

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V • EXAMINATION – WINTER 2013

Subject Code: 152404**Date: 02-12-2013****Subject Name: Electro Mechanical Energy Conversion - 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) Explain V-V connection of three phase transformer in detail. **07**
(b) Derive the expression for starting torque of an induction motor. **07**

- Q.2** (a) Why a 1-phase Induction motor is not self starting? How it is made self starting? **07**
(b) In a Scott connection, calculate the values of line currents on the 3-phase side if the loads on the 2-phase side are 300kW and 450kW both at 100V and 0.707p.f(lag) and the 3-phase line voltage is 3300V. The 300kW load is on the leading phase on the 2-phase side. Neglect transformer losses. **07**

OR

- (b) Two 3-phase transformers A and B having the same no-load line voltage ratio 3300/400 V supply a load of 750kVA at 0.707 lagging when operating in parallel. The rating of A is 500 KVA, its resistance is 2% and reactance 3%. The corresponding values for B are 250KVA; 1.5% and 4% respectively. Assuming that both transformers have star-connected secondary windings, 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.

- Q.3** (a) Explain construction & working of universal motor. **07**
(b) Explain basic construction and working principle of stepper motor. **07**

OR

- (b) Explain construction & working of shaded pole type single phase motor. Also enlist advantages & disadvantages. **07**

- Q.4** (a) Explain the effect of variation in excitation on the power factor and armature current of synchronous motor. Draw “V-Curves” and “Inverted V-Curves” for different loads. **07**
(b) Discuss the effect of increased load with constant excitation. **07**

OR

- (b) A 3-phase star connected 400V, 50Hz, 4-pole induction motor has the following per phase parameters in ohms, referred to the stator. **07**
 $R_1=0.15\Omega$, $X_1=0.45\Omega$, $R_2'=0.12\Omega$, $X_2'=0.45\Omega$, $X_m=28.5$
Compute the stator current and power factor when the motor is operated at rated voltage and frequency with $s=0.04$.

- Q.5** Answer any TWO. **07**
- (a) Explain blocked rotor test of induction motor. **07**
(b) Give comparison between synchronous motor and induction motor. **07**
(c) Explain working principle of permanent magnet brushless D.C. machine. **07**
