

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER- V (New) EXAMINATION – WINTER 2019****Subject Code: 2152407****Date: 02/12/2019****Subject Name: Power Electronic Circuits-I****Time: 10:30 AM TO 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) Define the following terms: (1) latching current (2) holding current (3) Circuit turn-off time. **03**
- (b) Discuss concept of PWM. **04**
- (c) Draw symbol of power semiconductor devices and give comparison between power BJT and SCR. **07**
- Q.2** (a) Describe the uses of freewheeling diode in converters circuit. **03**
- (b) Give classification of power electronics converter. **04**
- (c) Give comparison between power MOSFET and IGBT with respect to their operating frequency range, on state voltage drop range, type of snubber circuit requirement, maximum VI ratings, static VI characteristics, applications and circuit symbol. **07**
- OR**
- (c) Illustrate the various protection scheme of power circuit and gating circuit of an SCR. Also discuss on functions of various components used. **07**
- Q.3** (a) Explain single phase Half wave uncontrolled rectifier. **03**
- (b) Discuss requirement of drive circuits for various devices. **04**
- (c) Explain the working of 1- ϕ controlled Rectifier with RL load. Draw necessary figure and waveforms. **07**
- OR**
- Q.3** (a) Compare 1-Phase Rectifier with 3-Phase Rectifier circuit. **03**
- (b) Explain synchronized UJT circuit for triggering SCR. **04**
- (c) Explain the working of 3- ϕ controlled Rectifier with RL load. Draw necessary figure and waveforms. **07**
- Q.4** (a) Enlist requirements of DC Power Supply. **03**
- (b) Draw only circuit diagram & waveforms for Buck-Boost converter. **04**
- (c) Explain working of buck switching regulator circuit. **07**
- OR**
- Q.4** (a) Draw only circuit diagram & waveforms Four Quadrant (Type E) Chopper. **03**
- (b) Write a short note on Morgan chopper. **04**
- (c) Explain the TRC & CLC control strategies for the control of chopper. **07**
- Q.5** (a) Discuss Multiphase Choppers. **03**
- (b) Compare ZVS and ZCS topologies. **04**
- (c) Explain working of four quadrant operation of dual converter. **07**
- OR**
- Q.5** (a) State advantages of Isolated DC-DC Converters. **03**
- (b) Discuss Flyback type isolated DC-DC converter. **04**
- (c) Explain the working of full bridge isolated DC-DC converter. **07**
