CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Regular) - JULY- 2021
BASIC ELECTRICAL ENGINEERING
(Common to CSE, IT, CSD and CSC)
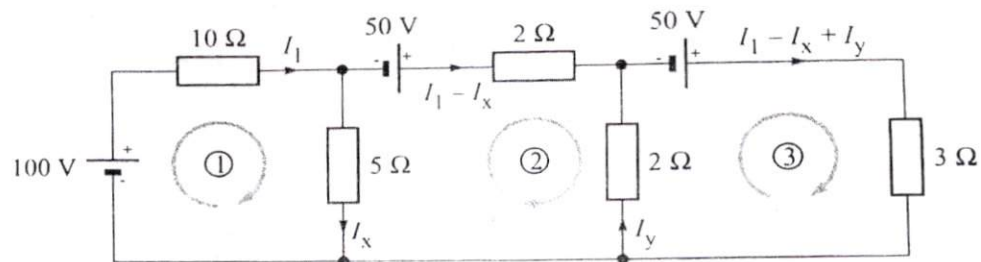
[Time: 3 Hours]   [Max. Marks: 70]

1. *Answer Any **FIVE** Questions. Each Question Carries 14 Marks*
2. *Illustrate your answers with NEAT sketches wherever necessary.*

5 x 14M=70M

1 a) Using KVL, determine the currents I_x and I_y in the network shown in Fig.1.

   b) State and explain superposition theorem with an example.
2 a) Derive the expressions for average and RMS values of an alternating voltage wave $v = V_m Sin\omega t$.
   b) Derive the relation between phase and line quantities of voltage and current in a balanced three phase star connected load.
3 a) A 50 kVA, 1000/10000 V, 50Hz single phase transformer has iron loss of 1200W. The copper loss with 5 A in the high voltage winding is 500 W. Calculate the efficiency at i) 50%, ii) 75 % iii) 100 % of full load at 0.6 power factor.
   b) Discuss the various three phase transformer groups and their significance.
4 a) Explain the principle of production of rotating magnetic field in a 3-phase induction Motor
   b) Describe the construction of a DC machine and represent each part in it.
5 a) State and explain Kirchhoff Laws
   b) Two resistors of 4Ω and 2 Ω are connected in parallel to 10V DC source determine the current supplied by source and current in each resistor

6   a) A series RC circuit is excited with a DC voltage. Derive the expression for i(t) when the switch is closed at t=0.

b) Obtain Norton's equivalent circuit with respect to the terminals AB for the circuit shown in Fig.2. Determine the current through a load resistor of 5Ω, if it were connected across terminals AB.
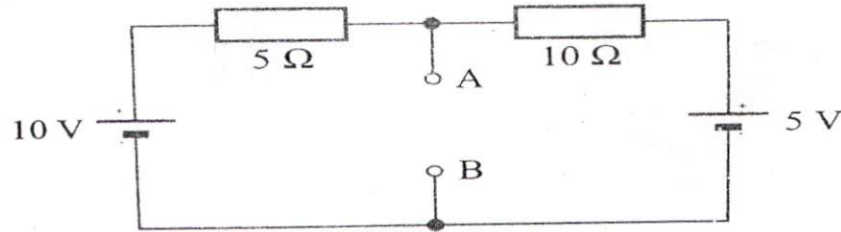

Fig.2

7   a) Draw and explain the torque-slip characteristics of a three phase induction motor.
     b) Derive the expression for resonant frequency in a series RLC circuit. A series RLC circuit consists of R= 2 ohm, L= 2mH and C=0.6 µF. Determine the resonant frequency.

8   a) Compare two winding transformer and auto transformer.
     b) Calculate total energy consumed per day by the use of following loads:

        i) 6 number of 40 W lights operated 4 hours per day
        ii) 1 HP motor is operated 3 hours per day
        iii) 1 KW heater is operated 1 hour per day
        iv) 1 computer is used for 8 hours per day with printer about 30 minutes

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