

**2021**

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

1. Answer **any ten** questions : 1×10
- (a) Cite an example of an inorganic solid material produced by hydrothermal method.
  - (b) What are biosensors?
  - (c) Mention one technological importance of an one-dimensional metal.
  - (d) Indicate the special feature of liquid crystal display (LCD).
  - (e) Cite one example of an one-dimensional nanomaterial.
  - (f) What is the importance of intercalation in the synthetic process?
  - (g) What is meant by antisical nanomaterial?
  - (h) Mention an environmental effect on composite.
  - (i) Cite an example of a cation exchange resin.
  - (j) Elucidate the importance of gold nanoparticles.
  - (k) Give two examples of engineered nanomaterials.
  - (l) Give an example of refractory material and mention its one use.
2. (a) What are the applications of bionanocomposite materials in the current world?  
(b) What are the steps for solid state synthesis method? 3+2
3. (a) How coloured solid can be obtained by mixing different inorganic pigments? Mention one technological importance of it.  
(b) Discuss the role of biopolyphosphate as a bionanomaterial. 3+2
4. (a) What are different types of inorganic liquid crystals? Give one example of each of them.  
(b) What are fullerides? Mention one technological importance of it. 3+2

**Please Turn Over**

5. (a) What is meant by inorganic nanowires? Mention the different types of nanowires.  
(b) Indicate the structural features of inorganic nanowires. 3+2
6. (a) Give a comparative account of plain steel and alloy steel with respect to their composition, fabrication characteristic and application.  
(b) What is heat and beat method for the preparation of inorganic solids? 3+2
7. (a) What are the four classes of matrix composites? Give one example of each.  
(b) What is the composition of magnelium? What is its use? 3+2
8. (a) Describe the three main parts of a fibre reinforced composite.  
(b) Mention the advantages of fibre reinforced composite. 3+2
9. (a) What are conventional engineering materials? Explain their limitations.  
(b) Write down the composition of bronze. Mention its use. 3+2
10. (a) Describe the method of preparation of silver nanoparticles. Mention its one significant use.  
(b) What is grey cast iron? Mention one of its use. 3+2
11. (a) What are the advantages of cast iron? Why does it has limited engineering applications?  
(b) How does a solid electrolyte work? 3+2
12. (a) How polyparaphenylene can be synthesized? Is it conductive? Explain.  
(b) What is conducting polymer? Mention one of its significant application. 3+2
13. (a) Distinguish between ceramics and refractory.  
(b) What are the raw materials required for the preparation of traditional ceramics? 3+2
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