

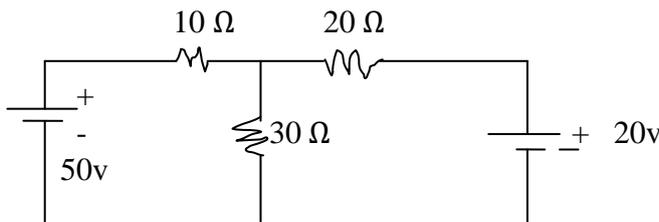
“Please check whether you have got the right question paper.”

- i) Question. No. 1 is compulsory.
- ii) Attempt any two questions from remaining questions
- iii) Assume suitable data if necessary
- iv) Figures to the right indicate full marks

Q.1 Solve any five questions 10

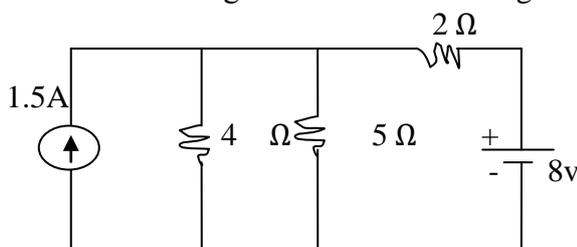
- 1) State the factors affecting the value of resistance. State the effect of temperature on resistance of 1) gold 2) Rubber
- 2) Define RTC. Prove, $\alpha_o = \frac{R_t - R_o}{R_o t}$
- 3) Define self inductance and mutual inductance
- 4) Write the equations for current and voltage during discharging. Draw the curves w.r.t. time
- 5) Define MMF, magnetic flux, Reluctance
- 6) Give four similarities between magnetic and electric circuits
- 7) State superposition theorem
- 8) Define time constant of charging circuit

Q.2 a) 05



Find current through 30Ω resistance using Thevenin's theorem.

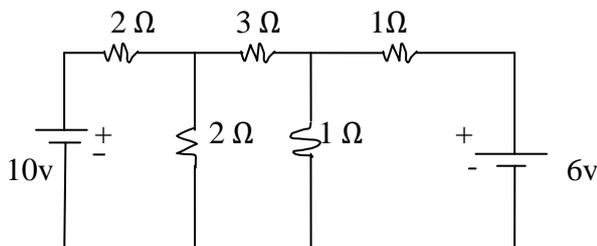
b) 05



Find current through 5Ω resistance using superposition theorem

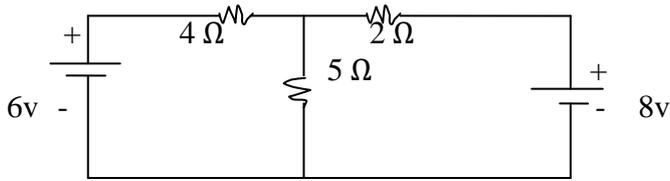
c) State and explain maximum power transfer theorem 05

Q.3 a) 05



Find current through 3Ω resistance using Loop analysis

b) 05



Find current through 5Ω using Nodal analysis

c) State and explain Thevenin's theorem 05

Q.4 a) Define R.T.C state, it's unit. if α_1 and α_2 are R.T.C. at $t_1^0 c$ and $t_2^0 c$ respectively then prove 05

$$\alpha_2 = \frac{\alpha_1}{1 + \alpha_1(t_2 - t_1)}$$

b) State and explain in brief the concept of self induction 05

c) With neat ckt diag and waveforms explain the charging process of capacitor. Derive the equations for charging voltage, current & charge 05

Q.5 a) Give the comparison of electric and magnetic circuit 05

b) Explain hysteresis and eddy current loss 05

c) A mild steel ring of 30cm mean circumference has a cross sectional area of 6cm^2 is wound by a 500 turns coil. The ring is cut with 1mm air gap. 4A current in the winding produces flux density of 1T in the air gap. Find relative permeability of mild steel neglect leakage 'fringing' 05