

2022

M.Sc.

2nd Semester Examination

CHEMISTRY

PAPER—CEM-204

**NANOTECHNOLOGY : PRINCIPLES
AND PRACTICES**

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group—A

Answer any four questions. 4×2

1. (a) Why Nano particles are used in hair care product?
- (b) How Nano emulsions are produced to use in skin care product?

(Turn Over)

- (c) Why hydroxyapatite nanoparticles are used in oral care product?
- (d) Show a profile of coercivity variation for the nanoparticle.
- (e) In which product Carbon Black (CI 77266) is used? Why?
- (f) State whether the scaling law is obeyed for particles in nano dimension.

Group—B

Answer any *four* questions.

4×4

2. (a) What are nano- fertilizers? How it can be prepared? What are the advantages of use of nano fertilizers in agriculture?
- (b) Write down the name and function of nano particle used in different type of beauty product.
- (c) Write down the name of nanoparticle used in Hair colour product. Why they are used?

- (d) What types of nanoparticles are used in skin care product? What are the advantages of using them?
- (e) What is Ostwald Ripening process? How does it play a role in synthesis of nanoparticle?
- (f) How does the ionization energy of Na cluster vary with its nuclearity in the nano dimension? Why do we observe a non-smooth variation in the ionization energy with respect to its nuclearity for nanoclusters of sodium?

Group—C

Answer any *two* questions.

2×8

3. (a) What nano particles are used to produce safer and secure mirrors and windows in automobile? How it work?
- (b) Write down the name of drug delivery carrier. What are the advantages of liposome to use as drug carrier? 4+4
4. (a) How quantum dots are used increase the efficiency of solar cells? What are the advantages of aluminium conductor composite reinforced (ACCR) wire for transmission electricity?
- (b) How can nanotechnology improve sporting goods? Discuss. 4+4

5. (a) Why the x-ray diffractogram for nanoparticles are less defined than the corresponding bulk material?
- (b) Why the polymeric materials are used in the synthesis of nanoparticle in aqueous medium?
- 4+4
6. (a) How hydrophobic surfaces can be produced to use in textile substrate?
- (b) What is lotus effect? In which factors it depends?
- (c) How UV-blocking cotton fabrics are made off?
- 3+3+2
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