Unique Paper Code:	**32177902**
Name of the Paper:	**DSE: Inorganic Materials of Industrial Importance**
Name of the Course:	**B.Sc.(Prog)**
Semester:	**V**
Duration:	**3 Hrs**
Maximum Marks:	**75**

Instructions for Candidates

1. Attempt **four** questions in all.
2. **Question 1** is compulsory.
3. Attempt any **three other** questions. All questions carry equal marks.

Q-1 (a) Fill in the blanks or mark True/False as required:

(i) Clays are formed by weathering of …….. and …….. rocks.

(ii) Insulators can be plated with metal by …….. technique.

(iii) In methanol-oxygen fuel cell, the net cell reaction is given by…….

(iv) In Buckminster fullerene, 60 Carbon atoms are arranged in form of sphere as …… and ……..

(v) …… method of synthesis of nanomaterial offers the best control over the particle size.

(vi) All heat resisting steels contain …….. as one of the constituent.

(vii) Glass containing …… can withstand sudden change in temperature.

(viii) Glasses have capacity of absorbing decorative colours without loss of transparency.(T/F)

(ix) When water is added to cement, hydration, hydrolysis, and gelation reactions take place with the liberation of heat. (T/F)

(b) Give one word or phrase for the following:

(i) The minimum voltage that must be applied to bring about continuous electrolysis of an electrolyte.

(ii) Any metal working process in which metal is shaped below its recrystallization temperature.

(iii) Additives which increase the flexibility of a paint film.

(c) Define the following:

(i) Tinning (ii) Boriding (iii) Fire Retardant Paint

(12, 3, 3.75)

Q.2 (a) How cement is obtained on a large scale by dry process? What are the relative merits and demerits of this process over wet process?

(b) Describe the steps in the manufacture of common commercial glass with the help of a flowchart. Discuss the importance of annealing in the manufacture of Glass. What special type of oven is used for the annealing of glass articles?

(c) Define the following properties of a material:

(i) Ductility, (ii) Toughness, (iii) Hardness, (iv) Creep.

(d) Why is it important to prepare the surface before electroplating? What are the different methods by which the surface is prepared?

(5, 5, 4, 4.75)

Q 3 (a) Distinguish between the following

(i) Physical Vapour Deposition and Chemical Vapour Deposition

(ii) Earthenware and stoneware

(b) What are carbon nanotubes? Briefly describe the different types of carbon nanotubes and their uses.

(c) What are the advantages and disadvantages of using chemical fertilizers? Discuss the Safety measures to be adopted during storage of fertilizers.

(d) Discuss the various types of cast iron. Write their composition and applications.

(2.5X2, 5, 4, 4.75)

Q.4 (a) Describe briefly the principle, working and applications of solar cell.

(b) Classify the types of carbon steel as per the percentage of carbon content in the steel. Give the composition of X10Cr18Ni9 Steel. List its main uses.

(c) What are the three major components of a paint formulation? Give examples and briefly explain the function of each component.

(d) Distinguish between electroplating and electroless plating with specific examples.

(5, 5, 4, 4.75)

Q.5 (a) Name the different alloying elements added to steel to make alloy steels and their effect on the steel. Give at least one example of each.

(b) Write the discharging and charging reactions of a lead storage battery and explain its working. Why is this battery still popular despite its bulk and weight?

(c) Explain the manufacturing of Ammonium nitrate fertilizer with the help of flow chart.

(d) What is the purpose of applying surface coatings to objects? Discuss anodization method of surface coating

(5, 5, 4, 4.75)

Q.6 (a) What is 'glazing' in the context of ceramics? What are the advantages of glazing? Mention two methods of glazing.

(b) Write a short note on (any two):

(i) Fullerenes (ii) Heat treatment of Steel (iii) Photochromic Glass

(c) Give the characteristics and applications of semiconducting and superconducting oxides.

(d) What are optical fibres? What are the advantages of using optical fibres? Briefly describe their applications.

(5, 5, 4, 4.75)