Roll No.

Total No. of Pages : 4

3E1651

3E1651

B. Tech. (Sem. III) (Mercy Back) Examination, December - 2017
Computer Sc. & Engg.
3CS1A Electronic Devices & Circuits

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Attempt any five questions. selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. any data you feel missing suitably by assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

1 (a) Calculate the current in diode (silicon) circuit shown in **fig. 1**.
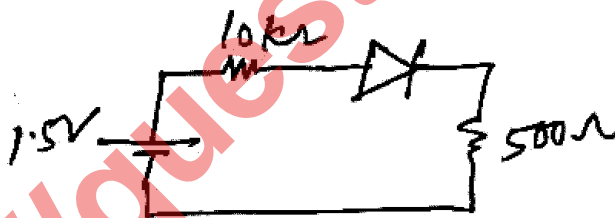

Fig. 1

6

(b) Define following :

(i) Mobility and

(ii) Mass action law

$3 \times 2 = 6$

3E1651]

1

[P.T.O.

(c) If a silicon sample has 10^{15} boron/cm^3 then calculate the no. of holes and electron density in it. Assume intrinsic concentration is $n_i = 1.5 \times 10^{10} / \text{cm}^3$.

4

OR

1 (a) Draw and define diode load line. Also define the load line under AC conditions.

6

(b) Find the expression for Hall coefficient and explain the application of Hall effects.

6

(c) Define Fermi level in semiconductor material.

4

UNIT - II

2 (a) If $\alpha = 0.8$ then find the value of common emitter and common collector current gain.

2×2=4

(b) Define following :

(i) Thermal runaway

(ii) Stabilization and

(iii) Compensation

3×3=9

(c) Write interrelation between h-parameter of CE and CB.

3

OR

2 (a) Draw circuit of fixed bias and define its stability factor.

6

(b) Draw Eber's Null model and explain its working for CE configuration.

6

(c) Write the units of all h-parameters.

4

UNIT - III

3. (a) Draw the frequency response of an RC coupled amplifier and mention on it (i) 3-dB cut off frequencies (ii) Bandwidth.

8

(b) Find the voltage gain for common source configuration if $\mu = 10^{-3}$ and $g = 10^{-5}$ then calculate the voltage gain for a load $R_C = 10\,k\Omega$.

8

OR

3. (a) Define Miller's theorem and its dual. How this theorem is useful in solving amplifier circuits ?

8

(b) Why common collector is called "emitter follower" ? Draw its circuit and find the expression for voltage gain.

8

UNIT - IV

4. (a) Define following :

(i) Forward voltage gain

(ii) Gain with feedback

(iii) Feedback factor and

(iv) Stability factor of feedback amplifier.

4×2=8

(b) If $R_i = 10\,k\Omega$ and $A_i = 100$ then find R_{if} and A_{if} in (i) voltage shunt and (ii) voltage series feedback.

4×2=8

OR

4 (a) What is current shunt feedback ? How it modifies input and output resistance of an amplifier ?

8

(b) Find the relation between R_i and R_{if} for

(i) Current series feedback and
(ii) Voltage shunt feedback.

4×2=8

UNIT - V

5 (a) Draw the circuit of Colpitt oscillator and find its oscillation frequency when $C_1 = C_2 = 10\,\mu F$ and $L = 2n\mu$.

8

(b) Draw the electrical equivalent circuit of crystal oscillator. Also find the expression for its series and parallel resonant frequencies.

8

OR

5 (a) Design Wein bridge oscillator for generating a signal at 1.5 kHz.

8

(b) Draw astable multivibrator circuit diagram and explain its working for generate clock.

8