

2023

CHEMISTRY — HONOURS

Paper : DSE-B-1 and DSE-B-2

(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.*

Paper : DSE-B-1

(Inorganic Materials of Industrial Importance)

Full Marks : 50

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) What is the role of linseed oil in varnish?
 - (b) What makes steel stainless?
 - (c) Mention one role of plasticizer added to a paint.
 - (d) State any one application of Monel metal.
 - (e) Give an example of a superconductor/conducting oxide.
 - (f) What is muriate of potash?
 - (g) Which type of cement is used in underwater constructions?
 - (h) Name the principal constituent of white paint.
 - (i) Cite one example each of a primary and a secondary explosive.
 - (j) Which common element is present in brass and bronze?
 - (k) What is the composition of clay?
 - (l) Mention any one industrial application of heterogeneous catalysis.
2. (a) Which compound(s) is (are) used to give—
- (i) amber colour, (ii) blue colour, (iii) purple colour to glass?
- (b) Compare the properties of solid and liquid propellants. 3+2

Please Turn Over

3. (a) What are carbon nanotubes? State any one application of carbon nanotubes. 3+2
(b) What is vehicle? 3+2
4. (a) State the composition and properties of borosilicate glass. 3+2
(b) Explain the process— 'Carburizing'. 3+2
5. (a) The following equation shows reaction products of the molecular explosive PETN ($C_5H_8N_4O_{12}$).
$$C_5H_8N_4O_{12} \rightarrow 4CO_2 + 4H_2O + 2N_2 + C$$

Calculate the oxygen balance for PETN. 3+2
(b) What is meant by 'Acid pickling'? State its use. 3+2
6. (a) Write down with equations the working principle of Pb-acid battery. 3+2
(b) What are the differences between glass and ceramics? 3+2
7. (a) How is calcium ammonium nitrate manufactured? Construct the flow chart diagram for the above manufacturing process. 3+2
(b) Discuss the chemical changes that occur during the setting of cement. 3+2
8. (a) What is the basic difference between an emulsion paint and an ordinary paint? Give the approximate formulation of an ordinary paint. 3+2
(b) What are the active materials used in the fabrication of solar cells? 3+2
9. (a) What are fillers? Cite an example. Write down the functions of fillers in a paint. 3+2
(b) Distinguish between drying oils and semi-drying oils. 3+2
10. (a) Explain the two commonly used techniques for metal spraying. Why is sand blasting done on the metal surface prior to spraying? 3+2
(b) What is the function of gypsum in cement? 3+2
11. (a) Differentiate between ferrous and non-ferrous alloys with examples. 3+2
(b) Explain the role of a phase transfer catalyst with the help of a suitable example. 3+2
12. (a) What is glazing? State two advantages of glazed ceramics. 3+2
(b) Write down one advantage and one disadvantage of Ni-Cd batteries. 3+2
13. (a) What are the objectives of electroplating? Mention the difference between electroplating and electroless plating. 3+2
(b) What is an eco-friendly paint? 3+2