

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. Sem. – IInd - Examination – June/July- 2011****Subject code: 1720701****Subject Name: Advanced Electrical Machines****Date: 22/06/2011****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) Derive expression of total energy supplied to the coupling field for electromechanical system with magnetic and electric field. **07**
(b) Explain the term vector rotator. Derive expression of vector rotator and explain its significance. **07**

- Q.2** (a) Explain micro stepping control of stepper motor. **07**
(b) Discuss converter fed BLDC drive. Discuss its performance for 120° conduction period. **07**

OR

- (b) Compare between outer rotor and inner rotor BLDC motor. **07**

- Q.3** (a) Explain construction and working principle of Hybrid stepper motor. **07**
(b) Explain the concept of energy efficient motor. Explain various efficiency evaluation techniques. **07**

OR

- Q.3** (a) Compare windmill generator with synchronous generator. How constant voltage and frequency is achieved in the windmill generator. **07**
(b) Explain direct saving and payback analysis of energy efficient motor. **07**

- Q.4** (a) Explain fault detection and diagnosis technique for 3 phase Induction motor. **07**
(b) Explain typical root causes and failure modes of electrical machines. How condition monitoring can help in diagnosis of machine health. **07**

OR

- Q.4** (a) Derive winding inductances and voltage equations for induction machines. Mention assumptions made for derivation. **07**
(b) Explain construction and working principle of BLDC. **07**

- Q.5** (a) Explain bifilar converter with necessary waveforms. **07**
(b) Explain electromechanical energy conversion in SRM. **07**

OR

- Q.5** (a) Explain with suitable diagram the compensation of reactive power requirement of the windmill generator. **07**
(b) Explain control and application of Linear Induction Motor. **07**
