[Total No. of Questions - 9] [Total No. of Printed Pages - 2]

May-24-0363

EC-101 (Fundamentals of Electronics Engineering)

B.Tech. 2nd (CBCS)

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from Sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) Explain the difference between Metal, Insulator and Semiconductor by showing Fermi level. (5)

   (b) Describe the LED and Seven-Segment Display with diagram. (5)

2. Draw and explain the working of Bridge Rectifier. Derive the equation for ripple frequency and efficiency of the bridge rectifier. (10)

SECTION - B

3. Explain the Input and Output characteristics of CB and CE configuration of BJT. (10)

4. Draw and explain the working principle of n-Channel JFET with transfer and drain characteristics. (10)

SECTION - C

5. Describe the working principle of Oscillator and explain the RC phase shift Oscillator and Wein Bridge Oscillator with diagram. (10)

6. Explain the linear application of Op-Amp in terms of Inverting, Non-inverting and Differential amplifier. (10)

SECTION - D

7. (a) Convert the octal number $(257.46)_8$ into binary, hexadecimal and decimal numbers. (5)

   (b) Realize NOT gate by using XOR gate. (5)

8. Explain the measurement of Voltage, Phase and Frequency by using CRO. (10)

SECTION - E (Compulsory)

9. Write brief answers. All carry equal marks.

   (i) Realize AND gate using only NOR gate.

   (ii) What factors affect the gain of the amplifier at high frequencies?

   (iii) What is the basic concept of operational amplifier?

   (iv) Explain the Zener Diode as Voltage Regulator with circuit diagram.

   (v) How is the gate-source diode of a JFET biased?

   (vi) If the base resistor is very small, then the transistor will operate in which region?

   (vii) Draw the cross-section of depletion mode and enhancement mode for n-channel MOSFET.

   (viii) Define beta ratio of Transistor.

   (ix) Explain the operation of CRO with circuit diagram.

   (x) Convert the two's complement number $(1101)_2$ into its decimal equivalent. (10×2=20)