GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Basic Sciences

Bachelor of Science Honours in Physics
Mid Term Examination - Mar 2024

Duration : 90 Minutes
Max Marks : 50

Sem VI - C1UD601T - Solid State and Nuclear Physics

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	What is a poly crystal? Give example.	K2	(2)
2)	What are the differences between crystalline and non-crystalline materials?	K1	(3)
3)	Find the Miller indices of a set of planes with intercepts a, 2a and 3a on X, Y and Z-axes respectively for a cubic crystal.	K2	(4)
4)	Prove that the void space in SCC crystal is 48%.	K2	(6)
5)	Describe the ionic bonds in solids with example and write the properties of it.	K3	(6)
6)	NaCl structure has FCC structure. The density of NaCl is $2.18\ cm^3$. Calculate the distance between two adjacent atoms. Molecular weight of NaCl is 58.5 g/mol.	K3	(9)
7)	Explain the effective mass and concept of holes using E-k curve. Relation between energy (E) and wave vector (k) semiconductor material is given by $E = Ak^2 - Bk^4$, here A and B are constants. Prove that the maximum energy (E_{max}) will be found when $k = (A/2B)^{1/2}$ and $E_{max} = A^2/4B$.	K4	(8)
8)	What is reciprocal lattice? Write the relation between reciprocal lattice parameters and direct lattice parameters.	K4	(12)
	OR		
	Deduce the Bragg's equation. Explain each terms used in this equation.	K4	(12)