Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 150901 **Date: 08/05/2017**

Subject Name: Electrical Machine - II

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.**

Q.1 **(a)** With the help of a neat diagram explain parallel operation of two 3-phase transformer. Also explain the essential & desirable conditions to be fulfilled for operating two 3-phase transformers in parallel. **07**

(b) A 220,3-phase ,4-pole,50-Hz, Y-connected induction motor is rated 3.73kw. The equivalent circuit parameters are,R_1 = 0.45 ohms. X_1 =0.8 ohms R_2' = 0.4 ohms, X_2' =0.8 ohms, B_0= -1/30 mho. The stator core loss is 50W and rotational loss is 150W . For a slip of 0.04, find Input current (ii) P.F (iii) air gap power (iv)Mechanical power (v) Electromagnetic Torque (vi) output power & (vii) Efficiency **07**

Q.2 **(a)** Two 3-phase transformers A and B having the same load line voltage ratio 3300/400-V. Supply a load of 750 KVA at 0.707 lagging when operating in parallel . The rating of A is 500 KVA , its resistance is 2% and reactance 3% . The corresponding value for B are 250KVA ; 1.5% and 4% respectively . Assuming that both transformer have star connected secondary winding , calculate. **07**

1.The load supplied by each transformer.
2.The power factor at which each transformer is working
3.The secondary line voltage of the parallel circuit

(b) Explain Scott-connection of transformer in detail. Also compare it with open – delta connection **07**

OR

(b) Two furnaces are supplied with 1-phase current at 50V from a 3- phase , 4.6kv system by means of two 1-phase scott- connected transformers with similar secondary windings. When the load on main transformers is 350 KW and that on the other transformer is 200kw at 0.8 p.f lagging. What will be the current in each 3-phase line? Neglect phase displacement and losses in transformers. **07**

Q.3 **(a)** Explain the working, equivalent circuit and advantages of double squirrel cage induction motor. **07**

(b) Explain the on load and off load tap-changers of transformer **07**

OR

Q.3 **(a)** Draw the constructional features and operating characteristics of shaded pole motor. Also state its application. **07**

(b) State different methods of speed control of 3-phase Induction motor. Explain **07**

any one method of speed control of 3- phase slip ring induction motor from the rotor side.

Q.4	**(a)**	Explain the phenomenon of cogging and crawling in induction motor.	**07**
	(b)	Discuss the applications of different transformer connection. Also draw the vector and winding diagram for the following 3-_ transformer connections Dz0, Dd6, Dy1, Yz1, Dy11, Yz11	**07**

OR

Q.4	**(a)**	Explain the construction and working principle of Repulsion motor	**07**
	(b)	Explain construction of welding transformer. How does it differ from power transformer?	**07**
Q.5	**(a)**	Explain the performance of induction motor against variation in supply voltage and frequency.	**07**
	(b)	Explain operation and principle of universal motor	**07**

OR

Q.5	**(a)**	Explain the action of commutator as a frequency converter.	**07**
	(b)	Explain the importance of Circle diagram of Polyphase Induction Motor	**07**

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