B.Sc. 6th Semester (Honours) Examination, 2023 (CBCS)

Subject : Chemistry

Course : DSE-4

(Inorganic Materials of Industrial Importance)

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any five* questions: 2×5=10

(a) Write down one important difference between primary and secondary battery.

(b) If the specific gravity of the electrolyte (H_2SO_4) in a lead acid cell increases, what will be its effect on internal resistance?

(c) Give two examples of silicate glass.

(d) What are the two main types of ceramics?

(e) Which is commonly used as a retarder in cement?

(f) What are the main components of fertilizers?

(g) Write the role of cupric chloride in the Wacker process.

(h) Write the chemical formula and IUPAC name of Wilkinson's catalyst.

2. Answer *any two* questions: 5×2=10

(a) Write two fundamental characteristics of an explosive. Give an example of an explosive organic compound. Mention the full form of PETN and its uses. 2+1+2

(b) What is the active species in Ziegler$^-$ Natta polymerization? Write the limitations of this polymerization. Give an example of a phase transfer catalyst. 2+2+1

(c) Explain how the properties of alloys are different from those of constituent metals. Give an example of a ferrous alloy. What is dephosphorization in steel manufacturing? 2+1+2

(d) What's the difference between a fuel cell and a battery? Write the advantages and limitations of Li-ion batteries. 2+3

3. Answer *any two* questions: 10×2=20

(a) Write short notes: 2.5×4

(i) Manufacture of cement and the setting process

(ii) Carbon fibre

(iii) Clays and feldspar

(iv) Five important applications of ceramic products

(b) Draw the schematic representation of catalytic steps of

(i) Hydroformylation and

(ii) Water gas reaction 5×2

and write their industrial applications.

(c) Discuss the manufacturing process(es) of the following two effective fertilizers: 5×2

(i) Ammonium nitrate

(ii) Superphosphate

(d) What are the two basic objectives of surface coating? What does metallic coating mean? What kind of wax is used in polishing? Define fire retardant with a suitable example. 2+2+2+2+2
