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**B TECH**  
**(SEM-III) THEORY EXAMINATION 2020-21**  
**ELECTRONIC DEVICES**

**Time: 3 Hours****Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

a.	What do you mean by diffusion
b.	What do you mean by effective mass of carriers?
c.	Explain the mechanism of Avalanche breakdown.
d.	Define optoelectronic devices?
e.	Explain positive feedback and negative feedback.
f.	Define sheet resistance.
g.	What is base width modulation?
h.	What is difference between Direct and Indirect semiconductor?
i.	In the linear region operation of MOSFET drain current decreases as the temperature increases. Explain.
j.	What type of semiconductor material is suitable for luminescence effect?

**SECTION B****2. Attempt any three of the following:****10x3=30**

a.	Explain the working principle of PN junction diode with V-I characteristics.
b.	Explain the operation and characteristics of N- channel MOSFET.
c.	What is a photodiode? Explain its construction and operation.
d.	Explain the transistor characteristics in CE configuration. Explain the behavior of the transistor in active and cutoff mode.
e.	Differentiate between direct and indirect band gap semiconductor. Also discuss the variation of energy band with alloy composition.

**SECTION C****3. Attempt any one part of the following:****10x1=10**

a.	Explain and draw the small signal models of MOS transistor.
b.	Explain the working principle and characteristics of following: (I) LED (II) Solar Cell

**4. Attempt any one part of the following:****10x1=10**

a.	What do you mean by Fermi level? Discuss the effect of temperature & doping on mobility.
b.	Using the concept of diffusion and drift of carriers derive the continuity equation and diffusion length.

**5. Attempt any one part of the following:****10x1=10**

a.	Draw a biasing circuit of MOSFET amplifier and explain it.
b.	Explain the working principle and V-I characteristics of Zener diode.

**6. Attempt any one part of the following:****10x1=10**

a.	Derive an expression for diode current in PN junction diode.
b.	Calculate the Fermi level position in Si containing $10^{16}$ phosphorous atoms/cm <sup>3</sup> at 100 <sup>0</sup> K assuming 50% of the impurities are ionized at this temperature. Also calculate the equilibrium electrons and holes concentrations.

**7. Attempt any one part of the following:****10x1=10**

a.	Explain Schottky diode in detail and write its applications.
b.	Explain Ebers- Moll model.