

**FACULTY OF INFORMATICS**

B.E. 2/4 (IT) I-Semester (Suppl.) Examination, June / July 2015

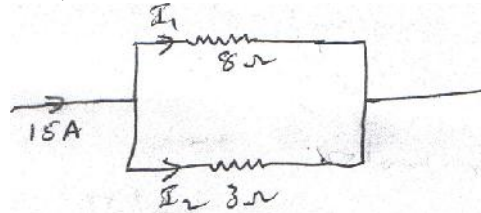
Subject : Electrical Circuits and Machines

Time : 3 Hours

Max. Marks: 75

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

- 1 For the circuit shown below, calculate  $I_1$  and  $I_2$ . (3)



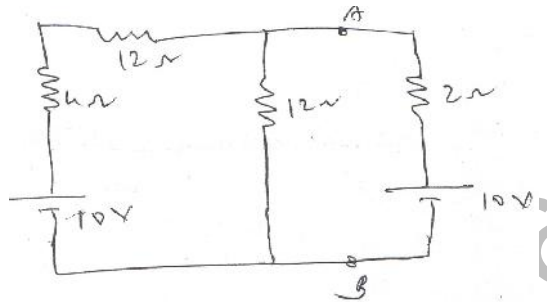
- 2 Mention the units for capacitance, inductance impedance and energy. (2)
- 3 What is the relationship between the line voltage and plot voltage in a delta connected system? (2)
- 4 Explain how transformer works. (3)
- 5 Draw schematic diagram of a d.c. generator and mention its various parts. (3)
- 6 Mention the maximum efficiency condition in dc machines. (2)
- 7 Define synchronous speed and slip of an 3-phase induction motor. (2)
- 8 Draw slip-torque characteristics of an 3-phase induction motor showing clearly motoring plugging and generating modes. (3)
- 9 Draw the phasor diagram of RC circuit with sinusoidal excitation. (3)
- 10 Compare 3-phase and 1-phase induction motors. (2)

**PART – B (50 Marks)**

- 11 Explain the constructional details and working principles of following motors. (10)  
(a) Stepper motor  
(b) Capacitor start motor
- 12 (a) Explain speed control of 3-phase induction motor. (5)  
(b) A 3-phase, 400V, 6-pole induction motor drawing a line current of 60 A at 0.75 p.f. lagging and at a slip of 3% and efficiency is 88%. Calculate the shaft torque and shaft power output. (5)
- 13 (a) A 220V, d.c. line motor runs at 500 rpm when taking a line current of 18A. The resistance of the armature is  $0.4\Omega$  and field is  $0.6\Omega$ . If the current taken remains constant, calculate the resistance necessary to reduce the speed to 430 rpm. (5)  
(b) Derive the emf equation of a D.C. machine from basis. (5)
- 14 (a) Explain OC and SC tests conducted on 1-phase transformer with help of neat circuit diagrams. (6)  
(b) Compare two winding transformer and auto transformed. (4)

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- 15 (a) Explain 3-phase power measurement by two watt meter watt schematic diagram. (5)  
 (b) Three similar resistance are connected in star cross a 400v, 3-phase system. The line current is 10 A. If the same resistors are connected in delta across the same supply, calculate the phase current, line current and power consumed. (5)
- 16 (a) State and explain Norton's theorem. (5)  
 (b) Determine Thevenits equivalent circuit between A and B for the circuit shown below. (5)



- 17 Write short notes on the following:
- (a) DOE convention (4)  
 (b) Mutual induction (3)  
 (c) Simple coupled circuit (3)

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