DEC-23-1212

EC-111 [Basic Electronics Engineering (Group-B)]

B.Tech.-1st CBCS/NEP Comman for all Branches

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 by selecting one question each from section A, B, C and D. Section-E is compulsory.

SECTION-A

1. Derive the expression of drift current and diffusion current density in semiconductor.   (10)

OR

2. Write in detail about the operation of full-wave bridge rectifier. Calculate the DC output voltage and efficiency in this rectifier.   (10)

SECTION-B

3. Explain the driving and output characteristics of CB and CE type configuration of BJT.   (10)

OR

4. Explain the operation of Depletion type MOSFET and draw its drain and transfer characteristics.   (10)

SECTION-C

5. I. What are the Barkhausen criterion for oscillator? Draw and explain the basic circuit diagram of an RC phase shift oscillator.   (6)

   II. Design a RC phase shift oscillator for frequency equal to 10kHz. Take $C = 5\mu F$.   (4)

OR

6. With the proper circuit diagrams, explain how Op-Amp can be used as Integrator and magnitude comparator. Derive the output voltage equation for both cases.   (10)

SECTION-D   (2×5=10)

7. I. Convert to hexadecimal and binary: $(20751.457)_8$

   II. Simplify Boolean expression to a minimum number of literals

$$(x'y' + z)' + z + xy + wz \qquad (10)$$

OR

8. Describe the function of the cathode-ray tube (CRT) in a CRO and explain, how to measure voltage, phase and frequency.   (10)

SECTION-E (Compulsory)   (10×2=20)

9. a) What do you mean by leakage current in a diode?

   b) Distinguish between avalanche and Zener breakdown.

   c) Calculate the average value of half wave rectifier for an input signal of $V = 3V_m \sin \omega t$.

d) What is the meaning of stability factor? Write down its expression for CE type.

e) Why FET is called unipolar device?

f) What is difference between Enhancement type and depletion type MOSFET?

g) What is the value of input resistance and feedback resistance of voltage follower circuit?

h) Find the resonance frequency of Wein bridge oscillator if $R = 51k\Omega$ and $C = 0.001\mu F$.

i) What are universal logic gates? Why are they called so?

j) Write two applications of signal generator.