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3 (Sem-6/CBCS) CHE HE 2

2025

CHEMISTRY

(Honours Elective)

Paper : CHE-HE-6026

(Industrial Chemicals and Environment)

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

1. Answer the following questions : $1 \times 7 = 7$
- (a) Asphyxiation is caused by the lack of
- (i) N_2
 - (ii) O_2
 - (iii) NH_3
 - (iv) CO_2
- (b) Eutrophication is caused by the discharge of which of the following
- (i) Phosphates
 - (ii) Nitrates

- (iii) Sulphates
 - (iv) Chlorides
 - (c) O₃ layer depletion is mainly due to the presence of
 - (i) O₂
 - (ii) CO₂
 - (iii) N₂
 - (iv) Chlorofluorocarbon
 - (d) In nitrogen cycle, ammonium ion (NH₄⁺) is converted to nitrites by nitrification caused by bacteria such as _____.
 - (e) What is BOD ?
 - (f) Which of the following is a type of non-renewable resource ?
 - (i) Nuclear energy
 - (ii) Solar energy
 - (iii) Geothermal energy
 - (iv) Hydrogen and fuel cell
 - (g) What is meant by smelting ?
2. Answer the following questions : 2×4=8
- (a) What is particulate matter ? How does PM1 affect our health ?
 - (b) Write *two* uses of borax.

- (c) How is bleaching powder manufactured ? Give the chemical reaction.
 - (d) Write the differences between calcination and roasting.
3. Answer **any three** questions : 5×3=15
- (a) Describe nitrogen cycle.
 - (b) Describe the manufacture of caustic soda by Nelson Diaphragm cell process. Give the necessary chemical reactions.
 - (c) How is photochemical smog formed ? Describe *any three* remedial measures of photochemical smog. 2+3=5
 - (d) What is dissolved oxygen (D.O.) ? Describe the process of measurement of DO content in water with necessary chemical reactions. 1+4=5
 - (e) What is bio-catalyst ? Discuss the advantages of bio-catalysts. 1+4=5
4. Answer the following questions : (**any three**) 10×3=30
- (a) What do you mean by depletion of ozone layer ? Write the photochemistry involved in the depletion of ozone layer by oxides of nitrogen, CFC and halogen. 1+3+3+3=10

- (b) How sulphuric acid is manufactured by contact process ? Give necessary chemical reactions. Describe the health hazards associated with sulphuric acid. How sulphuric acid should be stored ?

3+3+2+2=10

- (c) What are the main sources of SO_2 ? Discuss the effects of SO_2 on living organisms and vegetations. Describe the method of estimation of SO_2 .

1+3+6=10

- (d) What are the characteristics of non-conventional sources of energy ? Describe biomass as energy source. Why biomass is considered as an attractive energy source ?

2+2+6=10

- (e) What are industrial effluents ? Explain the effluents treatment technique of leather industry. Describe about the industrial waste management.

2+3+5=10

- (f) (i) What is the purest form of iron ? Write all the chemical reactions of smelting of haematite ore in a blast furnace.

1+4=5

- (ii) Describe the Bessemer process for the manufacture of steel. 5