Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: MAR / APR 2025
Faculty: Science and Technology

Semester: VI

Program: : BSc.Gen03 **SET: A**
Program (Specific):T.Y.B.Sc **Course Type: DSC**
Class: T.Y B.Sc **Max.Marks: 35**
Name of the Course: Nano-biotechnology
Course Code: 24-MB-3611 **Time: 2Hr**
Paper: VIII

Instructions to the candidate:

1) *There are 4 sections in the question paper. Write each section on a separate page.*
2) *All Sections are compulsory.*
3) *Figures to the right indicate full marks.*
4) *Draw a well labelled diagram wherever necessary.*

SECTION: A

Q1) Attempt the following **5**

a) Which characterization technique would you use to observe the surface morphology of gold nanoparticles?
   a) Fourier transform infrared spectroscopy (FTIR)
   b) Scanning electron microscopy (SEM)
   c) X-ray photoelectron spectroscopy (XPS)
   d) UV-Vis spectroscopy

b) How do liposomes function as bio-assemblies in drug delivery?
   a) They break down toxic materials in the bloodstream.
   b) They act as a shield against chemical reactions in the body.
   c) They carry drugs and release them at target sites.
   d) They produce proteins necessary for drug absorption.

c) Define nanoscience.
d) Enlist any two advantages of DLS.
e) Draw the diagram of multilamellar vesicle.

Q2) Attempt <u>any four</u> of the following **4**

a) Mention the role of DNA bio-assemblies.
b) Give the full form of XPS.
c) Discuss the role of nano-minerals.
d) Explain the role of nanoparticles in vaccine development**.**
e) Discuss any two advantages of X-Ray diffraction (XRD).
f) Cite any two example of fungi used for nanoparticle synthesis.

SECTION: B

Q3) Attempt <u>any four</u> of the following **8**

a) Discuss the role of nanotechnology in wastewater treatment.
b) Compare and contrast top down and bottom-up approach.
c) State the principle of DLS.
d) Explain how nanomaterials can be used for imaging techniques.
e) Summarize the advantages of microbial-mediated synthesis of nanoparticles over chemical methods**.**
f) Discuss the use of nanomaterials as biosensors.

SECTION: C

Q4) Attempt <u>any four</u> of the following **8**

a) Discuss the limitations of TEM.
b) Deduce the role of nanomaterials in animal industry.
c) State the principle of FTIR.
d) Quote any two properties of nanomaterial that differ from those of bulk materials.
e) Cite role of viruses in nanotechnology.
f) Classify the nanoparticles based on their dimensions.

SECTION: D

Q5) Attempt <u>any two</u> of the following (2/4) **10**

a) Justify: UV-Visual spectroscopy can be used to determine the concentration of nanoparticles in a solution.
b) Describe the working of Scanning Electron Microscopy (SEM) with neat labelled diagram.
c) Explore the applications of nanoparticles as antimicrobial agents.
d) Diagrammatically represent the mechanism of intracellular synthesis of silver nanoparticles.