

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VI EXAMINATION – SUMMER 2026****Subject Code:3162413****Date:08-06-2026****Subject Name:Power Electronics 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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define : 1. Total Harmonic Distortion 2. Harmonic Factor 3. Lowest Order Harmonics. **03**
- (b) Explain the principle of operation of single-phase half-bridge inverter with necessary diagram. **04**
- (c) Explain the integral cycle control method for the control of AC voltage with help of necessary waveforms and equations. **07**
- Q.2** (a) List advantages of multilevel inverters. **03**
- (b) Explain working of single-phase AC voltage controller with R load. Draw necessary circuit diagram and waveforms. **04**
- (c) Explain three-phase 180° mode voltage source inverter with necessary circuit diagram and waveforms. **07**
- OR**
- (c) Explain three-phase 150° mode voltage source inverter with necessary circuit diagram and waveforms. **07**
- Q.3** (a) Draw only the circuit diagram and waveforms of series inverter. **03**
- (b) Explain high side and low side switch drivers for inverter. **04**
- (c) Explain single-phase to single-phase mid-point step-down cycloconverter with RL load for discontinuous load current operation. **07**
- OR**
- Q.3** (a) Draw only the circuit diagram and waveforms of parallel inverter. **03**
- (b) Explain dead band and its importance in inverters. **04**
- (c) Explain the working of three-phase to single-phase cycloconverter with necessary diagram and waveforms. **07**
- Q.4** (a) Explain series inverter control technique of external control of AC output voltage of inverter. **03**
- (b) Explain sinusoidal pulse width modulation technique with necessary diagram. **04**
- (c) Explain trapezoidal modulation and selective harmonic elimination technique with necessary diagrams. **07**
- OR**
- Q.4** (a) Explain any two methods for external control of DC input voltage of inverter. **03**
- (b) Give technical comparison between CSI and VSI. **04**
- (c) Explain trapezoidal modulation and third harmonic injection technique for inverter with necessary diagrams. **07**
- Q.5** (a) Explain modulation index and over modulation. **03**
- (b) Explain the concept of dwell-time. **04**
- (c) Explain five-level flying capacitor multilevel inverter with necessary diagrams. **07**
- OR**
- Q.5** (a) Explain the basic concept of multilevel inverter. **03**
- (b) Explain the concept of space vector modulation. **04**
- (c) Explain five-level diode clamped multilevel inverter with necessary diagrams. **07**
