BTS 148(B)

B.Tech. Degree I Semester (Supplementary) Examination in Information Technology/Computer Science and Engineering/ Electronics and Communication Engineering/Mechanical Engineering/Safety and Fire Engineering, February 2002

IT/CS/EC/ME/SE 104 ELECTRICAL ENGINEERING I

(New Scheme)

Time: 3 Hours *Max. Marks: 100*

MODULE - I

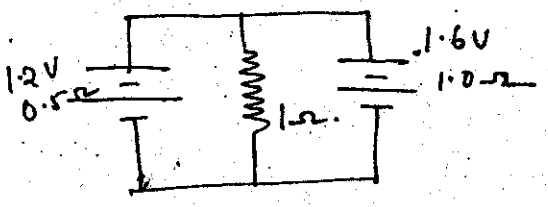
I a) Define units of current, voltage, energy and power in SD system. (8)

b) A resistance of 10 Ω is connected in series with two resistances each of 15 Ω arranged in parallel. What resistance must be shunted across this parallel combination so that total current taken shall be 1.5A with 20V applied? (12)

OR

II a) Two resistors are connected in parallel and a voltage of 200V is applied to the terminals. The total current taken is 25A and the power dissipated in one of the resistors is 1500W. What is the resistance of each element? (10)

b) Solve the given circuit by applying superposition theorem and determine the current in 1 Ω resistor. The internal resistance of 1.6V battery is 1.0 Ω and internal resistance of 1.2V battery is 0.5 Ω. (10)



(P.T.O)

MODULE - II

II a) A cast steel ring has a circular cross section of 2cm dia and a mean circumference of 1 metre. The ring is uniformly wound with a coil of 1000 turns carrying a current of 1.2A. Determine the reluctance of the magnetic circuit, magnetic flux and magnetic flux density in the ring, if the relative permeability of the material of the ring is 800. (10)

b) Two magnetically coupled coils P & Q having N_1 and N_2 turns respectively are wound on a former of length 'ℓ' and cross sectional area 'a'. Derive an expression for the coefficient of coupling between two coils in terms of their self and mutual inductances. (10)

OR

V a) Give a comparison between magnetic and electric circuits. (10)

b) State and explain Faraday's law and Lenz's law of electro-magnetic induction. (10)

MODULE - III

a) From fundamentals, obtain (i) form factor (ii) peak factor of a sinusoidal wave. (10)

b) Describe briefly the generation of alternating voltage and deduce the equation for an alternating emf $e = E_m \sin\theta$. (6)

c) Give definitions of frequency and amplitude. (4)

OR

VI a) Calculate the current in the phasor form in the branch having impedance Z_3 in the network shown below using (i) Thevenin's theorem (ii) Norton's theorem. (14)