

FACULTY OF ENGINEERING & INFORMATICS

B.E. 2/4 (M/P/IT) I-Semester (Main) Examination, November 2013

Subject : Electrical Circuits and Machines

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.**PART – A (25 Marks)**

1. Three resistors 4Ω , 12Ω and 6Ω are connected in parallel. If the total current taken is 12A, find the current through each resistor. (3)
2. Define Average value, RMS value and form factor for sinusoidal source. (3)
3. What is the difference between Ideal transformer and practical transformer? Explain. (2)
4. Draw the equivalent circuit diagram of a single phase transformer. (3)
5. Draw the internal and external characteristics of D.C. shunt generator. (3)
6. Why starter is required for starting a D.C. motor? Explain. (2)
7. Enumerate the differences between slip ring and squirrel cage induction motors. (3)
8. Describe the principle of operation of a 3 phase induction motor. (2)
9. Why a single phase induction motor is self starting? Explain. (2)
10. Explain the principle of operation of an alternator. (2)

PART – B (5x10=50 Marks)

11. A pure inductive circuit is excited by a sinusoidal voltage source. Draw the waveforms of voltage, current and power. Also derive the equations for instantaneous power and active power. (10)
12. Draw the phasor diagram for line voltage, phase voltage and currents in a balanced star connected systems. Derive the equation for the power. (10)
13. (a) Draw the phasor diagram of a 1 phase transformer on NO load. (5)
(b) A 200 KVA, 1-phase transformer has 100 turns in the primary and 600 turns on the secondary. The primary winding is supplied from a 440V, 50Hz source. Find the (i) secondary voltage at no load and (ii) primary and secondary currents at the full load. (5)
14. (a) Explain the constructional details of d.c. machines. (5)
(b) Draw and explain the speed versus torque characteristics of D.C. shunt and series motors. (5)
15. (a) Explain the speed control of induction motor by rotor resistance method. (5)
(b) The frequency of the emf in the stator of a 4 pole induction motor is 50Hz and that in the rotor is 2Hz. What is the slip and at what speed is the motor running. (5)
16. (a) Derive the equation for induced Emf in an alternator. (5)
(b) Discuss the construction and working of a capacitor start single phase induction motor. (5)
17. Write short notes on : (10)
(a) Three point starter
(b) Speed control of 3 phase induction motor by stator voltage method