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Seat No.: \_\_\_\_\_\_ No.\_\_\_\_\_

Subject Code: 170801

motor

## **GUJARAT TECHNOLOGICAL UNIVERSITY** BE - SEMESTER- VII • EXAMINATION – SUMMER 2015

Subject Name: Power Electronics and Industrial Drives

## Time: 02.30PM-05.00PM **Total Marks: 70** Instructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. **Q.1** Draw and explain the structure of IGBT. Also, explain principle of operation and I-V 07 (a) Characteristics of IGBT. Explain about the construction, characteristics and gate drive requirements of SCR. 07 **(b)** Classify the power factor improvement methods for phase controlled rectifiers. Explain Q.2 (a) 07 any one. Draw and explain full wave controlled rectifier with the inductive load using required 07 **(b)** waveforms and equations. OR Explain the operation of single phase, half wave and controlled rectifier with R load 07 **(b)** using waveforms. Also, derive the average and RMS value of the output voltage. 0.3 (a) Briefly describe the operation of single phase cycloconverter with necessary waveform. 07 **(b)** Derive the equation of output voltage for on/off AC voltage controller. Draw neat 07 sketch of circuit diagram and waveform. OR Discuss operation of three phase AC-AC converter with star connected resistive load Q.3 **(a)** 07 Discuss operation of three-phase inverter in 180° mode of conduction. **(b)** 07 Discuss about choice of A.C. and D.C. drives in detail. 07 **Q.4 (a)** Explain the selective harmonic elimination technique for VSI **(b)** 07 OR Discuss about controlled rectifier and DC-DC converter fed drive. 07 0.4 (a) Discuss the class B operation of Chopper Circuit. **(b)** 07 Q.5 Classify synchronous motor drives. Explain brushless DC and AC motor 07 (a) Discuss the rotor voltage control for slip ring induction motor **(b)** 07 OR **Q.5** Explain V/f control of induction motor drives Give its merits and demerits. 07 (a) Explain slip-power recovery by Static Scherbius method for speed control of induction **(b)** 07

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Date:01/05/2015