Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (NEW) EXAMINATION – SUMMER 2015

Subject Code: 2130904 **Dates: 11/06/2015**

Subject Name: DC MACHINES AND TRANSFORMER

Time:02.30pm-05.00pm **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Derive an emf equation for transformer with usual notation.	**07**
	(b)	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)**	Explain Hopkinson`s test with its advantages & disadvantages.	**07**
	(b)	Explain O.C & S.C. test on 1-Φ transformer.	**07**
		OR	
	(b)	A 200V 4-pole lap wound DC shunt motor has 800 conductors of its armature winding. The armature and field winding resistances are 0.5 Ω and 200 Ω respectively. Motor takes 21A and flux /pole is 30mwb. Find the torque and speed of the motor.	**07**
Q.3	**(a)**	Explain the constructional details of transformer.	**07**
	(b)	A 200V dc shunt motor develops an output of 17.158kW,when taking 20.2kW.The field resistance and armature resistances are 50 Ω and 0.06 Ω respectively. What is the efficiency and input power if output power is 7.46kW?	**07**
		OR	
Q.3	**(a)**	List the methods of speed control of DC series motor, explain any one in detail.	**07**
	(b)	A 40 kVA, single phase transformer has 400 turns on primary and 100 turns on secondary. The primary is connected to 2000 V.50 Hz supply. Determine: (i)The secondary Voltage on open circuit. (ii) The current flowing through the two windings on full load.(iii) The maximum value of flux.	**07**
Q.4	**(a)**	Write a note on T-T connection for 3-Φ transformer.	**07**
	(b)	A 600 kVA, 1-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.4	**(a)**	What is DC motor? Derive its torque equation.	**07**
	(b)	A 10 KVA, 2000/400 V single phase transformer has R1=5Ω, X1=12Ω, R2=0.2 Ω and X2= 0.48Ω. Determine the equivalent impedance of the transformer referred to (1) primary (2) secondary side	**07**
Q.5	**(a)**	Describe parallel operation of transformer.	**07**
	(b)	Explain the O.C.characteristic of DC shunt Generator, also define the critical resistance & speed from the characteristic.	**07**
		OR	
Q.5	**(a)**	Explain 3-point starter for DC motor.	**07**
	(b)	Explain the transformer ON-LOAD with vector diagrams	**07**

****