Unit 2. Current Electricity (20 marks)	
1 mark → 1 Question	5 mark → 2 Question 52,53
3 mark → 3 Question 33, 34,35	No 10 mark Question

UNIT – 2. Curren Electricity – 1 mark questions

1. The relation between current and drift velocity is -----[O-10]
   a) I = nAV$_d$/e **b) I = nAV$_d$e**
   c) I = neV$_d$/A d) I = nAV$_d$E

2. In case of insulators, as the temperature decreases, resistivity
   a) increases   b) decreases   [DPM, M-08, 09, J-13]
   c) becomes zero   d) remains constant

3. The unit of conductivity is ------   [J-07]
   a) mho   b) ohm
   c) ohm-m   **d) mho-m^{-1}**

4. The transition temperature of mercury is ----   [J-09]
   a) 4.2 ^{0}C   b) **4.2 K**
   c) 2.4^{0}C   d) 2.4 K

UNIT – 2. Curren Electricity – 1 mark problems

1. If the length of copper wire has certain resistance R, then on doubling the length its specific resistance ------
   a) will be doubled   b) will be ¼th   c) will be four times
   d) will remain the same   [DMP,S-09,M-10,M-11,O-11]

2. When the diameter of a conductor is doubled, its resistance -
   a) decreases twice   **b) decreases four**
   c) decreases sixteen times   d) increases four times   [M-12]

3. The electrical resistivity of a thin copper wire and a thick copper rod are respectively ρ_1 Ωm and ρ_2 Ωm. Then : [M-13]
   a) $\rho_1 < \rho_2$ b) $\rho_1 > \rho_2$ **c) $\rho_1 = \rho_2$**   d) $\frac{\rho_1}{\rho_2} = \infty$

4. Resistance of a metal wire of length 10 cm is 2 Ω. If the wire stretched uniformly to 50 cm, the resistance is ---- [M-06]
   a) 25 Ω   b) 10 Ω   c) 5 Ω   **d) 50 Ω**

5. When two 2 Ω resistances are connected in parallel their effective resistance is ------ [J-11]
   a) 2 Ω   b) 4 Ω
   c) 1 Ω   d) 0.5 Ω

6. The color code of carbon resistor is red-red-black. The resistance of the resistor is – [J-06]
   a) 2.2 Ω   **b) 22 Ω**   c) 220 Ω   d) 2.2 k Ω

7. The brown ring at one end of a carbon resistor indicates a tolerance of   [M-07]
   a) 1%   b) 2%   c) 5%   d) 10%

8. The resistance of the filament of a 110 w, 220 V electric bulb is
   a) 440 Ω   b) 220 Ω   [M-09]   c) 484 Ω   d) 848 Ω

9. A toaster operating at 240 V has a resistance of 120 Ω. The power is
   a) 400 W   b) 2W
   c) 480 W   d) 240 W   [J-10]

10. A cell of emf 2.2 V sends a current of 0.2 A through a resistance of 10 Ω. The internal resistance of the cell is
    a) 0.1 Ω   **b) 1 Ω**
    c) 2 Ω   d) 1.33 Ω   [J-12]

11. When n resistors of equal resistance (R) are connected in series the effective resistance is ---- [S-12]
    a) n/R   b) R/n
    c) 1/nR   **d) nR**

## UNIT – 2. Current Electricity – 3 mark Questions

1. Define drift velocity. Write its unit.
   [M-07,10,11, S-08,10,11, J-09,13]
2. Define mobility. Write its unit.   [M-08,O-06,M-09]
3. Define resistivity of a material   [S-12]
4. What are the changes observed at transition temperature when the conductor becomes superconductor?   [J-10]
5. What is called superconductivity?   [DPM]
6. State ohms law.   [M-06,S-07,09,M-10,J-12,S-12,M-13]
7. Write any three applications of superconductors. [J-13]
8. Define transition temperature.   [M-12]
9. Define temperature coefficient of resistance.   [J-08,M-11]
10. State Kirchhoff's 1) current law and 2) voltage law   [M-08]
11. State Kirchhoff's voltage law   [M-07,M-09,J-11,M-12]
12. Distinguish between emf and potential difference.
    [J-07,S-08,J-11,12,M-13]
13. Distinguish between electric power and electric energy.
    [J-08,J-09]
14. State faraday's laws of electrolysis.   [M-06,J-10,13, O-10]
15. State faraday's first law of electrolysis.   [J-13]
16. What are the applications of secondary cells?
    [S-08,11,M-12]
17. What are the advantages of secondary cells?   [DPM]

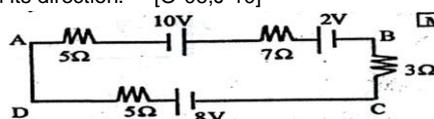## UNIT – 2. Current Electricity – 3 mark Problems

1. If 6.25 x 10^{18} electrons flow through a given cross-section of a conductor in unit time, find the current.
   (given charge of electron is 1.6 x 10^{-19}) [M-10,J-11]

2. A manganin wire of length 2 m has a diameter of 0.4 mm with a resistance of 70 Ω. Find the resistivity of the material. [J-06,M-13]

3. The resistance of nichrome wire at 0^{0}C is 10Ω. If the temperature coefficient of resistance is 0.004/^{0}C, find its resistance at boiling point of water. [DPM,J-07,S-07,M-08,O-10,11,S-12]

4. The resistance of nichrome wire at 0^{0}C is 4Ω. What will be the resistance of the wire at 100 ^{o}C if the temperature coefficient of resistance of platinum is 0.0038/ ^{0}C?   [M-07,J-09,J-10]

5. Two wires of same material and length have resistances 5 Ω and 10 Ω respectively. Find the ratio of radii of the two wires.   [M-09]

6. An iron box of 400 w power is used daily for 30 minutes. If the cost per unit is 75 paise, find the weekly expense on using the iron box.   [J-08,12]

7. Three resistors are connected in series with 10 V supply as shown in the fig. Find the voltage drop across each resistor. [M-06,J-10]
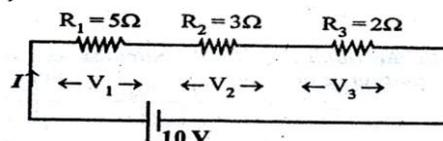

8. In the given circuit, what are the total resistance and current supplied by the battery? [S-09]
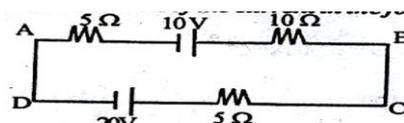

9. In the following circuit, calculate the current through the circuit. Mention its direction.   [O-06,J-10]

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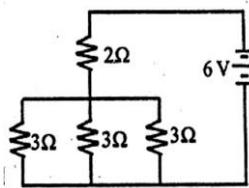
11. From the following network find the effective resistance between A an B [J-12]
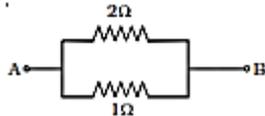

    $R_1 = R_2 = 15 \Omega$.

UNIT – 2. Current Electricity – 5 mark Questions

1. Define mobility. Establish the relation between drift velocity and current. [M-06]
2. Write any five applications of superconductors.
                [S-08,12M-09,13,J-11]
3. Discuss the variation of resistance with temperature with an expression and a graph. [J-12]
4. When two or more resistors connected in parallel. Derive an expression for effective resistance in the combination [O-06]
5. Explain the determination of internal resistance of a cell using a voltmeter.,   [S-09,J-11,13,M-13]
6. State and explain Kirchoff's second law for electrical network.
7. Obtain condition for bridge balance in Wheatstone's bridge.
                [DPM,M-06,J-06,O-06,M-08,J-09,M-10]
8. Explain the principle of potentiometer.   [S-07]
9. Explain the method of compare the emfs of two cells using potentiometer.   [DPM,M-07,O-10,11,M-12]
10. State and verify Faraday's first law of electrolysis.   [S-09]
11. State and verify Faraday's second law of electrolysis.
                [J-06,M-08,M-11]
12. Explain the working of Daniel cell.   [S-08,J-9,10,M-11]
13. Explain the working of Leclanche cell with diagram.
                [J-07,J-09,S-12]
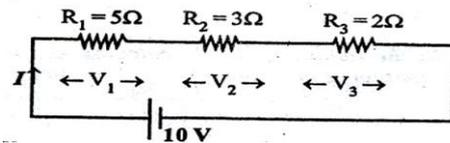14. Explain the working of Lead-acid accumulator. [S-07]

UNIT – 2. Current Electricity – 5 mark Problems

1. What is the drift velocity of an electron in a copper conductor having area 10×10^{-6} m^2 and carrying a current of 2A. Assume that there are 10×10^{28} electrons/m^3.   [J-10]

2. A copper wire 10^{-6} m^2 area of cross section, carries a current of 2 A. If the number of electrons per cubic metre is 8×10^{28}, calculate the current density and average drift velocity.   [M-09]

3. The resistance of a filed coil measures 50 Ω at 20 ^{0}C and 65 Ω at 70 ^{0}C. Find the temperature coefficient of resistance.   [J-13]

4. An iron box of 400 w power is used daily for 30 minutes. If the cost per unit is 75 paise, find the weekly expense on using the iron box. [J-12]

5. Find the current flowing across three resistors 3Ω , 5Ω and 2Ω connected in parallel to a 15 V supply. Also find effective resistance and total current drawn from the supply. [O-10]

6. In a metre bridge, the balancing length for a 10 Ω resistance in left gap is 51.8 cm. Find the unknown resistance and specific resistance of a wire of length 108 cm and radius 0.2 mm. [O-10, J-12]

7. The effective resistances are 10Ω , 2.4Ω when they are connected in series and parallel respectively. What are the resistances of individual resistors?   [M-07,M-10,S-11]

8. In the given network, calculate the effective resistance between A and B .   [M-07,O-11]
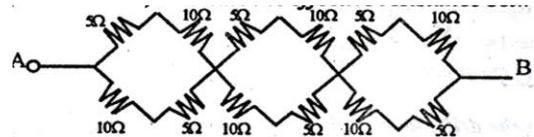
9. Three resistors are connected in series with a supply as shown in the fig. Find the voltage drop across each resistor. [O-06,J-10,12]

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