Physics

M. Marks: 20

1. An electric geyser has the ratings 2000W, 220 V marked on it. What should be the minimum rating, in whole number of a fuse wire, that may be required for safe use with this geyser? (1 marks)

2. Two metallic wires A and B are connected in parallel. Wire A has length l and radius r, wire B has a length 2l and radius 2r. Compute the ratio of the total resistance of parallel combination and the resistance of wire A. (1 marks)

3. Find the magnetic field intensity at the centre of coil of 50 turns, radius 0.5 m and carrying a current of 2A. (1 marks)

4. The electric power consumed by a device may be calculated by using either of the two expressions

   $P = I^2 R$ or $P = \dfrac{V^2}{R}$. The first expression indicates that it is directly proportional to R whereas the

   second expression indicates inverse proportionality. How can the seemingly different dependence of P on R in these expression be explained? (2 marks)

5. In the Bohr model of the hydrogen atom, the Single electron circulates around the nucleus in a path

   of radius 5.1×10^{-11} m with a time period of 0.14×10^{-15} s. What is the magnetic field set – up at the centre of orbit?
      (2 marks)

6. A current through a horizontal power line flows in east to west direction. What is the direction of magnetic field at a point directly below it and at a point directly above it? (2 marks)

7. A torch bulb is rated 5.0 V and 500 mA. Calculate its (i) power (ii) resistance and (iii) energy consumed when it is lighted for 4 hours. (2 marks)

8. A circular loop of larger radius will produce stronger magnetic field than a loop of smaller radius, if same current is flowing through both the loops. It is true or false? Explain. (2 marks)

9. Two resistors when connected in series give resultant value 9 Ω and when connected in parallel, the value becomes 2 Ω. Find the value of each resistor. (3 marks)

10. What is electric power? Derive expression for the same. Give its S.I. unit. (3 marks)

11. A household uses the following electric appliances: (3 marks)
    (i) Refrigerator of rating 400 W for ten hours each day.
    (ii) Two electric fans of rating 80 W each for twelve hours each day.
    (iii) Six electric tubes of rating 18 W each for 6 hours each day.
    Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.