



# PHYSICS

## BOOKS - MBD -HARYANA BOARD

### CURRENT ELECTRICITY

#### Very Short Answer Type Questions

1. Explain with a neat circuit diagram how will you determine unknown resistance 'X' by using meter bridge.



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2. How many electrons pass in one second when current is 1 A?



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3. Explain the Kirchhoff's Junction rule.

OR.

What is Kirchhoff's junction rule?



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4. On what factors does the resistivity of a material depend ?



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5. What is specific resistance and resistivity of a wire? Is it more for thick or thin wire?



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6. Define conductance and conductivity.

Or.

Define electrical conductivity of a conductor and give its S.I. unit.



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7. When drift velocity is so small, how is it that an electric bulb lights up as soon as we turn the switch on?



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8. Explain the Ohm's law.



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9. What happens to the drift velocity ( $v_d$ ) of electrons and to the resistance (R), if the length of a conductor is doubled (keeping potential difference unchanged)?



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**10.** Draw the circuit diagram for wheatstone bridge to determine unknown resistance.

Write condition for balancing of the bridge.



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**11.** Distinguish between resistance and specific resistance.



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**12.** Establish a relation between E.M.F. and potential difference of a cell.



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**13.** Draw the circuit diagram to determine unknown resistance using meter bridge. Write the equation used for determining the unknown resistance.



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14. A wire is drawn into double its length and half its original cross-section. What will be change in its resistance and specific resistance?

Or.

A wire of resistivity  $\rho$  is stretched to twice its length. What will be its new resistivity ?



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15. Internal resistance of a cell depends on



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**16.** A wire of resistance  $1\Omega$  is stretched to double its length. What is the new resistance ?



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**17.** Name two conditions when ohm's law fails?

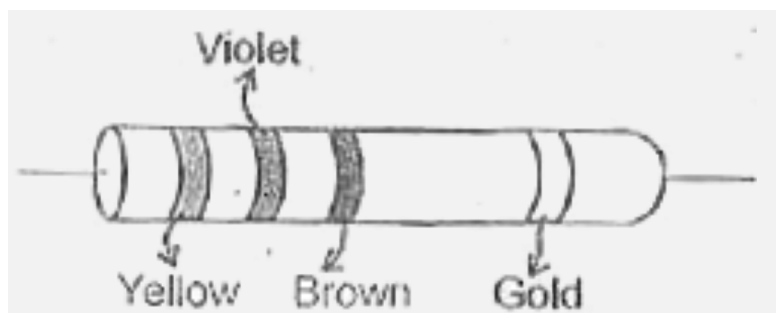


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**18.** Define resistance of a conductor. What is its cause? Explain the factors on which the resistance of a conductor depends.

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**19.** A carbon resistor has coloured strips as shown in figure. What is its resistance ?



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20. Compare ohmic and non-ohmic conductors.



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21. A wire of resistance  $2\Omega$  is stretched so that its radius is halved. Determine its new resistance.



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22. State the working principle of potentiometer. With the help of the circuit diagram, explain how a potentiometer is used to compare the emf's of two primary cells. Obtain the required expression used for comparing the emfs. Write two possible causes for one sided deflection in a potentiometer experiment.



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**23.** Point out the right statements about the validity of, Kirchhoff's junction rule



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**24.** The SI units of resistivity is



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**25.** The SI unit of electric current is



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26. What is Kirchhoff's loop rule.



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27. What is Kirchhoff's loop rule.



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28. How much current flows through a  $2k\Omega$  resistor when a potential difference of 4V is

applied across its ends?



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## Short Answer Type Questions

1. Deduce Ohm's law using the concept of drift velocity.



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2. Using Ohm's law, calculate the resistance of combination of few resistances joined in series.



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3. A conductor of length  $l$  is connected to a d.c., source of potential  $V$ . If the length of the conductor is tripled by stretching it, keeping  $V$  constant, explain how the following factors vary in the conductor?



(i) Drift speed of electrons

(ii) Resistance

(iii) Resistivity.



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4. Drive expression for the total resistance of a circuit in which a few resistors are connected in parallel.



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5. What do you mean by internal resistance, e.m.f. (electromotive force) and terminal potential difference of a cell? Derive a relation between the three. How will you determine it?



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6. Explain how the cells are grouped in series, Obtain the condition for maximum current through an external resistor.



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7. Explain how the cells are grouped in parallel.

Obtain the condition for maximum current through an external resistor.

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8. Define resistivity of a material and discuss the factors on which it depends.

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9. Explain the combination of resistances in series and parallel.



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## Long Answer Type Questions

1. What is Kirchhoff's loop rule.



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2. What is potentiometer ? What is its principle ? How will you find the internal resistance of a cell by a potentiometer?



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3. Explain the use of potentiometer for comparison of e.m.f. of two cells.



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4. (a) Derive a relation between electric current and drift velocity of charge carriers.

9b) Deduce the expression for resistivity.

(c) What is the effect of temperature on resistivity?



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5. Explain the use of a metre bridge for finding unknown resistance.



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6. Write a note on grouping of cells.



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## Objective Type Questions

1. One kilowatt hour is equal to

A.  $36 \times 10^5 J$

B.  $36 \times 10^3 J$

C.  $36 \times 10^{-5} J$

$$D. 36 \times 10^{-3} J$$

**Answer: A**



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2. The area of cross-section of a metal wire is doubled, keeping its length same, then its resistance is:

A. No change

B. doubled



C. four times

D. halved

**Answer: D**



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3. With increase in temperature, the conductivity of a conductor

A. remains same

B. decreases

C. increases

D. may increase or decrease

**Answer: B**



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4. The potential difference applied to an X-ray tube is 5 kV and the current through it is 3.2 mA. Then the number of electrons striking the target per second is

A.  $2 \times 10^{16}$

B.  $5 \times 10^6$

C.  $1 \times 10^{17}$

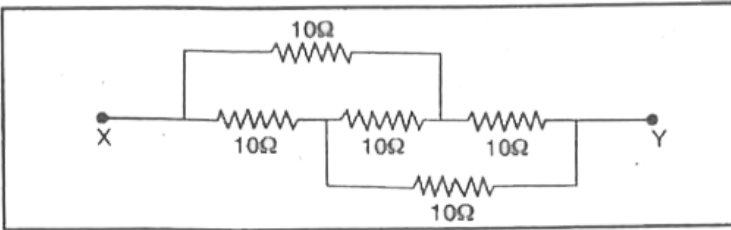
D.  $4 \times 10^{15}$

**Answer: A**



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5. The equivalent resistance between the points X and Y of the following circuit is



A.  $10\Omega$

B.  $30\Omega$

C.  $20\Omega$

D.  $50\Omega$

**Answer: A**



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6. Calculate the amount of charge flowing in 2 minutes in a wire of resistance  $10\Omega$  when a potential difference of 20 V is applied between its ends

A. 120C

B. 240C

C. 20C

D. 4C

**Answer: B**



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7. When length of a metal wire is doubled and area of cross-section is reduced to half then the resistance will be

- A. Double
- B. Four times
- C. No change
- D. Half

**Answer: B**





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8. For series combination total resistance  $R$  will be:

A.  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$

B.  $R = R_1 R_2 R_3 \dots$

C.  $R = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$

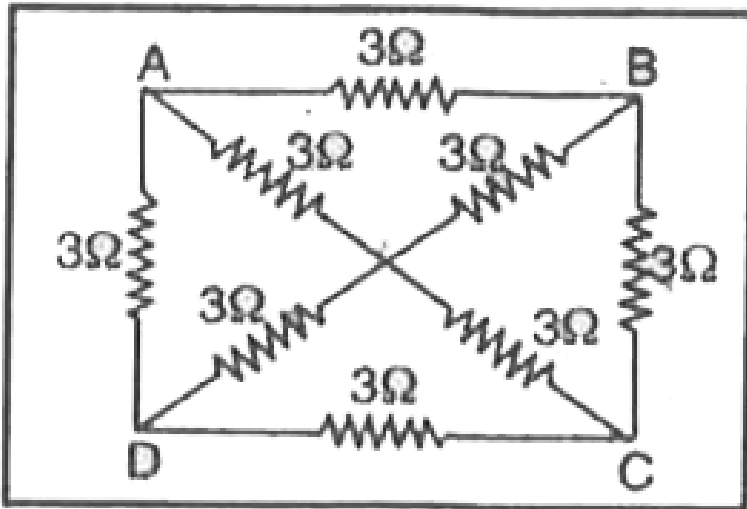
D.  $R = R_1 + R_2 + R_3 + \dots$

**Answer: D**



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9. The resistance between points A and C in the given figure is:



A.  $3\Omega$

B.  $4\Omega$

C.  $2\Omega$



D.  $8\Omega$

**Answer: C**



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**10.** With increase in temperature, the resistivity of a conductor

A. Does not change

B. May increase or decrease

C. Decreases

D. Increases

**Answer: C**



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**11.** When length of a metal wire is doubled and area of cross-section is reduced to half, then its resistance becomes

A. half

B. double

C. four times

D. No changes

**Answer: C**



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**12. The S.I. unit of resistivity is**

A.  $\Omega$

B.  $\Omega - m$

C.  $m$

D. A

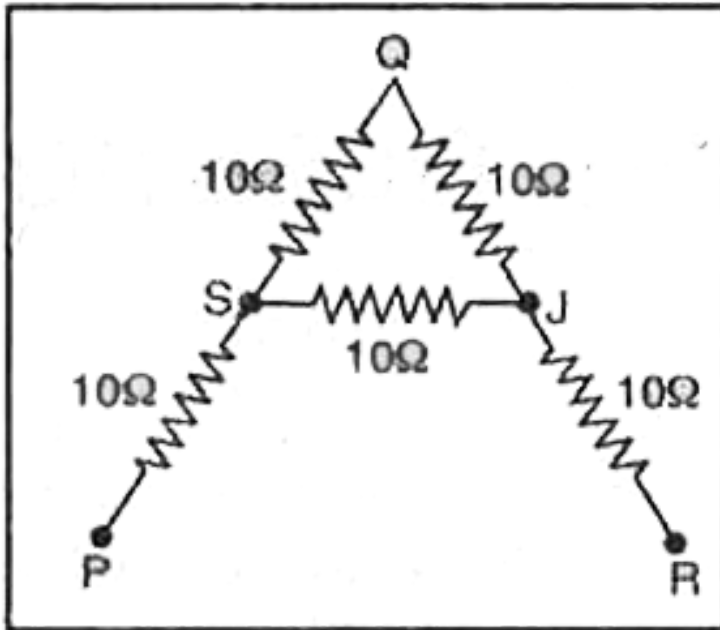
**Answer: B**



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**13.** The effective resistance (in  $\Omega$ ) between P and R of letter A containing resistances as

shown in the figure is:



A.  $\frac{160}{9}$

B.  $\frac{80}{3}$

C. 40

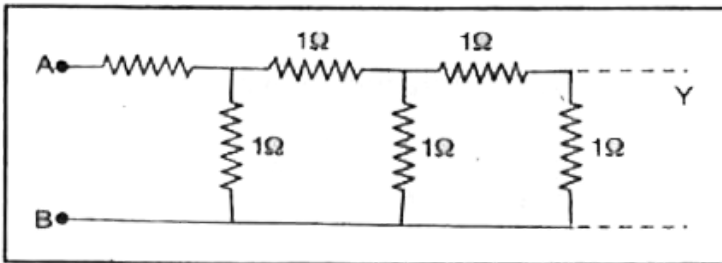
D. 60

**Answer: B**



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14. What is equivalent resistance between the points A and B of an infinite network of resistance will be



A. infinite

B. zero

C.  $2\Omega$

D.  $\frac{1 + \sqrt{5}}{2}\Omega$

**Answer: D**



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**15.** With the increase of temperature, the resistivity of a semiconductor

A. Decrease

B. Increase

C. My increase or decrease

D. Does not change

**Answer: A**



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**16.** How does the resistance of a metallic wire depend on its temperature ?

A. length



B. temperature

C. cross-section area

D. volume

**Answer: B**



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**17.** Kirchhoff's first rule is based on .....

A. Law of conservation of energy

B. Law of conservation of momentum

C. Law of conservation of electric charge

D. Principle of quantisation of charge

**Answer: C**



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**18. UNIT OF ELECTRIC CURRENT**



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**19. The S.I. unit of resistance is \_\_\_\_**



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20. How much current is flowing through a  $1k\Omega$  resistor when a potential difference of 2 V is applied across its end ?

A.  $2\mu A$

B. 2mA

C. 2A

D. 1A

**Answer: B**



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