

Roll No.:

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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

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

COURSE CODE(CREDITS): 18B1 WPH731(03)

MAX. MARKS: 15

COURSE NAME: Nanotechnology

COURSE INSTRUCTORS: Dr. Ragini Raj Singh

MAX. TIME: 1 Hour

*Note: (a) All questions are compulsory.*

*(b) Marks are indicated against each question in square brackets.*

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

**Q.1.** Draw the diagram which can correlate bulk material and nanostructures with their density of states. [CO:1 ; Marks:2]

**Q.2.** What are the disadvantages and limitations of top down approach? Why bottom up approach is preferred? [CO:1 ; Marks:2]

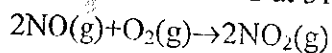
**Q.3.** Nanoparticles have unique set of properties with respect to their bulk counterparts, discuss. [CO: 1; Marks:2]

**Q.4.** Discuss the application of nanoparticles in  
(i) Cosmetics (ii) Displays (iii) Lubricants (iv) Military battle Suits [CO:2 ; Marks:4]

**Q.5. (a)** What is the surface area to volume ratio for a cube that measures 4 nm on each side? [CO:1 ; Marks:1]

**(b)** What is the surface area to volume ratio for a sphere whose diameter measures 5 nm? [CO:1 ; Marks:1]

**(c)** Calculate the  $\Delta G$  at 310 K for the following reaction [CO:2 ; Marks:1.5]



Given  $\Delta H = -120 \text{ KJ}$  and  $\Delta S = -150 \text{ JK}^{-1}$

**(d)** Calculate  $\Delta G$  for a reaction where  $\Delta H$  is equal to 40 KJ and  $\Delta S$  is equal to 145 J/K at 320 K. Is it a spontaneous reaction? [CO:3 ; Marks:1.5]