Roll No. 2900101704

Total Pages : 04

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May 2025

B.Tech. (Second Semester)

Basic Electrical Engineering

(ESC-101A/ELU-101-V)

Time : 3 Hours] [*Maximum Marks : 75*

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

Part A

1. (a) What is the purpose of using a laminated core in a transformer ? 1.5

   (b) Explain the duality between Thevenin's and Norton's equivalent circuits. 1.5

   (c) Define Earthing. 1.5

(d) What is the difference between fuse and MCB ? 1.5

(e) How can we make a single phase induction motor self-starting ? 1.5

(f) Define Active Power, Reactive Power, Apparent Power. 1.5

(g) What is the function of commutator in DC machines ? 1.5

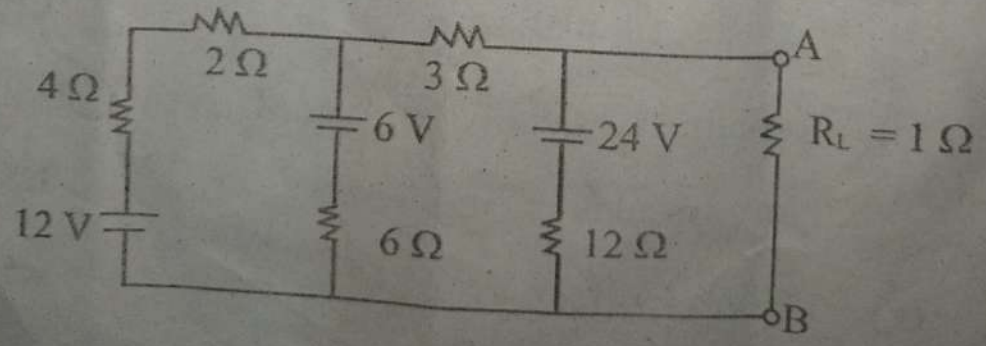
(h) What are different losses in a transformer ? 1.5

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

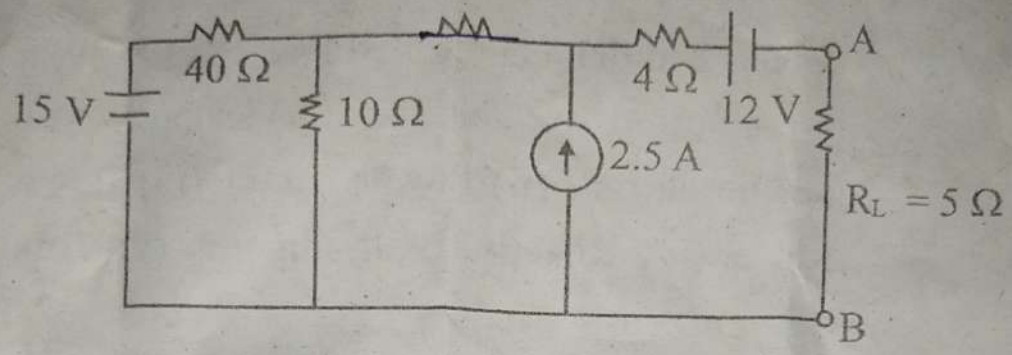
(j) What is the difference between dependent and independent sources ? 1.5

Part B

2. (a) Find the current through RL using Norton's Theorem in Fig.1. 7.5



(b) Find the current through R_L by using superposition theorem in Fig 2. 7.5



3. (a) Find the average value, rms value, form factor and peak factor for a half wave rectified sine wave. 7.5

(b) Discuss series resonance. Derive the expression of resonant frequency, bandwidth and quality factor. 7.5

4. (a) Draw the phasor diagram of a single phase transformer at inductive load. 7.5

(b) Define voltage regulation and efficiency of a transformer and derive the expression for maximum efficiency. 7.5

5. (a) Explain the construction and working of three phase induction motor. 7.5

(b) Why synchronous motor is not self starting ? 7.5

6. (a) Derive the expression for power and power factor in a three-phase circuit using two wattmeter method. 7.5

(b) A balanced delta connected load of $(12+j9)\ \Omega$ is connected to 3-phase, 400V supply. Find (i) line current (ii) Power Factor (iii) Power drawn (iv) Reactive volt-amperes (v) Total volt-amperes. 7.5

7. (a) Write a short note on 'Power factor improvement'. 7.5

(b) Draw and explain the working of ELCB. 7.5