

B. SC. (CHEMISTRY) EXAMINATION, 2022

(3rd Year, 6th Semester)

INDUSTRIAL CHEMISTRY AND ENVIRONMENTAL CHEMISTRY

PAPER – DSE/CHEM/TH/04

Time : Two hours

Full Marks : 40

UNIT: 6041-I

1. Answer *all* the questions :
 - a) Define glass (physically). Mention some important features of glass. What is a 'Batch Material'?

2+1+1
 - b) Discuss the chemical reactions that take place in the kiln during the manufacture of cement. 2
 - c) Write a short note on *any one* of the following: 3
 - i) Setting of cement
 - ii) Annealing
 - d) What are ceramics? 1
2. Answer *all* the questions : 5×2=10
 - a) Explain the mechanistic steps in the catalytic cycle of hydrogenation of olefins by Wilkinson's catalysts.
 - b) Discuss with an example "phase transfer catalysis".
 - c) Aluminosilicates can act as good acid catalysts in organic reactions. Justify.

[Turn over

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- d) Use of the modified catalyst $[\text{HCo}(\text{CO})_3(\text{PBU}_3)]$ instead of $[\text{HCo}(\text{CO})_4]$ gives better yield of straight chain aldehyde in hydroformylation reaction. Explain.
- e) Write down the reactions involved in the British synthesis of RDX. Calculate oxygen balance of RDX.
3. Answer **all** the questions :
- a) What do you mean by fuel rich and fuel lean condition of an automobile exhaust? How can we control pollution under such conditions? 2+3
- b) How are the toxic pollutants, peroxyacetyl nitrate (PAN) and peroxybenzoyl nitrate (PBzN) generated in the atmosphere? What is acid-rain? 2+1
- c) What is the composition of fly-ash? Mention any two adverse effects of particulate matter. 1+1
4. Answer **any five** of the questions : 5×2
- a) What are the different sources of water pollution? What will the exact policy be for the minimization of water pollution and how can it be implemented?
- b) What are Benthos and Coral-reefs? What are the drawbacks of extensive use of pesticides?

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- c) What is eutrophication? How do TOC and TDS parameters affect living systems?
- d) What is pharmaceutical water? Give the names of few chelators that are used for the detoxification of different heavy metals.
- e) Draw the different layer structure of earth. Mention the different parts of lithosphere.
- f) Geothermal energy is renewable: It is not a fossil fuel. Explain the fact.