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Total Pages : 03

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December 2024

B. Tech. (ME) (Third Semester)

Basics of Electronics Engineering (ESC-201)

Time : 3 Hours] *[Maximum Marks : 75*

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Give the example for practical PN diode and Zener diode with their voltage specification. **1.5**

   (b) Draw the input and output wave form for full wave rectifier with filter circuit. **1.5**

   (c) Draw the Pin diagram for op-amp. **1.5**

   (d) Draw the circuit diagram for Zener diode as voltage regulator. **1.5**

   (e) Define the Barkhausen's criteria for oscillation. **1.5**

(f) Define the function and characteristic of Flip-flop. **1.5**

(g) Give the block diagram for element of communication system **1.5**

(h) Implement XOR function using universal logic gates. **1.5**

(i) Implement a circuit diagram for subtraction of two signals using op-amp. **1.5**

(j) BJT is a current controlled device or voltage controlled justify. **1.5**

Part B

2. Explain the construction and working of R-C phase shift and Wein Bridge oscillator with all necessary neat diagrams. **15**

3. (a) The turn ratio of the transformer used in a half-wave rectifier is n_1: n_2 12: 1. The primary is connected to the power mains: 220V, 50Hz. Assuming the diode resistance in forward bias to be zero, calculate the dc voltage across the load. What is the PIV of the diode ?

(b) Repeat the above calculations for Centre tape bridge rectifier. 15

4. (a) Design and implement the half adder and full adder circuitry using truth table and k-Map.

(b) Implement the 3-bit counter circuit using JK Flip flop. 15

5. Draw and explain the functional block diagram of operational amplifier. Draw the circuit diagram and derive the gain of a non-inverting and inverting amplifier. 15

6. What is the need of modulation in a communication system ? Compare AM and FM in communication system. 15

7. Write the qualitative notes on the following : 15

(a) BJT Input and output characteristics in Common base configuration

(b) Explain the block diagram of GSM System

(c) Implement the integrator and differentiator using op-amp and derive the input and output relationship.