013304

December 2023

M.Tech. (ME/ME(Hindi Medium)) - III SEMESTER

Basics of Electronics Engineering

(ESC–201)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*

2. *Answer any four questions from Part-B in detail.*

3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) Prove using laws of Boolean Algebra : AB + A'C = (A + C)(A' + B). (1.5)

    (b) What is the difference between analog and digital signals? (1.5)

    (c) What is the need for modulation? (1.5)

(d) Differentiate between guided and unguided transmission media. (1.5)

(e) Convert 4C8.2 from hexadecimal to decimal number system. (1.5)

(f) What are lead lag networks? (1.5)

(g) Why is a rectifier circuit always followed by a filter circuit? (1.5)

(h) What are breakdown diodes? (1.5)

(i) What are the advantages of negative feedback in amplifiers? (1.5)

(j) Why is op amp not used in open loop configuration? (1.5)

PART–B

2. (a) Draw and explain the bridge type full wave rectifier. How is it better than the center tapped full wave rectifier? (10)

(b) With the help of a circuit diagram explain how a Zener diode acts as a voltage regulator? (5)

3. Which transistor configuration is most preferred for amplification and why? Draw the input output VI characteristics of CB transistor configuration. Derive the relation between the current gains of CB and CE transistor configuration. (15)

4. What is Barkhausen's criteria for sustained oscillations? Draw the circuit diagram of Wein bridge oscillator and derive the expression for frequency of oscillation. (15)

5. (a) What is the basic principle behind AM and FM modulation schemes? Draw a comparison between the two. Which is better and why? (8)

(b) Draw the block diagram of GSM system and explain it. (7)

6. (a) Draw and explain the JK flip flop with its truth table. What is race around condition? (8)

(b) Minimize the following expression using K map :
$Y(A,B,C,D) = \Sigma(0,1,2,3,4,5,6,7,11,13,14)$. (7)

7. Draw and explain the applications of op amp as

(a) Non inverting amplifier.

(b) Adder.

(c) Differentiator. (15)