

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER 2013****Subject Code: 142402****Date: 17-06-2013****Subject Name: Fundamentals of Power Electronics****Time: 10:30am – 01:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Draw the Block Diagram of Power Electronics System and Explain functionality and working of each block in detail. **07**
 (b) Explain V-I Characteristics of SCR and Derive equation of I_A using two transistor analogy of SCR. **07**
- Q.2** (a) Draw symbols and V-I characteristics of (a) Diode (b) DIAC (c) Power BJT (d) UJT (e) TRIAC (f) Power MOSFET (g) IGBT **07**
 (b) Compare the following term: 1. Power Diode and PIN Diode 2. Fast Recovery Diode and Schottky Diode **07**
- OR**
- (b) Compare the following term: 1. DIAC and TRIAC 2. Power BJT and Power MOSFET **07**
- Q.3** (a) Define commutation. Describe Thyristor Turn OFF mechanism in detail. List the method of commutation. **07**
 (b) Discuss causes and effect of di/dt and dv/dt problem for Thyristor and Explain its remedies. **07**
- OR**
- Q.3** (a) Define Turn ON time. Describe Thyristor Turn ON mechanism in detail . List the method of Triggering. **07**
 (b) Discuss Characteristics of ideal switch and explain each in detail. **07**
- Q.4** (a) Define Rectification. Explain working of 1- Ø Controlled Rectifier along with neat circuit diagram and waveform. **07**
 (b) What is inverter? Explain Classification of inverter in details. List the requirement of practical inverter. **07**
- OR**
- Q.4** (a) Explain Classification of Chopper. Explain working of down chopper using circuit diagram and neat waveform. **07**
 (b) What is Cycloconverter? Explain working and application of it. **07**
- Q.5** (a) Write a Short Note on: Material used in Power Semiconductor Devices. **07**
 (b) Define Following terms: 1. Reverse Recovery Time 2. THD 3. DF 4. LOH 5. Duty Cycle 6. Latching Current 7. Holding current **07**
- OR**
- Q.5** (a) Write a Short Note on : Power Module **07**
 (b) Define Following terms: 1. Finger Voltage 2. Intrinsic Stand off Ratio 3. Peak inverse Voltage 4. Rectification Efficiency 5. Rise Time 6. Displacement Power Factor 7. Harmonic Factor. **07**
