

16101(D) = 0 DEC 2016

**B. Tech 3rd Semester Examination**

**Electrical Machines-I (CBS)**

**EE-301**

**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 :** Attempt one question each in Unit I to IV. Unit V is compulsory which consists of short answer questions.

**UNIT - I**

1. (a) Discuss operation of Transformer under no load conditions.  
(b) Draw equivalent circuit of the Transformer. Explain salient features of Shell type and Core type Transformers. (4+6=10)
2. (a) Derive the condition for maximum efficiency in Transformer.  
(b) Give advantages of Auto Transformer. Discuss how a two winding transformer is converted to an Auto Transformer. (4+6=10)

**UNIT - II**

3. (a) With help of neat diagram describe construction of a three phase Transformer.  
(b) Explain star-star and star-delta connection of three phase Transformer. (4+6=10)
4. (a) Briefly explain salient features of distribution Transformers.  
(b) Discuss in detail the parallel operation of three phase Transformers. (4+6=10)

**UNIT - III**

5. (a) Discuss operation of DC Generator.

- (b) What is meant by armature reaction?  
A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series field and shunt field resistances of 0.05, 0.03 and 250 ohms respectively. Calculate the generated voltage and armature current. Allow 1 V per brush for contact drop. (4+6=10)
6. (a) Discuss various losses that occur in DC Generators.  
(b) Describe the methods to improve commutation. (4+6=10)

**UNIT - IV**

7. (a) Describe working of 4 point starter.  
(b) Explain characteristics of DC series and shunt Motors. Give applications. (4+6=10)
8. (a) Discuss any two speed control methods in DC motor.  
(b) A DC series motor operates at 800 RPM with a line current of 100 A from 230 V mains. Its armature and field circuit resistances are 0.15 and 0.1 ohms respectively. Find the speed at which motor runs at a line current of 25 A assuming that flux at this current is 45 % of the flux at 100 A. (4+6=10)

**UNIT - V (Short Answer Questions)**

9. (a) Why core of Transformer is laminated?  
(b) What is magnetic leakage in a Transformer?  
(c) Mention limitations of delta-delta connection in 3-phase Transformer.  
(d) Give disadvantage of an Auto Transformer.  
(e) State applications of Current Transformer.  
(f) Draw configuration of short shunt compound Generator.  
(g) Why DC series motor is not started on no load condition?  
(h) Define critical field resistance in DC Generator.  
(i) What is equivalent to back emf in DC Generator?  
(j) Why armature resistance is kept low in DC Machines? (2×10=20)