2124

B.E., First Semester
EEC-X01: Basic Electrical and Electronics Engineering
(Common with CIVIL, BIO and ECE)

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part. Assume any missing data.

x-x-x

1. (a) Write significance of zener diode.

   (b) What is meant by super mesh? Write its significance.

   (c) What are the limitations of open circuit test of transformers?

   (d) Explain V-I characteristics of a diode.

   (e) Derive relationship between line & phase voltages and line & phase currents of delta connected 3-ϕ circuit.

(5*2)

PART-A

2. (a) Derive formula for average and rms values of sinusoidal waveform.

   (b) A 3-ϕ, 440 V, delta connected circuit has following loads:

   Branch RY: 20 kW at unity p.f.

   Branch YB: 30 kVA at 0.8 p.f. lagging

   Branch BR: 20 kVA at 0.6 p.f. leading.

Find line currents and reading of wattmeters W_1 and W_2 whose current coils are in lines R & B and voltage coils between RY & BY.

(5, 5)

3. (a) The following circuit shows a battery in parallel with mechanical generator supplying a load. Determine:

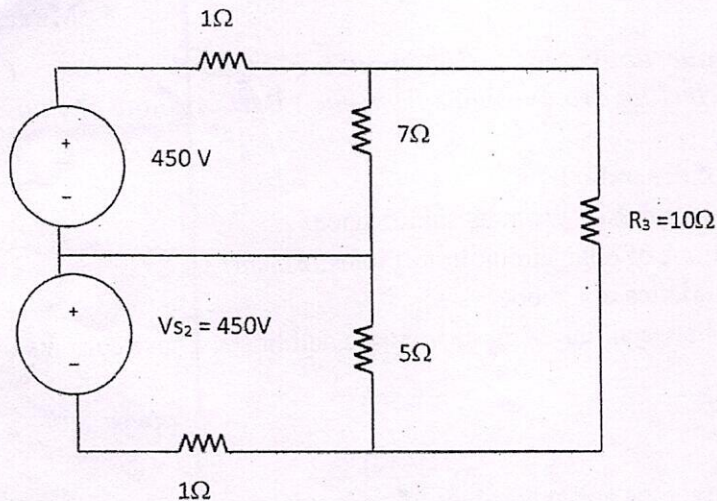   * Thevenin equivalent of the circuit to the left of terminal pair Y-Y'
   * The terminal voltage of battery (between Y-Y')
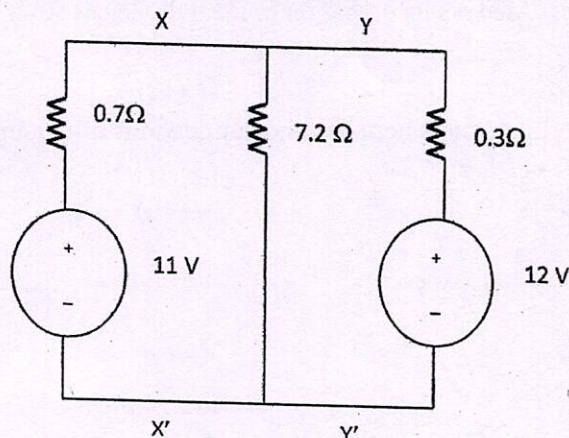
(b) For the following circuit, using superposition theorem, determine current through R_3 that is due to V_2. Also, find total current through R_3.

(5, 5)

4. Explain principle and working of 1-ϕ transformer. Write its emf equation. Define efficiency and voltage regulation. Derive condition for its maximum efficiency.

(10)

PART-B

5. What are intrinsic and extrinsic semiconductor materials? Explain doping process. What are p-type and n-type semiconductors?

(10)

6. Draw circuit model for diode clipper. Analyse its operation in ideal diode case and piecewise linear diode case.

(10)

7. What is BJT? Explain principle, working, characteristics and applications of Common-Base transistor.

(10)

x-x-x