

JAMIA HAMDARD
Department of Computer Science & Engineering
School of Engineering Sciences & Technology
New Delhi – 110062

Supplementary Examination-2023
(For Odd Semester Examination-2022)

Paper Name: Applied Physics-I Paper Code: BTCSE-101/BTCSE-AI-101/BTECE-101

Time: 3 Hours
2.5

Maximum Marks: 60

Section A

Attempt ALL Questions

(4 × 5 = 20)

Q.No.	Questions	CO	BL
1	Explain the phenomenon of total internal reflection of light. How is it used in propagation of light in optical fiber?	3	2
2	Draw and explain the V-I characteristics of <i>p-n</i> junction.	1	2
3	With the help of diagrams, explain the three radiative processes that may occur when light radiation interacts with matter.	2	2
4	Explain diffraction grating. What is the resolving power of a diffraction grating?	4	2

Section B

Attempt any FOUR Questions

(4 × 10 = 40)

Q.No.	Questions	CO	BL
1	(i) Write down the Fermi - Dirac distribution function and show that the probability of occupancy by an electron is zero if $E > E_F$ and unity if $E < E_F$. (5 marks) (ii) Determine the conductivity and resistivity of intrinsic germanium at 300 K. Given that the intrinsic carrier concentration is $2.5 \times 10^{13} \text{ cm}^{-3}$. Also, mobility of electrons and holes are $\mu_e = 3800 \text{ cm}^2 / (\text{V-sec})$ and $\mu_h = 1800 \text{ cm}^2 / (\text{V-sec})$, respectively. (5 Marks)	1	3,4
2	Write down different components of laser and explain their role in laser operation.	2	2
3	(i) Obtain the expression for acceptance angle for an optical fiber. (4 marks) (ii) Find the expression for numerical aperture for an optical fiber. (2 marks) (iii) Find the acceptance angle and numerical aperture of an optical fiber from if the refractive index of the core, $n_1 = 1.546$ and that of cladding, $n_2 = 1.378$. (4 marks)	3	3,4
4	(i) Find the expression for the fringe width, β in Young's double slit experiment. (6 marks) (ii) In the Young's double slit experiment, the separation between the two slits, $d = 0.5 \text{ mm}$, fringe width, $\beta = 0.05 \text{ cm}$ and the screen is placed 50 cm away. What is the wavelength of the light? (4 marks)	4	3,4
5	Write short notes on: (i) Avalanche breakdown (5 marks) (ii) Zener diode. (5 marks)	1	2
6	(i) Explain superconductivity and Meissner effect. (4 marks) (ii) Distinguish between Type I superconductors and Type II superconductors. (6 marks)	5	2,4

BL: Bloom's Taxonomy Level (1-Remembering, 2-Understanding, 3-Applying, 4- Analysing, 5- Evaluating, 6- Creating).