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 Ω 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)Ω per phase is connected to a
    3-φ, 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 Ω resistor in the network
        shown below using Thevenin's theorem.   6
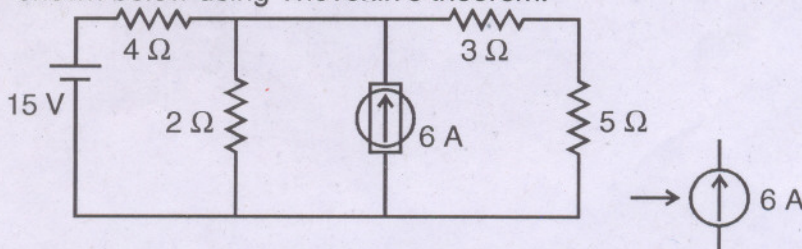
    (b) An a.c. sinusoidal current has an rms value of 40 A at 50 Hz
        frequency. Write expression of instantaneous current and obtain its
        value 0.002 sec after passing through maximum positive value.   4

(This paper contains 2 pages)   1   **P.T.O.**

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 Ω and 200 Ω 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-φ circuit by using two wattmeter method. **6**

 (b) A 4700 Ω resistor and a 2 μF 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.

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