

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V- EXAMINATION – SUMMER 2016****Subject Code: 150901****Date: 19/05/2016****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) Explain Scott connection of Transformer in detail and compare it with V-V connection. **07**
- (b) A 100 KVA, 11000/400 V, Delta –Star distribution transformer has a resistance drop of 1% and leakage Impedance drop of 6%. Find (a) the transformer impedance per phase as referred to high voltage side (b) voltage regulation at full load, 0.8 lagging power factor. **07**
- Q.2** (a) Draw the physical connection and phasor diagram of the following transformer connections. **07**
Dz6, Yd1, Yz11
- (b) Explain Construction of welding transformer. How does it differ from power transformer? **07**
- OR**
- (b) Explain Polarity testing of three phase transformer. **07**
- Q.3** (a) Explain the effect of unbalance voltages and frequency variation on the operation of 3 phase Induction motor. **07**
- (b) A 746 KW, 3 phase, 50 Hz, 16 pole Induction Motor has a rotor impedance of $0.02 + j 0.15$ ohm at standstill. Full load torque is obtained at 360 rpm. Calculate (i) the ratio of maximum to full load torque (ii) the speed for maximum torque (iii) the rotor resistance to be added to get maximum starting torque. **07**
- OR**
- Q.3** (a) Derive the expression for developed torque in three phase Induction motor and find the condition for maximum torque **07**
- (b) A 20 HP, 400 V, 50 Hz, 3Phase star Connected induction motor has the following test data: **07**
No Load test : 400 V, 9A, $\cos\phi = 0.2$
Block rotor test: 200 V, 50 A, $\cos\phi = 0.4$
Draw a circle Diagram and determine (a) line current (b) power factor (c) slip and (d) Efficiency at full load. The stator and copper losses are divided equally in the block rotor condition.
- Q.4** (a) Explain the phenomena of cogging and crawling in 3 phase induction motor. **07**
- (b) Explain construction and working of Universal Motor. **07**
- OR**
- Q.4** (a) Explain operating principal of Induction Generator. **07**
- (b) Explain why plain single phase motor is not self -starting. **07**
- Q.5** (a) Explain the working operation of Schrage motor. **07**

- (b) A 230V , 380W, 50 Hz , 4pole 1-Phase induction motor gave the following test result: **07**
No load test: 230 V, 84W, 2.8 A
Blocked rotor test: 110V, 460W, 6.2A
The stator winding resistance is $4.6 \, \Omega$ and during the blocked rotor test, the auxiliary winding is open. Determine the equivalent circuit parameters.

OR

- Q.5** (a) Describe the construction and working of repulsion motor. **07**
- (b) A 125W, 4 pole, 110 V, 50 Hz, single phase induction motor delivers rated output at a slip of 6%. The total copper loss at full load is 25 watts. Calculate the full load efficiency and the rotor copper loss caused by the backward field. Rotational losses may be assumed to be 25 watts. Neglect the stator copper loss. **07**
