

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1833

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Unique Paper Code : 2173012007

Name of the Paper : DSE-2: Inorganic Materials of Industrial Importance

Name of the Course : **B.Sc. (H.)**

Semester : IV/VI

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **six** questions out of **eight**.
3. Each question carries equal marks.

1. (a) Discuss the structure of glass and why it is considered a supercooled liquid.
(b) Define nanomaterials and classify them into zero-, one-, and two-dimensional types with examples.
(c) Define fertilizers. What are the different ways in which fertilizers can enhance the growth of plants?

(5,5, 5)

2. (a) Explain the composition and uses of soda-lime glass.
(b) What do you understand by surface coating? What are the different classifications of it based on its functions?
(c) What are carbon fibers? Discuss their preparation and properties.

(5, 5,5)

3. (a) Define a battery. What are the characteristics of an ideal battery?
(b) What is pigment? Differentiate between pigment volume concentration (PVC) and critical pigment volume concentration (CPVC).
(c) What are fullerenes? Describe their structure and properties.

(5, 5,5)

4. (a) What do you understand by surface preparation. What is the need for surface preparation before coating?
(b) Fertilizers provide nutrients in varying proportions. Discuss the classification of essential elements for plant growth based on the amounts required.
(c) What do you understand by paint? Name any three types of special paints.

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- (5, 5, 5)
5. (a) How did Portland cement get its name? Explain the process of setting and hardening of Portland cement using suitable chemical reactions.
- (b) What is the glass transition temperature? List three important properties of glass.
- (c) What are carbon nanotubes? Give three important applications.
- (5, 5, 5)
6. (a) What is calcium ammonium nitrate fertilizer? Discuss its synthesis and applications.
- (b) Describe the manufacturing process of glass with a flow diagram.
- (c) What is the role of pigment in paint formulation? Define pigment volume concentration (PVC) and its significance.
- (5, 5, 5)
7. (a) Discuss the principle of electroplating for metallic coatings. Explain its use in the process of nickel plating.
- (b) What are optical fibres? How do signals travel through them? Briefly describe their applications.
- (c) Discuss chemical vapour deposition technique in detail.
- (5, 5, 5)
8. (a) Explain monoammonium phosphate and diammonium phosphate fertilizers.
- (b) Discuss working principle, chemical reactions involved and advantages of lithium-metal battery.
- (c) Give the composition and applications of *any two* of the following types of glasses:
- (i) Borosilicate glass
 - (ii) Photochromic glass
 - (iii) Glass wool
- (5, 5, 5)