

# O P JINDAL SCHOOL, SAVITRINAGAR

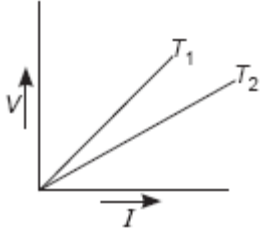
## PRACTICE PAPER

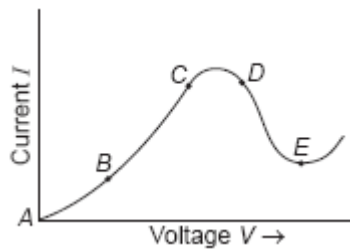
CLASS XII PHYSICS

TOPIC : CURRENT ELECTRICITY

Date : 22/04/20

MM :50

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- 1 Plot a graph showing the variation of resistance of a conducting wire as a function of its radius, keeping the length of the wire and its temperature as constant. 1
- 2  $V-I$  graph for a metallic wire at two different temperatures  $T_1$  and  $T_2$  is as shown in the figure. Which of the two temperatures is higher and why? 1
- 
- 3 The emf of a cell is always greater than its terminal voltage. Why? Give reason. 1
- 4 You are given three constantan wires  $P$ ,  $Q$  and  $R$  of length and area of cross-section  $(L, A)$ ,  $(2L, \frac{A}{2})$ ,  $(\frac{L}{2}, 2A)$  respectively. Which has highest resistance? 1
- 5 Two wires of equal length, one of copper and the other of manganin have the same resistance. Which wire is thicker? 1
- 6 State the condition for maximum current to be drawn from a cell. 1
- 7 Graph showing the variation of current versus voltage for a material GaAs is shown in the figure. Identify the region of  
(i) negative resistance,  
(ii) where Ohm's law is obeyed. 1

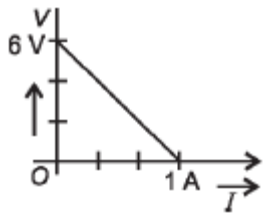


8 Define the term 'electrical conductivity' of a metallic wire. Write its SI unit. 1

9 When electrons drift in a metal from lower to higher potential, does it mean that all the free electrons of the metal are moving in the same direction? 1

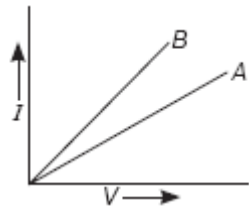
10 Show variation of resistivity of copper as a function of temperature in a graph. 1

11 The plot of the variation of potential difference across a combination of three identical cells in series, versus current is as shown here. What is the emf of each cell?



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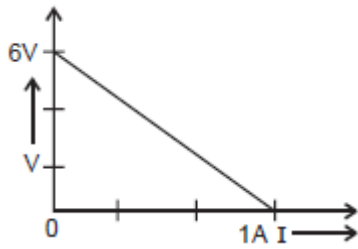
12 Out of  $V - I$  graph for parallel and series combination of two metallic resistors, which one represents parallel combination of resistors? Justify your answer.



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13 The plot of the variation of potential difference across a combination of three identical cells in series, versus current is shown below. What is the emf and internal resistance of each cell?

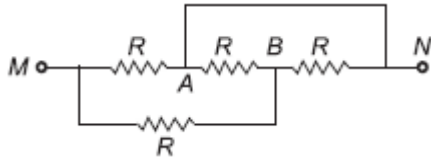
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14 Plot a graph showing temperature dependence of resistivity for a typical semiconductor. How is this behaviour explained? 1

15 Nichrome and copper wires of same length and area of cross section are connected in series, current is passed through them why does the nichrome wire get heated first? 2

16 Calculate the resistance across the points  $M$  and  $N$  in the given figure.



2

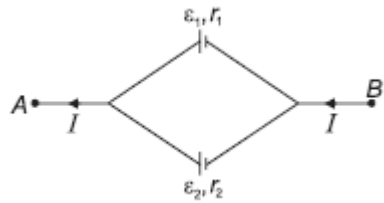
17 A uniform wire of resistance  $R$  ohm is bent into a circular loop as shown in the figure. Compute effective resistance between diametrically opposite points  $A$  and  $B$ .



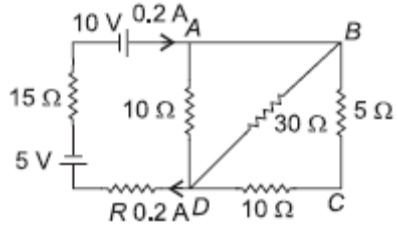
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18 Name two factors on which the resistivity of a given material depends. A carbon resistor has a value of  $62 \text{ k}\Omega$  with a tolerance of 5%. Give the colour code for the resistor. 2

19 Two cells of emfs  $\epsilon_1$ ,  $\epsilon_2$  and internal resistances  $r_1$  and  $r_2$  respectively are connected in parallel as shown in the figure. Deduce the expression for  
 (i) the equivalent emf of the combination,  
 (ii) the equivalent resistance of the combination, and  
 (iii) the potential difference between the points  $A$  and  $B$ . 3

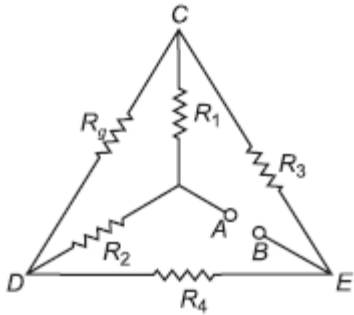


- 20 Calculate the value of the resistance  $R$  in the circuit shown in the figure so that the current in the circuit is  $0.2\text{ A}$ . What would be the potential difference between points  $A$  and  $D$ ?



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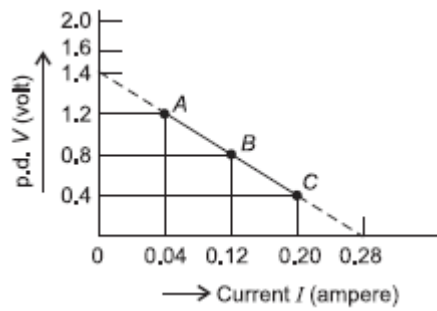
- 21 (i) Calculate the equivalent resistance of the given electrical network between points  $A$  and  $B$ .  
(ii) Also calculate the current through  $CD$  and  $ACB$ , if a  $10\text{ V}$  dc source is connected between  $A$  and  $B$ , and the value of  $R$  is assumed as  $2\ \Omega$ .



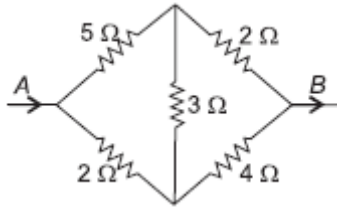
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- 22 A straight line plot showing the terminal potential difference ( $V$ ) of a cell as a function of current ( $I$ ) drawn from it is shown in the figure. Using this plot, determine (i) the emf, and (ii) internal resistance of the cell.

4

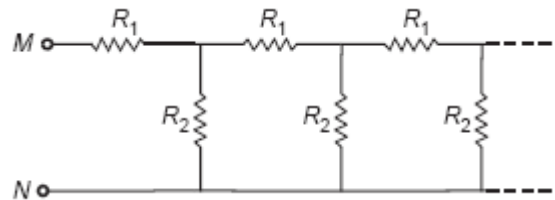


23 In the arrangement of conductors, find the equivalent resistance between *A* and *B*.



4

24 The figure shows an infinite circuit which is formed by the repetition of same chain consisting  $R_1$  and  $R_2$ . If  $R_1 = 4\Omega$  and  $R_2 = 3\Omega$ , then calculate the resistance between the points *M* and *N*.



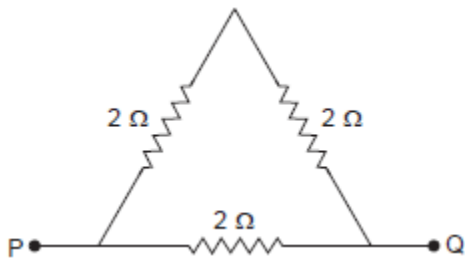
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25 A Daniel cell is balanced on 125 cm length of a potentiometer wire. Now the cell is short-circuited by a resistance 2 ohm and the balance is obtained at 100 cm. The internal resistance of the Daniel cell is

- (a) 0.5 ohm (b) 1.5 ohm
- (c) 1.25 ohm (d) 4/5 ohm

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26 Three resistors each of 2 ohm are connected together in a triangular shape. The resistance between any two vertices will be

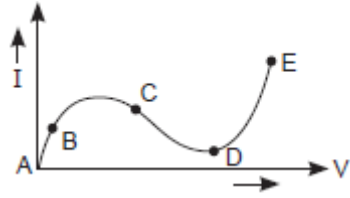


- (a) 4/3 ohm (b) 3/4 ohm

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(c) 3 ohm (d) 6 ohm

27 From the graph between current  $I$  and voltage  $V$  shown below, identify the portion corresponding to negative resistance

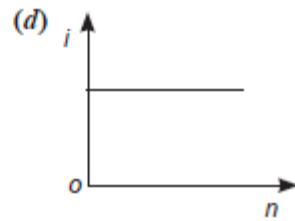
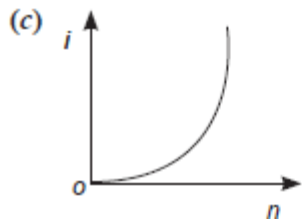
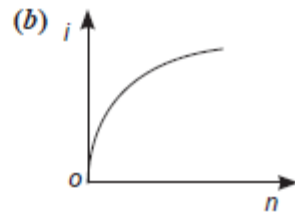
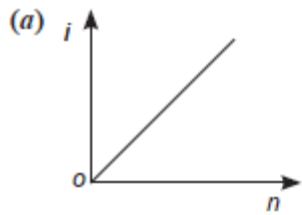


(a) AB (b) BC

(c) CD (d) DE

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28 A battery consists of a variable number 'n' of identical cells having internal resistances connected in series. The terminals of battery are short circuited and the current  $i$  is measured. Which of the graph below shows the relationship between  $i$  and  $n$ ?



1

29 A cell of e.m.f. 1.5V having a finite internal resistance is connected to a load resistance of  $2\Omega$ . For maximum power transfer the internal resistance of the cell should be \_\_\_\_\_.

1