

Dr Seebhorsh Chandra Phy Dept

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11/5/2023

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Department of Physics & Photonics Science, NIT Hamirpur (HP)
End Semester Examination
May 2023

Course Name: Fundamentals of Semiconductor Devices
Course Code: PH-321

Marks = 50
Time: 3 hrs

Questions	Marks
1. Describe working of a photodiode. What is responsivity of a photodiode.	5
2. Mentioning three to four points discuss how a laser diode differs from the conventional p-n junction diode. Based on same points discuss how a light emitting diode differs from a laser diode.	5
3. With the help of an energy band diagram explain the occurrence of negative resistance behavior in current-voltage characteristics of a tunnel diode.	5
4. Draw I-V characteristics of a p-n-p-n thyristor and discuss its important features. Which one is the gate terminal in it and what is its role.	5
5. Show schematic diagram of n-channel junction field effect transistor. Explain how pinch-off in the channel occurs.	5
6. Differentiate between JFET and MESFET explaining how gate operation is established. Explain how the drain current saturation occurs.	5
7. Draw energy band diagram of a p-n-p transistor in (i) unbiased condition (assuming all three terminals grounded) and (ii) biased in active mode of operation and explain how carrier flows from emitter to collector.	5
8. Discuss different modes of charging of Metal-Oxide-Semiconductor structure under different biasing conditions.	5
9. Discuss one method of growing an electronic grade high purity single crystal semiconductor.	5
10. Draw current-voltage characteristics of a solar cell in (i) dark condition and (ii) light illumination. Explain short circuit current and open circuit voltage. Establish relation between these two parameters. Discuss fill factor and to have maximum fill factor which type of current-voltage characteristics of solar cell should have.	5