

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-VII Semester (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS): 22B1WPH731 (3)

MAX. MARKS: 15

COURSE NAME: Computational Nanotechnology

COURSE INSTRUCTOR: SBA

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

Q.No	Question	CO	Marks
Q1	(a) Describe different dimensions of nanomaterials with definition. (b) Explain the change in electrical and magnetic properties due to nanoscale in nanomaterials.	CO-1	1+4
Q2	(a) Define a primitive unit cell in a Bravais lattice. (b) What will be the Miller indices of the crystal plane which cuts the intercepts of 2, 3 and 4 units along the three axes, respectively?	CO-2	1+2
Q3	(a) Define electronic Density of states. (b) Draw the diagram for density of states for the free electrons in a quantum dot, quantum well, and quantum wire. Also write the formula for variation of density of states with energy for each dimension.	CO-1	1+2
Q4	(a) How many crystal systems are there? (b) Define reciprocal lattice. (c) Find the primitive reciprocal lattice vectors for a simple cubic lattice with real-space vectors $a_1 = a\hat{i}$, $a_2 = a\hat{j}$ and $a_3 = a\hat{k}$	CO-2	1+1+2