Total No. of Questions—8]   [Total No. of Printed Pages—3

Seat
No.

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S.E. (Electrical) (II Sem.) EXAMINATION, 2017
ELECTRICAL MACHINES
(2012 PATTERN)

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

N.B. :— (*i*) Answer Q. No. **1** *or* Q. No. **2,** Q. No. **3** *or* Q. No. **4**
              or Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **8**.

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

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

   (*iv*) Use of non-programmable scientific calculator is allowed.

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

1. (*a*) Draw the neat connection diagrams and explain the OC and
           SC test on 1-ph transformer for finding voltage regulation and
           efficiency.   [6]

    (*b*) Explain the Scott connection for 3-ph to 2-ph power
           conversion.   [6]

Or

2. (*a*) Why parallel operation of transformers is necessary ? State
           the conditions to be satisfied for parallel operation of 1-ph
           transformer.   [6]

    (*b*) A 500 kVa, 1-ph, 50Hz, transformer has efficiency of 90% both
           at full load and half load with unity power factor. Determine
           its efficiency at 75% of full load and power factor 0.8
           lagging.   [6]

                                                            P.T.O.

3. (*a*) Obtain the equations for armature torque, shaft torque and lost torque. [6]

(*b*) Sketch and explain 3-point starter. [6]

Or

4. (*a*) Draw the power flow diagram for DC motor and explain. [6]

(*b*) A 37.3 kW, 500V, DC shunt motor on full load runs at 1000 rpm has efficiency of 92%. It have R_a = 0.25 Ω and R_{sh} = 250 Ω. Determine : [6]

(*i*) Full load line current

(*ii*) Full load shaft torque and

(*iii*) Starter resistance to limit starting current to 1.5 times the full load current.

5. (*a*) Explain the construction of 3-phase induction motor. [6]

(*b*) 3-phase, 50 Hz, 6-pole induction motor running at 960 rpm at full load and develops a torque of 160 N-m. The rotational losses are 300 W and that of the stator iron and copper loses are 1820 W. Calculate :

(*i*) Output power

(*ii*) Rotor copper loss and

(*iii*) Efficiency at full load. [7]

Or

6. (*a*) Obtain the relation between : [6]

(*i*) Starting torque/full load torque

(*ii*) Full load torque/max. torque.

(*b*) A 50Hz, 8-pole, 3-phase induction motor has full load speed 720 rpm. Rotor resistance per phase = 0.01 Ω and standstill rotor reactance is 0.1 Ω/ph. Find the ratio of full load torque to maximum torque and speed at which maximum torque occurs. [7]

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7. (*a*) Explain the no load and blocked rotor test on 3-phase induction motor to determine equivalent circuit parameters. [6]

(*b*) Sketch and explain circle diagram. [7]

Or

8. (*a*) Explain the testing of 3-phase induction motor as per IS-325. [6]

(*b*) Draw the neat connection diagram and explain the operation of star-delta starter. [7]