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

Dec-24-0065 (CBCS/NEP)

EC-111 (Basic Electrinics Engineering) (Group-B)

B.Tech. 1st

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 : Candidates are required to attempt five questions in all, selecting one question each from section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SECTION - A

1. Explain the formation of depletion region in p-n junction diode, emphasise on why the depletion region is wider in case of reverse biased configuration. What is the relation between depletion region and threshold voltage? (10)

2. (a) Differentiate between avalanche breakdown and Zener breakdown. (5)

   (b) Explain the Energyband concept of materials. (5)

SECTION - B

3. (a) Sketch two RC-coupled CE transistor stages. (5)

   (b) Design a self bias circuit for a CE amplifier having β=99 and s=5. The other value are V_{CE}=6V, V_{RE}=5.5V, V_{CC}=15V, R_C=2.5K and V_{BE}=0.3V. (5)

4. (a) Explain the concept of pinch-off. (5)

   (b) Explain with example, why Stability factor is so important to study and tackle down. (5)

SECTION - C

5. What is the principle behind RC phase shift oscillator? Explain the working of this oscillator with its application in general. (10)

6. What is the bandwidth of opamp? How do the bandwidth characteristics of ideal and real opamps differ? (10)

SECTION - D

7. Design all the basic gates using NOR gate. (10)

8. What is CRT? How is it used for signal display in CRO? (10)

SECTION - E (Compulsory)

9. (a) For a base current of 10 μA, what is the value of collector current in common emitter if $\beta_{dc} = 100$?

   (b) How does ICBO get affected by temperature variation?

   (c) Explain diode as voltage doublers.

   (d) Which is the most commonly used amplifier in sample and hold circuit?

   (e) What are the source and drain terminals for a FET?

   (f) How is focusing achieved in CRO?

   (g) Explain gray code.

   (h) What is slew rate?

   (i) Draw circuit of voltage follower through opamp.

   (j) Perform the following:- a. F2.34–91.62 b. A2.34 = $(\ )_8$

(10×2=20)