

U.G. 5th Semester Examination - 2024

CHEMISTRY**[HONOURS]**

Discipline Specific Elective (DSE)

Course Code : CHEM-H-DSE-T-1B

Full Marks : 40

Time : $2\frac{1}{2}$ Hours*The figures in the right-hand margin indicate 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) A fertilizer is labelled as 15-15-10. What does this designation mean?
 - b) Write down the composition of feldspar.
 - c) What are emulsifying agents?
 - d) State the function of lead azide as an explosive, indicating the reactions involved.
 - e) Write down the example of secondary storage battery.
 - f) What is meant by glassy state of matter?
 - g) Define paints and pigments.
 - h) Differentiate between ferrous and non-ferrous alloys with examples.

[Turn over]

2. Answer any two questions: $5 \times 2 = 10$

a) Differentiate between homogeneous and heterogeneous catalysis with example. How 'catalyst poisoning' is different from 'catalyst deactivation'? $3 + 2 = 5$

b) Elucidate briefly the functioning of the following battery including the reactions involved: $2\frac{1}{2} + 2\frac{1}{2} = 5$

i) Lead acid battery

ii) Lithium ion battery

c) What is surface coating? What is white pigment? What is the objective of surface coating?

$$2 + 1 + 2 = 5$$

d) i) Show a schematic diagram for the manufacture of commercial glass.

ii) What is armoured glass made of?

$$3 + 2 = 5$$

3. Answer any two questions: $10 \times 2 = 20$

a) i) Write the steps involved in the manufacture of steel.

ii) What are alloys? State the purpose of alloying with a suitable example.

iii) Explain the stages of setting of cement. What is white cement? Which chemical is added to accelerate the setting of cement? $3 + (1 + 2) + (2 + 1 + 1) = 10$

b) i) Write the composition, properties and applications of Soda lime glass and Coloured glass. What is annealing? Why is it necessary?

ii) Explain briefly the synthesis, structure, properties of the Fullerenes. Give an example of a superconducting ceramics.

$$(3 + 2) + (4 + 1) = 10$$

c) Give a short note on industrial production of urea. What are artificial fertiliser and micronutrients? Write down the role of phosphorous in plants. $4 + (2 + 2) + 2 = 10$

d) Write a short note on non-ferrous alloy. What are ceramics? Write down the composition of Portland cement. Write a short note on borosilicate glass. Write down the comparisons between the dry and wet methods for manufacturing of cement. What is 43-Grade cement? $2 + 1 + 2 + 2 + 2 + 1 = 10$