24026

B. Tech. 3rd Semester (EE)
Examination – December, 2018

ELECTRICAL MACHINES - I

Paper : EE-207-F

Time : Three Hours]　　　　　　*[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Attempt any *one* question from each Section.

1. (a) Define pole pitch and commutator pitch.　　04

   (b) What are the possible causes for the failure of generator to build up ?　　03

   (c) What causes over heating of commutator in D.C. motor.　　03

   (d) What is the significance of back e.m.f. ?　　02

   (e) Derive e.m.f. equation of D.C. generator.　　04

   (f) What is Hysteresis loss in transformer ? How it can be reduced ?　　04

SECTION – A

2. Why equivalent circuit of transformer is required ? Draw and explain equivalent circuit of single phase transformer in detail.   20

3. (a) In a test for determination of the losses of a 440-V, 50 Hz transformer, the total iron losses were found to be 2500 W at normal voltage and frequency. When the applied voltage and frequency were 220- V and 25 Hz, the iron losses were found to be 850 W. calculate eddy current loss at normal voltage and frequency.   10

   (b) With the help of suitable diagram, describe construction of transformer in detail.   10

SECTION – B

4. What are the necessary conditions for parallel operation of three phase transformer ? Explain parallel operation for equal voltage ratios of transformer.   20

5. (a) Explain Scott' connection for phase conversion in transformer. Also give application for it.   10

   (b) Explain magnetizing inrush current in power transformer. What are the effects of high inrush current ?   10

SECTION – C

6. A shunt generator delivers 195A at terminal p.d. of 250 V. the. armature resistance and shunt field resistance are 0.02 ohm and 50 ohm respectively. The iron and frictional losses equal to 950 W. Find (a) e.m.f

generated (b) copper losses (c) output of prime mover (d) commercial, electrical and mechanical efficiencies.   20

7. (a) Describe armature winding of dc machine in detail with the help of suitable diagrams.   10

   (b) Explain armature reaction of dc machine.   10

SECTION – D

8. (a) A 500-V, 37.3kW, 1000 r.p.m. d.c. shunt motor has on full-load an efficiency of 90 percent. The armature circuit resistance is 0.24 ohm and there is total voltage drop of 2 V at the brushes. The field current is 1.8 A. Determine (a) full load torque (b) full load shaft torque (c) total resistance in motor starter to limit the starting current to 1.5 times the full load current.   10

   (b) 'Compare shunt and series motor depending upon their characteristics and applications.   10

9. (a) Explain Ward-Leonard system of speed control of dc motor.   10

   (b) Draw and explain characteristic curves of dc shunt motor.   10