11th Science Lesson 8 Questions in English

8] Environmental Chemistry

1. Who was awarded the Nobel Prize for the development of new chemicals based on Green chemistry in 2005?

a) Yuves Chauvin

b) Robert H.Grubbs

c) R. Schrock

d) All the above

Explanation

The Nobel Prize in chemistry 2005 was awarded jointly to Yves Chauvin, Robert H. Grubbs and Richard R. Schrock for the development of new chemicals based on Green chemistry.

2. Choose the Incorrect statements.

i) Yves Chauvin explained the types of metal compound catalysts in reactions in the year 1971.

ii) Richard Schrock was one of the people to produce efficient metal compound catalysts for metathesis.

iii) Robert Grubbs developed better catalysts that are stable in air.

a) i only

b) ii only

c) iii only

d) All the above

Explanation

In 1971 Yves Chauvin explained the types of metal compound that act as catalysts in the reactions. Richard Schrock was the first to produce efficient metal compound catalysts for metathesis in 1990. Two years later Robert Grubbs developed better catalysts, stable in air that was highlighted in many applications.

3. Which of the following are the main objectives of the environmental chemistry?

a) Deals with the study of chemicals and processes occurring in the environment by human activities.

b) Deals with sources, causes and methods of Pollution.

c) Deals with all types of pollution like air, water and soil.

d) All the above

Explanation

Environmental chemistry is a branch of chemistry which deals with the study of chemicals and chemical processes occurring in the environment by direct human activities. It also deals with sources, causes and methods of controlling air, water and soil pollution.

4. Assertion (A): All the substances causes pollution of environment are called as pollutants.

Reasoning(R): The Pollutants may be solid, liquids or gaseous substances.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Environmental pollution is usually caused by the addition of waste products of human activity to the environment. The substances which cause pollution of environment are called pollutants. The pollutants may be solids, liquids or gaseous substances present in significant concentration in the environment.

5. Which of the following is not a bio-degradable pollutant?

a) Plant wastes

b) Nuclear wastes

c) Animal wastes

d) Biological wastes

Explanation

Bio-degradable pollutants: The pollutants which can be easily decomposed by the natural biological processes are called bio-degradable pollutants. Examples: plant wastes, animal wastes etc.

6. Choose the incorrect statements.

i) Non bio-degradable pollutants cannot be decomposed by the natural biological process.

ii) In low concentration non bio-degradable pollutants are not harmful to living organisms.

iii) Metal wastes, DDT, plastics and nuclear wastes are some of the Non bio-degradable pollutants.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Non bio-degradable pollutants: The pollutants which cannot be decomposed by the natural biological processes are called non bio-degradable pollutants. Examples: metal wastes (mainly Hg

and Pb), D.D.T, plastics, nuclear wastes etc., these pollutants are harmful to living organisms even in low concentration. As they are not degraded naturally, it is difficult to eliminate them from our environment.

7. Which of the following is not included in the mixture of air?

a) Nitrogen

b) Argon

c) Water vapor

d) Helium

Explanation

Earth's atmosphere is a layer of gases retained by the earth's gravity. It contains roughly 78% nitrogen, 21% oxygen, 0.93% argon, 0.04% carbon dioxide, trace amounts of other gases and little amount of water vapor. This mixture is commonly known as air.

8. Which of this region is also known as ozonosphere?

a) Hydrosphere

b) Stratosphere

c) Mesosphere

d) Thermosphere

9. Identify the Incorrect match.

A. Stratosphere	i) O_3
B. Thermosphere	ii) NO^+
C. Mesosphere	iii) e^-

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Regions of atmosphere

Region	Altitude from earth's surface	Temperature range	Gases/ species present
Stratosphere (ozonosphere)	10-50 km	-56°C to -2°C	N_2 O_2 O_3 O atoms
Mesosphere	50-85 km	-2°C to- –92°C	N_2 O_2^+ NO^+
Thermosphere	85-500 km	-92°C to 1200°C	O_2^+ O^+ NO^+ e^-

10. Which of this layer has about 80% mass of the atmosphere?

a) Troposphere

b) Stratosphere

c) Mesosphere

d) Exosphere

Explanation

Troposphere: The lowest layer of the atmosphere is called the troposphere and it extends from 0 – 10 km from the earth surface. About 80% of the mass of the atmosphere is in this layer.

11. Which of the following is not a category of troposphere?

a) Hydrosphere

b) Mesosphere

c) Lithosphere

d) Biosphere

Explanation

This troposphere is further divided as Hydrosphere, Lithosphere and Biosphere.

12. Which of this living organism are included in the biosphere of the Earth?

a) Lithosphere only

b) Hydrosphere only

c) Atmosphere only

d) All the above

Explanation

Biosphere: It includes the lithosphere hydrosphere and atmosphere integrating the living organism present in the lithosphere, hydrosphere and atmosphere.

13. Assertion (A): The Earth is called as a blue planet as 75% of earth's surface is covered by water.
Reasoning(R): Hydrosphere only includes the fresh water sources of the Earth.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Hydrosphere: Hydrosphere includes all types of water sources like oceans, seas, rivers, lakes, streams, underground water, polar icecaps, clouds etc. It covers about 75% of the earth's surface. Hence the earth is called as a blue planet.

14. In ____ an explosion at the Union Carbide pesticide plant released a cloud of toxic gas _____ into the air.

a) 1972, Ethyl alcohol

b) 1984, Methyl isocyanate

c) 1966, Benzene

d) 1989, Methane

Explanation

The world's worst chemical disaster happened in the Indian city of Bhopal in the early morning hours of December 3, 1984. An explosion at the Union Carbide pesticide plant released a cloud of toxic gas (methyl isocyanate) CH3NCO into the air.

15. Which of this pollution is also studied as atmospheric pollution?

a) Lithospheric pollution

b) Hydrosphere pollution

c) Tropospheric pollution

d) Exospheric pollution

Explanation

Atmospheric pollution is generally studied as tropospheric pollution. Different types of atmospheric pollutions are Air pollution, Water pollution and Soil pollution.

16. Choose the incorrect statements.

i) Air pollution is caused by any undesirable change in air which adversely affects the living organisms.

ii) Air pollution is not limited to any of the regions of the atmosphere.

iii) Air pollution is due to the excessive discharge of undesirable foreign matters in the atmosphere.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Air pollution: Any undesirable change in air which adversely affects living organisms is called air pollution. Air pollution is limited to troposphere and stratosphere. Air pollution is mainly due to the excessive discharge of undesirable foreign matter in to the atmospheric air.

17. Which of the following is not a gaseous air pollutant?

a) Oxides of nitrogen

b) Oxides of metals

c) Oxides of carbon

d) Hydrocarbons

Explanation

Air pollutants may exist in two major forms namely, gases and particulates. Oxides of sulphur, oxides of nitrogen, oxides of carbon, and hydrocarbons are the gaseous air pollutants.

18. What are the harmful effects of the sulphur dioxide?

a) Eye irritation

b) Asthma

c) Bronchitis

d) All the above

Explanation

Sulphur dioxide and sulphur trioxide are produced by burning sulphur containing fossil fuels and roasting Sulphide ores. Sulphur dioxide is a poisonous gas to both animals and plants. Sulphur dioxide causes eye irritation, coughing and respiratory diseases like asthma, bronchitis, etc.

19. Assertion (A): Sulphur trioxide combines with water vapor and forms H_2SO_4 and comes down as Acid rain.

Reasoning(R): Sulphur dioxide is oxidized into SO_3 in the presence of particulate matter in the polluted air.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Sulphur dioxide is oxidized into more harmful sulphur trioxide in the presence of particulate matter present in polluted air .SO_3 combines with atmospheric water vapor to form H_2SO_4 which comes down in the form of acid rain.

20. Which of the following is not true about the effects of nitrogen oxide?

a) The oxides of nitrogen are converted into nitric acid and form the acid rain.

b) The oxides of nitrogen form reddish brown haze in heavy traffic.

c) Nitrogen dioxide does not affect the plants and metals.

d) Nitrogen oxide is a respiratory irritant and causes asthma and lung injury.

Explanation

The oxides of nitrogen are converted into nitric acid which comes down in the form of acid rain. They also form reddish brown haze in heavy traffic. Nitrogen dioxide potentially damages plant leaves and retards photosynthesis. NO2 is a respiratory irritant and it can cause asthma and lung injury. Nitrogen dioxide is also harmful to various textile fibres and metals.

21. Which of these produces the carbon monoxide?

a) Incomplete combustion of coal

b) Automobile exhaust

c) Incomplete combustion of firewood

d) All the above

Explanation

Carbon monoxide is a poisonous gas produced as a result of incomplete combustion of coal or firewood. It is released into the air mainly by automobile exhaust.

22. Which of these are the effects of carbon monoxide in blood circulation?

a) Cardiac arrest

b) Dizziness

c) Loss of consciousness

d) All the above

Explanation

Carbon monoxide binds with hemoglobin Unit and forms carboxy hemoglobin which impairs normal oxygen transport by blood and hence the oxygen carrying capacity of blood is reduced. This oxygen deficiency results in headache, dizziness, tension, Loss of consciousness, blurring of eye sight and cardiac arrest.

23. Choose the Incorrect statements.

i) Carbon dioxide is released into the atmosphere mainly by the process of respiration.

ii) Green plants can convert CO_2 gas in the atmosphere into carbohydrate and oxygen through a process called photosynthesis.

iii) The decreased CO_2 level in the atmosphere is responsible for global warming. It causes headache and nausea.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Carbon dioxide is released into the atmosphere mainly by the process of respiration, burning of fossil fuels, forest fire, decomposition of limestone in cement industry etc. Green plants can convert CO2 gas in the atmosphere into carbohydrate and oxygen through a process called photosynthesis. The increased CO2 level in the atmosphere is responsible for global warming. It causes headache and nausea.

24. Choose the correct statements.

i) Hydrocarbons are the compounds composed of carbon with any gas or metal compounds.

ii) Hydrocarbons are the potential cancer causing agents.

a) i only

b) ii only

c) Both i and ii

d) Neither i nor ii

Explanation

The compounds composed of carbon and hydrogen only are called hydrocarbons. They are mainly produced naturally (marsh gas) and also by incomplete combustion of automobile fuel. They are potential cancer causing (carcinogenic) agents. For example, poly nuclear aromatic hydrocarbons (PAH) are carcinogenic they cause irritation in eyes and mucous membranes.

25. Who coined the term the Greenhouse Effect?

a) Jean Baptiste

b) Richard Schrock

c) Albert Einstein

d) Robert Grubbs

Explanation

In 1987, Jean Baptiste Fourier a French mathematician and scientist coined the term "Greenhouse Effect" for trapping of heat in the atmosphere by certain gases.

26. Which of these used to trap the heat in the atmosphere?

a) CFC

b) CH_4

c) CO_2

d) All the above

Explanation

The earth's atmosphere allows most of the visible light from the Sun to pass through and reach Earth's surface. As Earth's surface is heated by sunlight, it radiates part of this energy back toward space as longer wavelengths (IR). Some of the heat is trapped by CH4, CO2, CFCs and water vapor present in the atmosphere. They absorb IR radiation and effectively block a large portion of earth's emitted radiation. The radiation thus absorbed is partly reemitted to earth's surface. Therefore, the earth's surface gets heated up by a phenomenon called greenhouse effect.

27. Assertion (A): Global warming is the process of heating up the earth through the greenhouse effect.

Reasoning(R): The Carbon dioxide layer in the atmosphere reflects the infrared radiations and heat up the earth's surface.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Thus Greenhouse effect may be defined as the heating up of the earth surface due to trapping of infrared radiations reflected by earth's surface by CO_2 layer in the atmosphere". The heating up of earth through the greenhouse effect is called global warming.

28. What will be the average surface temperature of the Earth without the greenhouse effect?

a) 0°F

b) 273°C

c) 1000°F

d) -10°C

Explanation

Without the heating caused by the greenhouse effect, Earth's average surface temperature would be only about −18 °C (0 °F). Although the greenhouse effect is a naturally occurring phenomenon, it is intensified by the continuous emission of greenhouse gases into the atmosphere.

29. What is the pH value of the normal rain water?

a) 5.6

b) 50.2

c) 6.5

d) 6.6

Explanation

Rain water normally has a pH of 5.6 due to dissolution of atmospheric CO2 into it.

30. Which of these drops the pH of the rain water?

a) Sulphur Oxide

b) Hydrogen Sulphide

c) Nitrogen Oxide

d) Both a and c

Explanation

Oxides of sulphur and nitrogen in the atmosphere may be absorbed by droplets of water that make up clouds and get chemically converted into Sulphuric acid and nitric acid respectively. As a result, pH of rain water drops below the level 5.6, hence it is called acid rain.

31. Which of these react with the oxides of sulphur and nitrogen to produce acid rain?

a) Oxygen

b) Carbon dioxide

c) Hydrogen

d) Helium

Explanation

Acid rain is a by-product of a variety of sulphur and nitrogen oxides in the atmosphere. Burning of fossil fuels (coal and oil) in power stations, furnaces and petrol, diesel in motor engines produce sulphur dioxide and nitrogen oxides. The main contributors of acid rain are SO_2 and NO_2. They are converted into Sulphuric acid and nitric acid respectively by the reaction with oxygen and water.

32. Which of these is referred as stone leprosy?

a) Respiratory ailments in humans.

b) Acid rain effects in aquatic ecosystem.

c) Acid rain attacks on marbles.

d) Toxic effects of acid rain in water pipes.

Explanation

Acid rain causes extensive damage to buildings and structural materials of marbles. This attack on marble is termed as Stone leprosy.

$CaCO_3 + H_2SO4 \rightarrow CaSO4 + H_2O + CO_2\uparrow$

Acid rain affects plants and animal life in aquatic ecosystem. It is harmful for agriculture, trees and plants as it dissolves and removes the nutrients needed for their growth. It corrodes water pipes resulting in the leaching of heavy metals such as iron, lead and copper into drinking water which has toxic effects. It causes respiratory ailment in humans and animals.

33. Choose the correct statements.

i) Particulate pollutants are large solid, gas and liquid particles.

ii) Dust, smoke and aerosols are some of the particulate pollutants.

iii) Most of the particulate pollutants are not hazardous.

a) i only

b) ii only

c) iii only

d) All the above

Explanation

Particulate pollutants are small solid particles and liquid droplets suspended in air. Many of particulate pollutants are hazardous. Examples: dust, pollen, smoke, soot and liquid droplets (aerosols) etc. Combustion of high ash fossil fuels creates fly ash and finishing of metals throws metallic particles into the atmosphere.

34. In which of these ways the particulate pollutants are generated?

a) Volcanic eruption

b) Dust blows

c) Incomplete combustion of fossil fuels

d) All the above

Explanation

The dust, pollen, smoke, soot and liquid droplets (aerosols) etc. are some examples of particulate pollutants. They are blown into the atmosphere by volcanic eruption, blowing of dust; incomplete combustion of fossil fuels induces soot.

35. Which of these are not viable particulates?

a) Bacteria

b) Soot

c) Moulds

d) Algae

Explanation

Viable particulates: The viable particulates are the small size living organisms such as bacteria, fungi, moulds, algae, etc. which are dispersed in air. Some of the fungi cause allergy in human beings and diseases in plants.

36. What are the functions of the non-viable particles?

a) Transportation of viable particulates.

b) Increase the size of viable particulates.

c) Creating new types of diseases in plants.

d) Reduce the number of viable particulates.

Explanation

Non-viable particulates: The non- viable particulates are small solid particles and liquid droplets suspended in air. They help in the transportation of viable particles.

37. How many types of nonviable particulates are classified?

a) 5

b) 7

c) 4

d) 2

Explanation

There are four types of nonviable particulates in the atmosphere. They are classified according to their nature and size.

38. Which of this combustion produce the particles or mixtures?

a) Metals

b) Organic matters

c) Biodegradable products

d) Inorganic matters

Explanation

The Particles (or) mixture of solid and liquid particles are formed by combustion of organic matter. For example, cigarette smoke, oil smoke, smokes from burning of fossil fuel , garbage and dry leaves.

39. Which of the following is not a dust form?

a) Sand blast

b) Cement factories dust

c) Fly ash

d) Pesticides spray

Explanation

Dust: Dust composed of fine solid particles produced during crushing and grinding of solid materials. For example, sand from sand blasting, saw dust from wood works, cement dust from cement factories and fly ash from power generating units.

40. Which of these forms create the mists?

a) Fine solid particles by grinding of solid materials.

b) Saw dust from wood works.

c) Spray liquids and condensation of vapors in air.

d) None of the above

Explanation

Mists: They are formed by particles of spray liquids and condensation of vapors in air. For example, Sulphuric acid mist, herbicides and insecticides sprays can form mists.

41. Which of this condensation of vapors creates fumes?

a) Sublimation

b) Distillation

c) Calcination

d) All the above

Explanation

Fumes: Fumes are obtained by condensation of vapors released during sublimation, distillation, boiling and calcination and by several other chemical reactions. For example, organic solvents, metals and metallic oxides form fume particles.

42. Which pollutants are responsible causes of pneumoconiosis?

a) Dust

b) Mist

c) Fumes

d) All the above

Explanation

Dust, mist, fumes, etc., are air borne particles which are dangerous for human health. Particulate pollutants bigger than 5 microns are likely to settle in the nasal passage whereas particles of about 10 micron enter the lungs easily and cause scaring or fibrosis of lung lining. They irritate the lungs and causes cancer and asthma. This disease is also called pneumoconiosis. Coal miners may suffer from black lung disease. Textile workers may suffer from white lung disease.

43. Which of this process removes the particulates from the air?

a) Electrostatic precipitators

b) Gravity settling chambers

c) Wet scrubbers

d) All the above

Explanation

The particulates from air can be removed by using electrostatic precipitators, gravity settling chambers, and wet scrubbers or by cyclone collectors. These techniques are based on washing away or settling of the particulates.

44. What is the main component of smog?

a) Smoke and fog

b) Metals and oxides

c) Hydrocarbons

d) Inorganic matters

Explanation

Smog is a combination of smoke and fog which forms droplets that remain suspended in the air. Smog is a chemical mixture of gases that forms a brownish yellow haze over urban cities. Smog mainly consists of ground level ozone, oxides of nitrogen, volatile organic compounds, SO2, acidic aerosols and gases, and particulate matter.

45. Which of these causes the classical smog?

a) Photo chemical oxidants

b) Coal smoke

c) Saw dust

d) All the above

Explanation

There are two types of smog. One is Classical smog caused by coal smoke and fog second one is photo chemical smog caused by photo chemical oxidants.

46. In which year the London smog was first observed?

a) 1952

b) 1973

c) 1942

d) 1969

Explanation

Classical smog or London smog: Classical smog was first observed in London in December 1952 and hence it is also known as London Smog.

47. Which of the following is not true regarding the London smog?

a) It consists of smoke and fog and occurs in cool humid climates.

b) Its chemical composition is the mixture of SO_2, SO_3 and humidity.

c) It generally starts in midnight and becomes worse in early mornings.

d) It is also known as reducing smog.

Explanation

London smog consists of coal smoke and fog. It occurs in cool humid climate. This atmospheric smog found in many large cities. The chemical composition is the mixture of SO2, SO3 and humidity. It generally occurs in the morning and becomes worse when the sun rises. This is mainly due to the induced oxidation of SO2 to SO3, which reacts with water yielding sulphuric acid aerosol. Chemically it is reducing in nature because of high concentration of SO2 and so it is also called as reducing smog.

48. What are the effects of classical smog?

a) Acid rain

b) Poor visibility in traffics

c) Bronchial irritation

d) All the above

Explanation

Effects of classical smog: Smog is primarily responsible for acid rain. Smog results in poor visibility and it affects air and road transport. It also causes bronchial irritation.

49. Which type of smog is formed with the presence of sunlight?

a) Photo chemical smog

b) Classical fog

c) Mists

d) Reducing smog

Explanation

Photo chemical smog or Los Angel Smog: Photo Chemical smog was first observed in Los Angeles in 1950. It occurs in warm, dry and sunny climate. This type of smog is formed by the combination of smoke, dust and fog with air pollutants like oxides of nitrogen and hydrocarbons in the presence of sunlight. It forms when the sun shines and becomes worse in the afternoon.

50. Which of these results in the high oxidizing nature of the photo chemical smog?

a) NO_4 and O

b) NO and O

c) NO_2 and O_3

d) NO and O_2

Explanation

Chemically the photo chemical smog is oxidizing in nature because of high concentration of oxidizing agents NO_2 and O_3, so it is also called as oxidizing smog.

51. Which of these results in the reaction of un-burnt hydrocarbons with strong oxidizing agents?

a) Formaldehyde

b) Acrolein

c) Peroxy acetyl nitrate

d) All the above

Explanation

NO and O3 are strong oxidizing agent and can react with un burnt hydrocarbons in polluted air to form formaldehyde, Acrolein and peroxy acetyl nitrate (PAN).

52. What are the main components of Los Angeles smog?

a) Nitrogen oxide

b) Oxidized Hydrocarbon

c) Ozone

d) All the above

Explanation

The three main components of photo chemical smog are nitrogen oxide, ozone and oxidized hydro carbon like formaldehyde(HCHO), Acrolein (CH2=CH-CHO),peroxy acetyl nitrate (PAN).

53. Which of the following is not an direct effect of the photo chemical smog?

a) Irritation to skin, eye and throat.

b) Bronzing and glazing of young leaves.

c) Acid rain.

d) Corrosion in metal stones and painted surfaces.

Explanation

Photochemical smog causes irritation to eyes, skin and lungs, increase in chances of asthma. High concentrations of ozone and NO can cause nose and throat irritation, chest pain, uncomfortable in breathing etc. PAN is toxic to plants, attacks younger leaves and cause bronzing and glazing of their surfaces. It causes corrosion of metals stones, building materials and painted surfaces.

54. Which of this suppression will reduce the formation of photochemical smog?

a) Ozone

b) Hydrocarbons

c) Nitrogen oxides

d) Both b and c

Explanation

The formation of photochemical smog can be suppressed by preventing the release of nitrogen oxides and hydrocarbons into the atmosphere from the motor vehicles by using catalytic convertors in engines.

55. Which of these trees are used to metabolize the effects of nitrogen oxides?

a) Pinus

b) Pyrus

c) Juniparus

d) All the above

Explanation

Plantation of certain trees like Pinus, Pyrus, Querus Vitus and juniparus can metabolize nitrogen oxide.

56. Which of these layers acts as a shield for UV radiations at high altitudes??

a) CO_2

b) O_3

c) NO

d) O_2

Explanation

At high altitudes to the atmosphere consists of a layer of ozone (O3) which acts as an umbrella or shield for harmful UV radiations. It protects us from harmful effect such as skin cancer. UV radiation can convert molecular oxygen into ozone.

57. Which gas is thermodynamically unstable and decomposes into molecular oxygen?

a) Carbon dioxide

b) Helium

c) Ozone

d) Nitrogen

Explanation

Ozone gas is thermodynamically unstable and readily decomposes to molecular oxygen.

58. Which gases are most responsible for the depletion of the ozone layer?

a) Nitric Acid

b) CFC

c) ODS

d) All the above

Explanation

In recent years, a gradual depletion of this protective ozone layer has been reported. Nitric oxide and CFC are found to be most responsible for depletion of ozone layer. Generally substances that cause depletion of ozone or make it thinner are called Ozone Depletion Substances abbreviated as ODS. The loss of ozone molecules in the upper atmosphere is termed as depletion of stratospheric ozone.

59. In which of these forms nitrogen oxides are introduced into the stratosphere?

a) Exhaust gas

b) Active gas

c) Zero temperature gas

d) Thermal equilibrium gas

Explanation

Nitrogen oxides introduced directly into the stratosphere by the supersonic jet aircraft engines in the form of exhaust gases. These oxides are also released by combustion of fossil fuels and nitrogen fertilizers. Inert nitrous oxide in the stratosphere is photo chemically converted into more reactive nitric oxide. Oxides of nitrogen catalyze the decomposition of ozone and are themselves regenerated.

60. What is the trade name of Chloro fluoro derivatives?

a) Meso

b) Zeros

c) Frenos

d) None of the above

Explanation

The Chloro fluoro derivatives of methane and ethane are referred by trade name Freons.

61. Which of the following is not a property of the Chloro fluoro carbon compounds?

a) Unstable

b) Non-toxic

c) Non-corrosive

d) Liquefiable

Explanation

The Chloro Fluoro Carbon compounds are stable, non-toxic, noncorrosive and non-inflammable, easily liquefiable and are used in refrigerators, air- conditioners and in the production of plastic foams.

62. The CFC breaks up into _____ free radical in the presence of _____.

a) Hydrogen, Humidity

b) Carbon, Water vapor

c) Chlorine, UV radiation

d) Sodium, IR radiation

Explanation

In the presence of UV radiation, CFC's break up into chlorine free radical Chlorine radical is regenerated in the course of reaction. Due to this continuous attack of Cl° thinning of ozone layer takes place which leads to formation of ozone hole. It is estimated that for every reactive chlorine atom generated in the stratosphere 1, 00, 000 molecules of ozone are depleted.

63. Assertion (A): Any change in the equilibrium level of the ozone will adversely affect life in the biosphere

Reasoning(R): The regular natural process of formation and destruction of ozone never disturbs the equilibrium level of ozone in the stratosphere.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

The formation and destruction of ozone is a regular natural process, which never disturbs the equilibrium level of ozone in the stratosphere. Any change in the equilibrium level of the ozone in the atmosphere will adversely affect life in the biosphere.

64. What are the negative impacts of ozone layer depletion?

a) More UV rays will reach earth surface.

b) Cause skin cancer and decreases immunity in human beings.

c) Affects the growth of phytoplankton as a result ocean food chain is disturbed.

d) All the above

Explanation

Depletion of ozone layer will allow more UV rays to reach the earth surface and layer would cause skin cancer and also decrease the immunity level in human beings. UV radiation affects plant proteins which lead to harmful mutation of cells. UV radiation affects the growth of phytoplankton; as a result ocean food chain is disturbed and even damages the fish productivity.

65. Which of the natural element is essential for life?

a) Air

b) Water

c) Land

d) Food

Explanation

Water is essential for life. Without water life would have been impossible. The slogan, 'Save Water, Water will save you' tell us the importance of water. Such slogans tell us to save water. Apart from saving water, maintaining its quality is also equally important.

66. Which of the following pollutant originates from both natural and human activities?

a) Water pollutant

b) Air pollutant

c) Land pollutant

d) Forest pollutant

Explanation

The water pollutants originate from both natural and human activities. The source of water pollution is classified as Point and Non-point source.

67. Assertion (A): Easily identified source of pollution is called as point source.

Reasoning(R): Non-point sources of water pollution are mining wastes, acid rain, agricultural runoff and construction sediments.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Easily identified source of place of pollution is called as point source. Example: municipal and industrial discharge pipes. Non-point source cannot be identified easily, example: agricultural runoff, mining wastes, acid rain, and storm-water drainage and construction sediments.

68. Match the pollutant and their sources.

A. Microorganisms	i) Mining of uranium materials
B. Radioactive substances	ii) Chemical fertilizers
C. Heat	iii) Domestic sewage
D. Plant nutrients	iv) Cooling purpose in Industries

a) ii, iv, i, iii

b) iv, ii, iii, i

c) iii, i, iv, ii

d) iv, i, iii, ii

Explanation

List of major water pollutants and their sources

No	Pollutant	Sources
1	Microorganisms	Domestic sewage, domestic waste water, dung heap
2	Organic wastes	Domestic sewage, animal excreta, food processing factory waste, detergents and decayed animals and plants,
3	Plant nutrients	Chemical fertilisers
4	Heavy metals	Heavy metal producing factories
5	Sediments	Soil erosion by agriculture and strip-mining
6	Pesticides	Chemicals used for killing insects, fungi and weeds
7	Radioactive substances	Mining of uranium containing minerals
8	Heat	Water used for cooling in industries

69. Which of these microorganisms causes the microbiological diseases?

a) Bacteria

b) Viruses

c) Protozoa

d) All the above

Explanation

Microbiological (Pathogens) Disease causing microorganisms like bacteria, viruses and protozoa are most serious water pollutants. They come from domestic sewage and animal excreta. Fish and shellfish can become contaminated and people who eat them can become ill. Some serious diseases like polio and cholera are water borne diseases. Human excreta contain bacteria such as Escherichia coli and Streptococcus faecalis which cause gastrointestinal diseases.

70. Which of these organic excessive growth also causes the water pollution?.

a) Grass

b) Phytoplankton

c) Algae

d) Aquatic animals

Explanation

Organic matter such as leaves, grass, trash etc can also pollute water. Water pollution is caused by excessive phytoplankton growth within water. Microorganisms present in water decompose this organic matter and consume dissolved oxygen in water.

71. Which of this process provides excess nutrients to the water bodies?

a) Eutrophication

b) Chlorination

c) Metamorphism

d) Hybridization

Explanation

Eutrophication is a process by which water bodies receive excess nutrients that stimulates excessive plant growth (algae other plant weeds). This enhanced plant growth in water bodies is called as algae bloom. The growth of algae in extreme abundance covers the water surface and reduces the oxygen concentration in water. Thus, bloom-infested water inhibits the growth of other living organisms in the water body. This process in which the nutrient rich water bodies support a dense plant population kills animal life by depriving it of oxygen and results in loss of biodiversity is known as eutrophication.

72. Choose the Incorrect statement about the BOD of drinking water.

i) The total amount of oxygen in milligrams consumed by microorganism in decomposing the waste for 5 days is called as BOD.

ii) The water for calculating BOD is at 20°C and the value is expressed in ppm.

iii) The BOD value of the clean water will be above 17 ppm whereas the contaminated water is below 5 ppm.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

The total amount of oxygen in milligrams consumed by microorganisms in decomposing the waste in one liters of water at 20°C for a period of 5 days is called biochemical oxygen demand (BOD) and its value is expressed in ppm. BOD is used as a measure of degree of water pollution. Clean water would have BOD value less than 5 ppm whereas highly polluted water has BOD value of 17 ppm or more.

73. Which of the following is used as an oxidizing agent in COD?

a) MN_2SO_4

b) $K_2Cr_2O_7$

c) H_2SO_4

d) HCL

Explanation

BOD measurement takes 5 days so another parameter called the Chemical Oxygen Demand (COD) is measured. Chemical oxygen demand (COD) is defined as the amount of oxygen required by the organic matter in a sample of water for its oxidation by a strong oxidizing agent like $K_2Cr_2O_7$ in acid medium for a period of 2 hrs.

74. Which of this metal pollutant of drinking water causes kidney damage to humans?

a) Sodium

b) Cadmium

c) Tin

d) Copper

Explanation

Harmful effects of chemical water pollutants: Cadmium and mercury can cause kidney damage. Lead poisoning can leads to the severe damage of kidneys, liver, brain etc. it also affects central nervous system. Polychlorinated biphenyls (PCBs) causes skin diseases and are carcinogenic in nature.

75. In which year the standard characteristics for the drinking water were prescribed by BIS?

a) 1962

b) 1975

c) 1991

d) 1980

Explanation

Nowadays most of us hesitate to use natural water directly for drinking, because biological, physical or chemical impurities from different sources mix with surface water or ground water. Institutions like WHO (World Health Organization) at world level and BIS (Bureau of Indian Standards) and ICMR (ICMR: Indian Council of Medical Research) at national level have prescribed standards for quality of drinking water. Standard characteristics prescribed for deciding the quality of drinking water by BIS, in 1991

76. What is the desirable pH limit of drinking water?

a) 6.5 to 8.5

b) 4.5 to 6.5

c) 5.5 to 7.5

d) 6 to 10.5

77. Which of the following is a biological characteristic of the drinking water?

a) Hardness

b) Bacteria

c) Coliforms

d) Dissolved solids

Explanation

Standard characteristics of drinking water

S.No	Characteristics	Desirable limit
I	**Physico-chemical Characteristics**	
i)	pH	6.5 to 8.5
ii)	Total Dissolved Solids (TDS)	500 ppm
iii)	Total Hardness (as $CaCO_3$)	300 ppm
iv)	Nitrate	45 ppm
v)	Chloride	250 ppm
vi)	Sulphate	200 ppm
vii)	Fluoride	1 ppm
II	**Biological Characteristics**	
i)	Escherichia Coli (E.Coli)	Not at all
ii)	Coliforms	Not to exceed 10 (In 100 ml water sample)

78. Which of the following statement is not true regarding the fluorides?

a) The fluoride ion deficiency in drinking water causes tooth decay.

b) Non-soluble fluorides are added to decrease the fluoride ion concentration up to 1 ppm.

c) The fluoride ion makes the enamel on teeth much harder.

d) Fluoride ion concentration above 2ppm causes brown mottling of teeth.

Explanation

Fluoride ion deficiency in drinking water causes tooth decay. Water soluble fluorides are added to increase the fluoride ion concentration up to 1 ppm. The Fluoride ions make the enamel on teeth much harder by converting hydroxyapatite, [3(Ca3(PO4)2.Ca(OH)2], the enamel on the surface of the teeth, into much harder fluorapatite, [3(Ca3(PO4)2.CaF2]. However, Fluoride ion concentration above 2 ppm causes brown mottling of teeth. Excess fluoride causes damage to bone and teeth.

79. Which of these human organs are affected by lead contamination above 50 ppb in drinking water?

a) Liver

b) Kidney

c) Reproductive systems

d) All the above

Explanation

Drinking water containing lead contamination above 50ppb can cause damage to liver, kidney and reproductive systems

80. What are the effects of excessive concentration of sulphate level in drinking water?

a) Laxative effect

b) Cancer

c) Harmless

d) Bronchitis

Explanation

Sulphate: Moderate level of sulphate is harmless. The excessive concentration (>500ppm) of sulphates in drinking water causes laxative effect.

81. Which of this ppm value of a drinking water will cause blue baby syndrome in children?

a) < 165 ppm

b) > 45 ppm

c) < 1000 ppm

d) >= 100 ppm

Explanation

Nitrate: Use of drinking water having concentration of nitrate higher than 45 ppm may causes methemoglobinemia (blue baby syndrome) disease in children.

82. Choose the Incorrect statements.

i) Most of the salts are soluble in water and includes cations like calcium, magnesium, sodium, potassium and iron.

ii) The anions included in water are carbonate, bicarbonate, chloride, sulphate, phosphate and nitrate.

iii) The Total dissolved solids concentration lower than 500 ppm in a drinking water causes irritation in stomach and intestine.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Total dissolved solids (TDS): Most of the salts are soluble in water. It includes cations like calcium, magnesium, sodium, potassium, iron and anions like carbonate, bicarbonate, chloride, sulphate, phosphate and nitrate. Use of drinking water having total dissolved solids concentration higher than 500 ppm causes possibilities of irritation in stomach and intestine.

83. Which of the following facts about the soil is not true?

a) Soil is a thick layer of organic materials that covers the earth's rocky surface.

b) Soil constitutes the upper crust of the earth supporting the land, plants and animals.

c) Soil pollution is defined as the buildup of toxic compounds, radioactive materials and chemical salts.

d) Soil pollution affects the structure and fertility of soil, groundwater quality and food chain.

Explanation

Soil is a thin layer of organic and inorganic material that covers the earth's rocky surface. Soil constitutes the upper crust of the earth, which supports land, plants and animals. Soil pollution is defined as the buildup of persistent toxic compounds, radioactive materials, chemical salts and disease causing agents in soils which have harmful effects on plant growth and animal health. Soil pollution affects the structure and fertility of soil, groundwater quality and food chain in biological ecosystem.

84. Choose the correct statements.

i) Plants obtain carbon, hydrogen and oxygen from air and water.

ii) Plants absorb the essential nutrients from the artificial fertilizers.

iii) The usage of phosphate fertilizers and NPK increase the yield of the soil.

a) i only

b) ii only

c) iii only

d) All the above

Explanation

Sources of soil pollution: Artificial fertilizers: Soil nutrients are useful for growth of plants. Plants obtains carbon, hydrogen and oxygen from air or water, whereas other essential nutrients like nitrogen, phosphorous, potassium, calcium, magnesium, sulphur are being absorbed from soil. To remove the deficiency of nutrients in soil, farmers add artificial fertilizers. Increased use of phosphate fertilizers or excess use of artificial fertilizers like NPK in soil, results in reduced yield in that soil.

85. Assertion (A): Pesticides are the chemicals used to kill or stop the growth of unwanted organisms.

Reasoning(R): Pesticides does not affect the human beings and animals.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Pesticides are the chemicals that are used to kill or stop the growth of unwanted organisms. But these pesticides can affect the health of human beings.

86. Which of the following is not an insecticide?

a) DDT

b) NPK

c) BHC

d) Aldrin

Explanation

Insecticides: Insecticides like DDT, BHC, Aldrin etc. can stay in soil for long period of time and are absorbed by soil. They contaminate root crops like carrot, radish, etc.

87. Which of these compounds are generally used as a fungicide?

a) Mercury

b) Gold

c) Hydrogen

d) Argon

Explanation

Fungicide: Organic mercury compounds are used as most common fungicide. They dissociate in soil to produce mercury which is highly toxic.

88. Choose the incorrect statements.

i) Herbicides are used to control unwanted plants known as weed killers.

ii) Sodium chlorate and Sodium arsenate are known herbicides.

iii) Herbicides are not toxic to animals and mammals.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Herbicides: Herbicides are the chemical compounds used to control unwanted plants. They are otherwise known as weed killers. Example: sodium chlorate ($NaClO_3$) and sodium arsenate (Na_3AsO_3). Most of the herbicides are toxic to mammals.

89. Which of these human activities causes the major soil pollution?

a) Agriculture

b) Construction works

c) Industrial activities

d) All the above

Explanation

Industrial activities have been the biggest contributor to the soil pollution especially the mining and manufacturing activities.

90. Which of these chemicals are not involved in the industrial toxic wastes?

a) Cyanides

b) Silver

c) Copper

d) Zinc

Explanation

Large number of toxic wastes is released from industries. Industrial wastes include cyanides, chromates, acids, alkalis, and metals like mercury, copper, zinc, cadmium and lead etc. These industrial wastes in the soil surface lie for a long time and make it unsuitable for use.

91. Which of these are the waste management techniques?

a) Recycling

b) Growing more trees

c) Vehicle emission control

d) All the above

Explanation

Waste management: Environmental pollution can be controlled by proper disposal of wastes. Recycling: a large amount of disposed waste material can be reused by recycling the waste, thus it reduces the land fill and converts waste into useful forms. Substitution of less toxic solvents for highly toxic ones used in certain industrial processes. Use of fuels with lower sulphur content (e.g., washed coal) Growing more trees. Control measures in vehicle emissions are adequate.

92. What is the primary focus of Green chemistry?

a) Plant trees and save the Environment.

b) Recycle the hazardous substances.

c) Produce eco-friendly compounds.

d) Organic compounds for industrial usage

Explanation

Green chemistry is a chemical philosophy encouraging the design of products and processes that reduce or eliminate the use and generation of hazardous substances. For this, scientists are trying to develop methods to produce eco-friendly compounds.

93. Which of these are used to dehydrogenation of ethyl benzene?

a) Fe_2O_3

b) $MnSo_4$

c) CH_6

d) CH_3COOH

Explanation

Traditional route: This method involves two steps. Carcinogenic benzene reacts with ethylene to form ethyl benzene. Then ethyl benzene on dehydrogenation using Fe_2O_3/ Al_2O_3 gives styrene. Greener route: To avoid carcinogenic benzene, greener route is to start with cheaper and environmentally safer xylenes.

94. Choose the incorrect statements.

i) Tetrachloroethylene used in dry cleaning of clothes pollutes the ground water.

ii) Liquefied CO_2 with suitable detergent is not harmful to the ground water.

iii) HO_2 is used for bleaching clothes for better results and utilizes less water.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Dry cleaning of clothes: Solvents like tetrachloroethylene used in dry cleaning of clothes, pollute the ground water and are carcinogenic. In the place of tetrachloroethylene, liquefied CO_2 with suitable detergent is an alternate solvent used. Liquefied CO_2 is not harmful to the ground water. Now days H_2O_2 used for bleaching clothes in laundry, gives better results and utilizes less water.

95. What is used in the conventional method of paper bleaching?

a) Sulphide

b) Iodine

c) Chlorine

d) Magnesium

Explanation

Bleaching of paper: The Conventional method of bleaching was done with chlorine. Nowadays H_2O_2 can be used for bleaching paper in presence of catalyst.

96. Which of these products is prepared by one step oxidation of ethene?

a) Acetaldehyde

b) Ether

c) Benzene

d) Isopropyl alcohol

Explanation

Synthesis of chemicals: Acetaldehyde is now commercially prepared by one step oxidation of ethene in the presence of ionic catalyst in aqueous medium with 90% yield.

97. Which of the following is an alternate for the petrol in automobiles?

a) Ethanol

b) Hydrogen

c) Methanol

d) Hydrocarbons

Explanation

Instead of petrol, methanol is used as a fuel in automobiles. Neem based pesticides have been synthesized, which are safer than the chlorinated hydrocarbons. Every individual has an important role for preventing pollution and improving our environment.

98. How many categories of pollutants are classified?

a) 3

b) 4

c) 5

d) 2

Explanation

Environmental pollution is the effect of undesirable changes in the surrounding that have harmful effects on living things. Pollutants are generally classified as rapidly degradable (e.g. discarded vegetables) slowly degradable (e.g. Agriculture waste) and non-bio degradable pollutants (e.g. DDT, plastic materials).

99. Which of this pollution greatly affects the biosphere of the earth?

a) Stratosphere

b) Hydrosphere

c) Mesosphere

d) Exosphere

Explanation

Atmospheric pollutions include tropospheric and stratospheric pollution. Troposphere and stratosphere greatly affect the biosphere of the earth due to which the study of pollutions in these regions is most important.

100. Choose the Incorrect statements.

i) Troposphere is the highest region of atmosphere.

ii) Gaseous pollutants SO, NO, CO, O_3 hydrocarbons pollute the troposphere.

iii) The Particulate pollutants that pollute troposphere are dust, mist, fumes and smog.

a) i only

b) ii only

c) iii only

d) All the above

Explanation

Troposphere is the lowest region of atmosphere in which man, animal and plants exist. Gaseous pollutants like SOx, NOx, CO, CO_2, O_3 hydrocarbons and particulate pollutants like dust, mist, fumes, smog cause pollutions in troposphere.

101. Assertion (A): Acid rain results in the human activities that emit sulphur oxides and nitrogen oxides in the atmosphere.

Reasoning(R): If the PH value of rain water is lower than 5.6 then it is called as Acid rain.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Acid rain: When the PH of rain water becomes lower than 5.6 it is called acid rain. Acid rain is a byproduct of various human activities that emit sulphur oxides and nitrogen oxides in atmosphere. It damages buildings, statues and other monuments.

102. Which of the following is not included in the greenhouse gas?

a) O_2

b) N_2

c) CH_4

d) CFC

Explanation

The process of warming up of earth is known as greenhouse effect or global warming. CO_2, CH_4, O_3, CFC, N_2 and water vapor present in atmosphere act as a greenhouse gases.

103. Which of this greenhouse gas has the lowest heat retaining capacity?

a) CFC

b) N_2O

c) CO_2

d) CH_4

Explanation

Heat retaining capacity of greenhouse gases are called Global Warming Potential (GWP).The GWP based sequence of greenhouse gases is as $CFC>N_2O>CH_4>CO_2$.

104. Which of these humus cover is termed as soil?

a) Lithosphere

b) Troposphere

c) Exosphere

d) Mesosphere

Explanation

Lithosphere with humus cover is known as soil. The topsoil provides water and all nutrients required by plants for their growth.

105. Which of the following does not results in soil pollution?

a) Industrial waste

b) Organic wastes

c) Artificial fertilizers

d) Pesticides

Explanation

Industrial waste, artificial fertilizers and pesticides result in soil pollution.

106. Which of these methods are used for solid waste management?

a) Segregation

b) Dumping

c) Incineration

d) All the above

Explanation

The strategies for controlling environmental pollution are called can be waste management. Waste management involves reduction and proper disposal of waste. Wastes are produced in three forms, solid, liquid and gas. Solid waste can be disposed by segregation, dumping, incineration and composting.