

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – WINTER • 2013****Subject code: 1724504****Date: 31-12-2013****Subject Name: Advanced Electrical Machines****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) Discuss reactive power compensation of wind mill generator. **07**
(b) Discuss the basic concepts of energy efficient motor. **07**

- Q.2** (a) Discuss converter fed BLDC drive. Discuss performance for **07**
120° conduction period.
(b) Explain micro stepping control of a stepper motor. Compare variable **07**
reluctance, permanent magnet and hybrid step motors.

OR

- (b) Explain in brief construction and working principle of hybrid stepper **07**
motor.

- Q.3** (a) Explain Asymmetric bridge converter used for S.R.M. **07**
(b) Derive winding inductances and voltage equations for induction **07**
machines. Mention assumptions made for derivation.

OR

- Q.3** (a) How linear induction machine is different than conventional induction **07**
machine? State the Advantage and Disadvantage.
(b) Explain Bifilar Winding Type Converter used for S.R.M With proper **07**
diagram explains the working of (n+1) Converter used for S.R.M.

- Q.4** (a) Derive expression of total energy supplied to the coupling field for **07**
electromechanical system with magnetic and electric field.
(b) Define (i) D tente torque, (ii) start-stop mode, (iii) slewing mode, (iv) **07**
pull-in-torque in a stepper motor.

OR

- Q.4** (a) Compare VR, permanent magnet and hybrid step motor characteristics **07**
based on step angle, phases, drive type and rotor inertia.
(b) Determine the expression for f_{as} , f_{ds} and f_{os} for $f_{as} = \sin(t)$, $f_{bs} = t$, $f_{cs} = -$ **07**
 $\cos(t)$, assume $\theta(0) = -\pi/2$ and $\omega = 1$ rad/sec, for $t = \pi/6$.

- Q.5** (a) Draw and explain the schematic diagram for the closed loop control of **07**
BLDC drives for position control.
(b) Discuss fault detection and diagnosis technique for transformer. **07**

OR

- Q.5** (a) Explain the working principle of BLDC machine. Explain difference **07**
between BLDC machine and synchronous machine.
(b) How condition monitoring can help in diagnosis of machine health. **07**
