

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2018****Subject Code: 172403****Date: 26/11/2018****Subject Name: Power Processing Circuits - II****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) Explain active front-end rectifier with necessary diagram. List disadvantages of controlled rectifier and advantages of active front-end rectifier. **07**
(b) Explain the working principle of inverter. List and explain its performance parameters. **07**
- Q.2** (a) Classify inverters. Explain the operation of a single-phase half bridge inverter with necessary diagrams and waveforms. **07**
(b) Define the following: **07**
Dwell Time, Modulation Index, Cyclo-converter, UPS, THD, MTTR, MTBF.
- OR**
- (b) List different types of PWM used for the control of inverters. Explain sine triangle PWM with neat diagrams. **07**
- Q.3** (a) Classify multilevel inverters. Explain the basic principle of multilevel inverter giving its applications. **07**
(b) Explain the 120° conduction mode of operation of VSI with circuit diagram and waveforms. **07**
- OR**
- Q.3** (a) Explain five-level diode-clamped single-phase multilevel inverter with circuit diagram and waveforms. **07**
(b) Explain the 180° conduction mode of operation of VSI with circuit diagram and waveforms. **07**
- Q.4** (a) Explain Integral Cycle Control method for AC voltage controllers. **07**
(b) Explain the input side control techniques of an inverter with necessary diagrams. **07**
- OR**
- Q.4** (a) Derive the THD in the output voltage waveform of a square inverter assuming suitable values. THD is the measure of what for an inverter? **07**
(b) Write a note on parallel resonant pulse inverter. **07**
- Q.5** (a) A 30 KVA UPS is to be employed for RL load with power factor of 0.8. The backup time required is 30 minutes. Assuming the UPS efficiency to be 85%, select a suitable Pb-Acid battery (find KW/cell capacity) for the same. Take minimum allowable battery voltage as 24 Volts and final V/cell=1.75 V. **07**
(b) Explain the single-phase to single-phase step-down midpoint cyclo-converter with discontinuous load current. Draw circuit diagram and waveforms. **07**
- OR**
- Q.5** (a) List various methods of battery charging. Discuss any one in brief. **07**
(b) Differentiate: On-line and Off-line UPS **07**
