

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18EC36

Third Semester B.E. Degree Examination, June/July 2024 Power Electronics and Instrumentation

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the V.I. characteristics of SCR by clearly indicating different states on characteristic. Also explain different modes of operation. (10 Marks)
b. Explain the UJT Relaxation oscillator circuit working with circuit diagram and waveforms. (10 Marks)

OR

- 2 a. Explain class A – self commutation by resonating the load with proper circuit and waveforms. (10 Marks)
b. What are the gate triggering schemes? Explain the operation of resistor-capacitor firing circuit with appropriate waveforms. (10 Marks)

Module-2

- 3 a. Explain the effect of freewheeling diode with a neat circuit diagram and waveform for single phase half wave controlled rectifier with RL load. (10 Marks)
b. Explain the principle of step up chopper with a neat circuit diagram and waveforms. Also derive the expression for output voltage. (10 Marks)

OR

- 4 a. If the half wave controlled rectifier has a purely resistive load R and the delay angle is $\alpha = \frac{\pi}{3}$. Identify: (i) Rectification efficiency (ii) Form factor (iii) Ripple factor (iv) TUF (v) PIV (10 Marks)
b. Explain the principle of step up / down chopper with a neat circuit diagram and waveforms. Also derive the expressions for output voltage. (10 Marks)

Module-3

- 5 a. Explain the working of single phase half bridge inverter connected to RL load with the help of necessary circuit diagram and waveforms. (10 Marks)
b. Explain the working of continuous mode fly back converter with necessary circuit diagram and waveform. (10 Marks)

OR

- 6 a. Define the following terms as applied to an electronic instrument:
(i) Instrument (ii) Measurement (iii) Accuracy (iv) Resolution
(v) Precision (vi) Expected value (vii) Error (viii) Sensitivity (10 Marks)
b. Sketch and explain the operation of a multirange voltmeter. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Discuss the operation of dual slope integrating type DVM with the help of block diagram. (10 Marks)
b. Explain the operation of the Wein's bridge with a neat circuit diagram. Derive the expression for the frequency. (10 Marks)

OR

- 8 a. Explain the operation of a function generator with the help of block diagram. (10 Marks)
b. With the aid of diagram, explain the working of balanced wheat stone bridge and derive for a galvanometer current expression. (10 Marks)

Module-5

- 9 a. Explain the construction, working principle and operation of LVDT. Show the characteristics curve. (10 Marks)
b. Explain the construction of temperature indicators using thermistor. (10 Marks)

OR

- 10 a. Explain the construction and working of instrumentation amplifier using transducer bridge. (10 Marks)
b. Explain the structure and operation of programmable logic controller. (10 Marks)
