 PG/IIS/CEM/204/25(CBCS)

M.Sc. 2nd Semester Examination, 2025

CHEMISTRY

PAPER – CEM-204 (CBCS)

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

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

GROUP—A

Answer any **four** of the following questions : 2×4

1. In which product Carbon Black (CI 77266) is used ? Why ?

2. In which product Tris-Biphenyl Triazine (nano) is used ? Why ?

3. State the benefits of hydroxyapatite nanoparticles used in oral care product.

4. Why are Nanoliposomes used in cosmetics ?

5. Why is optical microscope not suitable for observing nanoparticles ? What is the wave-length of an electron with kinetic energy of 10 KV ?

6. What are the methods used for characterization of metal nanoparticles ?

GROUP–B

Answer any **four** questions : 4×4

7. How terpenoids can be termed as Renewable Molecular Functional Nanos ? Give an example of a nano-sized terpenoid.

8. "Silica nanoparticles have attracted interest from cosmetic industry". Explain with example.

9. What is bottom-up approach for the synthesis of metal nanoparticles ? Describe a method for the green synthesis of AuNPs. Write schematically the mechanism of its formation.

10. How is nanoparticle used for modulation of skin colour ? Explain with an example.

11. What are the advantages of using silver nano-particles in anti-Bacterial fabrics ?

12. What is Green Chemistry ? Write four principles of Green Chemistry.

GROUP – C

Answer any **two** questions : 8×2

13. What do you mean by nano-fertilizers ? Outline the synthesis of nano-fertilizer from the banana peels. Write down the function of nano-fertilizer in agriculture. 1 + 4 + 3

14. (*a*) How nanoparticles can be applied in food packaging ? What is a smart package ?

(*b*) Why Nanofilteration is superior to RO filtration for the purification of water ? 4 + 4

15. (*a*) What are different types of non-covalent interactions ? Describe schematically how nano-sized terpenoids can self-assemble to form vesicles.

(*b*) How many plant secondary metabolites have been reported so far ? What are the major plant secondary metabolites ? What are terpenoids ? Classify the terpenoids. 2 + 2 + 1 + 1 + 1 + 1

16. (*a*) How can nanotechnology improve sporting goods ? Discuss.

(*b*) What is lotus effect ? On which factors does it depend ?

(*c*) How UV-blocking cotton fabrics are made ? 3 + 3 + 2

[Internal Assessment — 10 Marks]