Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

Subject Code: 2130904 **Date: 5/12/2019**

Subject Name: DC Machines and Transformer

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			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)	An 8-pole dc generator has 500 armature conductors and has a useful flux per pole of 0.065 wb. What will be the emf generated if it is lap connected and run at 1000 rpm? What must be the speed at which it is to be derived to produce the same emf if it is wave wound?	**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 single phase transformer is designed to operate at 240/120V,50 Hz. Calculate the secondary no load voltage and its frequency if the h.v side of the transformer is connected to (a) 240 V , 40 Hz (b) 120 V, 25 Hz (c) 120 V,50 Hz (d) 480 V, 50 Hz (e) 240 V , d.c.	**07**
		OR	
	(c)	Discuss retardation test on D.C machine.	**07**
Q.3	**(a)**	Distinguish between singly excited and doubly excited magnetic systems.	**03**
	(b)	A 4- pole, lap wound, long shunt, dc compound generator has useful flux per pole of 0.07wb. The armature consists of 220 turns and resistance per turn is 0.004ohm. Calculate the terminal voltage if the resistance of shunt and series field is 100 ohm and 0.02 ohm respectively; when the generator is running at 900 rpm with armature current of 50A. also calculate the power output in KW for the generator	**04**
	(c)	Explain Equivalent circuit of transformer and draw generalized phasor 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 & S.C. test on 1-Φ transformer	**03**
	(b)	What is the necessity of starter in DC motor? Explain 3-point starter for DC motor.	**04**

	(c)	Explain process of commutation. Enlist different methods to improve commutation and explain any one method.	**07**

OR

Q.4	**(a)**	Derive condition for maximum efficiency for I - Ø transformer.	**03**
	(b)	Enlist different speed control methods of DC shunt motor. Explain any one method.	**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 DC shunt generator.	**03**
	(b)	Explain Sumpner's test for testing of a 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

Q.5	**(a)**	Describe parallel operation of 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 compared to Two winding transformer.	**07**

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