CBCS SCHEME

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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)**

## 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)**

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