

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2020****Subject Code: 3140913****Date: 15/02/2021****Subject Name: Electrical Machine- I****Time: 02:30 PM TO 04:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		Marks
Q.1	(a) What is tap changing? Why is it required?	03
	(b) Distinguish between singly excited and doubly excited magnetic systems.	04
	(c) Sketch diagram of 3 point starter and explain working.	07
Q.2	(a) Why Secondary of current transformer should not be open?	03
	(b) What is the necessity of starter in a DC motor?	04
	(c) Define Pitch Factor and Distribution factor. Enlist advantages and disadvantages of short pitch or fractional pitch coil.	07
Q.3	(a) Derive the EMF equation of a DC generator from first principle.	03
	(b) Mention the conditions for satisfactory parallel operation of three phase transformers.	04
	(c) Explain the procedure and calculations for Field test on identical DC series machines.	07
Q.4	(a) Derive the equation of pitch factor for short pitch coil.	03
	(b) Draw the vector diagram of a transformer on load. Consider the winding resistances, leakage reactance and no load losses.	04
	(c) Draw and explain internal and external characteristics of dc series generator.	07
Q.5	(a) Describe function of compensating winding.	03
	(b) Draw the schematic diagrams and explain the winding connections for the short shunt and long shunt compound generators.	04
	(c) Enlist different speed control methods of DC shunt motor. Explain any one method.	07
Q.6	(a) State advantages and disadvantages of Swinburne's test.	03
	(b) Define armature reaction. Explain cross magnetizing and demagnetizing effects of armature reaction in brief.	04
	(c) Explain the direct load test for determination of voltage regulation and efficiency of transformer with necessary diagram.	07
Q.7	(a) Justify following statements: i. Transformer core is laminated. ii. Transformer rating is in KVA.	03
	(b) Differentiate between core type and shell type transformer.	04
	(c) Explain V-V connection of 3 phase transformer.	07

- Q.8** (a) Explain polarity test of single phase transformer. **03**
- (b) Draw connection diagrams and winding diagrams for Dd0, Yd1, and Dy11. **04**
- (c) Derive an expression for saving of copper when auto transformer is used compared to Two winding transformer. **07**