

OPTION - B

Paper : CHE-HE-6026

(Industrial Chemicals and Environment)

1. Answer the following questions : $1 \times 7 = 7$

(a) Which of the following chemicals is used in wound treatment ?

- (i) Bleaching powder
- (ii) Caustic soda
- (iii) Hydrochloric acid
- (iv) Hydrogen peroxide

(b) Which of the following pair of gases is toxic to humans ?

- (i) N_2 and CO_2
- (ii) CO_2 and CH_4
- (iii) CO and $COCl_2$
- (iv) Ar and N_2

(c) Zone refining is a method to obtain :

- (i) Very high temperature
- (ii) Ultra-pure gases
- (iii) Ultra-pure metals
- (iv) Ultra-pure oxides

(d) The global environmental issue of ozone layer depletion is associated with

- (i) Sulphur dioxide
- (ii) Carbon dioxide
- (iii) Methane
- (iv) Chlorinated hydrocarbons

(e) Which of the following are the primary causes of water pollution ?

- (a) Plants (b) Animals
- (c) Human activities (d) None of these

Choose the most appropriate answer from the options given below :

- (i) (a) and (b) only
- (ii) (b) and (d) only
- (iii) (d) only
- (iv) (a), (b) and (c) only

(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 cells

- (g) The most used method for measuring the dissolved oxygen content in a water sample is
- Winkler method
 - Roger method
 - Tittler method
 - Johnson method
2. Answer the following questions : $2 \times 4 = 8$
- Give *two* uses of industrial oxygen gas.
 - Give *one* method (with reaction) for the industrial production of concentrated hydrochloric acid.
 - Mention *two* major sources of air pollution.
 - What is nuclear fusion? Give an example.
3. Answer **any three** questions: $5 \times 3 = 15$
- Write briefly about the industrial production of fluorine gas. Mention *one* use of the gas. $4 + 1 = 5$
 - Write a note on the biogeochemical cycle of nitrogen.
 - Write briefly about the various types of water pollutants.

- Write briefly about the process of reverse osmosis for the treatment of water.
- What are the sources of oxides of nitrogen in atmosphere? How these oxides deplete ozone layer? Write briefly. $1 + 4 = 5$

4. Answer **any three** from the following questions : $10 \times 3 = 30$

- Describe the method with appropriate diagrams and reactions for the commercial production of common salt. Draw a neat diagram showing the portion of the crystal lattice of common salt. Why is common salt iodized for human consumption? Why is common salt used for de-icing of roads? $6 + 2 + 1 + 1 = 10$
- Describe the major regions of the atmosphere by covering their temperature variations.
- Describe briefly the hydrological cycle. Why the "Ganga-Brahmaputra-Meghna" river system is called the largest resource of water in India? Mention *three* initiatives taken by the Government of India for the rejuvenation of Ganga. $5 + 2 + 3 = 10$

(d) (i) What is nuclear fission? Describe this process by taking ${}^{235}_{92}\text{U}$ as an example. Give suitable diagram showing the chain reaction.

1+4=5

(ii) What is nuclear pollution? Describe briefly about the management of nuclear disaster.

1+4=5

(e) What is green chemistry? Describe the principles of green chemistry. Why is a greener chemical reaction more desirable than a conventional chemical reaction?

1+8+1=10

(f) What is chemical oxygen demand (COD) and how does it differ from biological oxygen demand (BOD)? Describe the laboratory methods for the determination of COD and BOD. Give a source of common interference in the determination of COD.

2+7+1=10