Dr. Ravi hant

National Institute of Technology, Hamirpur (HP

End Semester Examination - June, 2023

Course - B.Tech. Semester - 2nd Subject Name -Engineering Physics

Maximum Marks: 50

Subject Code - PH-101 Time: 3:00Hour

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All questions are compulsory

Q1:

a)	What is meant by effective mass of electron?
b)	What is the significance of E-K diagram? (1)
c)	Comment on the role of metastable state in the operation of logar (1)
d) 1	Does charges from outside contributes to the flux through a last. (1)
e)	Sketch the propagation of light signal in graded in 1 (1)
f)	What is the physical significance of a multi-
g)	Define Poynting vector Mantine it 1: (1)
h)	Which type of semiconduct (1)
i) 1	Enlist the various much in internals are used for laser diode? (1)
i) 1	What is Mognetest it is a solution in the optical fibers. (1)
J)	(1)
Q 2: Comp Given that I	bute the concentration of intrinsic charge carriers in a germanium crystal at 300 K. $E_g = 0.72 \text{ eV}$ and assume $m_e^* = m_e$. (5)
Q 3: An opt end of the f the other en	tical fibre is 2m long and has a diameter of 20 mm. If a ray of light is incident on one ibre at an angle of 40°, how many reflections does it undergo before emerging from d? The refractive index of core of fibre is 1.3. (5)
Q 4: How Ampere's la	w was the concept of displacement current helpful in removing discrepancy in w?

Q 5: In which medium electromagnetic waves travel with velocity of light? Show that electromagnetic waves are transverse in nature. (5)

Q 6: Illustrate principle, working and energy level diagram of Ruby Laser. Why this laser gives output in pulse form? (5)

Q 7: What is superconductivity? Explain Meissner's effect, Type-I and Type-II superconductors.

Q 8: How does the probability of finding the particle inside a one dimensional box change for first three eigen values? (5)

Q 9: What is piezoelectric effect? Draw a neat labeled diagram for the production of ultrasonic waves by piezoelectric oscillator. (5)