

	SL No of QP :9906
Unique Paper Code	:2173540008
Name of the Paper	:Material Science
Name of the Course	: B.Sc. (Prog) Analytical Chemistry
Semester	:VII
Duration	:2hrs.
Maximum Marks	:60

ATTEMPT ANY FOUR QUESTIONS

Q.1

- What are self-healing materials? Differentiate between intrinsic and extrinsic healing.
- Discuss emerging trends of 4D printing.
- What are photo responsive material? Explain cis-trans isomerism exhibited by them.

(4, 5, 6)

Q.2

- What are thermoplastic and thermoset polymers. Give two examples of each.
- What are composite materials. Classify them on the basis of the matrix material.
- 2.1g of coal is burnt in combustion tube. The increase in weight of anhydrous CaCl_2 is 0.53 gm and increase in weight of KOH tube is 5.73 gm. Calculate the percentage of hydrogen and carbon in the given coal sample.

(4, 5, 6)

Q.3

- Explain hand lay-up method to prepare composites. Draw a neat diagram.
- What is the role of nanoparticles and micelles in controlled release drug delivery?
- A CaCO_3 solution shows a transmittance of 90%, when taken in a cell of 1.0 cm thickness. Calculate its concentration, if the molar absorptivity coefficient is $9000\text{dm}^3/\text{mol}/\text{cm}$.

(4, 5, 6)

Q.4 Write short notes on ANY THREE

- Michelson Interferometer
- Surface morphology
- CHNS characterization technique
- Supramolecules

(5, 5, 5)

Q.5

- Explain LCST and UCST phenomena of thermos-responsive polymers.
- Discuss the cardiovascular applications of biomaterials.
- Differentiate synthetic scaffolds from natural ones.

(4, 5, 6)

Q.6

- Explain the contribution of lotus effect in bio-inspired and biomimetic materials? Give examples.
- What are the emerging trends and future prospects of AI-integrated materials?
- How would you determine the percentage of nitrogen in a fixed amount of coal?

(4, 5, 6)