

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
 TEST -2 EXAMINATION- 2026
 B.Tech-VI Semester (BT)

Course Code (Credits):18B1WBT633 (3)

Max. Marks: 25

Course Name: NanoBiotechnology

Course Instructor: Dr. Abhishek Chaudhary

Max. Time:1.5 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 calculators is not allowed

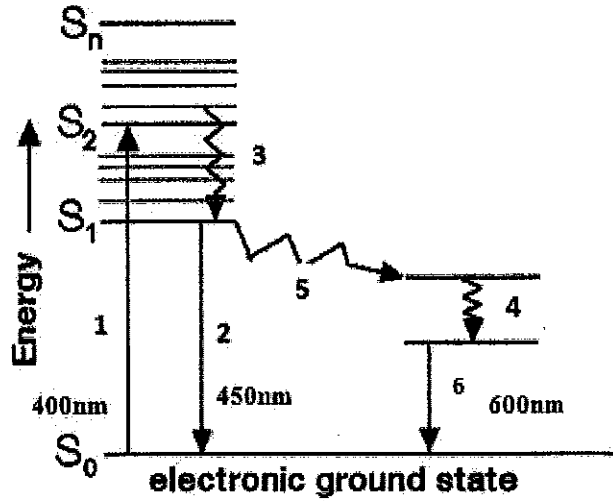
Q.No	Question	CO	Marks
Q1	Nanoparticle synthesis includes several strategies for the preparation of nanoparticles. These may be produced either from bulk precursor materials by a top-down approach or through bottom-up methods, where nanoparticles form by nucleation and subsequent growth from molecular species in liquid or vapor phases. Taking Silver (Ag) as an example, discuss the mechanism of nanoparticle synthesis in monophasic and biphasic systems. Also compare and contrast chemical and green methods for nanoparticle synthesis.	CO-2	5
Q2	Scanning electron microscopy (SEM) is a powerful analytical technique used to obtain high-resolution images and detailed surface morphology of specimens. In SEM, a focused beam of electrons scans the specimen surface to generate images with far greater resolution than that of optical microscopy. a. Describe the working principle of SEM with a neat, labelled diagram. b. Explain the various specimen–electron interactions responsible for image formation. c. Enumerate the major differences between transmission electron microscopy (TEM) and scanning electron microscopy (SEM).	CO-3	3+2+1
Q3	Calculate the spin multiplicity of singlet and triplet electronic states, and explain each with a suitable justification.	CO-3	2
Q4	In radial immunodiffusion assay, antibody is incorporated into the gel at a defined concentration. If you need to prepare exactly 500 mL of antibody solution at a final concentration of 0.5 nM, calculate and describe how this solution can be prepared from stock solutions of 5.0 mM and 50 μM antibody.	CO-1	5

Q5

Examine the Jablonski diagram given below, in which **six processes** are marked. Identify the labeled processes and describe each process in detail. Additionally, calculate the Stokes shift based on the information provided in the diagram

CO-3

6+1



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