2020

CHEMISTRY — HONOURS

Paper : DSE-B-2

(Novel Inorganic Solids)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer ***questions no.*** **1** (compulsory) and ***any eight*** questions from the rest (question no. **2** to **13**).

1. Answer ***any ten*** questions : 1×10

(a) Mention two disadvantages of heat and beat methods.

(b) What is ion exchange capacity?

(c) Cite one example of a material produced by sol-gel method.

(d) What are inorganic liquid crystals?

(e) What is the significant property of fulleries in respect of their electrical conductivity?

(f) Cite an example of mixed inorganic pigment.

(g) Give an example of natural but not biological nanomaterial.

(h) Mention two significant uses of inorganic nanowire.

(i) Give an example of super alloy and mention its composition.

(j) Cite an example of an anion exchange resin.

(k) Indicate two special features of conducting polymers in respect of their application.

(l) In what way polyacetylene is termed as a speciality polymer?

2. (a) Elucidate co-precipitation method citing a specific example as illustration.

(b) Cite two advantages of sol-gel method as a synthetic process. 3+2

3. (a) What are one-dimensional metals and molecular magnets? Mention their chemical significance.

(b) Give examples of each of a white and black pigment of inorganic origin. 3+2

4. (a) What are bio-inorganic nanomaterials? Classify various types of it.

(b) What are bionanocomposites? 3+2

5. (a) How do you prepare gold nanoparticles? Mention its two significant uses.

(b) Indicate the structural features of carbon nanotube. 3+2

6. (a) How does the content of carbon varies in cast iron and alloy steels? Distinguish between cast iron and alloy steel in terms of its application.

(b) What is the composition of duralumin? Mention its use. 3+2

7. (a) What are super thermoplastics? Classify these and mention their technical applications.

(b) Indicate technical uses of brass and bronze. 3+2

8. (a) What are matrix composites? Discuss the role of matrix composites pointing out its advantage over conventional engineering materials.

(b) Cite two examples of fibre-reinforced composites. 3+2

9. (a) Mention three important properties of refractories relevant to their utility.

(b) Elucidate the environmental effects on composites. 3+2

10. (a) Elucidate conduction mechanism of conducting polymers.

(b) How polypyrrole can be synthesized? 3+2

11. (a) Distinguish between thermoplastics and thermosets.

(b) Cite two technical uses of ceramic material. 3+2

12. (a) Illustrate with an example how inorganic solids can be synthesized using ion-exchange methods.

(b) What are intercalated compounds? Give one example. 3+2

13. (a) How are refractories classified? Give examples.

(b) How could you exercise one-dimensional control over nanoarchitecture? 3+2

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