GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV(NEW) EXAMINATION – WINTER 2022

Subject Code:3140913   **Date:15-12-2022**
Subject Name:Electrical Machine- I
Time:10:30 AM TO 01:00 PM   **Total Marks:70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed**

			MARKS
Q.1	**(a)**	Explain principle of energy conservation.	**03**
	(b)	List out parts of D.C machine and briefly discuss any two.	**04**
	(c)	A shunt generator deliver 195A at 250V, armature and shunt field resistances are 0.02 Ω and 50 Ω respectively. The iron and friction losses are 950W.Calculate (1) Emf generated ,(2)Total copper loss,(3)Output of prime-mover,(4)Mechanical efficiency , electrical efficiency and total efficiency.	**07**
Q.2	**(a)**	Define following terms: (1) Mechanical and Electrical angle (2) Pole pitch (3) pitch factor	**03**
	(b)	Explain polarity test of transformer.	**04**
	(c)	A 600 KVA single phase transformer has an efficiency of 92 % both at full load and half load at unity power factor.Determine its Efficiency at 60 % of full load at 0.8 power Factor lag.	**07**
		OR	
	(c)	Discuss series field test on D.C machine.	**07**
Q.3	**(a)**	Distinguish between singly excited and doubly excited magnetic systems.	**03**
	(b)	Define the following: (a) magnetic flux (b) mmf (c)magnetic permeability(e)leakage flux.	**04**
	(c)	Explain Equivalent circuit of transformer with circuit diagram.	**07**
		OR	
Q.3	**(a)**	Explain comparison between simplex lap and wave winding.	**03**
	(b)	Explain Equalizer connection.	**04**
	(c)	Define voltage regulation of a transformer. Describe the method to find out voltage regulation of a transformer using open circuit and short circuit tests.	**07**
Q.4	**(a)**	Explain O.C . test on 1-Φ transformer	**03**
	(b)	Explain 3-point starter for d.c. motor.	**04**
	(c)	Explain process of commutation. Enlist different methods to improve commutation and explain any one method.	**07**
		OR	
Q.4	**(a)**	List the applications of d.c. motors.	**03**
	(b)	Derive condition for maximum efficiency for I - Ø transformer.	**04**
	(c)	Draw the vector diagrams and winding connections for the Following transformer connections. (a) Dz6 (b) Yz11 (c) Yd11	**07**

Q.5 **(a)** Explain the load characteristics of d.c. shunt generator.   **03**
      (b) Explain Sumpner's test for testing of a transformer.   **04**
      (c) Explain the methods of speed control on d.c. shunt motor.   **07**

OR

Q.5 **(a)** Explain the conditions for parallel operation of three phase transformer.   **03**
      (b) What are the advantages and disadvantages of Swinburne test?   **04**
      (c) Derive an expression for saving of copper when auto transformer is used   **07**
           compared to Two winding transformer.

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