

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC SEM-II Examination-Dec-2011

Subject code: X21901**Date: 22/12/2011****Subject Name: Electrical Machines and Electronics****Time: 10.30 am -1.00 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) State different parts & their materials of a dc generator. Also draw external and internal characteristics of a dc (i) Series and (ii) Shunt generators. **07**
- (b) Derive the expression of armature torque of a dc motor. Draw the speed torque characteristics of a dc (i) Series, (ii) Shunt and (iii) Compound motors. **07**
- Q.2** (a) Justify the need of a starter for a dc shunt motor. Explain the working of a 3-point starter with necessary diagram. **07**
- (b) Discuss various methods of speed control of a dc shunt motor. **07**
- OR**
- (b) Explain how does rotating magnetic field is created in a 3-phase induction motor. Also discuss slip –torque characteristics of an induction motor. **07**
- Q.3** (a) Compare 3-phase and 1-phase induction motor. Why is 1-phase induction motor not self starting, Justify. **07**
- (b) The power input to a 500 V, 6-pole, 3-phase induction motor running at 975 rpm is 40 kW. The stator losses and windage losses are 1 kW and 2 kW respectively. Calculate the (i) slip, (ii) rotor copper losses, (iii) shaft power and (iv) efficiency **07**
- OR**
- Q.3** (a) Write short notes on (i) 1-phase capacitor motor, (ii) 1-phase shaded pole and (iii) universal motor. **07**
- (b) Define voltage regulation of an Alternator. Also state the reasons for the stationary armature in an Alternator. **07**
- Q.4** (a) State types of transformers based on its construction. Discuss the use of breather, bushings and conservators in a transformer. **07**
- (b) Define step-up and step-down transformers. Explain its working. **07**
- OR**
- Q.4** (a) Compare AC and DC transmission. State advantages of high transmission voltage. **07**
- (b) Discuss disadvantages of low power factor and its causes. **07**
- Q.5** (a) Compare indoor and outdoor substations. **07**
- (b) Explain Half wave rectifier with necessary circuit and waveforms. **07**
- OR**
- Q.5** (a) Discuss the use of OPAM as (i) inverting, (ii) non-inverting, (iii) differential and (iv) comparator **07**
- (b) Discuss AND, OR, NOR, NOT, NAND, Ex-OR and Ex-NOR logic gates with their truth tables. **07**
