

## FACULTY OF INFORMATICS

B.E. 2/4 (IT) I - Semester (Main) Examination, December/January 2014-15

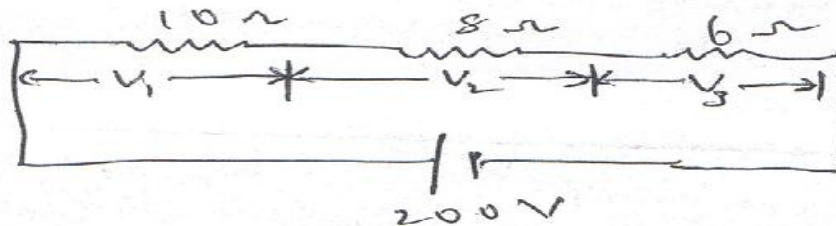
Subject: Electrical Circuits and Machines

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 Define time period and frequency for sinusoidal wave form. (2)
- 2 For the circuit show below, calculate  $V_1$ ,  $V_2$  and  $V_3$ . (3)



- 3 What are the advantages of 3-phase ac over 1-phase ac system? (3)
- 4 Define regulation of transforms and when it will be negative. (2)
- 5 Draw electrical and mechanical characteristics of dc shunt and series motors. (3)
- 6 What is meant by critical resistance and critical speed of dc machine? (2)
- 7 Why stator core of a 3-phase induction motor is laminated? (3)
- 8 Mention various losses occur in 3- phase induction motor. (2)
- 9 Why single phase induction motors are not self starting? (3)
- 10 Mention the applications of stepper motor. (2)

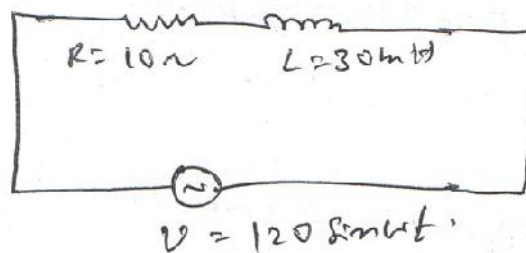
**PART – B (50 Marks)**

- 11 (a) Explain constructional details and working principles of DC motor. (5)
- (b) Explain principle operation of capacitor run motor with neat circuit diagram and mention its applications. (5)
- 12 (a) The power input to a 440V, 50Hz, 3-phase, 4-pole induction motor running at 1480 rpm is 30 kw. The stator losses are 1 kw and friction and windage losses are 2 kw. Calculate the efficiency of the motor. (5)
- (b) Explain any one method of starting of 3-phase induction motor with neat schematic diagram. (5)
- 13 (a) Explain the speed control of DC shunt motor by using armature and field diverters. (5)
- (b) A 50 kw, 220v, dc shunt generator has armature and field resistances of  $0.04\Omega$  and  $1.0\Omega$  respectively. Calculate the total power developed by the armature when it delivery full output power. (5)
- 14 (a) Derive the emf equation of a transformer from basis. (5)
- (b) Explain principle operation of auto transformer with neat circuit diagram. (5)

- 15 (a) Derive the relation between line and phase quantities of voltage and currents for a star connected system. (5)  
 (b) Explain two watt method of 3-phase power measurement with all circuit diagram. (5)
- 16 (a) State and explain Thevenits theorem. (5)  
 (b) Calculate current flow in  $5\Omega$  resistor using Newton theorem, for the circuit shown below. (5)



- 17 (a) Derive the expression for energy stored in inductance and capacitance. (5)  
 (b) For the circuit shown below, determine current. And real power supplied. Input current lags the supply voltage by  $60^\circ$ .



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