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B.TECH.
(SEM III) THEORY EXAMINATION 2022-23
ELECTRONIC DEVICES AND CIRCUITS

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

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

- (a) What is drift mechanism?
- (b) What is effective mass?
- (c) Explain forward and reverse bias junction.
- (d) Write the effect of negative feedback.
- (e) What is subthreshold conduction in MOSFET.
- (f) Explain T model of BJT.
- (g) Compare BJT and MOSFET.

SECTION B

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

- (a) Derive expression for electron concentration in conduction band.
- (b) Explain the Photodiode in detail.
- (c) Explain with drain characteristic and transfer characteristic, the working of n channel enhancement type MOSFET.
- (d) Explain BJT as an amplifier and as a switch.
- (e) Compare all the negative feedback topologies.

SECTION C

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

- (a) Explain Hall Effect. Also derive expression for Hall voltage.
- (b) Explain diffusion of carrier and Derive equation for Einstein relation.

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

- (a) Explain the following:
 - (i) Solar cell
 - (ii) LED
- (b) Explain the Photodetector in detail.

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

- (a) Explain internal capacitances and high frequency model of MOSFET.
- (b) Write the drain current in triode region. Derive drain current in saturation region. Also derive finite resistance in saturation.

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

- (a) What is transistor biasing? Explain all methods of biasing.
- (b) Explain hybrid π model of BJT in detail.

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

- (a) Explain the working of wien bridge oscillator. Derive the frequency of oscillation and condition of oscillation for it. Also describe the advantages and disadvantages.
- (b) Explain the working of Hartley oscillator. derive the frequency of oscillation and condition of oscillation for it. Also describe the advantages and disadvantages.