

- VIII. (a) A 400V, 50Hz system supplies the following loads:  
 (i) A star connected balanced load of  $(4 + j3)\Omega$ .  
 (ii) a balanced delta connected load of  $(8 + j6)\Omega$ .  
 Calculate the line current, overall pf and power. (12)  
 (b) What is meant by neutral shift? Explain any one method of solving an unsymmetrical system feeding an unbalanced load. (8)

**MODULE - V**

- IX. (a) With a neat diagram explain the working of an induction type energymeter. (10)  
 (b) Compare moving coil and moving iron instruments. (4)  
 (c) What is the use of shunts and multipliers in the field of electrical measurements? (6)
- OR**
- X. (a) A moving coil instrument has a resistance of  $10\Omega$  and gives fullscale deflection when carrying a current of  $100\text{mA}$ . Show how it can be used to measure voltages upto  $1000\text{V}$  and currents upto  $50\text{A}$ . (10)  
 (b) What are the different torques in an electrical instrument? Explain. (10)



B. TECH. DEGREE I SEMESTER (SUPPLEMENTARY) EXAMINATION  
 IN INFORMATION TECHNOLOGY/COMPUTER SCIENCE AND  
 ENGINEERING/ELECTRONICS AND COMMUNICATION  
 ENGINEERING/MECHANICAL ENGINEERING (CAD/CAM)/  
 SAFETY AND FIRE ENGINEERING, FEBRUARY 2002

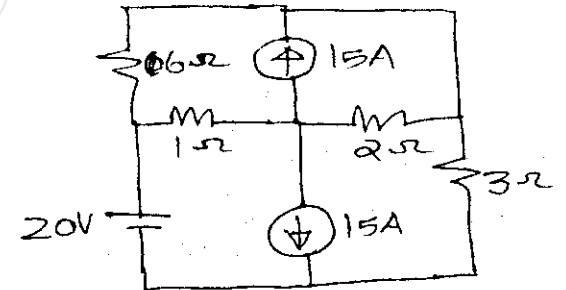
**IT/CS/EC/ME/SE 104 ELECTRICAL ENGINEERING I**  
 (Old Scheme)

Time: 3 Hours

Maximum Marks: 100

**MODULE - I**

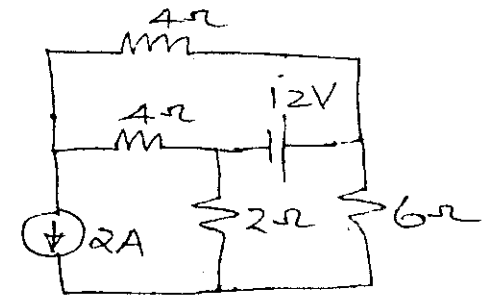
- I. (a) Using super position theorem calculate the current through the  $3\Omega$  resistance of the circuit drawn below: (15)



- (b) State and explain Kirchoff's laws. (5)

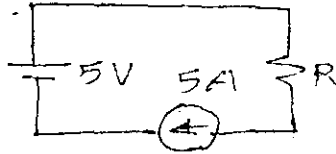
**OR**

- II. (a) Using Thevenin's theorem compute the current through the  $6\Omega$  resistance of the circuit below: (15)



(Turn over)

- II. (b) In the circuit shown below, if 25% of the power consumed by R is supplied by the current source, compute R. (5)



**MODULE - II**

- III. (a) The equivalent inductance of the series combination of 2 coils is measured as 5H. If the equivalent inductance remains the same, after halving the number of turns of the first coil and doubling the number of turns of the second coil, calculate the possible values of mutual inductance between the coils and separate inductances. (12)
- (b) Establish analogy between electric and magnetic circuits. Also list out the differences. (8)

**OR**

- IV. (a) An iron ring has mean circumferential length of 80cm and cross sectional area of 4cm<sup>2</sup>. It is wound with a coil of 100 turns. An airgap of 2mm in width is cut in the ring. Determine the current required to produce a flux of 0.48mWb in the airgap. Assume leakage factor of 1.05. B-H data of iron is as follows: (12)

B(Wb/m <sup>2</sup> ) :	0.9	1.0	1.1	1.2	1.3
H (AT/m) :	450	500	550	600	620

- (b) Derive expressions for the energy stored in a magnetic field and lifting power of a magnet. (8)

**MODULE - III**

- V. (a) A pure inductor, a non inductive resistor and a capacitor are connected in series in that order. The supply emf is 85V at 50Hz, the pd across the capacitor and resistor together is 85V and that across the inductor is 40V. If the circuit current is 5A, calculate the value of all the components and pf of the circuit. (16)
- (b) If two ac voltages of equal value adds to 15V, calculate the phase angle between them. (4)

**OR**

- VI. (a) A 50Hz, 250V single phase power line supplies the following loads:

- (i) 4KW at a pf of 0.8 lagging.
- (ii) 6KVA at 0.6 pf lagging.
- (iii) 5KVA which includes 1.2 KVAR leading.

Determine the overall pf of the system, total load in KVA and the capacitance to be connected in parallel to improve the overall pf to unity. (15)

- (b) Draw and explain the vector diagram of a series RLC circuit. (5)

**MODULE - IV**

- VII. (a) Discuss different methods of interconnection of 3 phase systems and compare them. (8)
- (b) The power of a 3 phase balanced load supplied from a symmetrical 3 phase system is measured using 2 wattmeter method. If the reading of one wattmeter is 250W, what are the possible values of total power. Assume that the load pf is 0.866 lagging. Also calculate the corresponding reactive powers. (12)

**OR**