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

Seat No.	

[4657]-537

S.E. (Electrical) (II Sem.) EXAMINATION, 2014

ELECTRICAL MACHINES—I

(2012 PATTERN)

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

N.B. **:—** (*i*) Answer *four* questions.

(*ii*) Neat diagrams must be drawn wherever necessary.

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

(*iv*) Use of electronic pocket calculator is allowed.

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

1. (*a*) Sketch and explain phasor diagram for 1-phase transformer at ON Load. [6]

(*b*) State and explain the conditions to be satisfied for parallel operation of 1-phase transformers. [6]

Or

2. (*a*) State and explain standard connections of 3-phase transformer. Write *one* application of each. [6]

P.T.O.

(*b*) A 20 kVA, 440/220 V, 50 Hz, 1-phase transformer has core loss of 324 W and copper loss of 100 W at half load. Calculate :

(*i*) kVA loading for max. efficiency.

(*ii*) Maximum efficiency at p.f. = 0.8 lag. [6]

3. (*a*) Explain the speed control of D.C. series motor by flux control. [6]

(*b*) A 500 V, 6-pole, D.C. shunt motor have arm. and field winding resistance of 0.5 Ω and 250 Ω respectively. It draws a fuel load current of 20 A from supply. If rotational losses are 900 W, calculate efficiency of motor. [7]

Or

4. (*a*) Draw the construction diagram of D.C. machine and explain each part. [9]

(*b*) Sketch and explain torque-arm. current characteristics of :

(*i*) D.C. shunt motor and

(*ii*) D.C. series motor. [4]

5. (*a*) Compare squirrel-cage and wound rotor of 3-phase induction motor. [6]

(*b*) Obtain the equation for torque under running condition for 3-phase induction motor. [6]

Or

6. (*a*) Obtain the relationship between :

(*i*) T_{st}/T_{max}

(*ii*) T_{FL}/T_{max}. [6]

(*b*) 3-phase, 8-pole, 50 Hz induction motor running at a speed of 710 rpm at a certain load draws a power of 35 kW. The stator and rotor losses amount to be 1200 W and 600 W respectively. Calculate :

(*i*) rotor copper loss

(*ii*) lost torque

(*iii*) efficiency of motor. [6]

7. (*a*) Sketch the phasor diagram and explain the induction motor as a generalised transformer. [6]

(*b*) With neat connection diagram, explain no load and blocked rotor test on 3-phase induction motor. [7]

Or

8. (*a*) Sketch and explain the circle diagram indicating, full load current, o/p line, torque line, rotor Cu loss, stator Cu loss and fixed losses. [8]

(*b*) Explain the operation of star-delta starter used for 3-phase induction motor. [5]