

Code: 19EE3401

II B.Tech - II Semester – Regular Examinations – AUGUST 2021

ELECTRICAL MACHINES - I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place
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PART – A

1. a) Define Magnetic Intensity.
b) What is the importance of the commutator in DC machine?
c) What is the condition for gross mechanical power developed by motor is maximum?
d) List the various losses occurred in a transformer.
e) What are the Advantages of autotransformers?

PART – B

UNIT – I

2. Explain in detail about energy in magnetic system. 12 M

OR

3. a) Give comparison between electric and magnetic circuits. 6 M
b) Explain about B-H curve of a ferro-magnetic material. 6 M

UNIT – II

4. Explain the effect of armature reaction in a DC shunt generator. How are its demagnetizing and cross-magnetizing ampere turns calculated? 12 M

OR

5. a) Draw and explain the no-load and load characteristics of DC series and compound generators. 6 M
- b) 4-pole, D.C. shunt generator, with a shunt field resistance of 100 ohms and an armature resistance of 1 ohm, has 378 wave-connected conductors in its armature. The flux per pole is 0.02 Wb. If a load resistance of 10 ohms is connected across the armature terminals and the generator is driven at 1000 r.p.m., calculate power absorbed by load. 6 M

UNIT-III

6. a) Derive an expression for the torque developed in the armature of a D.C. motor. 6 M
- b) Derive the expression for efficiency of D.C. machines. 6 M

OR

7. a) With the help of neat circuit diagram, explain Swinburne's test. 6 M
- b) Explain the operation of a 4-point starter with neat diagram. 6 M

UNIT – IV

8. a) Derive the emf equation of single phase transformer. 6 M

- b) A 120kVA, 6000/400V, single-phase, 50Hz transformer has a iron loss of 1800W. The maximum efficiency occurs at $\frac{3}{4}$ full loads. Find the efficiency of the transformer at
- (i) Full load and 0.8 pf
 - (iii) The maximum efficiency at unity pf.

OR

9. a) Draw and explain the no load phasor diagram of a single phase transformer. 6 M
- b) Explain about of Sumpner's test with neat circuit diagram. 6 M

UNIT – V

10. a) Explain the principle and operation of auto transformer. 6 M
- b) Distinguish between auto transformer and two winding transformer. 6 M

OR

11. a) With the help of circuit diagrams, explain any two types of three phase transformer connections. 6 M
- b) Explain about Scott connection of transformer with neat circuit diagram. 6 M