

Total number of printed pages-4

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

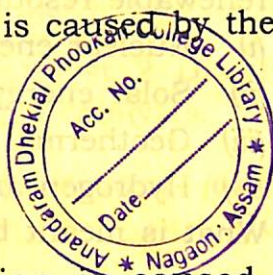
(iii) NH_3

(iv) CO_2

(b) Eutrophication is caused by the discharge of which of the following

(i) Phosphates

(ii) Nitrates



(iii) Sulphates

(iv) Chlorides

(c) O_3 layer depletion is mainly due to the presence of

(i) O_2

(ii) CO_2

(iii) N_2

(iv) Chlorofluorocarbon

(d) In nitrogen cycle, ammonium ion (NH_4^+) 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 ?

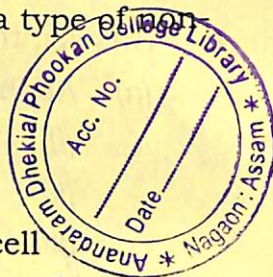
(i) Nuclear energy

(ii) Solar energy

(iii) Geothermal energy

(iv) Hydrogen and fuel cell

(g) What is meant by smelting ?



2. Answer the following questions : $2 \times 4 = 8$

(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 : $5 \times 3 = 15$

(a) Describe nitrogen cycle.

(b) Describe the manufacture of caustic soda by Nelson Diaphragm cell process. Give the necessary chemical reactions.

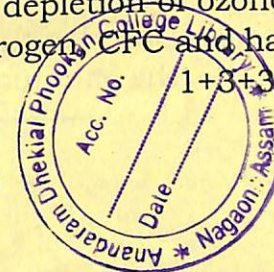
(c) How is photochemical smog formed ? Describe **any three** remedial measures of photochemical smog. $2 + 3 = 5$

(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**) $10 \times 3 = 30$

(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



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