

Roll No.

3042

**B. Tech. 3rd Semester (EE)
Examination – March, 2021**

ELECTRICAL MACHINE - I

Paper : PCC-EE-209-G

Time : Three Hours]

[Maximum Marks : 75

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 : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) How energy can be stored or retrieved from a Magnetic system ?
- (b) What causes over heating of Commutator in D.C. motor ?
- (c) Define Pole pitch and Commutator pitch.
- (d) Derive E.M.F. equation of D.C. generator.

- (e) What is Hysteresis loss in transformer ? How it can be reduced ?
- (f) State Biot-Savart's law. 2.5 × 6 = 15

SECTION - A

2. Derive expression for field energy, co-energy and field energy density and co-energy density for electromechanical energy conversion process in magnetic system. Assume linearity in the circuit. 15
3. State and explain Ampere's Circuital Law. Using the same law find out the magnetic field intensity H for an infinite line current, an infinite sheet of current. 15

SECTION - B

4. Describe armature winding of dc machine in detail with the help of suitable diagrams. 15
5. What do you mean by armature reaction in D.C. Machine ? Explain the effect of armature reaction in detail. How the effect of the same can be neutralized ? 15

SECTION - C

6. (a) 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 10

- (b) Draw and explain open circuit characteristics for separately-excited D. C. Generator. 5

7. (a) Draw and explain characteristic curves of dc series motor. 10
- (b) Compare Generator and Motor action. 5

SECTION - D

8. What are the necessary conditions for parallel operation of three phase transformer ? Explain parallel operation for equal voltage ratios of transformer. 15
9. (a) Explain the working and construction of auto transformer in detail. 10
- (b) Explain magnetizing inrush current in power transformer. 5