<p>What are the products obtained by anaerobic respiration in plants?</p> <p>(a) Lactic acid + energy</p> <p>(b) Carbon dioxide + water + energy</p>	1
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(c) Ethanol + carbon dioxide + energy      (d) Pyruvate

- 9 Which of the following is an example of genetic variation?
- (a) One person has a scar, but his friend doesn't
  - (b) One person is older than the other
  - (c) Reeta eats meat, but her sister Geeta is a vegetarian
  - (d) Two children have different eye colour

10 Which of the following statement(s) is(are) true about excretion in human beings?

1. Urine is stored in the urethra until the urge of passing it out. ✗
2. Each kidney has large numbers of filtration units called nephrons.
3. The bladder is muscular, so it is under nervous control.
4. Kidneys are the primary excretory organs.

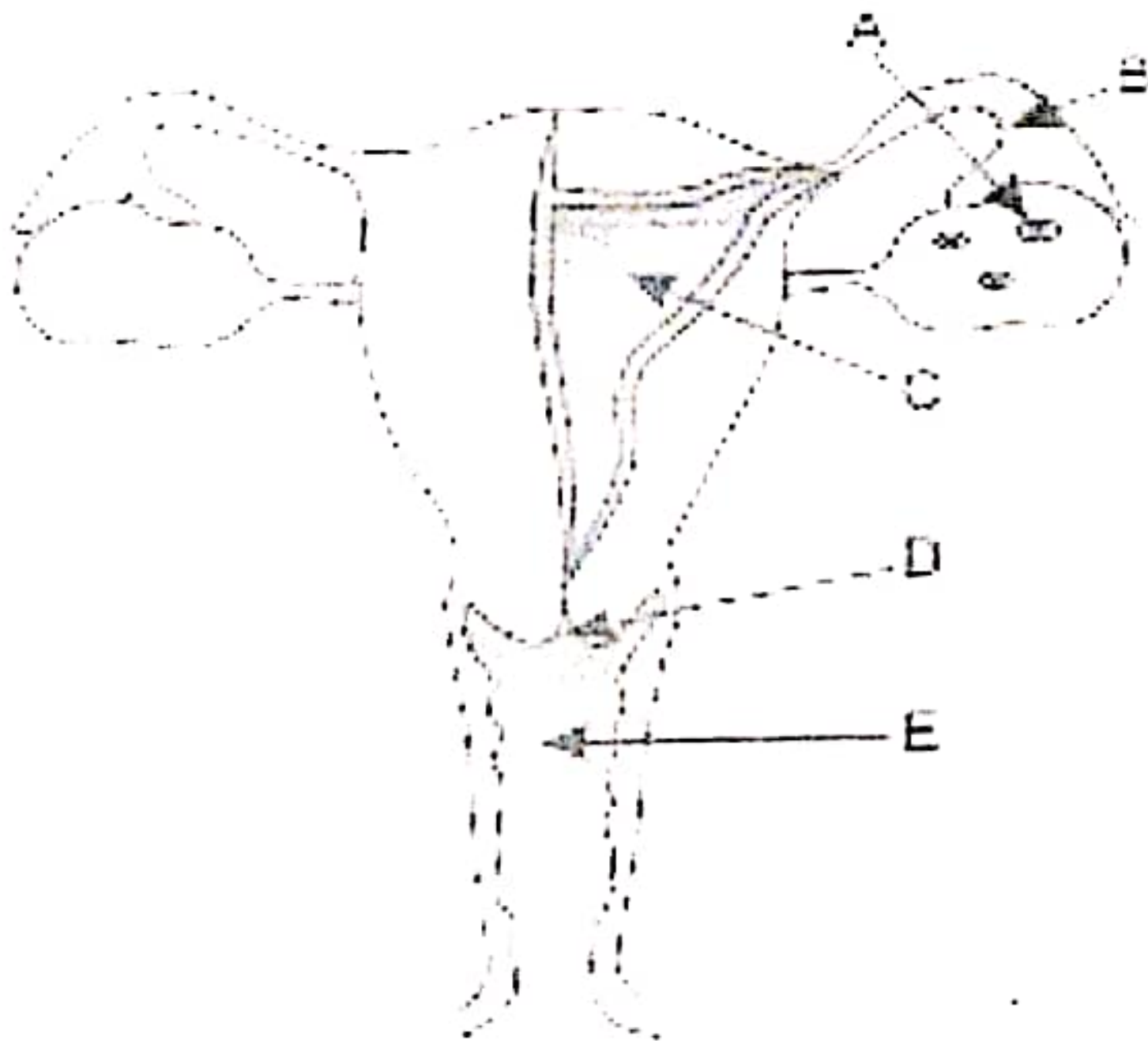
a. i and ii only

b. i and iii only

c. ii, iii, and iv only

d. i and iv only

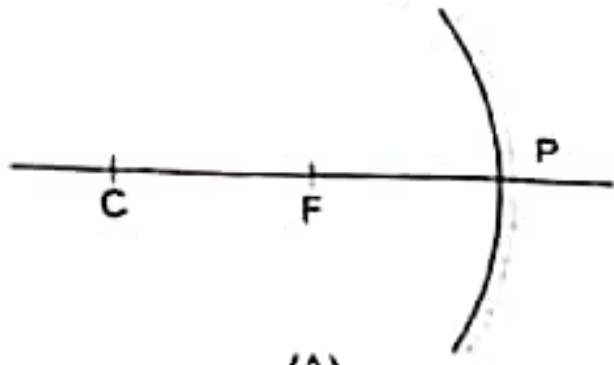
11 Choose the right option.



- (a) Fallopian tube, Oviduct, Uterus, Cervix, Vagina
- (b) Oviduct, Vas deferens, Ovary, Vagina, Cervix
- (c) Ovary, Oviduct, Uterus, Cervix, Vagina
- (d) Ovary, Fallopian tube, Uterus, Vagina, Cervix

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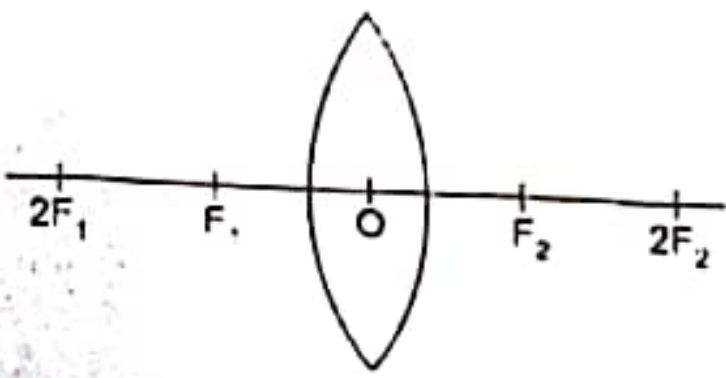
Which of the following can make a parallel beam of light?



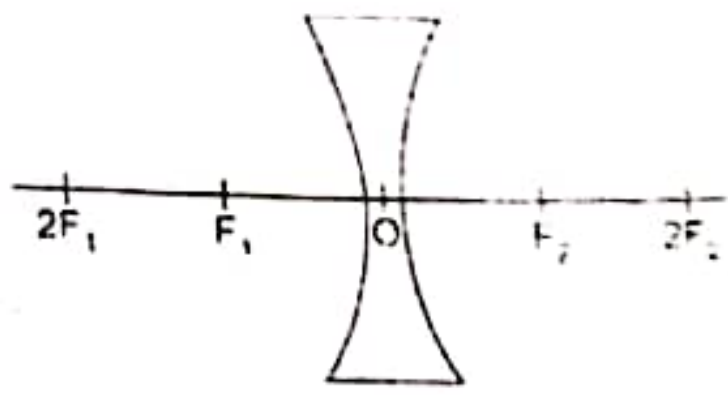
(A)



(B)



(C)

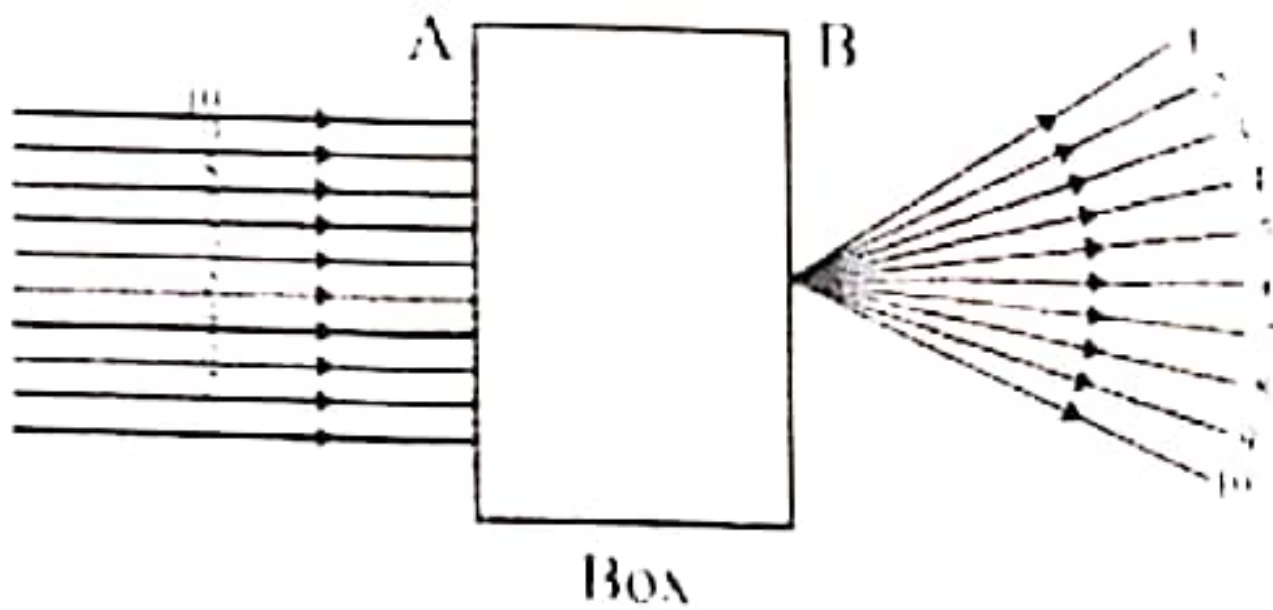


(D)

- (a) A and B both
- (b) B and C both
- (c) A and C both
- (d) A and D both

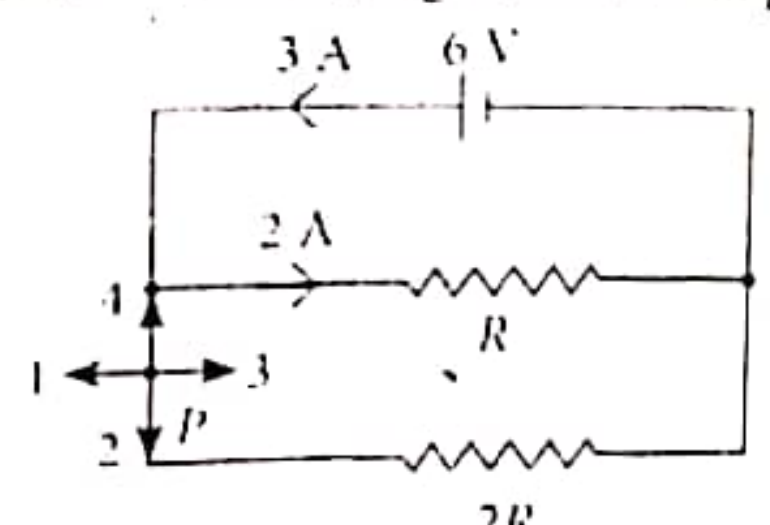
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A beam of light is incident through the holes on side A and emerges out of the hole on the other face of the box as shown in the figure. Which of the following could be inside the box?



- (a) Concave lens
- (b) Rectangular glass slab
- (c) Prism
- (d) Convex lens

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14	<p>Which of the following is true about point P?</p>  <p>(a) Current is flowing in direction 4. ✗  (b) Electrons are flowing in direction 4. ✗  (c) Electrons are flowing in either direction 1 or direction 3. ✗  (d) Electrons are flowing in direction 2.</p>	1
15	<p>A magnetic field exerts no force on</p> <p>(a) a stationary electric charge  (b) a magnet  (c) an electric charge moving perpendicular to its direction  (d) an unmagnetised iron bar</p>	1
16	<p>When light ray enters the eye, the maximum refraction occurs at the</p> <p>(a) crystalline lens  (b) iris  (c) pupil  (d) outer part of the cornea</p>	1
<p>Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</p> <p>(a) Both A and R are true, and R is the correct explanation of A.  (b) Both A and R are true, and R is not the correct explanation of A.  (c) A is true but R is false.  (d) A is false but R is true.</p>		
7	<p>Assertion(A) : The strength of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the current flowing through the coil.  Reason (R) : Magnetic field strength is inversely proportional to the current flowing in the coil.</p>	1
8	<p>Assertion (A) : Baking soda creates acidity in the stomach.  Reason (R): Baking soda is alkaline.</p>	1

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19	Assertion(A) : Spores are unicellular bodies. Reason (R) : The parent body simply breaks up into smaller pieces on maturation.	1
20	Assertion(A): Biodegradable substances result in the formation of compost and natural replenishment. Reason (R): It is due to breakdown of complex inorganic substances into simple organic substances	1

**Section-B**  
 Question No. 21 to 26 are very short answer questions

21	Give any two methods which could be applied to reduce our intake of pesticides through food to some extent.	2
22	What will happen if mucus is not secreted by the gastric glands?	2
23	Lime water turns cloudy in the presence of a gas which is a by-product of respiration. Shown below are four setups kept in sunlight for 24 hours. In which setup is <u>lime water</u> expected to be the cloudiest? Why?	2
24	Explain the role of a <u>fuse</u> in series with any electrical appliance in an electric circuit. Why should a fuse with defined rating for an electric circuit not be replaced by one with a larger rating?	2

25	Draw a ray diagram to explain the term angle of deviation.	2
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26	A Chemical Compound X is used in the soap industry, it is prepared from brine (i) Write the chemical name and formula for X. (ii) Write the equation involved in the preparation of it.	2
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**Section-C**

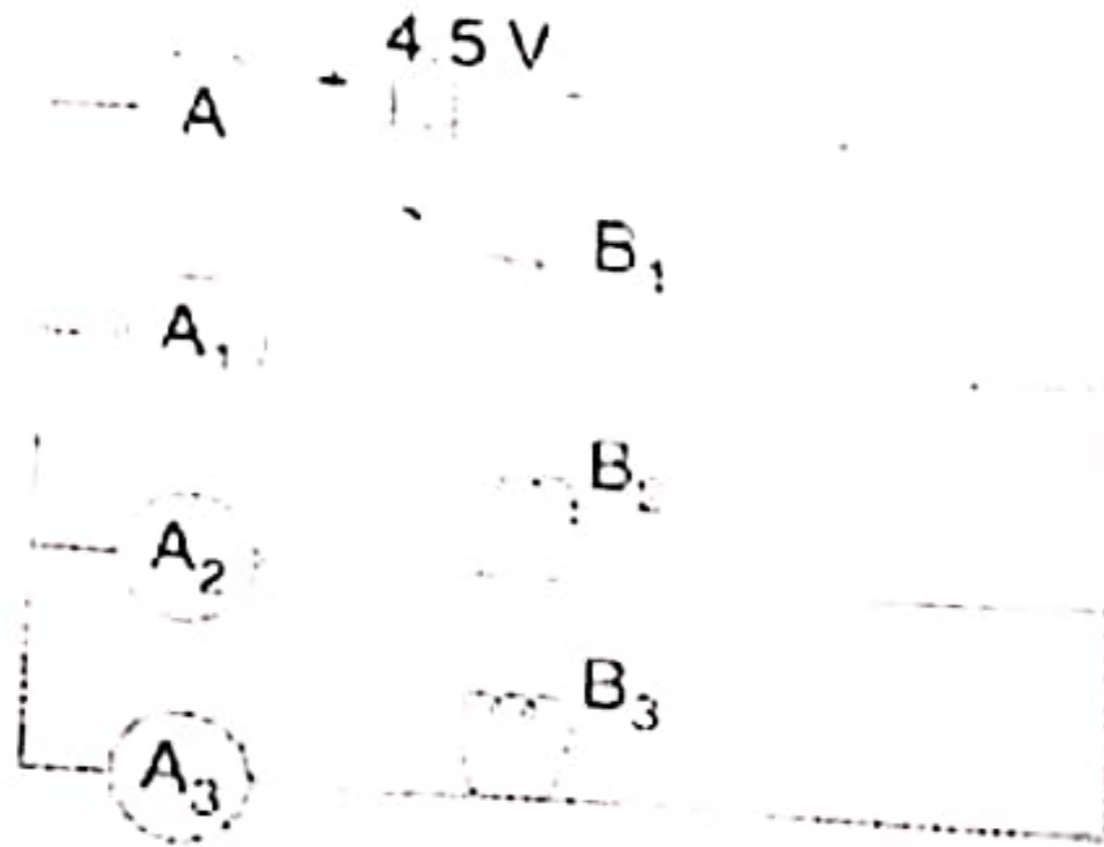
Question No. 27 to 33 are short answer questions

27	2 g of ferrous sulphate crystals are heated in a dry boiling tube. (a) Write one observation. (b) Name the type of chemical reaction taking place. (c) Write balanced chemical equation for the reaction and name of the products formed.	3
28	An ore on treatment with dilute hydrochloric acid produces brisk effervescence. (a) Name the type of ore with one example. (b) What steps will be required to obtain metal from the enriched ore? Write the chemical equations for the reactions involved in the process.	3
29	(a) Define reflex arc. Draw a flow chart showing the sequence of events which occur during sneezing. (b) List any phytohormone and write one of its function.	3

30	(a) Why is the F1 progeny always of tall plants when a tall plant is crossed with a short pea plant? (b) How is F2 progeny obtained by self-pollination of F1 progeny different from F1 progeny? Give reason for this observation. (c) State a conclusion that can be drawn on the basis of this observation.	3
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31	a) In the following food chain, plants provide <u>500 J</u> of energy to rats. How much energy will be available to hawks from snakes? Plants → Rats → Snakes → Hawks b) In a food chain of frog, grass, insect and snake, assign trophic level to frog and why?	3
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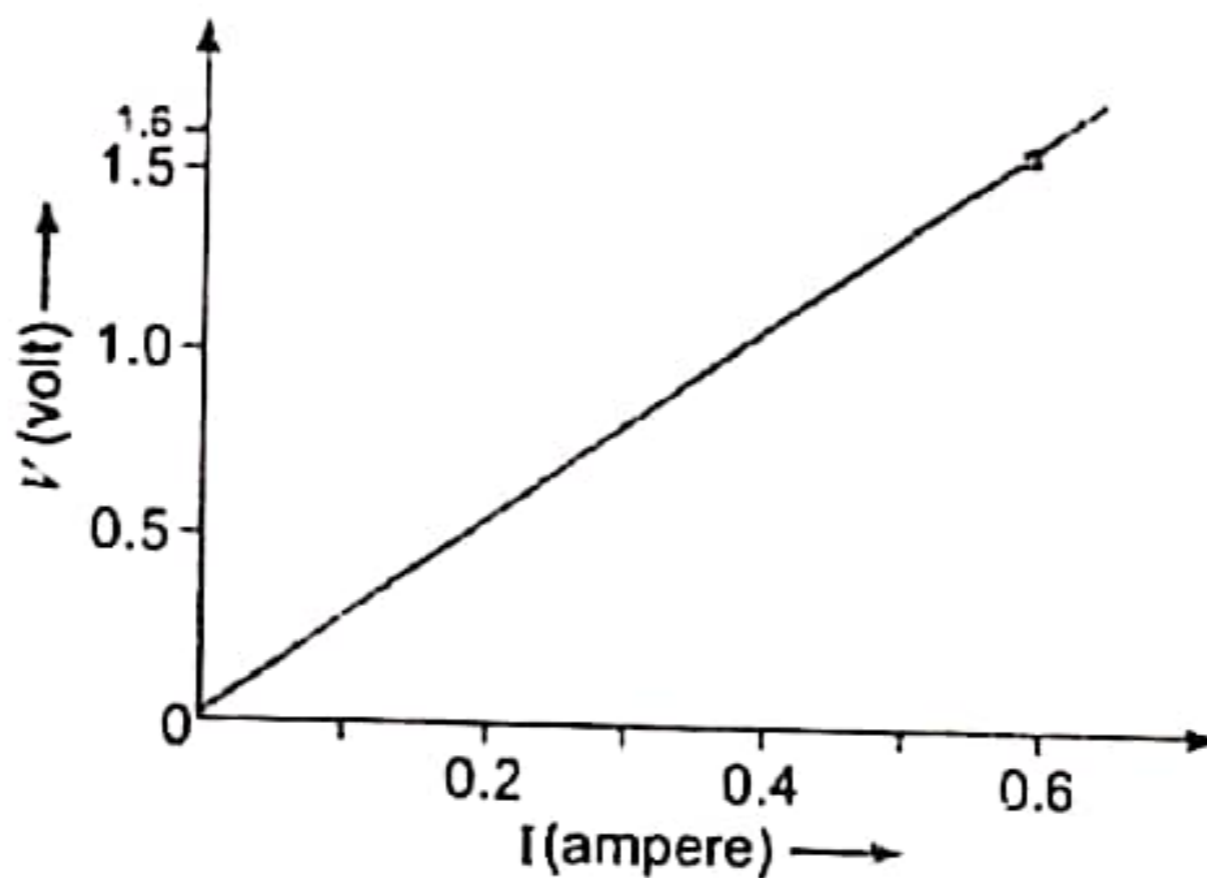
Study the circuit shown in which three identical bulbs  $B_1$ ,  $B_2$ , and  $B_3$ , are connected in parallel with a battery of 4.5 V and answer the questions that follow.



- (a) What will happen to the glow of the other two bulbs if the bulb  $B_3$  gets fused?  
 (b) If the rating of each bulb is 1.5 W, how much reading will the ammeter A show when all the three bulbs glow simultaneously.  
 (c) Find the total resistance of the circuit.

OR

- (a) Draw a closed circuit diagram consisting of a 0.5 m long nichrome wire XY, an ammeter, a voltmeter, four cells of 1.5 V each and a plug key.  
 (b) Following graph was plotted between V and I values :



What would be the values of  $V/I$  ratios when the potential difference is 0.8 V, 1.2 V and 1.6 V respectively? What conclusion do you draw from these values?

- 33 An object is kept at a distance of 18 cm, 20 cm, 22 cm and 30 cm respectively from a lens of power + 5D.  
 (a) In which case or cases would you get a magnified image? Give reason



(b) Which of the magnified images can be obtained on a screen?

Section-D

Question No. 34 to 36 are long answer questions.

34 A blue colour flower plant denoted by BB is cross-bred with that of white colour flower plant denoted by bb. 5

(a) State the colour of flower you would expect in their F1 generation plants.

(b) What must be the percentage of white flower plants in F2 generation if flowers of F1 plants are self-pollinated?

(c) State the expected ratio of the genotypes BB and Bb in the F2 progeny with the help of cross.

**OR**

A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other.

(a) List your observations regarding :

(i) Colour of stem in their F1 progeny

(ii) Percentage of brown stemmed plants in F2 progeny if plants are self pollinated.

(iii) Ratio of GG and Gg in the F2 progeny.

Based on the findings of this cross, what conclusion can be drawn?

35 A compound X is formed by the reaction of carboxylic acid  $C_2H_4O_2$  and alcohol in the presence of a few drops of  $H_2SO_4$ . The alcohol on oxidation with alkaline  $KMnO_4$  followed by acidification gives the same carboxylic acid as used in this reaction. 5

(a) Identify the compound 'X'. Give its name and structure.

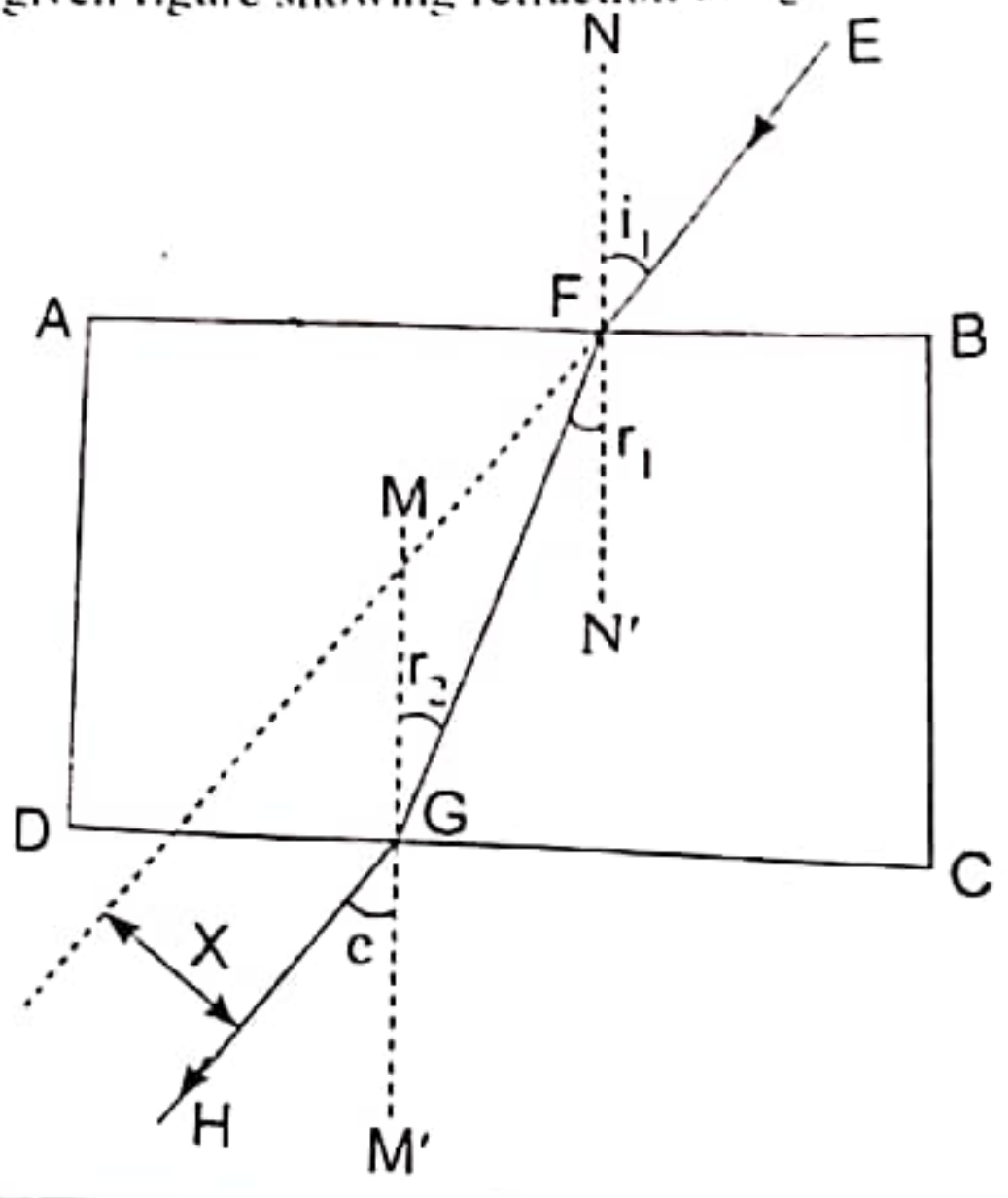
(b) Give the reaction involved when alcohol undergoes an oxidation in the presence of alkaline  $KMnO_4$ .

(c) Give the balanced chemical equation for the preparation of compound 'X'.

**OR**

An organic compound A on heating with concentrated  $H_2SO_4$  forms a compound B which on the addition of one mole of hydrogen in presence of Ni forms a compound C. One mole of compound C on combustion forms two moles of  $CO_2$  and 3 moles of  $H_2O$ . Identify the compounds A, B and C and write the chemical equations of the reactions involved.

36 Look at the given figure showing refraction of light through a rectangular glass slab carefully.



lateral disp.

(a) What is 'X' in the above figure? What are the factors on which it depends?

A ray of light EF suffers two refractions. Identify the points where two refractions take place.

(c) State Snell's law of refraction .

(d) The refractive index of diamond is 2.42. What is the meaning of this statement?

OR

An object 4.0 cm in size, is placed 25.0 cm in front of a concave mirror of focal length 15.0 cm.

(a) At what distance from the mirror should a screen be placed in order to obtain a sharp image?

(b) Find the size of the image.

(c) Draw a ray diagram to show the formation of image in this case.

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$$\frac{3}{15} = \frac{4}{25} = \frac{v}{15}$$

$$\frac{3}{15} = \frac{4}{25} = \frac{v}{15}$$

**SECTION - E**

Question No. 37 to 39 are case-based/data -based questions with 2 to 3 short sub-parts.

37	<p>Have you ever observed while bathing that foam is formed with difficulty and an insoluble substance (scum) remains after washing with water? This is caused by the reaction of the soap with certain salts, which causes the hardness of water. Hence you need to use a large amount of soap. This problem is overcome by using another class of compounds called detergents as cleansing agents</p> <p>(i) Name two salts that cause hardness in water</p> <p>(ii) What are detergents? How can they form lather with hard water?</p>	4
38	<p>Andre Marie Ampere suggested that a magnet must exert an equal and opposite force on a current carrying conductor, which was experimentally found to be true. But we know that current is due to charges in motion. Thus, it is clear that a charge moving in a magnetic field experiences a force, except when it is moving in a direction parallel to it. If the direction of motion is perpendicular to the direction of magnetic field, the magnitude of force experienced depends on the charge, velocity (<math>v</math>), strength of magnetic field (<math>B</math>), and sine of the angle between <math>v</math> and <math>B</math>. Direction of magnetic force is given by Fleming's left hand rule.</p> <p>(a) If an electron is travelling horizontally towards east, what is the direction of force experienced by the electron for a magnetic field in vertically downward direction exerts a force on the electron along?</p> <p>(b) If a charged particle is moving along a magnetic field line, then what is the magnetic force on the particle?</p> <p>(c) What are magnetic lines of force?</p> <p align="center"><b>OR</b></p> <p>How will the magnetic field be affected on:</p> <p>(i) increasing the current through the conductor</p> <p>(ii) reversing the direction of flow of current in the conductor?</p>	4
39	<p>Reema collected some pond water which was dark green in color in a test tube. She took out green-colored mass from it and separated its filaments by using needles. She broke some filaments into small fragments and put them in a Petri dish containing clean water. She observed that after a few days the small fragments gave rise to complete filaments.</p> <p>(a) What do you think the mass of green filament was?</p> <p>(b) The small fragment gave rise to new filament. What does it indicate?</p> <p>(c) How will an organism be benefited if it reproduces through spores? <i>protection in spore form</i></p> <p align="center"><b>OR</b></p> <p>(i) State one feature of reproduction that is common to Amoeba, Spirogyra and yeast.</p> <p>(ii) Write two organisms in which asexual reproduction takes place through budding. Illustrate any one with a labelled diagram.</p>	4