

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- 1.a) The voltage across 5Ω resistor is 10 volts. Find the current and power dissipated in that resistor? [2M]
- b) Give the statement of Thevenin's theorem. [3M]
- c) Define form factor and peak factor. [2M]
- d) Discuss the significance of j-operator. [3M]
- e) Write the relation among primary and secondary voltages, currents and winding turns. [2M]
- f) Write the properties of ideal transformer. [3M]
- g) What is the expression for torque developed in a DC motor? [2M]
- h) Define slip and synchronous speed. [3M]
- i) What is the role of damping torque in measuring instruments? [2M]
- j) Categorize the commonly used ammeters and voltmeters. [3M]

PART-B

(50 Marks)

- 2.a) Derive the relationship between Star to delta transformation.
- b) State and explain Kirchhoff's laws with an example. [5+5]

OR

- 3.a) Find the current flowing through 2Ω resistor using superposition theorem (figure 1).

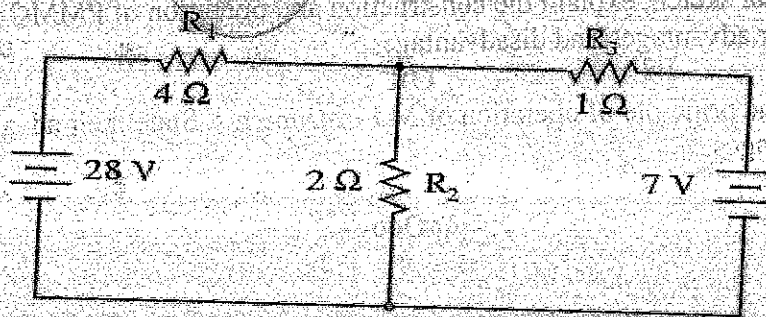


Figure: 1

- b) Explain passive and active elements in detail. [6+4]

- 4.a) Find the R.M.S value for the following waveform (Figure 2).

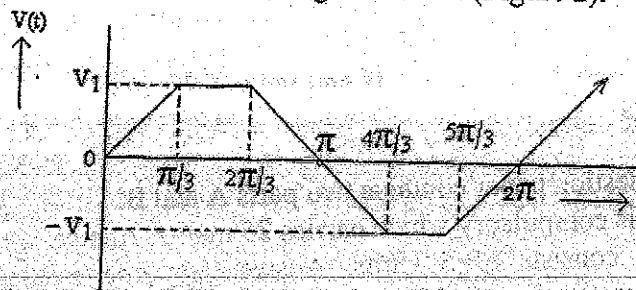


Figure: 2

- b) Find the current in a series R-C circuit when excited by $v(t) = V_m \sin(\omega t)$. [6+4]
- OR**
- 5.a) Explain the following with an example:
i) addition and subtraction of phasors
ii) multiplication and division of phasors.
- b) Find the impedance of series R-L-C circuit with $R=100\Omega$, $X_L=50\Omega$ and $X_C=20\Omega$. [6+4]
- 6.a) Explain the working principle of single-phase transformer.
- b) What are the tests to be conducted on a single phase transformer to find efficiency and regulation of a transformer? [5+5]
- OR**
- 7.a) Explain various losses in a single phase transformer.
- b) Enumerate constructional features of single-phase transformer. [5+5]
- 8.a) Draw and explain slip-torque characteristics of 3-phase induction motor.
- b) Derive the emf equation of DC Generator. [5+5]
- OR**
- 9.a) Explain the classification of DC motors and their applications.
- b) Discuss the principle of operation 3-phase induction motor. [5+5]
10. With a neat sketch, explain the construction and operation of PMMC instrument? State their advantages and disadvantages. [10]
- OR**
11. Explain the principle of operation of M.I instruments. State their advantages and disadvantages. [10]

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