K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Backlog Exam. ~~August~~ **Dec** 2023
Program: B.Tech. ~~(~~ ~~)~~
Examination: FY Semester: I Scheme : II
Course Code: BSC102 and Course Name: Engineering Physics

Date of Exam: 28/12/2023   Duration: 02 Hours   Max. Marks: 45

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

			Max. Marks	CO	BT level
Q 1	**Solve any 5 questions out of six**		**15**		
i)	The speed of an electron is measured to within an uncertainty of 2×10^4 m/s. What is the minimum space required by the electron to be confined to an atom?		3	CO1	APP
ii)	Draw the following planes in a cubic unit cell –(100), (212), (111)		3	CO2	U
iii)	What are properties of matter waves?		3	CO3	U
iv)	With a neat diagram show, how does Fermi level change with increasing doping concentration in n-type and p-Type semiconductor?		3	CO3	U
v)	Why excessively thin films appear black?		3	CO4	U
vi)	State and explain Meissner effect exhibited by superconductors.		3	CO5	U
Q.2	**Solve any three questions out of four.**		**15**		
i)	Derive one dimensional Schrodinger's Time Independent wave equation.		5	CO1	U
ii)	An electron has a speed of 900 m/s with an accuracy of 0.001%. Calculate the uncertainty in the position of the electron.		5	CO1	APP
iii)	Show that for an intrinsic semiconductor, $E_F = \frac{E_C + E_V}{2}$ where symbols have their usual meaning.		5	CO3	U
iv)	What is the probability of an electron being thermally promoted to conduction band in silicon at 27^0C ? Given : band gap is 1.12 eV.		5	CO3	APP

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Q.3	Solve any three questions out of four.	15		
i)	Explain construction and working of Bragg's X-ray spectrometer.	5	CO2	APP
ii)	Write a short note on nonreflecting films.	5	CO4	U
iii)	The diameter of 10th dark ring is 5 mm, when light of wavelength 5500 A⁰ is used in Newton's rings experiment. If the space between lens and glass plate is filled with a liquid of refractive index 1.25, what will be the diameter of 10th dark ring?	5	CO4	APP
iv)	What do you mean by superconductor? Define critical field. Differentiate between Type 1 and Type 2 superconductors.	5	CO5	U

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