

CHAPTER 16

ENVIRONMENTAL CHEMISTRY

MULTIPLE CHOICE QUESTIONS

- Synthetic organic chemicals can cause which of the following problems:**
(a) Nausea (b) Dizziness
(c) Blindness (d) All of the above
- Which of the following is considered as cause of pollution:**
(a) Rapid increase in population (b) Industrialization
(c) Transportation (d) All of the above
- Which of the following is primary pollutant:**
(a) H_2SO_4 (b) N_2O
(c) H_2CO_3 (d) SO_2
- In which of the following layer of atmosphere there is more thickness of ozone:**
(a) Troposphere (b) Stratosphere
(c) Mesosphere (d) Thermosphere
- Which of the following air pollutants is quiet killer:**
(a) CO_2 (b) CO
(c) NO_2 (d) N_2O_4
- The cause of water pollution is:**
(a) Pesticides (b) Detergents
(c) Tanneries (d) All
- The pH value of the acid rain is in the range of:**
(a) 6.5 – 7.0 (b) Less than 5.6
(c) Less than 5.0 (d) Less than 7.0

8. Which of the following factors help to measure quality of water:
- (a) DO (b) BOD
(c) COD (d) All of above
9. Which method is used to remove permanent hardness of water:
- (a) Aeration (b) Coagulation
(c) Ion exchange (d) Chlorination
10. To avoid, formation of toxic compounds with chlorine which of the followings is better to use as a disinfectant of water:
- (a) O_3 (b) ClO_3
(c) Both (d) None
11. Peroxyacetyl nitrate (PAN) is an irritant to human beings and it affects:
- (a) Eyes (b) Ears
(c) Stomach (d) Nose
12. A single chlorine free radical can destroy how many ozone molecules:
- (a) 100 (b) 10,000
(c) 10,00,000 (d) 100,000
13. Ecosystem is a smaller unit of:
- (a) Lithosphere (b) Hydrosphere
(c) Biosphere (d) Atmospheric
14. The coagulant used in the purification of potable water is:
- (a) Alum (b) Nickle sulphate
(c) Copper sulphate (d) Barium sulphate
15. Newspaper can be recycled again and again, by how many times:
- (a) 2 (b) 3
(c) 4 (d) 5
16. Which of the following is not common domestic materials which are recycled:
- (a) Paper (b) Iron
(c) Glass (d) Plastics
17. The normal amount of overhead ozone is about:
- (a) 335 DU (b) 340 DU
(c) 345 DU (d) 350 DU

18. When ground water seeps in the landfill a mixture of dissolved, suspended and microbial contaminants is formed, this mixture is called:
- (a) Rancidity (b) Incinerate
(c) Refuse (d) Leachate
19. The gas that binds strongly with hemoglobin is:
- (a) Carbon monoxide (b) Carbon dioxide
(c) Methane (d) Nitrogen oxide
20. The concentration of dissolved oxygen in water ranges from:
- (a) 4–8 ppm (b) 6–10 ppm
(c) 8–10 ppm (d) 0.4–0.8 ppm
21. Fungicides are the pesticides which:
- (a) Kill insects (b) Kill fungus
(c) Kill plants (d) Kill herbs
22. The main pollutant of leather tanneries in the waste water is due to the salt of:
- (a) Lead (b) Chromium (III)
(c) Chromium (VI) (d) Copper
23. The temperature in the incinerator of industrial waste products has a range:
- (a) 900–1000°C (b) 250–500°C
(c) 950–1300°C (d) 500–900°C
24. Which part of atmosphere is near to the earth:
- (a) Thermosphere (b) Troposphere
(c) Mesosphere (d) Stratosphere
25. Thickness of atmosphere is:
- (a) 100 km (b) 500 km
(c) 1000 km (d) 1500 km
26. How much fresh water is used for domestic purpose:
- (a) 8% (b) 23%
(c) 69% (d) 100%

27. The most abundant element in the earth crust is:
 (a) O (b) Si
 (c) Al (d) Fe
28. The residence time of NO is:
 (a) Few hours (b) 1day
 (c) 3 days (d) 4 days
29. The mean residence time of methane (CH₄) in atmosphere is:
 (a) 1–2 years (b) 3–4 years
 (c) 3–5 years (d) 3–7 days
30. The yellow colour in photochemical smog is due to the presence of:
 (a) NO (b) NO₂
 (c) SO₂ (d) CO₂
31. Ozone depletion is mainly due to the reaction of ozone (O₃) with:
 (a) O₂ (b) CFCs
 (c) SO₂ (d) All of these
32. In human liver which substance cause cancer:
 (a) Chloroform (b) Methane
 (c) Carbon dioxide (d) H₂SO₃

answers

1.	(d)	2.	(d)	3.	(d)	4.	(b)	5.	(b)
6.	(d)	7.	(b)	8.	(d)	9.	(c)	10.	(a)
11.	(a)	12.	(d)	13.	(c)	14.	(a)	15.	(d)
16.	(b)	17.	(d)	18.	(d)	19.	(a)	20.	(a)
21.	(b)	22.	(c)	23.	(c)	24.	(b)	25.	(c)
26.	(a)	27.	(a)	28.	(d)	29.	(d)	30.	(b)
31.	(b)	32.	(a)						

SOLVED EXERCISE

Q.1 Fill in the blanks:

- (i) Only _____ of the total earth's water resources are available as fresh water.
- (ii) _____ is a smaller unit of biosphere which consists of community of organisms and their interaction with environment.
- (iii) Carbon monoxide is highly poisonous gas and causes suffocation of inhaled, it binds blood _____ more strongly than oxygen thus excluding oxygen from normal respiration.
- (iv) The elevated concentration of _____ is harmful for fish as it clogs the gills thus causing suffocation.
- (v) The ozone layer in the _____ surrounds the globe and filter most of the harmful UV rays in the sunlight before they could reach the earth.
- (vi) The presence of _____ in livestock waste can contaminate surface and ground water causing various infectious diseases.
- (vii) The substances which can directly kill the unwanted organisms are called _____.
- (viii) _____ is frequently used to disinfect water.
- (ix) Incineration is not a clean process because it produces air pollution and toxic _____.
- (x) A process in which some of the used or waste materials are not discarded after their initial use but are processed so that it can be used again is called _____.

answers

(i)	1%	(ii)	ecosystem	(iii)	haemoglobin
(iv)	aluminium	(v)	stratosphere	(vi)	bacteria
(vii)	pesticide	(viii)	chlorine	(ix)	ash

(x)	recycling
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Q.2 Indicate True or False:

- (i) Half of the mass of the atmosphere is concentrated in lower 10 km.
- (ii) The oceans cover approximately 71 percent of the earth.
- (iii) The volcanoes produce 55% of SO₂.
- (iv) The reducing smog is due to the presence of nitric oxide.
- (v) Ozone is produced in the polar regions by the photochemical reaction of oxygen.
- (vi) The temperature in the troposphere decreases with the increasing altitude from 15 to -56°C.
- (vii) Incineration is a waste treatment process in which solid waste is dumped in a land fill.
- (viii) Acid rain is due to the presence of oxides of sulphur and nitrogen which get mixed with the rain water.
- (ix) The heavy metals have a safe limit where they are not toxic.
- (x) The reprocessing of the plastics is to convert back to their components by a chemical or thermal process so that these can be used again.

answers

(i)	False	(ii)	True	(iii)	False	(iv)	False	(v)	True
(vi)	True	(vii)	False	(viii)	True	(ix)	False	(x)	True

Q.3 Multiple choice questions. Encircle the correct answer:

- (i) **The pH range of the truly acidic rain is:**
 - (a) 7-6.5
 - (b) 6.5-6
 - (c) 6-5.6
 - (d) Less than 5.6
- (ii) **Peroxyacetylnitrate (PAN) is an irritant to human beings and it affects:**
 - (a) Eyes
 - (b) Ears
 - (c) Stomach
 - (d) Nose
- (iii) **To avoid the formation of toxic compounds with chlorine which substance is used for disinfecting water:**

- (a) KMnO_4 (b) O_3
 (c) Alums (d) Chloramines
- (iv) A single chloride free radical can destroy how many ozone molecules:
 (a) 100 (b) 100000
 (c) 10000 (d) 10
- (v) Fungicides are the pesticides which:
 (a) Control the growth of fungus (b) Kill insects
 (c) Kill plants (d) Kill herbs
- (vi) Ecosystem is a smaller unit of:
 (a) Lithosphere (b) Hydrosphere
 (c) Atmosphere (d) Biosphere
- (vii) The main pollutant of leather tanneries in the waste water is due the salt of:
 (a) Lead (b) Chromium (VI)
 (c) Copper (d) Chromium (III)
- (viii) In purification of potable water the coagulant used is:
 (a) Nickel sulphate (b) Copper sulphate
 (c) Barium sulphate (d) Alum
- (ix) The temperature in the non-rotating chamber in the incineration of industrial and hazardous waste process has a range:
 (a) 900 to 1000°C (b) 250 to 500°C
 (c) 950 to 1300°C (d) 500 to 900°C
- (x) Newspaper can be recycled again and again by how many times:
 (a) 2 (b) 3
 (c) 4 (d) 5

answers

(i)	(d)	(ii)	(a)	(iii)	(b)	(iv)	(b)	(v)	(a)
(vi)	(d)	(vii)	(b)	(viii)	(d)	(ix)	(c)	(x)	(d)

Q.4 Discuss in detail the components of the environment.

Ans. Detailed question. See text book for answer.

Q.5 Describe the natural and human sources of carbon monoxide, nitrogen oxides and sulphur oxides.

Ans. Descriptive question. Consult text book for details.

Q.6 What is acid rain and how does it affect our environment?

Ans. **Acidic Rain:** Affect see in text book.

Q.7 What is smog? Explain the pollutants which are the main cause of photochemical smog.

Ans. **Smog:** Explanation see in text book.

Q.8 Why is ozone layer depleting? What will happen when the concentration of ozone will be decreased?

Ans. The decrease in the thickness of ozone layer present in the stratosphere is called ozone hole or ozone depletion. Ozone absorbs UV radiations and increases the temperature in the upper part of the ozone layer.

Q.9 How is oil spillage affecting the marine life?

Ans. Seawater gets polluted by accident oil spills and leakage from cargo oil tankers in sea, tanker tanks, pipelines leakage during off shore exploration and leakage of underground storage tanks. The marine organisms are severely affected by soluble aromatic fractions of oil (C-10 or less) which damages the marine life often causing death.

Q.10 How detergents are threat to aquatic animal life?

Ans. See text book.

Q.12 Explain how pesticides are dangerous to human beings.

Ans. See text book.

Q.13 Discuss industrial waste effluents.

Ans. Detailed question. See text book.

Q.14 How water is purified i.e., made potable? Discuss in detail.

Ans. Descriptive question. See text for details.

Q.15 What are leachates?

Ans. The ground water which seeps in the landfill and liquid from the waste percolate through the refuse is called leachates.

Q.16 Explain the process of incineration of industrial waste.

Ans. Detailed question. See text book.



DO YOU KNOW?

1. Oceans contains 97% earth's water.
2. The part of environment which includes all water bodies is called hydrosphere.
3. The layer of gases surrounding the earth is called atmosphere.
4. The component of environment which consists of rigid rocky crust of earth is called lithosphere.
5. The component of environment which includes the regions of earth capable of supporting life is called biosphere.
6. The smallest unit of biosphere which consists of organism and their interaction with the environment is called ecosphere.
7. Carbon monoxide reacts with haemoglobin to form carboxy haemoglobin which destroys the ability of blood to carry oxygen.
8. PAN (Peroxy Acetyl Nitrate) is eye-irritant.
9. The residence time of NO and NO₂ in the atmosphere is 4 and 3 days respectively.
10. The mean residence time of CH₄ is about 3–7 years in the atmosphere.
11. Smog is a combination of smoke and fog.
12. The amount of ozone in the atmosphere is expressed in Dobson Units (DU).
13. The normal amount of overhead ozone is about 350 DU.
14. DDT (dichloro-diphenyl-trichloroethane) is powerful insecticide.
15. Cr (VI) is highly toxic and causes cancer.
16. The D.O (dissolved oxygen) value less than 4 ppm shows that water is polluted.
17. Greater the value of COD, greater is the pollution.
18. The waste treatment process in which solid waste is burnt at high temperature ranging from 900–1000°C is called incineration.
19. Paper is recycled five times.
20. The formula of PAN (peroxyacetyl nitrate) is $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{O}-\text{ONO}_2$.