

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE – SEMESTER V • EXAMINATION – WINTER - 2012****Subject code: 152401****Date: 11-01-2013****Subject Name: Power Electronics Devices & Circuits****Time: 02:30 pm to 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Notations/Symbols used have usual meanings.

- Q.1** (a) Discuss ideal switch characteristics. Enlist only various types of losses in an electronic switch. **07**
- (b) Explain materials used to fabricate power electronic components. **03**
- (c) Compare Power MOSFET with Power Transistor. **04**
- Q.2** (a) What is thyristor? Enumerate the various mechanisms by which thyristor can be triggered into conduction. What are the necessary condition(s) for turning - off an SCR? **07**
- (b) Discuss Turn – ON mechanism for a thyristor with neat sketches. **07**
- OR**
- (b) Enlist commutation methods of thyristor. Discuss Class – C commutation method in detail. **07**
- Q.3** (a) Describe (i) construction of a Fast recovery diode and (ii) switching characteristics of a PiN diode in brief. **10**
- (b) Discuss an application of PUT. **04**
- OR**
- Q.3** (a) Draw equivalent circuit of P-N junction diode. Explain, also the reverse recovery characteristics of the same. Is parallel operation of P-N junction diode is possible? **10**
- (b) Explain the concept of real source and real load. **04**
- Q.4** (a) Discuss an application of a (i) TRIAC and (ii) LASCR. **10**
- (b) Discuss the following requirements of any one power device: (i) Cooling and (ii) Mounting. **04**
- OR**
- Q.4** (a) Describe working of a (i) GTO and (ii) Power Integrated Circuit. **10**
- Q.4** (b) Draw and explain. Power Electronics System's block diagram. **04**
- Q.5** (a) Discuss  $dv/dt$  and  $di/dt$  ratings of an SCR. Describe protection of SCR from  $dv/dt$  and  $di/dt$ . **07**
- (b) Compare IGBT with POWER MOSFET. **07**
- OR**
- Q.5** (a) Discuss switching characteristic of IGBT. **07**
- (b) Explain working of E- type Power MOSFET with neat diagram. **07**

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