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

Seat No.	

[5352]-147

S.E. (ELECTRICAL) (II Sem.) EXAMINATION, 2018

ELECTRICAL MACHINES-I

(2012 COURSE)

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

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

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

(*iii*) Use of scientific pocket calculator is allowed.

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

1. (*a*) With neat connection diagram, explain the procedure to conduct O.C. and S.C. test on 1-ph transformer to obtain voltage regulation and efficiency. [6]

(*b*) Explain V-V connection of transformers and obtain relation between V-V capacity and delta-delta capacity. [6]

Or

2. (*a*) What is the necessity of parallel operation of transformers ? State and explain conditions to be satisfied for parallel operation of transformers. [6]

(*b*) 20 kVA, 440/220 V, 1-ph, transformer has full load iron loss of 400 W and half load copper loss 120 W. Calculate :

(*i*) efficiency at full load and p.f = 0.75 lagging.

(*ii*) kVA loading at maximum efficiency. [6]

P.T.O.

3. (*a*) Sketch neat construction diagram of D.C. machine and explain each part. [6]

(*b*) A 20 kW, 250 V, d.c. series motor has armature resistance of 0.1 ohm and series field resistance of 0.05Ω. The brush voltage drop is 3V. It runs at 650 rpm while drawing 80 A. Calculate the speed, when it draws armature current of 100 A. [6]

Or

4. (*a*) Explain the speed control of d.c. shunt motor by :

(*i*) Flux control

(*ii*) Voltage control.

Draw the necessary circuit diagrams. [6]

(*b*) For d.c. motor, obtain the following expressions :

(*i*) Arm. torque

(*ii*) Shaft torque

(*iii*) Lost torque. [6]

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

(*b*) A 20 kW, 3-ph, 4-pole, 50 Hz, induction motor has rotational losses of 2.5 % of output. It has slip of 4%. Calculate for full load :

(*i*) Rotor Cu loss

(*ii*) Rotor input

(*iii*) Shaft torque. [7]

Or

6. (*a*) Sketch and explain family of torque-slip characteristics of 3-ph induction motor. [6]

(*b*) Obtain the relationship between :

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

(*ii*) T_{fl} / T_{max}. [7]

7. (*a*) With neat connection diagram, explain the no load and blocked rotor test on 3-ph induction motor to determine equivalent circuit parameters. [6]

(*b*) 3-ph induction motor is known as a generalised transformer. Explain with phasor diagram. [7]

Or

8. Write short notes on :

(*i*) D.O.L. Starter. [6]

(*ii*) Star-Delta starter. [7]