



Date: 31-10-2018

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

**PART – A**

**Answer ALL the Questions**

**I. Choose the correct answer**

**(5 x 1 = 5 Marks)**

- Which among the following biosensor is used to detect analytes with picomolar sensitivity  
a) Cantilever                      b) Plasmonic                      c) Artificial                      d) All the above
- The multilayer deposition of vaporized nanoparticles on the surface of the substrate is  
a) Nanofibre                      b) Nanobots                      c) Nanodendrites                      d) Nanosensors
- Which is the largest known molecule to exist in space?  
a) Gold                      b) Platinum                      c) Fullerene                      d) Diamond
- Application of nanotechnology in food science technology  
a) Food safety                      b) Transgenics                      c) Nanocomposites                      d) GM food
- Process in which a sample is heated to constant weight at each of the series of increasing temperature  
a) Quantistatic                      b) Thermal                      c) Isothermal                      d) Thermostatic

**II. State whether the following are true or false.**

**(5x1=5 Marks)**

- Dimethylsulfoxide is a cryoprotectant.
- An artificial RBC is otherwise known as nanorobot.
- Graphene is a thin film made from fullerenes.
- Size of a quantum dot is 5cm.
- Gern Binnig and Heinrich Rohre invented the transmission electron microscope.

**III. Complete the following**

**(5 x 1= 5 Marks)**

- Primary advantage of STEM over conventional SEM imaging is the improvement in \_\_\_\_\_ resolution.
- \_\_\_\_\_ is the branch of science that deals with therapeutics with diagnostics.
- Photovoltaic cells convert solar energy into \_\_\_\_\_.
- \_\_\_\_\_ is an organosilicon compound used in NMR spectroscopy.
- \_\_\_\_\_ is the most important exposure route of toxic nanoparticles.

**IV. Answer the following within 50 words**

**(5 x 1 = 5 Marks)**

- What are nanorobots?
- Define nano-engineering.
- Give the formula for Bragg's Law.
- What is replica molding?
- Write a note on cantilever.

**PART B**

**Answer the following each within 500 words.**

**(5 x 8 = 40 marks)**

**Draw diagrams wherever necessary.**

21. (a) What do you mean by carbon nanotubes? Give various types of carbon nanotubes.

OR

(b) Enumerate the features of cell repair machines.

22. (a) Explain the technique of photodynamic therapy.

OR

(b) Describe the role of nanotechnology in agriculture

23. (a) What are the different methods of operation of AFM.

OR

(b) Give a short note on the different steps involved in photolithography process.

24. (a) Write a note on protein nanoparticles and their applications in nanotechnology.

OR

(b) Are nanomaterials safe to use? Substantiate.

25) (a) Describe how precisely crystal lattice constant can be determined.

OR

(b) Give a brief note on the working method of electron spin resonance spectroscopy.

**PART – C**

**Answer any TWO of the following, each within 1500 words.**

**(2 x 20 = 40 Marks)**

**Draw diagrams wherever necessary.**

26. Explain the basic principle of biosensor. How are they classified?

27. Bring out the applications of nanotechnology in medicine.

28. Explain in detail the principle, working and applications of Raman spectroscopy for the evaluation of properties of nanomaterials and nanostructures.

29. Give a detailed account on the X-ray powder characterization and diffraction technique

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