Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[5152]-533

S.E. (E&TC) (I Sem.) EXAMINATION, 2017

ELECTRICAL CIRCUITS AND MACHINES

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. :— (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

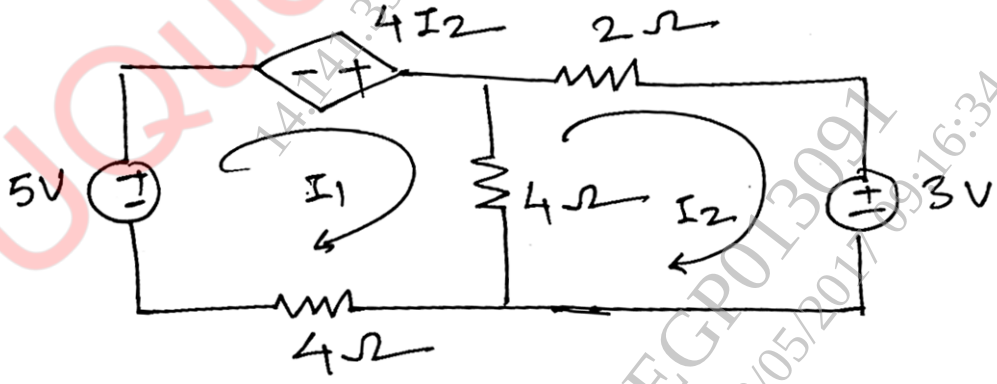
(*iii*) *All* questions carry equal marks.

(*iv*) You are advised to attempt not more than **4** questions.

(*v*) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(*vi*) Assume suitable data, if necessary.

1. (*a*) Apply Mesh Analysis & determine current I_1 & I_2 : [7]



(*b*) Explain construction & working principle of current transformer. [5]

P.T.O.

Or

2. (*a*) State and explain Maximum power transfer theorem. [4]

(*b*) The following readings were obtained from O.C & S.C tests on 8 KVA, 400/120 V, 50 Hz transformer : [8]

O.C. test on LV side	120 V	4 A	75 W
S.C. test on HV side	9.5 V	20 A	110 W

Calculate the voltage regulation & efficiency at full load, 0.8 P.f. lagging.

3. (*a*) Explain the characteristics of D.C shunt motor. Comment on p.f. [5]

(*b*) Output of 3ϕ, 415 V Induction Motor running at 2% slip is 36.775 kW. Determine : [8]

(*i*) Rotor speed & Slip speed

(*ii*) Rotor O/P & rotor copper loss

(*iii*) Efficiency of motor at given loading conditions.

Assume Motor is wound for 4-pole & supply frequency to be 50 Hz. Given friction & windage losses are 1500 W while stator losses are 3 kW.

Or

4. (*a*) Explain Torque-slip characteristics of 3ϕ Induction Motor. Explain the effect of Rotor resistance on its characteristics with the help of diagram. [7]

(*b*) A 4 pole, 250 V DC series Motor has wave connected armature winding with 1254 conductors. The flux pole is 22 mWb when the motor is taking 50 A. The armature & series field coil resistances are 0.3 Ω & 0.2 Ω. Calculate the speed & Torque of the motor & also power developed in watts. [6]

5. (*a*) What are Brushless Motors ? Explain with neat diagram. Explain the operation of unipolar brushless DC Motor. [6]

(*b*) Explain construction, principle & applications of Reluctance Motor. [7]

Or

6. (*a*) Compare Brushless DC Motor with conventional DC Motor. [6]

(*b*) What are Universal Motors ? Explain speed-torque characteristics of compensated type & non-compensated type Universal Motor. [7]

7. (*a*) What are Stepper Motors ? Explain any *one* type in detail. State its applications. [6]

(*b*) Compare variable reluctance motor with permentent magnet stepper motor. [6]

Or

8. (*a*) Explain construction & working of AC Servomotor. State its applications. [6]

(*b*) What are Induction Motors ? Explain operating principle of shaded 1ϕ Induction Motor. [6]