

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- VIth SEMESTER–EXAMINATION – MAY- 2012****Subject code: 160902****Date: 11/05/2012****Subject Name: Power Electronics-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 Mc Murray Bedford half bridge inverter with circuit diagram and waveforms. **07**
 (b) Explain Single phase transformer connection changers in detail. **07**

- Q.2** (a) Compare AC & DC drives. **07**
 (b) Explain static Kramer drive and static Scherbius drive for slip power recovery scheme for large size induction motor control. **07**

OR

- (b) A 400V, 4 pole, 50Hz, 3 phase, star connected induction motor has the following parameters: **07**
 No. of stator turns/phase is twice the number of rotor turns/phase, $r_1=0.64 \Omega$, $x_1=1.1 \Omega$, $r_2=0.8 \Omega$, $x_2=0.12 \Omega$. The load torque is proportional to square of speed and is 40 N-m at 1440 rpm. If the motor speed is 1300 rpm, find (a) load torque (b) rotor current (c) stator applied voltage. Neglect no load current.

- Q.3** (a) In a single phase to single phase cycloconverter, the input voltage is 120V (rms), 60 Hz. The load resistance is 5Ω and the load inductance is $L=40$ mH. The frequency of the output voltage is 20Hz. If the converters are operated as semi converters such that $0 \leq \alpha \leq \pi$ and the delay angle is $\alpha_p=2\pi/3$, determine (a) the rms value of output voltage V_o , (b) the rms current of each thyristor I_R , and (c) the input PF. **07**
 (b) For a single phase full wave AC controller, the input rms voltage is $V_s=120$ V, 60Hz. The load is $L=6.5$ mH and $R=2.5\Omega$. The delay angles of thyristors are equal i.e. $\alpha_1= \alpha_2=\pi/2$. Determine (a) the conduction angle δ of the thyristor, which conducts for positive half cycle (b) the rms output voltage V_o (c) the rms thyristor current I_R (d) the rms output current I_o (e) the average current of a thyristor I_A and (f) the input PF. **07**

OR

- Q.3** (a) Explain Third harmonic PWM in detail with output waveforms. **07**
 (b) Explain Space Vector switching and Space Vector sequence used for Space Vector Modulation (SVM) **07**

- Q.4** (a) Explain AC voltage controllers with PWM control **07**
 (b) Discuss Matrix converter in detail **07**

OR

- Q.4** (a) Explain scalar control with reference to Closed-Loop control of induction motor **07**
 (b) Discuss volts/hertz control and self controlled synchronous motor drives with basic schematic arrangements. **07**
Q.5 (a) Discuss Active filters **07**
 (b) Write a brief note on HVDC **07**

OR

- Q.5** (a) Classify the FACTS device and explain any one device in detail with application. **07**
 (b) Explain RF heating **07**
