

**END TERM EXAMINATION****THIRD SEMESTER [B.TECH] DECEMBER 2024-JANUARY 2025****Paper Code: EEC-211****Subject: Electrical Machines-I****Time: 3 Hours****Maximum Marks: 60****Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.****Q1 Attempt all parts:-**

- ~~(a)~~ What are the differences between Magnetic circuits and Electric circuits? (4)
- ~~(b)~~ Define iron losses? What are the components of iron losses in dc machines and in which part of the machine it occurs? (4)
- ~~(c)~~ Why starter is required to start the DC shunt motor? (2)
- ~~(d)~~ Why swinburne's test cannot be performed on DC series motor? (2)
- ~~(e)~~ Define efficiency and all day efficiency of transformer? (3)
- ~~(f)~~ Explain any one special purpose transformer? (3)
- ~~(g)~~ What is the difference between DC motor and Brushless DC motor? (2)

**UNIT-I**

- Q2** (a) Describe the Principle of energy conversion. Explain the Block diagram/ Flow chart for Mechanical to Electrical energy conversion. (5)
- (b) Drive the relation for Electrical energy input and Magnetic field energy stored for singly excited Magnetic system. (5)

**OR**

- Q3** ~~(a)~~ Name the major part of a DC machine. State the material and function of each part. Draw the sketch and show the path of magnetic flux in a 4 pole machine. (5)
- ~~(b)~~ Explain the conditions required to build-up voltage in DC shunt generators. (5)

**UNIT-II**

- Q4** ~~(a)~~ Explain the armature reaction in DC generator? A 4 pole generator has wave wound armature with 722 conductors and it delivers 100 A on full load. If the brush shift is 8 degree mechanical, calculate the armature demagnetizing and cross magnetizing ampere- turns per pole. (5)
- ~~(b)~~ What do you mean by commutation? Write down methods to improve the commutation. Explain anyone. (5)

**OR**

- Q5** (a) A 240 V dc series motor takes 40A when giving its rated output at 1500 rpm. Its resistance is 0.3 ohm. Find what resistance must be added to obtain the rated torque (a) at starting (b) at 1500rpm. (5)
- ~~(b)~~ A 250 V DC series motor runs at 1000 RPM when drawing a line current of 50 A. The armature and series field resistances are 0.08  $\Omega$  and 0.05  $\Omega$  respectively. If the current taken by the motor remains the same, determine the value of series resistance required to reduce the speed to 800 RMP. (5)

**UNIT-III**

- Q6 (a) Can DC supply be applied to transformers? Explain working of transformer on Load, draw phasor diagram for resistive load. (5)
- (b) Explain open circuit and short circuit test performed on the single phase transformer. Draw the equivalent circuit diagram referred to LV (low voltage) side. (5)

**OR**

- Q7 (a) Why transformer rating in KVA? Describe the various losses in a transformer. Explain how these losses are minimized? (5)
- (b) Define voltage regulation of a transformer? A transformer has 2 % resistance and 5% reactance. Find its voltage regulation at full load and 0.8 power factor lagging. (5)

**UNIT-IV**

- Q8 (a) What are the different types of connections of three phase transformer. Write down applications of each connection. (5)
- (b) Explain vector grouping with clock convention. (5)

**OR**

- Q9 (a) Why parallel operation of transformers required? Discuss the essential and desirable conditions to be fulfilled for operating two – three phase and two single phase transformers connected in parallel. (5)
- (b) Explain three phase to six phase conversion. (5)

\*\*\*\*\*