Roll No. 2500101601 6 Total Pages : 04

003102

Dec. 2025

B. Tech. (First Semester)

Basics Electrical Technology

(ESC-101-A/ESCH-101-A/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 an autotransformer ? **1.5**

   (b) Explain the duality between Thevenin's and Norton's theorem. **1.5**

   (c) Define power factor, phase angle. **1.5**

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

(e) What are the losses in transformer? How can we reduce them ? 1.5

(f) On what principle the synchronous generators operate ? 1.5

(g) Why is parallel resonant circuit is known as rejector circuit ? 1.5

(h) Give difference between fuse and MCB. 1.5

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

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

Part B

2. (a) Find the current through R_L resistance using Norton's Theorem in Figure 1. When R_L=16 Ω : 7.5

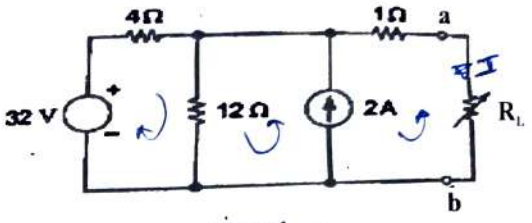

Figure1

(b) Find the current in each branch by using superposition theorem in Figure 2 : 7.5

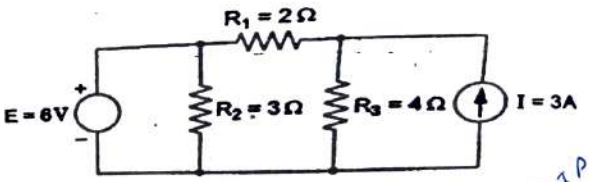

Figure2

3. (a) State and prove Maximum Power Transfer Theorem. 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

4. (a) With the help of a graphical representation, discuss series resonance. Define resonant frequency, cut off frequencies, band width. 7.5

(b) Find the average value, rms value, form factor and peak factor in case of full wave rectified sine wave. 7.5

5. (a) Prove that power in a three phase circuit can be measured using two wattmeter method. 7.5

(b) Describe the working principle of transformer. Define efficiency and draw the expression for maximum efficiency. 7.5

6. (a) Explain in detail, the construction and working of a three phase induction motor. 7.5

(b) Discuss in detail constructional features of a DC generator. 7.5

7. Write short notes on the following :

(a) Earthing and its types 7.5

(b) Power factor improvement. 7.5

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