Environmental Chemistry

Question1

Given below are two statements :
Statement I: The nutrient deficient water bodies lead to eutrophication
Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies.
In the light of the above statements, choose the correct answer from the options given below:

[NEET 2023]

Options:

A.

Both Statement I and Statement II are false.

B.

Statement I is correct but Statement II is false.

C.

Statement I is incorrect but Statement II is true.

D.

Both Statement I and Statement II are true.

Answer: C

Solution:

Solution

Nutrient enriched water bodies support a dense plant population, which kills animal life by depriving it of oxygen and results in subsequent loss of biodiversity. This process is called as eutrophication.

Question2

Which statement is not true about photochemical smog?

[NEET 2023 mpr]

Options:

A.

Photochemical smog is harmful to humans but has no effect on plants.

B.

Plants like Pinus, Juniparus can help in reducing the photochemical smog.

C.

Photochemical smog occurs in warm, dry and sunny climate.

D.

Common components of photochemical smog are ozone, nitric oxide, acrolein, formaldehyde and peroxyacetyl nitrate.

Answer: A

Question3

The pollution due to oxides of sulphur gets enhanced due to the presence of:
(a) particulate matter
(b) ozone
(c) hydrocarbons
(d) hydrogen peroxide
Choose the most appropriate answer from the options given below: [NEET-2022]

Options:

A. (a), (d) only

B. (a), (b), (d) only

C. (b), (c), (d) only

D. (a), (c), (d) only

Answer: B

Solution:

Presence of particulate matter in polluted air catalyzes the oxidation of SO_2 to SO_3

i.e., $2SO_2(g) + O_2(g) \longrightarrow 2SO_3(g)$

This reaction can also be promoted by O_3 and H_2O_2, as

$SO_2(g) + O_3(g) \longrightarrow SO_3(g) + O_2(g)$

$SO_2(g) + H_2O_2(l) \longrightarrow H_2SO_4(aq)$

Question4

Match List - I with List - II:

List – I	List – II
(a) Biochemical oxygen demand	(i) oxidising mixture
(b) Photochemical smog	(ii) polar stratospheric cloud
(c) Classical smog	(iii) organic matter In water
(d) Ozone layer depletion	(iv) reducing mixture

Choose the correct answer from the options given below: [NEET Re-2022]

Options:

A. (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

B. (a) - (i), (b) - (iv), (c) - (ii), (d) - (iii)

C. (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)

D. (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

Answer: D

Solution:

Solution

Biochemical oxygen demand - Organic matter in water

Photochemical smog - Oxidising in nature Classical smog − Reducing in nature

Ozone layer depletion - Polar stratospheric cloud

Question5

Match List-I with List-II.

List-I	List-II
(a) $2SO_2(g)+O_2(g) \rightarrow 2SO_3(g)$	(i) Acid rain
(b) $HOCl(g) \xrightarrow{h\nu} \dot{O}H + \dot{C}l$	(ii) Smog
(c) $CaCO_3+H_2SO_4 \rightarrow CaSO_4+H_2O+CO_2$	(iii) Ozone depletion
(d) $NO(g) \xrightarrow{h\nu} NO(g)+O(g)$	(iv) Tropospheric pollution

Choose the correct answer from the options given below. [NEET 2021]

Options:

A. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

B. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

C. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

D. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Answer: C

Solution:

● Tropospheric pollution: In the presence of pollutant, SO_2 cunverts into SO_3
$2SO_2 + O_2 \rightarrow 2SO_3$
● In spring season, sunlight breaks $HOCl$ and Cl_2 to give chlorine radicals.
$HOCl \xrightarrow{hv} \dot{O}H(g) + \dot{Cl}(g)$
These chlorine radicals deplete ozone layer
● High level of sulphur causes acid rain which reacts with marble and causes discolouring and disfiguring
$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$
● A chain reaction occurs from interaction of NO with sunlight in which NO is converted to NO_2 which absorb energy from sunlight and breaks into NO and O, which causes photochemical smong.
$NO_2(g) \xrightarrow{hv} NO(g) + O(g)$

Question6

Among the following, the one that is not a greenhouse gas is (NEET 2019)

Options:

A. sulphur dioxide

B. nitrous oxide

C. methane

D. ozone.

Answer: A

Question7

Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity? (NEET 2018)

Options:

A. N_2O_5

B. NO_2

C. N_2O

D. NO

Answer: A

Solution:

Solution:
N_2O_5 is not a common pollutant introduced into a atmosphere both due to natural and human activity.
N_2O, NO, and NO_2 are common pollutants introduced into a atmosphere both due to natural and human activity.

Question8

Which of the following is a sink for CO?
(NEET 2017)

Options:

A. Microorganisms present in the soil

B. Oceans

C. Plants

D. Hemoglobin

Answer: D

Solution:

Solution:
Microorganisms present in the soil consume atmospheric CO. Hemoglobin has higher affinity for CO and it combines with CO to form carboxyhemoglobin.

Question9

Which one of the following is not a common component of Photochemical smog?
(2014)

Options:

A. Ozone

B. Acrolein

C. Peroxyacetyl nitrate

D. Chlorofluorocarbons

Answer: D

Question10

Which one of the following statements is not true? (Karnataka NEET 2013)

Options:

A. Clean water would have a BOD value of 5 ppm.

B. Fluoride deficiency in drinking water is harmful. Soluble fluoride is often used to bring its concentration upto 1ppm

C. When the pH of rain water is higher than 6.5, it is called acid rain.

D. Dissolved Oxygen (DO) in cold water can reach a concentration upto 10ppm.

Answer: C

Solution:

Solution:
When pH of rain water drops below 5.6 it is called acid rain.

Question11

Which one of the following statements regarding photochemical smog is not correct? (2012)

Options:

A. Carbon monoxide does not play any role in photochemical smog formation.

B. Photochemical smog is an oxidising agent in character.

C. Photochemical smog is formed through photochemical reaction involving solar energy

D. Photochemical smog does not cause irritation in eyes and throat.

Answer: D

Question12

Which one of the following statement is not true? (2011)

Options:

A. pH of drinking water should be between 5.5 - 9.5

B. Concentration of DO below 6 ppm is good for the growth of fish.

C. Clean water would have a BOD value of less than 5 ppm

D. Oxides of sulphur, nitrogen and carbon, are the most widespread air pollutant.

Answer: B

Solution:

Solution:
Fish dies in water bodies polluted by sewage due to decrease in dissolved oxygen (D.O).

Question13

Green chemistry means such reactions which (2008)

Options:

A. are related to the depletion of ozone layer

B. study the reactions in plants

C. produce colour during reactions

D. reduce the use and production of hazardous chemicals

Answer: D

Solution:

Green chemistry is the design, development, and implementation of chemical products and processes to reduce or eliminate the use and generation of substances hazardous to human health and the environment, or Green chemistry refers to the redesign of chemical products and processes with the goal of reducing or eliminating any negative environmental or health effects

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Question14

Which one of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere?
(2004)

Options:

A. Polyhalogens

B. Ferrocene

C. Fullerenes

D. Freons

Answer: D

Solution:

Fluorocarbons such as freon-11 ($CF\,Cl_3$) and freon-12 (CF_2Cl_2) emitted as propellants in aerosol spray cans, refrigerators, fire fighting reagents etc. are stable compounds and chemically inert. They do not react with any substance with which they come in contact and thus float through the atmosphere unchanged and eventually enter the stratosphere. There they absorb UV radiations and break down liberating free atomic chlorine which causes decomposition of ozone. This results in the depletion of the ozone layer.

$\overset{\bullet}{C}l + O_3 \rightarrow Cl\,\overset{\bullet}{O} + O_2$

$Cl\,\overset{\bullet}{O} + O_3 \rightarrow \overset{\bullet}{Cl} + 2O_2$
