October, 2020

B.Tech. - II SEMESTER (Reappear)

Basic Electrical Engineering (EE-101C)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Distinguish between active and passive components. (1.5)

(b) Define statically induced emf and dynamically induced emf. (1.5)

(c) State Millman's theorem. (1.5)

(d) The equation of an alternating current is $i = 282.8 \sin 377\ t$. What is rms value of current and frequency? (1.5)

(e) What are the active and reactive powers? Draw the power triangle. (1.5)

(f) Define quality factor in the resonant circuit. (1.5)

(g) What are the advantages of three phase system over single phase system? (1.5)

(h) Define voltage regulation of transformer. (1.5)

(i) Which type of rotor is used in high speed alternators and why? (1.5)

(j) Why is commutator employed in DC machines? (1.5)

PART - B

2. (a) Calculate the current in each branch of the circuit shown in Fig-1. (8)

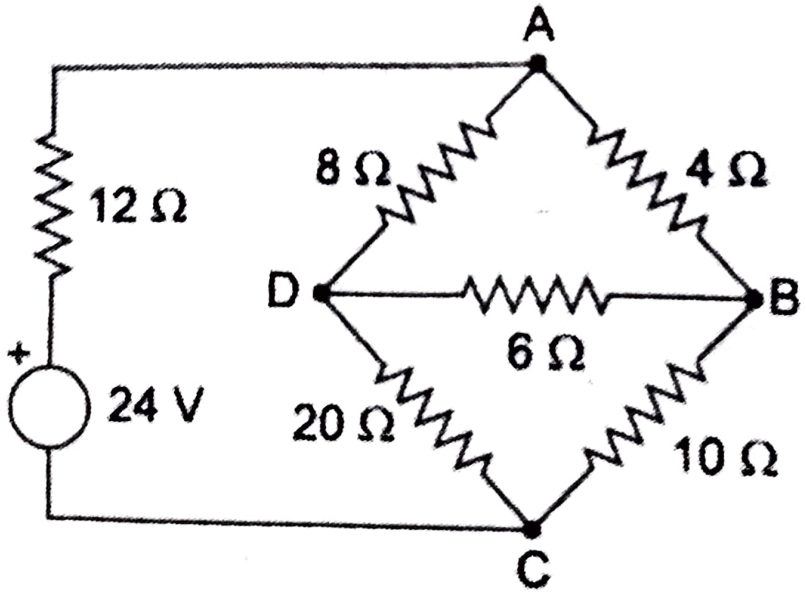

Fig-1

(b) How energy get stored in the magnetic field? Derive the expression for energy stored. (7)

3. (a) By using Thevenin theorem, find current through resistor 'R' connected between points 'a' and 'b' in the circuit shown in Fig-2. (8)

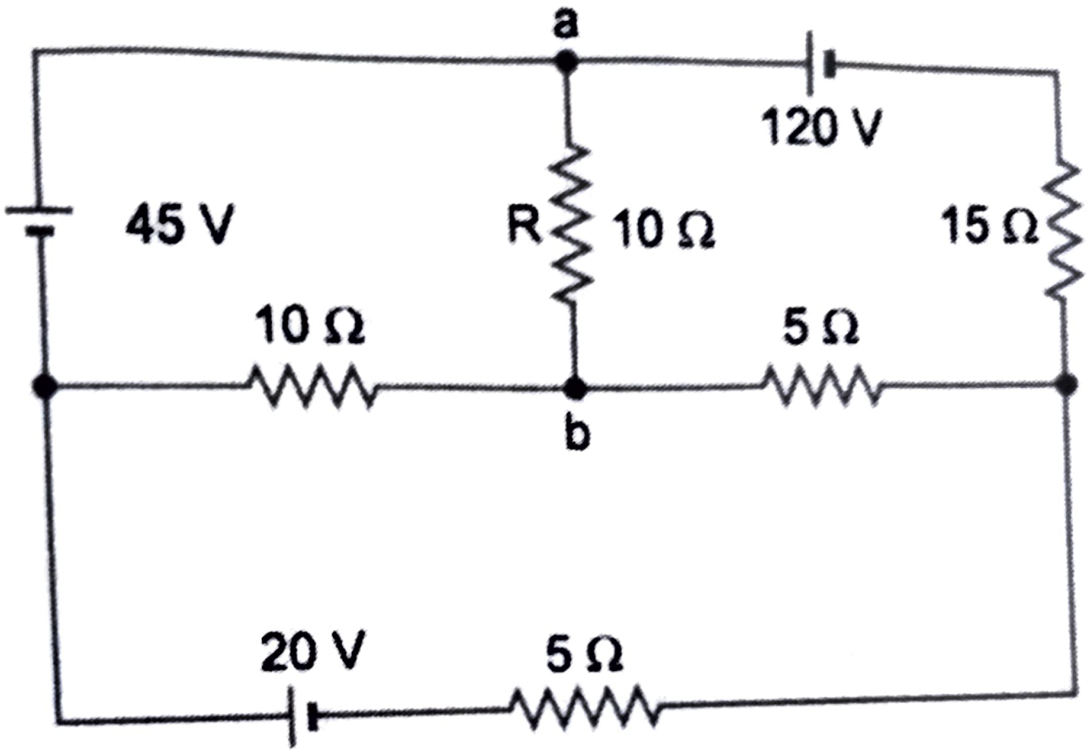

Fig-2

(b) State and explain maximum power transfer theorem. (7)

4. (a) An iron ring of mean length of 100 cm and cross-sectional area of 10 cm^2 has an air gap of 1 mm cut in it. It is wound with a coil of 100 turns. Assuming relative permeability of iron as 500, calculate the inductance of a coil. (8)

(b) Using superposition theorem, find voltage across 4 Ω resistance in Fig-3. (7)

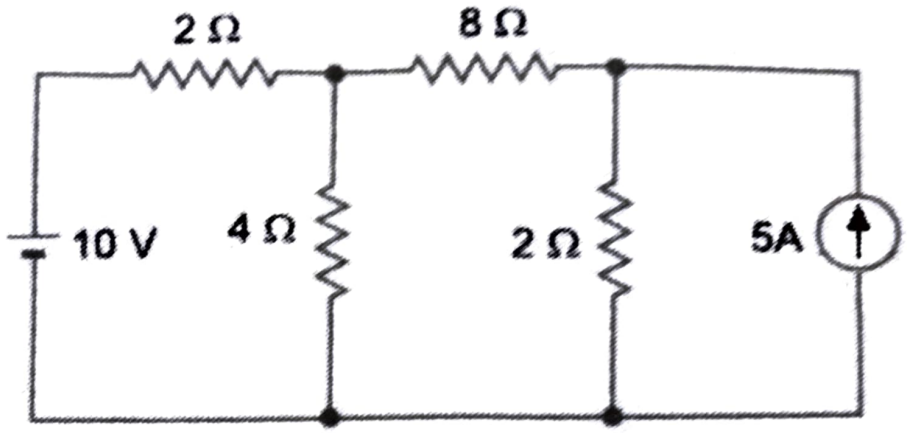

Fig-3

5. (a) Find the average and rms values of the sinusoidal waveform shown in Fig. 4. The maximum value is 100 V. (7)

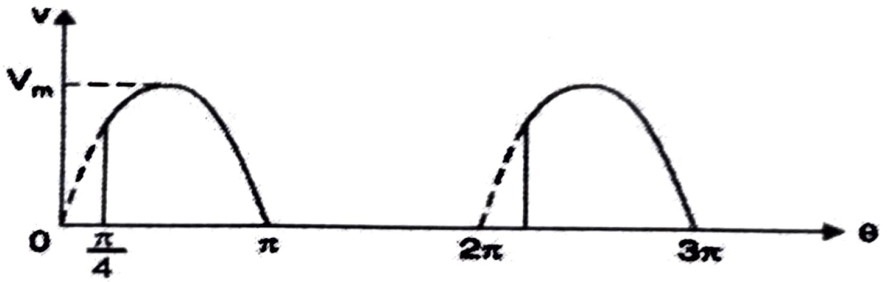

Fig-4

(b) In the circuit shown in Fig. 5, find the values of (i) the current I (ii) V1 and V2 and (iii) power factor. Draw the phasor diagram. (8)

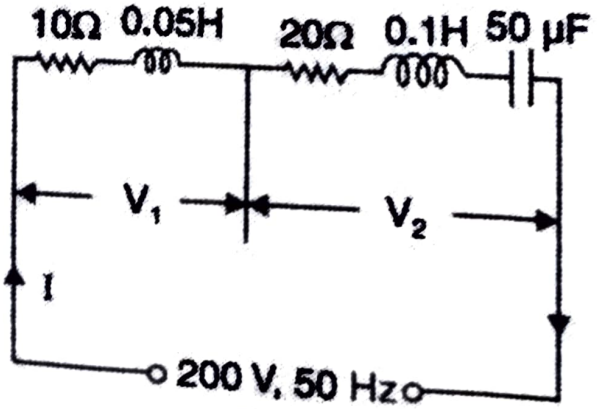

Fig-5

6. (a) Define resonance in parallel RLC circuit. Also, give the graphical representation of parallel RLC circuit in detail. (7)

(b) Three identical coils, each having a resistance of 8 Ω and a reactance of 6 Ω are connected in star, across 400 V, 3-phase supply. Find the line current and the readings on each of the two wattmeters connected to measure the power. (8)

7. (a) In a transformer explain how power is transferred from one winding to the other. Derive an expression for the emf induced in a transformer winding. (7)

(b) Why a starter is required to start a 3-phase induction motor? Explain the working of a direct-on-line starter with neat sketch. (8)