Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–V • EXAMINATION – WINTER 2013**

**Subject Code: 152405** **Date: 09-12-2013**

**Subject Name: Power Electronics Applications**

**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.**

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|---|---|---|---|
| **Q.1** | (a) | Draw the Block Diagram of Power Electronics System and Explain functionality and working of each block in detail. | **07** |
| | (b) | Do as directed | |
| | | 1. Draw the detailed block diagram indicating all parts of Electrical Motor Drive. | **02** |
| | | 2. Enlist the function of Power Electronics Modulator in Drive system. | **03** |
| | | 3. List the advantages and disadvantages of Electrical drive. | **02** |
| **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) | What is thyristor? Explain its construction, operating principle and V-I Characteristics of SCR. | **07** |
| | | **OR** | |
| | (b) | Discuss Characteristics of ideal switch and explain each in detail. | **07** |
| **Q.3** | (a) | Define commutation. Describe Thyristor Turn OFF mechanism in detail. List the method of commutation. | **07** |
| | (b) | What is inverter? Explain Classification of inverter in details. List the requirement of practical inverter. | **07** |
| | | **OR** | |
| **Q.3** | (a) | Define Turn ON time. Describe Thyristor Turn ON mechanism in detail . List the method of Triggering. | **07** |
| | (b) | Explain Classification of Chopper. Explain working of step down chopper using circuit diagram and neat waveform. | **07** |
| **Q.4** | (a) | Define SMPS. Explain the classification of it and also explain working of SMPS with necessary block diagram. | **07** |
| | (b) | Compare the following terms: | |
| | | 1. Induction and Dielectric heating | **04** |
| | | 2. Conventional and load proportional capacity modulated heat pump | **03** |
| | | **OR** | |
| **Q. 4** | (a) | Define UPS. Explain the classification of it and also explain working of UPS with necessary block diagram. | **07** |
| | (b) | Compare the following terms: | **04** |
| | | 1. AC and DC Motor Drive 2.Electroplating and Electroforming. | **03** |
| **Q.5** | (a) | Explain the working, advantages, disadvantages and application of Electronic Ballast using block diagram. | **07** |
| | (b) | Explain configuration of HVDC Transmission along with its advantages, disadvantages and application. | **07** |
| | | **OR** | |
| **Q.5** | (a) | Define Electrical Welding. Explain the working, advantages, disadvantages and application of Switched Mode Arc Welder using block diagram. | **07** |
| | (b) | Explain the utilization of Non Conventional Energy Sources in power generation using power electronics with necessary diagram. | **07** |

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