

FACULTY OF ENGINEERING
B.E. 2/4 (IT) I – Semester (Backlog) Examination, May/June 2019

Subject : Electrical Circuits and Machines

Time: 3 Hours

Max. Marks: 75

Note: Answer All questions from Part – A and any five questions from Part – B

Part – A (25 Marks)

1. Derive the equation for the RMS value for sinusoidal source. 2
2. Prove that the average power in an AC circuit is $VI \cos$ 3
3. Why starting current in a dc moter is very high. 2
4. The current $i_1 = 10 \sin (wt + 30^\circ)$ A, $i_2 = 5 \sin (wt - 30^\circ)$ A, $i_3 = 15 \sin (wt + 30^\circ)$ A meet at a node. Find $i_4+i_1+i_2+i_3$ 2
5. Explain how a starting torque is produced in a single phase Induction motor. 3
6. Define the equivalent resistance and reactance of a transformer. 3
7. Draw the circuit diagram of long shunt and short shunt compound motors. 2
8. In a two watt meter method of 3-phase power measurement the readings are $W_1 = 100$ watts and $W_2 = 160$ watts. What is the total reactive power and p.f. 3
9. Define active power, reactive power and draw the power triangle. 3
10. Explain the principle of operation of 3 phase Induction motor. 2

Part – B (50 Marks)

11. (a) With a neat sketch explain the concepts of self inductance and mutual inductance. 4
 (b) Two coils with terminals T_1, T_2 and T_3, T_4 respectively are placed side by side, measured separately, the inductance of the first 1200 and that of the second coil is 800 with T_2 joined T_3 , the total inductance between the two coils is 2500. What is the mutual inductance? 6
12. (a) What are the starting methods of slip ring Induction motors. 4
 (b) With a neat diagram explain the rotor resistance starting method of slip ring induction motor. 6
13. (a) Draw and explain the significance of equivalent circuit of a transformer. 5
 (b) Describe the procedure for conducting open circuit test on a Transformer. What are the parameters calculated from the test? 5
14. (a) What will happen if the field of a DC motors is opened. 4
 (b) With a neat diagram explain the principle of operation and construction of a DC motor. 6
15. (a) With a neat diagram the working of stepper motor. 5
 (b) Derive the relation between the line and phase currents in a delta connected system. 5

contd..2

16. (a) The Frequency of the e.m.f. in the stator of 4 pole induction motor is 50 Hz and that in rotor is 2 Hz. What is the slip and at what speed is the motor running. 5
(b) Explain Torque & slip characteristics of a 3.5 Induction motor. 5
17. Write short notes on
- (a) Armature reaction 3
(b) Dot convention 3
(c) Explain the working principle of an auto transformer with a neat sketch. 4

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