This question paper contains 4 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **8056**

Unique Paper Code : **2233010014**

Name of the Paper : **DSE : Nanobiotechnology**

Name of the Course : **B.Sc. Zoology**

Semester : **VI (NEP-UGCF)**

Duration : **3 Hours** Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all, and

Question No. **1** is compulsory.

1. (A) Define the following terms : 5×1=5

(*a*) Nanotoxicology

(*b*) Quantum dots

(*c*) Nanoremediation

(*d*) Buckyball

(*e*) Liposomes.

P.T.O.

(B) Differentiate between : 5×3=15

(*a*) Inorganic *Vs.* Organic Nanoparticles

(*b*) Nanoparticles *Vs.* Nanocomposites

(*c*) Controlled *Vs.* Systemic Drug Delivery

(*d*) SEM *Vs.* TEM

(*e*) Chemical synthesis *Vs.* Green synthesis.

(C) Expand the following terms : 6×1=6

(*a*) DDS

(*b*) HR-TEM

(*c*) FTIR

(*d*) ROS

(*e*) ADME

(*f*) PLGA.

(D) Mark true *or* false : 4×1=4

(*a*) Quantum dots are lipids.

(*b*) Nanoparticles cannot be biosynthesised using microbes.

(*c*) Risk assessment is necessary for safe nanoparticle use.

(*d*) The size and surface charge of nanoparticles do not affect their circulation time in the bloodstream.

2. (*a*) What is a drug delivery system ? Discuss the differences between oral, systemic and transdermal drug delivery systems using nanocarriers. 10

(*b*) Explain the nanoscale assembly of microorganisms and their applications. 5

3. (*a*) Explain the nanoparticle-membrane interactions, entry of nanoparticles in the cell and intracellular environment for efficient intracellular uptake. 10

(*b*) Compare and contrast bulk materials and nanomaterials in terms of physical and chemical properties. 5

4. (*a*) Describe various ways to characterise the nanoparticles. Discuss the use of any *two* methods for characterization of nanomaterials. 10

(*b*) Explain the concept of active and passive targeting in drug delivery. 5

5. (*a*) What is nanotoxicology ? Discuss how size, shape, surface charge and composition determine the extent of cellular toxicity. 10

(*b*) What is the Enhanced Permeability and Retention (EPR) effect ? How does it help in passive targeting of tumours ? 5

P.T.O.

6. Write short notes on the following (any *three*) : 3×5=15

(*i*) Nanosensors and their applications

(*ii*) Nanomedicines

(*iii*) Environmental impacts of nanotechnology

(*iv*) Pharmacokinetics and Pharmacodynamics.