

2021

CHEMISTRY — HONOURS

Paper : DSE-B-1

(Inorganic Materials of Industrial Importance)

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** (compulsory) and **any eight** questions from the rest (**question nos. 2 to 13**).

1. Answer the following questions (**any ten**) : 1×10
- (a) Name the components of borosilicate glass.
 - (b) What is glass transition temperature (T_g)?
 - (c) What do you mean by the designation 20–15–10 in an NPK fertilizer bag?
 - (d) Name the components acting as anode and cathode in a lithium battery.
 - (e) Name the ‘depolariser’ in a modified Leclanche’s dry cell battery.
 - (f) Give an example of an incomplete fertilizer.
 - (g) Write the name and formula of an important clay.
 - (h) Name the heterogeneous catalyst used in the water gas shift reaction.
 - (i) Give an application of ceramics in biomedical field.
 - (j) What are the components of Portland cement?
 - (k) Cite example of a rocket propellant.
 - (l) What are mordant dyes?
2. (a) Show by a flow-chart diagram the major unit operations in the manufacture of ammonium nitrate.
(b) What do you understand by the term ‘prilling’? 3+2
3. (a) What are the advantages of heterogeneous catalysis over homogeneous catalysis?
(b) Explain two mechanisms of catalyst deactivation. 3+2
4. (a) State the basic principle of a fuel cell.
(b) Give two examples of non-ferrous alloys and their uses. 3+2

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5. (a) Name the different types of explosives and give one example for each.
(b) Explain the phenomenon 'nitriding'. 3+2
6. (a) Give an outline of the manufacture of steel.
(b) What are the components of photosensitive glass? 3+2
7. (a) Distinguish between traditional ceramics and high technology ceramics.
(b) What is the difference between SSP and TSP? 3+2
8. (a) Show a schematic diagram for the manufacture of commercial glass.
(b) How is lead azide used as an explosive? 3+2
9. (a) What are the different additives used in a paint? What purposes do they serve?
(b) What are the active materials used for the fabrication of solar cells? 3+2
10. (a) Explain the stages of setting of cement.
(b) What is the role of feldspar in manufacture of ceramics? 3+2
11. (a) Mention the elementary steps in homogeneous catalysis.
(b) What is plastic paint? 3+2
12. (a) What do you mean by glass annealing? Why is it necessary?
(b) What are emulsifying agents? 3+2
13. (a) What are the important electrolytic metallic coatings? Mention the principle of any one of them.
(b) What is armoured glass made of? 3+2
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