

## FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II Sem. (Main) Examination, May/June 2011

## ELECTRICAL CIRCUITS AND MACHINES

Time : 3 Hours ]

[ Max. Marks : 75

Note : Answer all questions from Part – A. Answer any five questions from Part – B.

## PART – A

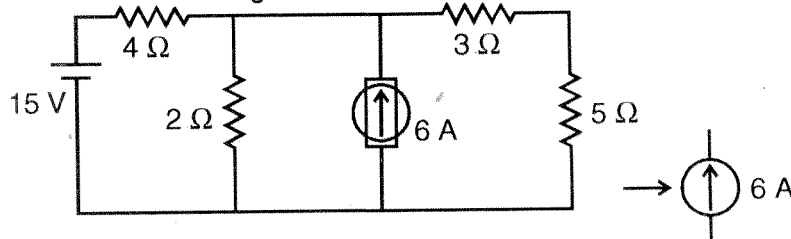
(Marks : 25)

1. State Thevenin's theorem and give the utility of this theorem. 3
2. A coil has a resistance of  $10 \Omega$  and draws a current of 5 A when connected across 100 V, 50 Hz source. Determine the reactive power of the circuit. 2
3. A balanced star-connected load of  $(8 + j6)\Omega$  per phase is connected to a 3- $\phi$ , 230 V, 50 Hz supply. Draw the phasor diagram for the above circuit. 3
4. Give the expression for regulation of a transformer. 2
5. Draw the characteristics of DC series motors. 3
6. Give the applications of dc motors. 2
7. A 4 pole induction motor is running at 1440 rpm from a 50 Hz supply. Find the percentage slip and frequency of rotor current. 3
8. List the methods of starting of Induction Motors. 2
9. Why single phase induction motors are not self starting ? 3
10. What is universal motor ? 2

## PART – B

(Marks : 50)

11. (a) Determine the current flowing through the  $5 \Omega$  resistor in the network shown below using Thevenin's theorem. 6



- (b) An a.c. sinusoidal current has an rms value of 40 A at 50 Hz frequency. Write expression of instantaneous current and obtain its value 0.002 sec after passing through maximum positive value. 4

12. Explain with a neat diagram OC and SC tests on a single phase transformer. Explain how can you draw the equivalent circuit with the help of the above tests. 10
13. (a) Derive emf equation for a dc generator. 5  
(b) A 400 V dc motor takes 5A at no-load. Its armature and field resistances are  $0.5 \Omega$  and  $200 \Omega$  respectively. Calculate the efficiency of the motor when motor takes 40 A on full load. 5
14. Describe the construction and principle of operation of a 3-Ph induction motor. 10
15. (a) Explain the principle of operation of a split phase motor. 5  
(b) Explain the principle of operation of a Brushless DC motor. 5
16. (a) Explain the measurement of power of 3- $\phi$  circuit by using two wattmeter method. 6  
(b) A  $4700 \Omega$  resistor and a  $2 \mu\text{F}$  capacitor are connected in parallel across a 240 V, 50 Hz source. Determine the circuit impedance and line current. 4
17. Write short notes on the following: 10  
(a) Dot convention  
(b) Auto transformer  
(c) Losses in a D.C. machine.