

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-VII Semester (Open Elective)

COURSE CODE (CREDITS): 18B1WPH731(03)

MAX. MARKS: 25

COURSE NAME: NANOTECHNOLOGY

COURSE INSTRUCTORS: Dr. Ragini Raj Singh

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

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

Q.No	Question	CO	Marks
Q1	(a) What are the basic criteria for nanoparticle synthesis by chemical route? (b) Discuss complete mechanism of nucleation and growth of nanoparticles.	1	2+2=4
Q2	(a) Role of Gibbs free energy is very important in chemical synthesis of nanoparticles. In this regard define what is Gibbs free energy and also discuss each parameter of its equation in detail. (b) The sign of ΔG gives certain information about chemical reactions, discuss.	2	2+3=5
Q3	In equation $\Delta G = -\frac{4}{3}\pi r^3 \Delta G_v + 4\pi^2 \gamma$ what are all the parameters and what each part of the equation describes. Also draw the related graph which shows all the relations.	3	3
Q4	(a) Discuss the advantages of chemical methods used to synthesize nanoparticles. (b) Explain: i) Interaction of colloids and medium ii) Effects of charges on collides iii) Steric repulsion	3, 4	2+4.5=6.5
Q5	Give one example with chemical reaction for each synthesis (a) Metal nanoparticles (b) Semiconducting nanoparticles	4	1.5+1.5=3
Q6	(a) In what different structures single wall carbon nanotubes are possible. (b) Also discuss models of multi-walled carbon nanotubes.	4	1.5+2=3.5