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Total Pages : 4

013102

December 2024

B. Tech. (First Semester)

Basic Electrical Technology (ESC-101A)

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) Differentiate the dependent and independent sources. **1.5**

(b) Distinguish between a current source and voltage source. **1.5**

(c) Define Apparent power and Power factor. **1.5**

(d) Define Phase and Phase difference. **1.5**

(e) Define Earthing. **1.5**

(f) What is the main purpose of commutator in a DC machine ? **1.5**

(g) List the advantage of three phase system over a single-phase system. **1.5**

(h) Write the current and voltage relations for delta connected three phase system. **1.5**

(i) List the five house hold application of single-phase induction motor. **1.5**

(j) List the components of a switchgear system. **1.5**

Part B

2. (a) In the figure 1 given below V = 10V, $R_1 = 10\Omega$, $R_2 = 10\Omega$, $R_3 = 15\Omega$, $R_4 = 20\Omega$ and $R_5 = 5\Omega$. The internal resistance of voltage source is 1Ω. Fing the current following through R_5 using Thevenin theorem. **9**

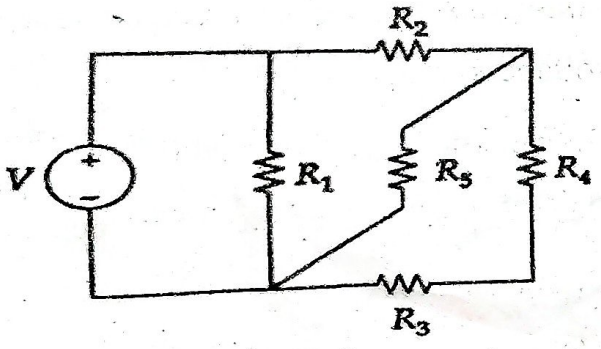

Figure1

(b) State and prove the Maximum power transfer theorem with suitable example. **6**

3. (a) Describe the construction of an induction motor with neat diagrams. **7.5**

(b) Draw and explain the two-wattmeter method of power measurement in a three-phase circuit. **7.5**

4. (a) An a. c. series circuit consisting of a pure resistance of 250, inductance of 0.15H and capacitance of 80μF is supplied from a 230V, 50Hz. Find : **8**

(i) impedance of the circuit,

(ii) the current,

(iii) power drawn by the circuit and

(iv) the power factor.

(b) With a neat circuit diagram Explain the construction and principle of operation of DC Motor. **7**

5. (a) Define the term resonance. What the conditions for parallel resonance occurrence ?

Derive the expression for parallel resonance frequency and also draw the resonance curve for the same. 8

(b) Draw and explain the working of ELCB. 7

6. (a) A three-phase star connected load consists of three identical inductive coils of resistance 20Ω and inductance 0.5H. The supply voltage is 400V, 50 Hz. Calculate : 8

(i) phase current

(ii) line current

(iii) power factor

(iv) total power consumed.

(b) Discuss the different method of power factor improvements. 7

7. Discuss the working of transformer and draw the phasor diagram of transformer for inductive load. Also draw and explain the equivalent circuit of single-phase transformer. 15