Roll No. ....

BE-104

B. E. (First Semester) EXAMINATION, April, 2009

(Common to all Branches)

BASIC ELECTRICAL ENGINEERING

(BE – 104)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt *five* questions in all selecting *one* question from each Unit. All questions carry equal marks.

Unit – I

1. (a) Determine the current through the branch AB for the circuit shown in the figure using modal analysis.
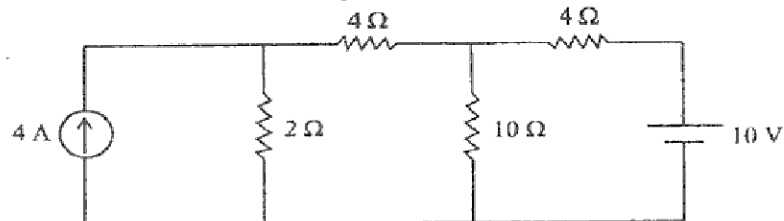

Fig. 1

   (b) Deduce the relation for conversion from star to delta circuit.

Or

2. (a) State and explain superposition theorem.
   Define :
   (i) Linear
   (ii) Bilateral network

P. T. O.

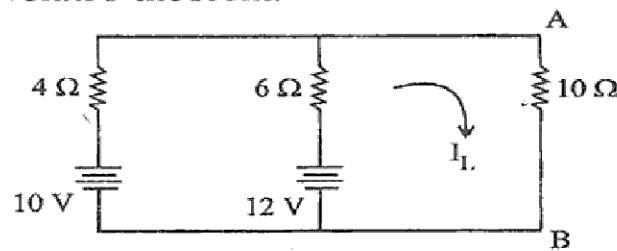(b) Determine the circuit I_L in the network by using Thevenin's theorem.

Fig. 2

Unit — II

3. (a) Deduce, the relation between line and phase quantities in 3-ϕ star circuit. Draw the phasor diagram.

   (b) The power in a 3-phase circuit is measured by 2 wattmeter method. If the total power is 100 kW and power factor is 0·66 leading, what will be the reading of each wattmeter ? For what power factor will one of the wattmeters reads zero ?

Or

4. (a) A choking coil of inductance 0·08 H and resistance 12 ohm, is connected in parallel with a capacitor of 120 μF. The combination is connected to a supply of 240 V, 50 Hz. Determine the total current from the supply and its p. f.

   (b) Deduce an expression for the power measurement in 3-ϕ circuit using 2 W. m. method.

Unit — III

5. (a) What is (i) series and (ii) parallel magnetic circuit ?

   (b) What is meant by eddy current loss ? How does it appear ? How can the eddy current loss be reduced ?

Or

6. (a) A mild steel ring having a own sectional area of 5 cm² and a mean circumference of 40 cm has a coil of 200 turns wound uniformly around it. Calculate :

   (i) The reluctance of the ring.

   (ii) The current required to produce a flux of 800 μ Wb in the ring.

   Assume relative permeability of mild steel to be 330 at the flux density developed at the cone.

   (b) Explain induced E. M. F. and their types.

Unit — IV

7. (a) Draw the vector diagram of a transformer on lagging p. f. load. Give clearly the name of each parameter used.

   (b) What is an auto transformer ? When it is used ?

Or

8. (a) Give the principle of operation of a transformer.

   (b) A 1 kVA, single phase transformer has an iron loss of 12 W, and full load copper loss of 18 W. Find the full load efficiency assuming the power factor be 0·9 (96·77 percent).

Unit — V

9. (a) How torque is generated in D. C. motor ? What are the various types of D. C. motor ?

   (b) Give the construction details of rotor and stator of 3-phase induction motor.

Or

10. (a) Develop an e. m. f. equation for D. C. generator.

    (b) Explain, the 3-ϕ induction motor cannot run at synchronous speed.

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