

Gurukul fortuneer

Class 10th electricity test (9584098089)

Question 1 (2.0 marks)

a) Calculate the energy transferred when 2 A current flows through a $10\ \Omega$ resistor for 30 minutes.

b) Calculate the amount of charge that would flow in one hour through the element of an electric iron drawing a current of 0.4 amps.

Question 2 (2.0 marks)

Draw a circuit diagram showing a cell, a bulb and a closed switch.

Question 3(2.0 marks)

a) How much work is done in moving a charge of 3 coulomb from a point at the volts 115 to a point at 125 volts?

b) Ammeter burns out when connected in parallel. Give reasons.

Question 4 (2.0 marks)

Given n resistors each of resistors R_s . How will you combine them to get the (i) maximum and (ii) minimum effective resistance? What is the ratio of the maximum to minimum resistance?

Question 5 (3.0 marks)

a) A wire of length L and resistance R is stretched so that its length it's doubled. How will the (a) Resistance change (b) Resistivity change?

b) In an experiment the current flowing through a resistor and potential difference across it are measured. The values are given below. Show that these values confirm Ohm's Law

I (ampere) 1.0 1.0 2 1.5 2.0 2.0 2.5 2.5 3.0 3.0

V (volt) 4.0 4.0 6.0 6.0 8.0 8.0 10.0 10.0 12.0 12.0

Question 6 (3.0 marks)

a) A tube light draws 0.1 A current from a 220 V supply. What current will this tube light draw when it is connected to a 110 V supply?

a) An electric wire is stretched to increase its length by 25%.By what % will the resistance be increased and what will be increase in its resistivity?

Question 7 (3.0 marks)

a) Two resistances of $4\ \Omega$ and $8\ \Omega$ are connected in parallel. What would be the combined resistance of the system?

b) Two identical resistors each of resistance $2\ \Omega$ are connected in turn (1) in series (2) in parallel to a battery of $12\ \text{V}$. Calculate the ratio of power consumed in two cases.

Question 8 (3.0 marks)

a) A household uses the following electric appliances:

(i) Refrigerator of rating $400\ \text{W}$ for ten hours each day.

(ii) Two electric fans of rating $80\ \text{W}$ each for twelve hours each day.

(iii) Six electric tubes of rating $18\ \text{W}$ 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.

b) An electric iron of resistance $20\ \Omega$ takes a current of $5\ \text{A}$. Calculate the heat developed in $30\ \text{sec}$.

Question 9 (5.0 marks)

a) Derive the expression for Joules' $\frac{1}{2}$ law of heating.

b) Derive a formula for four equivalent resistances connected in series.

Question 10 (5.0 marks)

(a) The electric power consumed by a device may be calculated by using either of the two expressions $P = I^2R$ or $P = V^2/R$. 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 expressions be explained?

(b) (i) A $100\ \text{W}$ electric bulb is connected to $220\ \text{V}$ mains power supply. Calculate the strength of the electric current passing through the bulb. (ii) If the same bulb is taken to U.S.A where the main power supply is $110\ \text{V}$, how much electric current will pass through the bulb when connected to mains

