Printed Pages:02 **Sub Code: REC-101**

Paper Id 233070 **Roll No.** | | | | | | | | | | |

B.TECH.
(SEM I) THEORY EXAMINATION 2022-23
BASIC ELECTRONICS

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 7 x 2 = 14

(a) What you mean by Doping. Describe its need.
(b) A silicon diode has a saturation current (I_S) of 5nA at 25°C. Find I_S at 100°C.
(c) Determine $ß_{dc}$ and I_{CBO}, if I_E = 5 mA, I_C = 4.95 mA, I_{CEO} = 200µA.
(d) Differentiate between Depletion and Enhancement type MOSFET.
(e) Define Slew Rate and CMRR.
(f) Give the need of triggering circuit in a CRO.
(g) A 320W carrier is simultaneously modulated by two audio waves with modulation % of 45 and 60 respectively. What is the sideband power radiated.

SECTION B

2. Attempt any *three* of the following: 3 x 7 = 21

(a) What is Diode. Draw & explain the V-I characteristic of a P-N junction diode. Also describe the effect of Temperature on the V-I characteristic of a P-N junction diode.
(b) What is a Transistor. Describe the construction of a NPN transistor. Describe output characteristics for NPN transistor in CE configuration. Label all variables and also indicate the regions.
(c) What is an Operational Amplifier. Describe its block diagram. Give its equivalent circuit and voltage transfer characteristics. List its characteristics.
(d) What is Cathode Ray Oscilloscope. Describe its working with the help of block diagram.
(e) Define Amplitude Modulation.Also derive power relation of AM wave.

SECTION C

3. Attempt any *one* part of the following: 1 x 7 = 7

(a) What do you mean by a Rectifier. Compare different types of rectifier, giving their circuit.
(b) For a Zener Voltage regulator, determine the range of R_L and I_L that will result in V_O being maintained at 10V. Given V_{in} = 50V, R = 1K Ω, I_{ZM} = 32mA.

4. Attempt any *one* part of the following: 1 x 7 = 7

(a) Describe the construction, working and characteristic of enhancement type MOSFET.

(b) Define α and β with respect to BJT and derive the relationship between them. Explain the operation of voltage divider bias circuit and write down the approximate equations of V_B, I_E, I_C and V_{CE}.

5. Attempt any *one* part of the following: 1 x 7 = 7

(a) Draw the circuit of Non-inverting amplifier using OP Amp and explain its working. Also obtain expression for its output.

(b) Draw the circuit of Subtractor using OP Amp and explain its working. Also obtain expression for its output.

6. Attempt any *one* part of the following: 1 x 7 = 7

(a) What is Digital Multimeter. Describe its working with the help of block diagram .

(b) Describe Frquency& Phase measurement with the help of Lissajous Pattern using CRO.

7. Attempt any *one* part of the following: 1 x 7 = 7

(a) Explain the elements of communication system with the help of block diagram.

(b) An audio frequency signal 10 Sin 2 Π x 500 t is used to amplitude modudate a carrier of 50 Sin 2 Π x 10^5 t . Calculate :

(i) Modulation Index
(ii) Sideband Frequency
(iii) Amplitude of each sideband
(iv) Bandwidth required
(v) Total power delivered to the load of 1 K Ω
(vi) Transmission Efficiency