Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–V • EXAMINATION – SUMMER 2013**

**Subject Code: 150901** **Date: 14-05-2013**

**Subject Name: Electrical Machine - II**

**Time: 10.30 am - 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.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | Draw and explain vector diagram, connection diagram and clock representation of Dz6 connection of 3-phase transformer. | **07** |
| | **(b)** | Draw and explain vector diagram and connection diagram of Scott used for converting 3-phase supply into two 1-phase supply using two 1-phase transformer | **07** |
| **Q.2** | **(a)** | With the help of a neat diagram explain parallel operation of two 3-phase transformers. Also explain the essential & desirable conditions to be fulfilled for operating two 3-transformers in parallel. | **07** |
| | **(b)** | Two transformers are connected in open delta and supply a balance 3-phase load of 240 KW at 400 volt and a power factor of 0.866, determine<br>(1) The secondary line current, (2) The KVA load on each transformer,<br>(3) The power delivered by the individual transformers. | **07** |
| | | OR | |
| | **(b)** | Draw and explain vector diagram, connection diagram and clock representation of Yz11 connection of 3-phase transformer. | **07** |
| **Q.3** | **(a)** | Draw the circle diagram for a 3-phase,6-pole,50hz,400 V star connected induction motor from the following data<br>No load test: 400V, 9A, 1250 watt; Short circuit test: 200V, 50A, 6930 watt<br>The stator loss at standstill is 55% of total copper losses and full load current is 32 A. determine (1) power factor , slip, output, efficiency, speed and torque at full load (2) starting torque | **10** |
| | **(b)** | Explain the phenomenon of cogging and crawling in induction motor. | **4** |
| | | OR | |
| **Q.3** | **(a)** | State and explain different speed control methods of 3-phase induction motor | **07** |
| | **(b)** | Explain principle and operation of 3-phase induction generator. Also state its application. | **07** |
| **Q.4** | **(a)** | Explain double revolving field theory related to 1-phase induction motor. From this theory verify that 1-phase induction motor is not self started. | **07** |
| | **(b)** | A 230V, 380W, 50Hz, 4-pole, 1-phase induction motor gave the following test results.<br>No load test : 230 V, 84 W, 2.8 A; Blocked rotor test: 110 V,460W, 6.2A<br>The stator winding resistance is 4.6 ohm and during the blocked rotor test the auxiliary winding is open. Determine the equivalent circuit parameters. | **07** |
| | | OR | |
| **Q.4** | **(a)** | Explain operation and principle of universal motor | **07** |
| | **(b)** | Explain different methods of producing starting torque in 1-phase induction motor | **07** |
| **Q.5** | **(a)** | Explain construction and working principle of Schrage motor. | **07** |
| ` | **(b)** | Explain the working, equivalent circuit and advantages of double squirrel cage induction motor. | **07** |
| | | OR | |
| **Q.5** | **(a)** | Explain construction and working principle of shaded pole induction motor. | **07** |
| | **(b)** | Explain construction of welding transformer. How does it differ from power transformer? | **07** |

**********