

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II B.TECH II SEM-REGULAR/SUPPLEMENTARY EXAMINATIONS MAY - 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(AERONAUTICAL ENGINEERING)

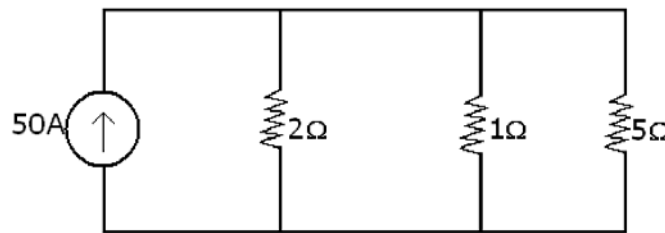
Time: 3hours

Max.Marks:80

Answer any FIVE questions
 All questions carry equal marks

- - -

- 1.a) When 4 resistances of value R_1 , R_2 , R_3 and R_4 ohms are connected in parallel. Prove that $1/R_{\text{equivalent}} = 1/R_1 + 1/R_2 + 1/R_3 + 1/R_4$.
- b) Determine the current in all resistors for the following circuit shown in figure. [8+8]



- 2.a) What are the similarities and dissimilarities between lap and wave windings in a dc machine?
- b) Calculate the voltage induced in the armature winding of a 4-pole, wave-wound, dc machine having 128 conductors and running at 1800 rpm. The flux per pole is 35m Wb. [8+8]
3. A single phase 10 KVA, 2000/200 V, 50 Hz transformer has impedance drop of 10% and resistance drop of 5%. Find the voltage regulation:
- a) At full load at 0.8 power factor lagging.
- b) At half the F.L at 0.6 P.f leading. [16]
4. A 4-pole, 50Hz star-connected alternator has a flux per pole of 0.12 Wb. It has 4 slots per pole per phase, conductors per slot being 4. If the winding coil span is 150°, find the emf induced deriving all necessary factors. [16]
5. A moving coil consists of 100 turns wound on a square former having a length of 3 cm. The flux density is 0.06 Wb/m². Calculate the deflecting torque action on the coil when it carries a current of 12mA. [16]
- 6.a) The mobility of electrons and holes in a sample of intrinsic Germanium at room temperature are 0.36 m²/V-s and 0.17 m²/V-s, respectively. If the electron and hole densities are each equal to $2.5 \times 10^{19} \text{ m}^{-3}$ calculate the conductivity.
- b) Discuss the following with respect to semiconductor:
- i) Doping
- ii) Dopant
- iii) Donor and
- iv) Acceptor. [8+8]

7. A half wave rectifier circuit employing an SCR is adjusted to have a gate current of 1 mA and its forward breakdown voltage is 150 V. If a sinusoidal voltage of 400 V peak is applied, determine
- Firing angle,
 - Average output voltage,
 - Average current for a load resistance of 200 Ω and
 - Power output.
- [16]
- 8.a) Explain electrostatic deflection sensitivity.
- b) An electrostatic cathode ray tube has a final anode voltage of 400 V. The deflection plates are 2 cm long and 1 cm apart. The screen is at a distance of 10 cm from the centre of the plates. A voltage of 20 V is applied to the deflection plates. Calculate
- Velocity of electron on reaching the field,
 - Acceleration due to deflection field,
 - Deflection produced on the screen and
 - Deflection sensitivity
- [8+8]
