

## HALF YEARLY EXAMINATION—2025-26

### CLASS-X SUBJECT-SCIENCE

Time : 3 Hrs.

M.M. : 80

No. of Pages 16

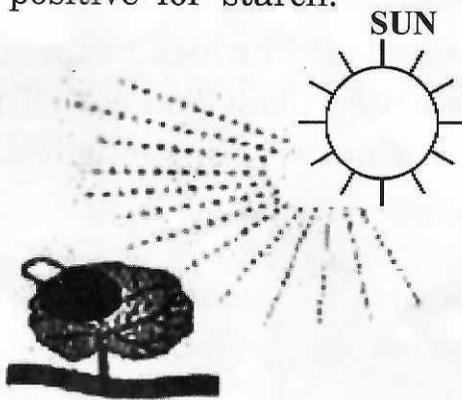
No. of Qs. 39

#### General Instructions :

- (i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
- (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.

### SECTION-A

**Q1.** The diagram below shows a leaf that was covered by a piece of black paper for a period of 3 days. After 3 days the paper was removed. On testing, it was found that the area under the black paper tested negative for starch and the rest tested positive for starch. (1)



What was the experiment trying to test ?

- (A) If plants make their own food.
- (B) If light is required for plants to make food.
- (C) If plants can respire in the absence of light.
- (D) If plants can survive even in the absence of light.

#### Alternative Question for Visually impaired Students in lieu of Q. 1

**Q1.** In Amoeba, the food engulfed by endocytosis is digested in the :

- (A) Food vacuole
- (B) Mitochondria
- (C) Pseudopodia
- (D) Nucleus

**Q2.** During cellular oxidation of glucose, ATP is produced along with formation of other products. Which of the following events is associated with production of maximum ATP molecules per molecule of glucose during this process ? (1)

- (A) Synthesis of ethanol in Yeast
- (B) Synthesis of lactic acid in muscle cells
- (C) Synthesis of carbon dioxide in yeast cells
- (D) Synthesis of carbon dioxide in human cells

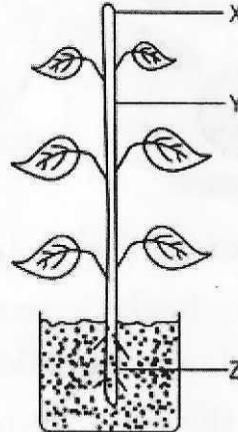
**Q3.** Which part of the phloem helps in the actual transport of sugars ? (1)

- (A) Tracheids
- (B) Sieve tubes
- (C) Companion cells
- (D) Phloem parenchyma

**Q4.** An organism which breaks down the food material outside the body and then absorbs it is- (1)

- (A) a plant parasite, *Cuscuta*
- (B) an animal parasite, *Tapeworm*
- (C) a bacteria, *Rhizobium*
- (D) a fungi, *Rhizopus*

**Q5.** Shown in the figure below is a plant in which auxin is synthesized at part X of the plant. Geeta took the potted plant and cut off part X. Then she took the plant and kept it near a window with sunlight and observed it after 7 days. (1)



Which of the following is she likely to have observed ?

- (A) Part Y grew and bent towards the window.
- (B) Part Z started growing upwards and out of the soil.
- (C) Part Y did not grow at all.
- (D) Part Y grew upwards.

### **Alternative Question for Visually impaired Students in lieu of Q. 5**

**Q5.** Which plant hormone is responsible for cell division and growth in plants ?

(A) Auxin (B) Gibberellin  
(C) Cytokinin (D) Abscisic acid

**Q6.** Read the given statements about lymph and select the CORRECT ones from the following options : (1)

(i) Lymph vessels carry lymph through the body and finally open into large arteries.  
(ii) Lymph contains some amount of plasma, proteins and blood cells.  
(iii) Lymph contains some amount of plasma, proteins and red blood cells.  
(iv) Lymph vessels carry lymph through the body and finally open into larger veins.

Choose the CORRECT statements :

(A) (i) and (ii) (B) (i) and (iii)  
(C) (ii) and (iv) (D) (iii) and (iv)

**Q7.** In plants, waste products like resins and gums are stored in : (1)

(A) Leaves that fall off (B) Old xylem  
(C) Phloem (D) Cellular vacuoles

**The following two questions consist of two statements-Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below :**

(A) Both A and R are true, and R is the correct explanation of A.  
(B) Both A and R are true, but R is not the correct explanation of A.  
(C) A is true but R is false.  
(D) A is false but R is true.

**Q8. Assertion (A) :** During breathing cycle, when air is taken in and let out, the lungs always contain residual volume. (1)

**Reason (R) :** Residual volume of air present in lungs during breathing cycle ensures that the exchange of oxygen and carbon dioxide takes place continuously.

**Q9.** **Assertion (A) :** Neurotransmitters are chemical substances that help in the transmission of nerve impulses. (1)

**Reason (R) :** Neurotransmitters travel from dendrites of one neuron to the nerve endings of the next neuron.

**Q10.** Identify the part of the brain responsible for controlling the following actions/ functions : (2)

- (i) Blood pressure, Salivation
- (ii) Picking up a pencil
- (iii) Smelling
- (iv) Thinking and reasoning

**Q11.** Students to attempt either option A or B :

(A) Pertaining to endocrine system, what will you interpret if : (2)

- (i) You observe swollen neck in people living in the hills.
- (ii) Over secretion of growth hormone takes place during childhood.

**OR**

(B) Explain the feedback mechanism to regulate the action of the hormones with the help of one example.

**Q12.** Touching a flame suddenly is a dangerous situation for us. One way is to think consciously about the possibility of burning and then removing our hand from it. But our body has been designed in such a way that we save ourselves from such situations immediately. (2)

(A) Name and briefly explain the response by which we can protect ourselves in the situation mentioned above.

(B) What is the role of (i) motor and (ii) relay neurons in the above case ?

**Q13.** Draw a well labeled diagram of the structural and functional unit of the kidney. What is it called ? (3)

Label the following parts on the diagram stating their name :

- (A) Part where maximum reabsorption of water and salts take place.
- (B) Part that collects the urine.
- (C) Part that collects the initial filtrate.

**Alternative Question for Visually impaired Students in lieu of Q. 13**

**Q13.** (A) How is the amount of urine produced regulated in the body ?  
(B) Write the pathway of urine in our body starting from the organ of its formation to its excretion.  
(C) Mention a common nutrient that is absorbed in the small intestine and reabsorbed by the kidney tubules.

**Q14.** Water is used by the leaves of the plants for photosynthesis but rather than watering the leaves, we water the plant through the soil. How does this water reach the leaves of the plant ? (3)

**Q15.** Ritika noticed that the pea plant growing in her garden had started curling its slender tendrils around a stick placed nearby. Over the next few days, the tendrils had tightly coiled around the support. Curious, Ritika asked her teacher how the plant was able to 'find' the support. The teacher explained the reason for that to be thigmotropism – one of the types of responses shown by plants. However, plants do show some other movements, just in different ways. For example, turning sunflowers in the direction of sunlight and drooping of the *Mimosa pudica* leaves in response to touch. (4)

- (A) Which stimulus brings about the movement of tendrils around support ? Is this movement directional or non-directional ?
- (B) Which hormone is responsible for showing the movement of sunflowers towards the light source ? Is it a tropic or nastic movement ?

**Attempt either subpart C or D :**

- (C) Explain what causes tendrils to move around the support in the above case ? Which means do plants use to convey this information of 'stimulus' from cell to cell ?

**OR**

(D) Give any two points of differences stating how this movement of tendrils around support is different from the movement shown by *Mimosa pudica* leaves ?

**Q16. Attempt either option A or B :**

(5)

A. (i) State the reason why bile juice doesn't contain any enzyme, yet it has important roles in digestion.

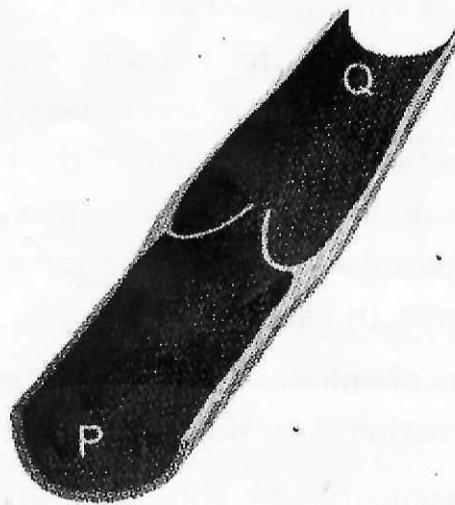
(ii) Although 'Pepsin' and 'Trypsin' are both protein digesting enzymes, yet they differ from each other. Justify this statement by giving any one point of difference between the two.

(iii) Mention the source of each of the following secretions in the human digestive system. Also, state their role in the process of digestion.

(a) Intestinal juice      (ii) Lipases      (iii) HCl

**OR**

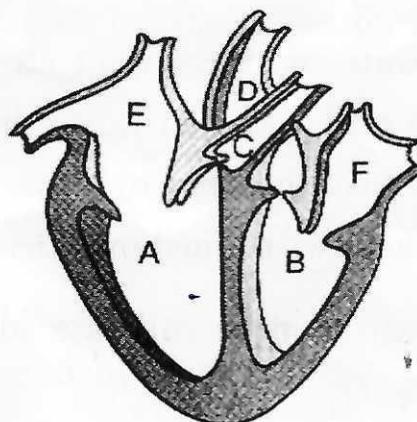
B. (i) The figure shown below shows the cross section of a blood vessel of the human arm.



(a) Name the type of the vessel shown in the figure. Justify your answer.

(b) State the direction of blood flow in such blood vessels, if P side emerges from a body organ and Q side gets connected with the heart.

(ii) Observe the diagram carefully and answer the questions that follow :



- Which chamber of the heart (A, B, E or F) pumps blood to the lungs for oxygenation ? Name the blood vessel that carries it to the lungs.
- Identify the chamber that receives oxygenated blood and name the blood vessel that brings it.
- Why do muscular walls of chambers A and B are thicker than the chambers E and F ?

**Alternative Question for Visually Impaired Students in lieu of Q. 16(B)**

**Q16. B.** Give reasons for the following statements :

- Arteries have thicker walls than veins.
- Rate of breathing in aquatic organisms is faster than in terrestrial animals.
- It is important to prevent intermixing of oxygenated and deoxygenated blood in birds.
- Respiratory pigment in blood takes up oxygen and not carbon dioxide.
- Alveoli are designed to maximise the exchange of gases.

**SECTION-B**

**Q17.** The yellow colour of turmeric changes to red on addition of soap solution. When substance P is added to turmeric, there is no change in colour. (1)

Which of the following is definitely true about substance P ?

|                      |                               |
|----------------------|-------------------------------|
| (A) P is an acid.    | (B) P is not a salt.          |
| (C) P is not a base. | (D) P is a neutral substance. |

**Q18.** How will you protect yourself from the heat generated while diluting a concentrated acid ? (1)

(A) By adding acid to water with constant stirring.  
 (B) By adding water to acid with constant stirring.  
 (C) By adding water to acid followed by base.  
 (D) By adding base to acid with constant stirring.

**Q19.** In the reaction of Iron with copper sulphate solution : (1)

$$\text{CuSO}_4 + \text{Fe} \rightarrow \text{Cu} + \text{FeSO}_4$$

Which option in the given table correctly represents the substance oxidized and reducing agent.

| Options | Substance oxidized | Reducing agent  |
|---------|--------------------|-----------------|
| A       | Fe                 | Fe              |
| B       | Fe                 | $\text{CuSO}_4$ |
| C       | Cu                 | Fe              |
| D       | $\text{CuSO}_4$    | Fe              |

**Q20.** An element with atomic number..... will form a basic oxide. (1)

(A) 7 (2, 5) (B) 17 (2,8,7)  
 (C) 14 (2,8,4) (D) 11 (2,8,1)

**Q21.** A cable manufacturing unit tested few elements on the basis of their physical properties : (1)

| Properties              | W    | X   | Y   | Z    |
|-------------------------|------|-----|-----|------|
| Malleable               | Yes  | No  | No  | No   |
| Ductile                 | Yes  | No  | No  | Yes  |
| Electrical Conductivity | Yes  | Yes | Yes | No   |
| Melting Point           | High | Low | Low | High |

Which of the above elements were discarded for usage by the company ?

(A) W, X, Y (B) X, Y, Z  
 (C) W, X, Z (D) W, Y, Z

**Q22.** Generally, metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg) ? (1).

(A)  $\text{H}_2\text{SO}_4$

(B)  $\text{HCl}$

(C)  $\text{HNO}_3$

(D) All of these

**Q23.** Select the appropriate state symbols of the products given as X and Y in the following chemical equation by choosing the correct option from the table given below : (1)



| Options | (x)  | (y)  |
|---------|------|------|
| (A)     | (s)  | (l)  |
| (B)     | (aq) | (g)  |
| (C)     | (aq) | (s)  |
| (D)     | (g)  | (aq) |

**The following question consists of two statements—Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below :**

- A. Both A and R are true, and R is the correct explanation of A.
- B. Both A and R are true, but R is not the correct explanation of A.
- C. A is true but R is false.
- D. A is false but R is true.

**Q24. Assertion (A) :** Silver Bromide decomposition is used in black and white photography. (1)

**Reason (R) :** Light provides energy for this exothermic reaction.

**Q25.** When hydrogen gas is passed over heated copper (II) oxide, copper and steam are formed. Write the balanced chemical equation with physical states for this reaction. Identify the substance that is oxidized and substance that is reduced in the above reaction. (2)

**Q26. Attempt either option A or B :**

(3)

A. (a) For the preparation of cakes, baking powder is used. If at home your mother uses baking soda instead of baking powder, how will it affect the taste of the cake and why ?

(b) How baking soda be converted into baking powder ?

(c) What makes the cake soft and spongy ?

**OR**

B. During electrolysis of brine, a gas G is liberated at anode. When this gas G is passed through slaked lime, a compound 'C' is formed, which is used for disinfecting drinking water.

(a) Write chemical formula of 'G' and 'C'.

(b) Write the chemical equations involved.

(c) What is the common name of compound 'C' ?

**Q27.** With the help of an appropriate example, justify that some of the chemical reactions are determined by : (3)

(a) Change in temperature

(b) Evolution of a gas

(c) Change in color

Give chemical equation for the reaction involved in each case.

**Q28.** Read the passage given below and answer the following questions : (4)

A student was stung by an ant while playing outdoors. The affected area became red and inflamed, and the student experienced a burning sensation. Upon learning about this, another student suggested rubbing some baking soda on the affected area.

(a) Which chemical is injected into the skin during an ant's sting that causes burning pain. Why does it cause a burning sensation ?

(b) Explain why the other student suggested using baking soda.

**OR**

Can baking powder be used instead of baking soda ? Justify your answer.

(c) Write the chemical formula and chemical name of baking soda. Identify the acid and base from which this salt is formed.

**Q29. Attempt either option A or B :**

A. (a) By the transfer of electrons, illustrate the formation of bond in magnesium chloride and identify the ions present in this compound.  
(b) Ionic compounds are solids. Give reasons.  
(c) With the help of a labelled diagram show the experimental set up of action of steam on a metal.

**Alternative Question for Visually impaired Students in lieu of Q.29 (A)**

A. (a) An element 'M' with electronic configuration 2,8,3 combines separately with  $\text{Cl}^-$ ,  $\text{SO}_4^{2-}$ , anions. Write the chemical formulae of the compounds formed. Predict, with the suitable reason, the nature of the bond formed by element 'M' in general.  
(b) Why do ionic compounds not conduct electricity in solid state but conduct electricity in molten and aqueous state ?

**OR**

B. State the reason for the following :  
(a) Aluminium oxide is called amphoteric oxide.  
(b) An iron strip dipped in a blue copper sulphate solution turns the blue solution to pale green solution.  
(c) Ionic compounds have high melting and boiling points.  
(d) Calcium starts floating when added to water.  
(e) Sodium and Potassium metals are kept immersed under kerosene.

**SECTION-C**

**Q30.** The resistance of a resistor is reduced to half of its initial value. In doing so, if other parameters of the circuit remain unchanged, the amount of heat produced in the resistor will become : (1)

(A) four times (B) two times  
(C) half (D) one fourth

**Q31.** A cylindrical conductor of length L and uniform area of cross-section A has resistance R. Another conductor of length 2 L and resistance R of the same material has an area of cross-section (1)

(A)  $A/2$  (B)  $3A/2$   
(C)  $2A$  (D)  $3A$

**The following question consists of two statements—Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below :**

- A. Both A and R are true, and R is the correct explanation of A.
- B. Both A and R are true, but R is not the correct explanation of A.
- C. A is true but R is false.
- D. A is false but R is true.

**Q32. Assertion (A) :** Tungsten is used almost exclusively for filament of electric lamps. (1)  
**Reason (R) :** Tungsten is a strong alloy with high resistivity and high melting point.

**Q33.** Why is it impractical to connect an electric bulb and an electric heater in series ? State two reasons. (2)

**Q34. Attempt either option A or B :**

(A) Three resistors each of value  $2\ \Omega$ ,  $4\ \Omega$  and  $6\ \Omega$ , are connected across a 4 V battery. Calculate (2)  
(i) the current through  $4\ \Omega$  resistor,  
(ii) the potential difference across  $6\ \Omega$  resistor.

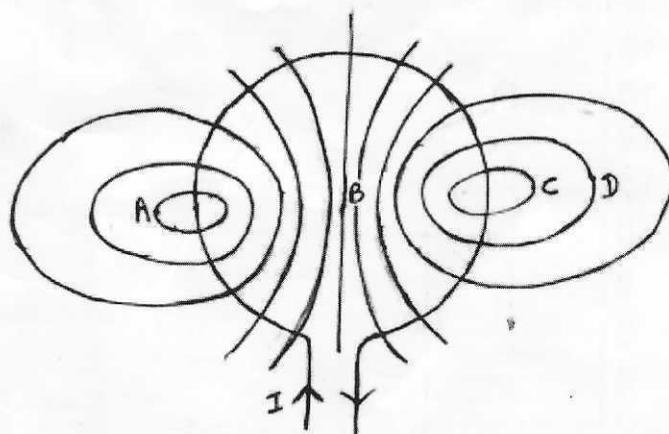
**OR**

(B) Several electric bulbs designed to be used on a 220 V electric supply line, are rated 100 W. How many bulbs can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 10 A ?

**Q35.** An electric motor rated 1100 W is connected to 220 V mains. Find : (3)  
(a) the current drawn from the mains.  
(b) electrical energy consumed if the motor is used for 5 hours daily for 6 days.  
(c) total cost of energy consumed if the rate of 1 unit is ₹ 5.

**Q36.** (a) A horizontal wire placed perpendicular to a magnetic field carries a current from left to right. The magnetic field is horizontal, directed towards you. What is the direction of magnetic force on the wire ?  
(b) Name and state the rule used to determine the direction of force in part (a).  
(c) When is the force experienced by a current carrying conductor placed in a magnetic field the largest ? (3)

**Q37.** A current carrying coil is placed in the plane of the paper. The magnetic field pattern due to the coil is shown in the diagram below : (3)



- (a) Identify the direction of magnetic field at point (i) A, (ii) B.
- (b) A compass needle is first placed at point C and then at point D. Will its deflection increase or decrease ? Give reason.
- (c) State the rule used to find the direction of magnetic field line passing through A.

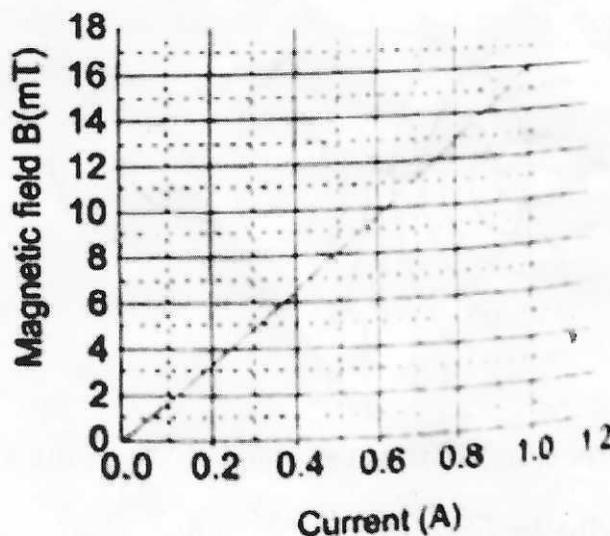
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**Alternative Question for Visually Impaired Students in lieu of Q. 37**

- (a) Differentiate between short-circuiting and overloading.
- (b) What is the function of an earth wire ? Why is it necessary to earth the metallic appliances ?

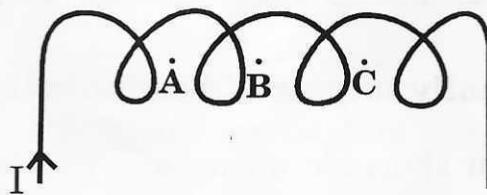
**Q38.** A straight current carrying conductor produces a magnetic field around it in the form of concentric circles. If the wire is wound on a cylindrical cardboard tube such that its length is greater than its diameter, it becomes a solenoid. On passing current through a solenoid, magnetic field is produced which is the superposition of the fields due to current through each coil. The magnetic field produced by a current carrying solenoid is similar to the magnetic field of a bar magnet. The field is uniform inside the solenoid. The strength of magnetic field depends on a few factors such as the current in the coil, number of turns per unit length, etc.

Saksham performs an experiment in the lab to see the variation of the magnetic field with respect to the current in the solenoid.



The unit of magnetic field as given in the graph is milli-tesla (mT) and the current is in Ampere (A). (4)

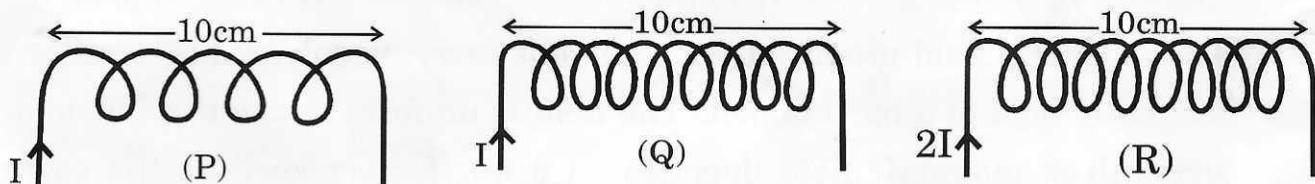
(A) Compare the strength of magnetic field at points A, B and C in the diagram given below. Give reason for your answer.



(B) Draw a well labelled diagram of the pattern of magnetic field lines through and around a current-carrying solenoid.

**Attempt either subpart C or D :**

(C) Three solenoids P, Q and R are shown below. The magnetic field strengths inside the three are  $B_P$ ,  $B_Q$  and  $B_R$  respectively. Arrange these magnetic fields in the decreasing order of their strength. Give a reason for your answer.



**OR**

(D) What amount of magnetic field does Saksham observe corresponding to  $0.8\text{ A}$  current ? To get a lower value of magnetic field for the same value of current and the same length of the solenoid, should he increase or decrease the number of turns ? Why ?

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**Alternative Question for Visually impaired Students in lieu of Q. 38**

A solenoid is a cylindrical shaped coil of wire whose one end acts as a magnetic north pole and the other end acts a magnetic south pole similar to that of a bar magnet and the magnetic field is uniform inside it. An electromagnet can be made when a piece of magnetic material is placed inside the solenoid.

(A) What happens to the magnetic field of a solenoid if a soft iron core is placed inside it ?

(B) Give two uses of electromagnets.

**Attempt either subpart C or D :**

(C) Compare and contrast the properties of a bar magnet and an electromagnet.

**OR**

(D) How does the magnetic field of a solenoid carrying current similar to that of a bar magnet ? Explain.

**Q39. Attempt either option A or B :**

(5)

(A) (a) You are given 'n' resistors, each of resistance 'R'. Calculate the ratio of maximum to minimum equivalent resistance that can be obtained using these.

(b) Explain the statement "Potential difference between two points is 1 volt."

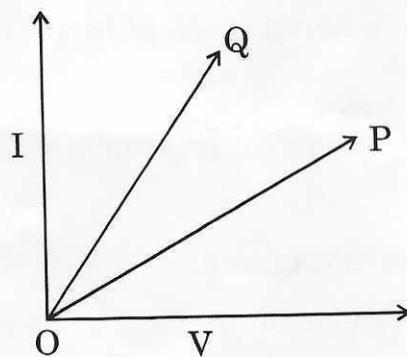
(c) Why does the cord of an electric heater not glow while the heating element does ?

**OR**

(B) (a) The potential difference across the two ends of a circuit component is decreased to one-third of its initial value, while its resistance remains constant. What change will be observed in the current flowing through it ? Name and state the law which helps to answer this question.

(b) Why should an ammeter have low resistance ?

(c) Two V-I graphs (P & Q) for series and parallel combinations of two resistors are as shown. Giving reasons, state which graph shows  
(i) series, (ii) parallel combination of resistors.



**Alternative Question for Visually impaired Students in lieu of Q. 39 (B) subpart (c)**

(c) Out of two electric bulbs of 50 W-220 V and 100 W-220 V, which one will glow brighter when they are connected in series ?

□□□