[Total No. of Questions - 9] [Total No. of Printed Pages - 2]

Dec-24-0318 (CBCS)

EE-301 (Electrical Machine-I)

B.Tech. 3rd

Time : 3 Hours Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Section E is compulsory. Attempt one question each from section A, B, C & D.

SECTION - A

1. Draw general schematic of a single phase transformer. Derive its working principle and deduce the expression for emf in secondary winding. (10)

2. Explain the equivalent circuit of a single phase transformer. (10)

SECTION - B

3. Explain with the help of connection and phasor diagrams, how are Scott connection used to obtain 3-phase supply from 3- phase mains? (10)

4. Why is parallel operation of transformers required? Describe the conditions for parallel operation of three phase transformers. (10)

SECTION - C

5. What is armature reaction? Describe the effect of armature reaction on the operation of d.c. machines. How the armature reaction is minimized? (10)

6. Explain the function of the following in dc machines:

   (i) Interpoles (5)

   (ii) Compensating windings (5)

SECTION - D

7. Discuss different methods of speed control of dc motor. (10)

8. Explain the speed-current, torque-current and speed-torque characteristics of dc shunt motor. (10)

SECTION - E (Compulsory)

9. (a) Define reluctance and its units.

   (b) Define the term voltage regulation in transformer.

   (c) Write application of transformers.

   (d) Define the term efficiency of a motor.

   (e) What are different method used for transformer testing? Also, give their merits and demerits.

   (f) What are various types of connection of three phase transformer?

   (g) Why are starters required for starting the dc motor?

   (h) What is analogy between electric and magnetic circuit?

   (i) Derive emf equation of dc generator.

   (j) What is the critical field resistance of a dc shunt generator? (10×2=20)