

## Natural resources

1. The micro-organisms which helps in formation of soil is
  - a. Bacteria
  - b. Moss
  - c. Lichen
  - d. B and c
2. Burning of fossil fuels add
  - a.  $\text{CO}_2$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ , gases in air
  - b. C,  $\text{SO}_2$ ,  $\text{N}_2$ , gases in air
  - c. CO,  $\text{SO}_3$ ,  $\text{NO}_3$ , gases in air
  - d.  $\text{CH}_4$ ,  $\text{CO}_2$ ,  $\text{NO}_2$ , gases in air
3. Greenhouse gases are
  - a. Industries
  - b. Rhizobium
  - c. Lightening
  - d. All of the above
4. Nitrogen fixation can be done by
  - a. Industries
  - b. Rhizobium
  - c. Lightening
  - d. All of the above
5. Atmosphere maintain the temperature of earth because
  - a. It contains water vapor
  - b. It hold air, which is bad conductor of heat
  - c. It reflects the heat rays
  - d. It absorbs the heat rays
6. Molecules of proteins contain
  - a. Carbon
  - b. Nitrogen
  - c. Oxygen
  - d. All of these
7. Life cannot sustain on Mars and Venus because major component in atmosphere is
  - a. Oxygen
  - b. Carbon dioxide
  - c. Nitrogen
  - d. Ozone
8. On moon the temperature ranges from  $-190^\circ\text{C}$  to  $110^\circ\text{C}$ . This is due to
  - a. No water bodies present
  - b. Water bodies present
  - c. No bio geo chemical cycle
  - d. No atmosphere

9. Depletion of ozone molecules in the stratosphere is due to
- Chlorine compound
  - Fluorine compound
  - Halogen compound
  - None of these
10. The life supporting zone of the earth is
- Lithosphere
  - Hydrosphere
  - Atmosphere
  - Biosphere

**Answers**

- C
  - A
  - D
  - D
  - B
  - D
  - B
  - D
  - C
  - D
1. Which of the following is a green house gas?
- Nitrogen dioxide
  - Sulphur dioxide
  - Carbon dioxide
  - Carbon monoxide
2. Floods can be prevented by
- Afforestation
  - Removing top soil
  - Deforestation
  - Agriculture
3. Narmada bachao andolan was to
- Clean narmada
  - Expand narmada
  - Save narmada
  - None of above
4. Which of the following is best method from environment point of view?
- Reduce
  - Recycle
  - Reuse
  - All of above
5. The full form of UV rays is
- Ultra violet

- b. Ultra violent
  - c. Ultra valve
  - d. Ultimate violet
6. Synthetic material/ chemical which depleted Ozone layer is
- a. CFCs
  - b. CFLs
  - c. CO<sub>2</sub>
  - d. None of above
7. What is coliform?
- a. Group of bacteria
  - b. Group of viruses
  - c. Group of microorganisms
  - d. Group of diseases
8. What is the name given for replenishment of forest?
- a. Afforestation
  - b. Silviculture
  - c. Deforestation
  - d. Sericulture
9. Why should we conserve forest and wild life?
- a. To protect biodiversity
  - b. To maintain ecosystem
  - c. To maintain balance
  - d. To continue food chain
10. Water harvesting is a method which
- a. Increase ground water level
  - b. Not practiced in modern days
  - c. Has no relation with ground water
  - d. Decrease ground water level

### ANSWERS

- 1. C
- 2. A
- 3. C
- 4. D
- 5. A
- 6. A
- 7. A
- 8. A
- 9. B
- 10. A

**1. Which of the following is a non-renewable resource?**

- a) water
- b) coal

- c) soil
- d) wildlife

**2. Conventional energy refers to**

- a) Exhaustible energy sources in limited quantity
- b) Inexhaustible energy sources in unlimited quantity
- c) renewable energy resources
- d) none of these

**3. Which of the following is an inorganic natural resource?**

- a) water
- b) fossil fuels
- c) plants
- d) animals

**4. Energy that is trapped in the form of organic matter is called**

- a) Conventional energy
- b) Renewable energy
- c) Biomass energy
- d) Bioenergy

**5. Which of the following is a renewable source of energy?**

- a) petroleum
- b) nuclear fuel
- c) trees
- d) coal

**6. Which of the following is considered as conventional, inexhaustible source of energy?**

- a) thermal energy
- b) hydropower
- c) solar energy
- d) wind energy

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## MCQ on on Natural Resources



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**7. All are renewable resources except**

- a) soil fertility
- b) rainfall
- c) biological species
- d) wildlife

**8. Fossil fuels include**

- a) coal and metals
- b) coal, natural gas and oil
- c) oil and minerals
- d) oil, minerals and metals

**9. Which of the following is not a conventional energy resource?**

- a) petrol
- b) LPG
- c) tidal energy
- d) coal

**10. Which of the following is an exhaustible renewable resource?**

- a) petroleum
- b) tidal energy
- c) coal
- d) fresh water

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**Answers:**

- 1. b) coal
- 2. a) Exhaustible energy sources in limited quantity
- 3. a) water
- 4. c) Biomass energy
- 5. c) trees
- 6. b) hydropower
- 7. c) biological species
- 8. b) coal, natural gas and oil
- 9. c) tidal energy
- 10. d) fresh water

1. Acid rains are produced by

- (a) excess NO<sub>2</sub> and SO<sub>2</sub> from burning fossil fuels
- (b) excess production of NH<sub>3</sub> by industry and coal gas
- (c) excess release of carbon monoxide by incomplete combustion
- (d) excess formation of CO<sub>2</sub> by combustion and animal respiration. (1988, 89)

Answer and Explanation:

1. (a): Acid rain refers to the precipitation with a pH of less than 5. It is a mixture of  $H_2SO_4$  and  $HNO_3$ , the ratio of the two acids vary depending on the relative quantities of sulphur oxides and nitrogen oxides present in the atmosphere. These oxides are mainly produced by combustion of fossil fuels, smelters, industries, power plants, automobile exhausts etc.

2. Which one is not a pollutant normally?

(a) hydrocarbon

(b) carbon dioxide

(c) carbon monoxide

(d) sulphur dioxide.

Answer and Explanation:

2. (b): The common gaseous pollutants are oxides of carbon ( $CO$  and  $CO_2$ ), oxides of nitrogen ( $NO$  and  $NO_2$ ) oxides of sulphur ( $SO_2$  and  $SO_3$ ), all these together contribute 90% of the global air pollution. Out of all these  $CO_2$  is not a pollutant normally, the green plants, by photosynthesis balance the  $CO_2$  and  $O_2$  ratios in the air to a great extent, whereas others like carbon monoxide,  $NO_2$  etc are poisonous gases.

3. Upper part of sea/aquatic ecosystem contains

(a) plankton

(b) nekton

(c) plankton and nekton

(d) benthos.

Answer and Explanation:

3. (a): Planktons are passively floating in upper water, nektons are actively swimming while benthos lead sedentary life upon the sea bottom. Planktons are producers and are present in large number.

4. Competition for light, nutrients and space is most severe between

(a) closely related organism growing in different niches

(b) closely related organisms growing in the same area/niche

(c) distantly related organisms growing in the same habitat

(d) distantly related organisms growing in different niches. (1988)

Answer and Explanation:

4. (b): Competition is rivalry for obtaining the same resource. Competition of light, nutrients and space is most severe between closely related organisms growing in the same area/niche, due to overproduction of population in the same area/niche.

5. A mutually beneficial association necessary for survival of both partners is

(a) mutualism/symbiosis

(b) commensalism

(c) amensalism

(d) both A and B.

Answer and Explanation:

5. (a): Mutualism is an association between individuals of two species, both of which are benefitted but cannot live separately under natural conditions e.g. instances of mutualism exist between animals and plants and also in between plants e.g. lichens. Amensalism is an interaction in which one species causes harm to another species with its toxic secretion often without gaining any benefit from the interaction. Commensalism is the relationship between individuals of two species of which one is benefitted and the other is almost unaffected i.e.; neither benefitted nor harmed.

6. What is true of ecosystem?

(a) primary consumers are least dependent upon producers

(b) primary consumers out-number producers

(c) producers are more than primary consumers

(d) secondary consumers are the largest and most powerful.

Answer and Explanation:

6. (c): An ecosystem may be defined as a structural and functional unit of the biosphere comprising living organisms and their non-living environment that interact by means of food chains and chemical cycles resulting in energy flow, biotic diversity and material cycling to form a stable, self supporting system.

The organisms in an ecosystem are classified into 3 main categories—producers, consumers and decomposers. The consumers utilize materials and energy stored by the producers. Decomposers obtain their food molecules from the organic materials of dead producers and consumers. In a true ecosystem, producers are more than consumers (herbivores and carnivores).

7. In an ecosystem, which one shows one-way passage

- (a) free energy
- (b) carbon
- (c) nitrogen
- (d) potassium.

Answer and Explanation:

7. (a): The behaviour of energy in ecosystem can be termed energy flow due to unidirectional flow of energy, Flow of energy is only in one direction i.e., from solar radiation → producers → herbivorous → carnivores. This energy cannot pass in the reverse direction. There is decrease in the content and flow of energy with rise in trophic level.

8. Green house effect is warming due to

- (a) infra-red rays reaching earth
- (b) moisture layer in atmosphere
- (c) increase in temperature due to increase in carbon dioxide concentration of atmosphere
- (d) ozone layer of atmosphere.

Answer and Explanation:

8. (c): The mean global temperature rise by  $2^{\circ} - 6^{\circ}\text{C}$  and the concentration of carbon dioxide increases in the troposphere upto 600 ppm. Hence, the surface of the earth becomes warm which causes global warming. The phenomenon is similar to that of green house in which the glass enclosed atmosphere gets heated up due to its insulation from the rest of the environment. Hence, global warming is also known as green house effect and the gases responsible for it are called green house gases e.g  $\text{CH}_4$ ,  $\text{CO}_2$  etc.

9. Soil conservation is

- (a) conversion of sterile soil into fertile one

- (b) aeration of soil
- (c) erosion of soil
- (d) protection against loss.

Answer and Explanation:

9. (d): Soil conservation is to conserve fertile soil from the losses like heavy rainfall, drainage, high wind, flood, draught etc. Soil is the top cover of the earth in which plants can grow. The rotation of crops, contour ploughing and use of proper fertilizers help in maintaining the fertility of soil. Plantation of trees, controlled grazing of grasslands, reforestation, prevention of forests fires will protect the erosion of top soil. The regulation of water resources to prevent flood will help not only in soil conservation but also supply an adequate water supply in the period of drought.

10. The relation between algae and fungi in lichen is

- (a) symbiosis
- (b) parasitism
- (c) commensalism
- (d) proto cooperation.

Answer and Explanation:

10. (a): Algae and fungi in a lichen show symbiotic relationship. Fungi give support to the algae, give protection and help in absorption of water while algae provide food to fungi which is achlorophyllous. No one is harmed but both are benefitted by each other.

11. Major aerosol pollutant in jet plane emission is

- (a) sulphur dioxide
- (b) carbon monoxide
- (c) methane
- (d) fluorocarbon.

Answer and Explanation:

11. (d): Aerosols are chlorofluoro-hydrocarbon compounds released into air with force in the form of vapour. Main source of aerosols is the emission of jet planes, where fluorocarbons are

used. These chlorofluorocarbons deplete the ozone layer in the higher atmosphere. These CFC's have produced a hole in the ozone layer.

12. Gas released during Bhopal tragedy was

- (a) methyl isocyanate
- (b) potassium isothiocyanate
- (c) sodium isothiocyanate
- (d) ethyl isothiocyanate.

Answer and Explanation:

12. (a): In Bhopal, the killer gas methyl isocyanate (MIC) was leaked into air from a chemical plant (Union Carbide) killing more than 2,000 people, many of the people are still suffering from various diseases and defects of eye.

13. Deforestation will decrease

- (a) soil erosion
- (c) soil fertility
- (b) land slides
- (d) rainfall.

Answer and Explanation:

13. (d): Deforestation is the conversion of forested areas to non-forest land use such as arable land, pasture, urban use, logged area, or wasteland. Generally, the removal or destruction of significant areas of forest cover has resulted in a degraded environment with reduced biodiversity. Deforestation results from removal of trees without sufficient reforestation, and results in declines in habitat and biodiversity, wood for fuel and industrial use, and quality of life. Due to deforestation, transpiration will be decreased, air temperature will be increased and water content will be decreased hence rainfall decreases.

14. Pyramid of numbers in a grassland/tree ecosystem

- (a) always inverted
- (b) always upright
- (c) both (a) and (b)

(d) spindle-shaped.

Answer and Explanation:

14. (b): Pyramid of number in a grassland/tree ecosystem is always upright. It shows the number of individual organisms at each level. In grassland, the producers, which are mainly grasses, are always maximum in number. This number then shows a decrease towards apex, primary consumers are lesser in number than the grasses; the secondary consumers are lesser in number than the primary consumers. Finally, the top consumers are least in number. Thus, the pyramid becomes upright.

15. Domestic waste constitutes

(a) nonbiodegradable pollution

(b) biodegradable pollution

(c) effluents

(d) air pollution

Answer and Explanation:

15. (a): Domestic waste constitutes biodegradable pollution. These are also called non-conservative pollutants. These are decomposed chemically or by activity of microorganisms into harmless products and are recycled back into the atmosphere.

16. Acid rain is due to increase in atmospheric concentration of

(a) ozone and dust

(b) CO<sub>2</sub> and CO

(c) SO<sub>2</sub> and CO

(d) SO<sub>2</sub> and NO<sub>2</sub>.

Answer and Explanation:

16. (d): SO<sub>2</sub> and NO when present in large quantities dissolved in water vapour form sulphuric acid and nitric acid which dissolve in rain water resulting in acid rain (H<sub>2</sub>SO<sub>4</sub>) and (HNO<sub>3</sub>) which in turn causes great damage to forests and vegetation.

17. A non-renewable resource is

(a) nonrenewable nonconventional energy source

- (b) nonrenewable conventional energy source
- (c) renewable nonconventional energy source
- (d) renewable conventional energy source.

Answer and Explanation:

17. (b): Conventional energy resources are those energy resources which are in common use, e.g. animal power, fuel wood, fossil fuel and hydroelectric energy. These conventional energy resources are non-renewable resources.

A non-renewable resource is a natural resource that cannot be re-made, re-grown or regenerated on a scale comparative to its consumption. It exists in a fixed amount that is being renewed or is used up faster than it can be made by nature. Often fossil fuels, such as coal, petroleum, and natural gas are considered non-renewable resources, as they do not naturally re-form at a rate that makes the way we use them sustainable.

18. Renewable source of energy is

- (a) biomass
- (b) coal
- (c) petroleum
- (d) kerosene.

Answer and Explanation:

18. (a): A natural resource qualifies as a renewable resource if it is replenished by natural processes at a rate comparable to its rate of consumption by humans or other users. Biomass, in the energy production industry, refers to living and recently dead biological material which can be used as fuel or for industrial production.

Most commonly, biomass refers to plant matter grown for use as biofuel, but it also includes plant or animal matter used for production of fibres, chemicals or heat. Biomass may also include biodegradable wastes that can be burnt as fuel. Renewable resources of energy include biomass energy and some forms of inexhaustible energy like solar energy, hydropower, wind power, tidal energy, wave energy, geothermal energy, etc. Coal, petroleum and kerosene are non-renewable resources of energy.

19. Homeostasis is

- (a) tendency of biological systems to change with change in environment
- (b) tendency of biological systems to resist change

(c) disturbance of self regulatory system and natural controls

(d) biotic materials used in homeopathic medicines.

Answer and Explanation:

19. (b): The ability to maintain a steady state within constantly changing environment is essential for the survival of living systems. The maintenance of a constant internal environment is called homeostasis.

20. Deep black soil is productive due to high proportion of

(a) sand and zinc

(b) gravel and calcium

(c) clay and humus

(d) silt and earthworm.

Answer and Explanation:

20. (c): Deep black soil is productive due to high proportion of clay and humus. The organic matter present in the soil is contributed by the death and decay of living organisms. These are the richest in nutrients and therefore these soils are the most fertile.

21. Soil water available to roots is

(a) surface water

(b) hygroscopic water

(c) gravitational water

(d) capillary water.

Answer and Explanation:

21. (d): The spaces between the soil particles may be occupied by water or air. The rain water fills all the pore spaces as it moves downward under the influence of gravity however very small pore spaces serve as capillaries allowing the water to move against the pull of gravity, this is called capillary water and is available to the roots.

Some water forms an extremely thin, tightly held film around the soil particles; it is termed as hygroscopic water. Some water vapour is there in the soil pore spaces. The downward moving water is called gravitational water.

22. Which one is true?

- (a) commensalism when none of the interacting populations affect each other
- (b) symbiosis when the interaction is useful to both the populations
- (c) symbiosis when neither populations affects each other
- (d) commensalism when the interaction is useful to both the populations.

Answer and Explanation:

22. (b): When the interactions is useful to both the populations it is called symbiosis. Symbiosis means living together. It is beneficial co-action between two or more different species in which one or both species are benefitted and neither species is harmed.

23. Food chain in which microorganisms breakdown the food formed by primary producers is

- (a) parasitic food chain
- (b) detritus food chain
- (c) consumer food chain
- (d) predator food chain.

Answer and Explanation:

23. (b): The dead organic matter of plant or animal is called as detritus. While a part of it remains on the soil surface as litter, the other part enters the soil. Many animals such as protozoan's, nematodes, insects etc. depend on detritus and hence they are called as detritivores. Even the human beings are detritivores when they eat cooked food. From detritus, the chain proceeds to detritivores, then to carnivores and finally to top carnivores.

24. Pick up the correct food chain

- (a) grass → chamelion → insect → bird
- (b) grass → fox → rabbit →» bird
- (c) phytoplankton → zooplankton → fish
- (d) fallen leaves → bacteria → insect larvae.

Answer and Explanation:

24. (c): The process of transfer of energy from producers through a series of organisms, i.e., from primary consumers to secondary consumers and from secondary consumers to tertiary consumers by process of eating and being eaten constitute a food chain. The correct food chain is phytoplankton → zooplankton → fish.

25. Most hazardous metal pollutant of automobile exhausts is

- (a) mercury
- (b) cadmium
- (c) lead
- (d) copper.

Answer and Explanation:

25. (c): Lead is the most hazardous metal pollutants of automobile exhausts. Its effects are lead poisoning, anaemia, kidney disease and convulsions. It also affects central nervous system and distorts the red blood corpuscles.

26. Fertility of soil is measured by its ability to

- (a) retain nutrients
- (b) hold organic materials
- (c) hold water
- (d) support life.

Answer and Explanation:

26. (d): Soil fertility is the characteristic of soil that supports abundant plant life. In particular the term is used to describe agricultural and garden soil.

27. Petroleum is a

- (a) synthetic product
- (b) renewable resource
- (c) nonrenewable resource
- (d) inconvenient resource.

Answer and Explanation:

27. (c): A non-renewable resource is a natural resource that cannot be re-made, re-grown or regenerated on a scale comparative to its consumption. It exists in a fixed amount that is being renewed or is used up faster than it can be made by nature. Often fossil fuels, such as coal, petroleum, and natural gas are considered non-renewable resources, as they do not naturally re-form at a rate that makes the way we use them sustainable.

28. Minerals and metals are

- (a) biodegradable resources
- (b) renewable
- (c) non-renewable
- (d) renewable and nonrenewable resources.

Answer and Explanation:

28. (d): Metals and minerals are both renewable and non-renewable resources. Non renewable due to very long recycling in case of metals and some minerals but renewable due to shorter recycling in case of biogenetic nutrients.

29. Soil fertility is reduced by

- (a) crop rotation
- (b) nitrogen fixing bacteria
- (c) decaying organic matter
- (d) intensive agriculture.

Answer and Explanation:

29. (d): Soil fertility is the characteristic of soil that supports abundant plant life. In particular the term is used to describe agricultural and garden soil. During intensive agriculture most of the nutrients and minerals are exhausted from the soil so fertility decreases.

30. Water is a resource that is

- (a) nondegradable nonmaintainable
- (b) degradable maintainable
- (c) renewable

(d) non-renewable.

Answer and Explanation:

30. (c): Water is a natural resource which get replenished, recycled or reproduced and should not used beyond its renewability. It is a major renewable inorganic resource which is an essential component of living beings, a habitat for several organisms, determine of vegetation and climate, floods and droughts, requisite; for drinking, bathing, washing, cooling, constructor worth disposal of sewage and industrial effluents irrigation eel.

31. River water deposits

(a) loamy soil

(b) alluvial soil

(c) laterite soil

(d) sandy soil

Answer and Explanation:

31. (b): River water deposit alluvial soil. Alluvial soils are transported by water.

32. A fertile agricultural soil appears deep coloured at the surface as compared to soil one metre down. The reason for colour of top soil is

(a) more moisture

(b) rich in organic matter

(c) rich in iron, calcium and magnesium

(d) recent formation.

Answer and Explanation:

32. (b): A fertile agricultural soil appears deep coloured at the surface as compared to soil one metre down. The reason for colour of top soil is rich in organic matter. The mineral component constitutes some 50-60% of soil. It is present in the form of particles of different sizes.

33. Soil particles determine its

(a) texture

(b) field capacity

(c) water holding capacity

(d) soil flora.

Answer and Explanation:

33. (a): Soil particles determines its textures. These particles enclose living spaces in between them call pore space. In coarse textured soils, the pore space is wide but pore frequency is low. But in fine textured soil, the pore space is narrow but pore frequency is high.

34. Ultraviolet radiations from sunlight causes a reaction that produces

(a) fluorides

(b) carbon monoxide

(c) sulphur dioxide

(d) ozone.

Answer and Explanation:

34. (d): Ozone is generated in the lower atmosphere during the formation of photochemical smog when nitrogen dioxide splits to produce reactive oxygen atoms which combine with molecular oxygen. Oxygen molecules split under ultraviolet radiations to produce oxygen atoms which combine with molecular oxygen to form ozone. It is this gas which forms the protective ozone umbrella in the stratosphere and shield life from biocidal high energy radiations. It can also damage DNA molecules and cause carcinogenesis.

35. American water plant that has become a troublesome water weed in India

(a) *Cyperus rotundus*

(b) *Eichhornia crassipes*

(c) *Typha latifolia*

(d) *Trapa bispinosa*.

Answer and Explanation:

35. (b): *Eichhornia crassipes* or water hyacinth (American water plant) has become the most serious weed in many tropical, warm and temperate freshwater habitats worldwide including India. It has the highest growth rate of any saltwater, freshwater or terrestrial vascular macrophyte and can be labelled as an "ecosystem engineer" or an invasive habitat modifier.

In slow-moving to still water bodies it is especially problematic as it forms dense monospecific mats that lower dissolved oxygen levels in the water, alter river hydrology and increase organic sediment. These mats displace native aquatic plant and animal communities; drastically alter the ecosystem and puts native habitats and wildlife at risk. Furthermore, water hyacinth may interfere with the use of a water-body for cultural, social or commercial purposes causing substantial economic hardship and putting livelihoods at risk.

36. Study of inter-relationships between organisms and their environment is

- (a) ecology
- (b) ecosystem
- (c) phytogeography
- (d) ethology.

Answer and Explanation:

36. (a): Ecology is the branch of science which deals with the study of inter-relationship between organisms and their environment. The scope of ecology is very vast as it treats the organisms at the level of population, community and ecosystem. Ethology is the study of evolution and any significant behaviour of people in their natural surroundings. Phytogeography is the branch of biogeography that is concerned with the geographic distribution of plant species.

37. The sum total of the populations of the same kind of organisms constitute

- (a) colony
- (b) genus
- (c) community
- (d) species.

Answer and Explanation:

37. (d): The sum total of the populations of the same kind of organisms constitute species. A species is a group of individuals of same kind of phenotypic characters and can interbreed.

38. Soil best suited for plant growth is

- (a) clay
- (b) loam
- (c) sandy

(d) gravel.

Answer and Explanation:

38. (b): Soil best suited for plant growth is loam. Loam soils have sand, silt and clay in a specific proportion. The soil contains 20% clay, 40% silt and 40% sand. They have good nutritive status aeration and hydration.

39. Association of animals when both partners are benefitted

(a) colony

(b) mutualism

(c) commensalism

(d) ammensalism.

Answer and Explanation:

39. (b): Mutualism is a type of association where both the partners are benefitted. This is permanent and t obligatory association involving a physiological inter- dependence e.g. in lichens.

40. Pyramid of numbers deals with number of

(a) species in an area

(b) individuals in a community

(c) individuals in a trophic-level

(d) subspecies in a community.

Answer and Explanation:

40. (c): Pyramid of number is an ecological pyramid which employs the number of individuals per unit area at various trophic levels sequence wise with producers at the base and various consumers at successively higher levels. Pyramid of number assumes different shapes in different ecosystems, individuals in a trophic level.

The pyramid of number in pond ecosystem is also upright. In forest ecosystem the pyramid of number is inter mediate. Here the number of primary consumers is more than producers as well as top consumers. In parasitic food chain the pyramid of number is inverted.

41. Pyramid of numbers in a pond ecosystem is

- (a) irregular
- (b) inverted
- (c) upright
- (d) spindle shaped.

Answer and Explanation:

41. (c): Pyramid of number in a pond ecosystem is always upright, showing the number of individual organisms at each level. In a pond, the producers, which are mainly phytoplanktons, are always maximum in number. This number then shows a decrease towards apex, primary consumers are lesser in number than the grasses; the secondary consumers are lesser in number than the primary consumers. Finally, the top consumers are least in number. Thus, the pyramid becomes upright.

42. Which among the following is likely to have the highest levels of D.D.T. depositions in its body?

- (a) sea gull
- (b) phytoplankton
- (c) eel
- (d) crab.

Answer and Explanation:

42. (a): Biomagnifications is the increase in concentration of a compound in the tissue of organism as the compound passes up a food chain usually as a result of food intake. This results from the accumulation of the compound at each trophic level prior to its consumption "by organisms at the next trophic level. Most chlorinated hydrocarbon like DDT shows biomagnifications. Level of concentration of compound increases in higher trophic level as shown in the following chain. Water → phytoplanktons → zooplanktons → insects → fish → large fish

Higher the trophic level higher will be the accumulation of organic compound. Hence sea gull is likely to have the highest level of DDT deposition in its body.

43. Which one of the following gases contributes maximum to the green house effect' on the earth?

- (a) carbon dioxide

- (b) chlorofluoro carbon
- (c) Freon
- (d) methane.

Answer and Explanation:

43. (a): Due to excessive combustion activity, the content of CO<sub>2</sub> in the atmosphere has been steadily rising. CO<sub>2</sub> is opaque to infra-red waves. Therefore, it allows the sunlight to fall on earth but checks the loss of heat during night. As carbon dioxide accumulates in the atmosphere it absorbs more and more of the reflected infrared radiation.

This could cause an increase in temperature referred to as the green house effect. Methane also causes green house effect but comparatively lesser than CO<sub>2</sub>. Chlorofluorocarbons and Freon cause depletion of ozone layers. Depletion of ozone layer leads to increase in incidence of skin cancer due to increased penetration of sun's harmful rays.

44. The dominant second trophic level, in a lake ecosystem, is

- (a) phytoplankton
- (b) zooplankton
- (c) benthos
- (d) plankton.

Answer and Explanation:

44. (b): Trophic level is a step or division of food chain which is characterized by the method of obtaining its food. The two fundamental trophic levels are producers and consumers. Producers belong to the first trophic level. In a lake the producers are mainly some rooted or floating plants and phytoplanktons.

Primary consumers form the second trophic level. They feed on living plants or plant parts. The primary consumers are zooplanktons.

45. Sounds above what level are considered hazardous noise pollution?

- (a) above 80 dB
- (c) above 150 dB
- (b) above 30 dB
- (d) above 120 dB.

Answer and Explanation:

45. (d): Noise level are expressed on a logarithmic scale of decibels. The baseline noise levels in the community vary around 40 dB. International standards prescribe a maximum of 50 dB for day and 40 dB for night time in a residential area. Noise over 115 dB is regarded as highly avoidable. The World Health Organization (WHO) recommends an industrial noise limit of 75 dB.

46 A disease caused by eating fish contaminated by industrial waste, containing mercury compounds, is called

- (a) osteosclerosis
- (b) Hashimoto's oxidase
- (c) Bright's disease
- (d) minimata disease.

Answer and Explanation:

46. (d): Mercury gets changed to water soluble dim ethyl mercury which undergoes biomagnifications.

Eating poisoned animals causes deformity known as minamata disease (first reported in 1952 due to eating of fish captured from Hg-contaminated Minamata Bay of Japan) which is characterised by diarrhoea, hemolysis, impairment of various senses, numbness of lips, tongue, limbs, deafness, blurring of vision, mental derangement, meningitis and death.

47. When huge amount of sewage is dumped into a river, its B.O.D. will

- (a) slightly decrease
- (b) remain unchanged
- (c) increase
- (d) decrease.

Answer and Explanation:

47. (c): BOD is biochemical oxygen demand which is the oxygen in mg required for 5 days in 1 litre of water at 20°C for the micro-organisms to metabolize organic waste. Due to dumping of huge amount of sewage, the oxygen levels are depleted, which are reflected in terms of BOD values of water. With dumping of wastes number of microbes also increases tremendously and these also consume most of the oxygen, so BOD of the river will increase.

48. If we completely remove the decomposers from an ecosystem, its functioning will be adversely affected, because

- (a) mineral movement will be blocked
- (b) the rate of decomposition will be very high
- (c) energy flow will be blocked
- (d) herbivores will not receive solar energy.

Answer and Explanation:

48. (a): Decomposers are aprototrophs which decompose the organic remains by secreting extracellular digestive enzymes. They are also known as mineralisers as they release minerals trapped in organic remains. So in the absence of microorganisms the flow of mineral will stop.

49. In a biotic community, the primary consumers are

- (a) detritivores
- (b) herbivores
- (c) carnivores
- (d) omnivores.

Answer and Explanation:

49. (b): Consumers are heterotrophs, mostly animals which feed on other organisms. Herbivores feed on producers. This is because the herbivores obtain their food directly from plants. The carnivores which feed on herbivores are called as primary carnivores or second order consumers. The animals which feed on primary carnivores are called secondary carnivores. Omnivores eat both plants and animals therefore they are called third order consumers. Detritivores or scavengers are animals which feed on dead bodies of other organisms.

50. The abundance of a species population, within its habitat, is called

- (a) relative density
- (b) regional density
- (c) absolute density
- (d) niche density.

Answer and Explanation:

50. (d): Niche is specific part of habitat occupied by individuals of a species which is circumscribed by its range of tolerance, range of movement, microclimate, type of food and its availability, shelter, type of predator, and timing of activity. A habitat has several ecological niches and supports a number of species. An ecological niche is used by a single species. Two or more species cannot use the same niche despite having a mutualistic association. The abundances of a species population within its habitat is called niche density.

51. The Taj Mahal is threatened due to the effect of

- (a) oxygen
- (b) hydrogen
- (c) chlorine
- (d) sulphur-dioxide.

Answer and Explanation:

51. (d): The Taj Mahal is built with white marble and is threatened by environmental pollution, especially due to sulphur dioxide. Sulphur dioxide is produced during combustion of fossil fuels, refining of petroleum and smelting of sulphur containing ores. Threat to Taj Mahal from Mathura refinery is due to pollutant gases composing  $\text{SO}_2$ ,  $\text{H}_2\text{S}$  and nitrogen oxides. They would convert  $\text{CaCO}_3$  (marble) into calcium sulphate and calcium nitrate.

52. In Minamata Bay Japan the animals which remained free from minamata disease, are

- (a) dogs
- (b) cats
- (c) pigs
- (d) rabbits.

Answer and Explanation:

52. (d): Minamata disease is caused because of eating of poisoned animals which contain water soluble dimethyl mercury which undergoes biomagnification. Thus animals which feed on marine animals (especially fish) and plants suffered from this disease, rabbits remained free from this disease because they feed on terrestrial plants.

53. Which of the following pairs is a sedimentary type of biogeochemical cycle?

- (a) phosphorus and nitrogen
- (b) phosphorus and sulphur
- (c) oxygen and nitrogen
- (d) phosphorus and carbon dioxide.

Answer and Explanation:

53. (b): The term biogeochemical cycling is useful exchanges/circulation of biogeochemical nutrients between living and nonliving components of biosphere. In sedimentary cycle of matter, materials involved in circulation between biotic and biotic components of biosphere are nongaseous and the reservoir pool is lithosphere, e.g., phosphorus, calcium, magnesium. Sulphur has both sedimentary and gaseous phase. O<sub>2</sub>, N<sub>2</sub> and CO<sub>2</sub> do not have sedimentary phase but are gaseous cycle.

54. The toxic effect of carbon monoxide is due to its greater affinity for haemoglobin as compared to oxygen approximately by

- (a) 200 times
- (b) 1000 times
- (c) 2 times
- (d) 20 times.

Answer and Explanation:

54. (a): Carbon monoxide but are gaseous cycle is produced due to incomplete combustion, metallurgical operations and naturally by plants as well as animals. Carbon monoxide has 200 times more affinity within haemoglobin as compared to oxygen. Carbon monoxide combines with haemoglobin of blood and forms a stable compound called carboxyhaemoglobin. At 50 ppm, CO converts 7.5% of haemoglobin into carboxy-haemoglobin within 8 hours. It impairs oxygen transport resulting in headache, decreased vision, and cardiovascular malfunction and asphyxial.

55. Which of the following isotopes is most dangerous to Homosapiensl?

- (a) phosphorus-32
- (b) strontium-90
- (c) caesium-137
- (d) iodine-131.

Answer and Explanation:

55. (b): Strontium-90 is a long lived radionuclide. It tends to cycle like calcium. It causes bone cancer, blood and tissue degeneration.

56. Which of the following is the most stable ecosystem?

- (a) mountain
- (b) ocean
- (c) forest
- (d) desert.

Answer and Explanation:

56. (b): Of all the ecosystems, ocean is the largest and most stable ecosystem. Aquatic life is protected from vigorous climates and weather that are climatic conditions, problem of water supply, food, fire and artificial forces such as industrialization, farming and grazing are lacking in the oceans. The sea is continuous and not separated as land and freshwater habitats.

57. The primary succession refers to the development of communities on a

- (a) forest clearing after devastating fire
- (b) newly-exposed habitat with no record of earlier vegetation
- (c) freshly cleared crop field
- (d) pond, freshly filled with water after a dry phase.

Answer and Explanation:

57. (b): When succession begins on an area which has not been previously being occupied by a community e.g. a new exposed rock area, sand dunes, new islands, deltas, shore or recent lava flow, it is known as primary succession. The first group of organisms (plants or animals) which become established in such an area is termed the pioneer community.

58. A dental disease characterized by mottling of teeth is due to the presence of certain chemical element in drinking water. Which of the following is that element?

- (a) fluorine
- (b) boron

(c) mercury

(d) chlorine.

Answer and Explanation:

58. (a): Flourides are given out during refining of materials. Flourides cause flourosis. It is a disease which is defined by mottling of teeth, abnormal bones that are liable to fracture because fluorine replaces  $\text{Ca}^{2+}$  and makes the bones brittle. Flouride pollution is a serious problem in many districts of Rajasthan, where excess of flouride in water adversely affects the health of man. Many villagers have aged prematurely or became hunch backs.

59. Which of the following is the main factor of desertification?

(a) over-grazing

(b) tourism

(c) irrigated agriculture

(d) all of these.

Answer and Explanation:

59. (a): Desertification means a process of spread of desert that occurs due to degradation of environment, cutting of trees, soil erosion etc. It can be natural or manmade. The main causes for desertification are over cultivation of poor soils, over grazing by animals, excessive cutting of fuel wood and inappropriate irrigation practises resulting in salinization. Among them overgrazing is the most important factor as it causes maximum effect.

60. Which one of the following pairs is correctly matched?

(a) parasitism – intra-specific relationship

(b) uricotelism – aquatic habitat

(c) excessive perspiration – xeric adaptation

(d) stream lined body – aquatic adaptation.

Answer and Explanation:

60. (d): Streaming body is a secondary aquatic adaption. It is found in animals that live permanently in water but most of them are amphibious in nature. The stream lined body consists of compression of head, body and tail into a curved stream lined form.

There is no protruberance over the body so that the animal can move easily through water. Parasitism is a relationship between two organisms of different species in which one organism called parasite obtains its food directly from another living organism called host.

In xeric adaptation perspiration is reduced to conserve water. Uricotelism is characteristic of terrestrial animals which excrete uric acid.

61. The closely related morphologically similar sympatric populations, but reproductively isolated, are designated as

- (a) clones
- (b) sibling species
- (c) clines
- (d) denies.

Answer and Explanation:

61. (c): Clones are populations of genetically similar cells of individuals. Such a population is obtained either by mitosis or by asexual reproduction by parthenogenesis from a single plant. Clines are a morphological or genetic gradation of a species in a geographical area. Demes are a group of individuals which are capable of interbreeding. Siblings are the off springs of same male and female parents.

62. The true statement about 'green-house effect' is that it is

- (a) caused by combination of many gases
- (b) caused only by CO<sub>2</sub>
- (c) caused by CO<sub>2</sub>, CFC, CH<sub>4</sub> and NO<sub>2</sub> gases
- (d) none of these.

Answer and Explanation:

62. (c): Green house effect is warming effect found in green house by allowing solar radiations to pass in but preventing long range heat radiations to pass out. The gases which are transparent to solar radiation but retain and partially reflect back long wave heat radiations are called green house gases.

Recently the concentration of green house gases has started rising resulting in enhanced green house effect that is thus increasing the mean global temperature. It is called global warming. The various greenhouse gases are CO<sub>2</sub> (warming 60%), CH<sub>4</sub> (effect 20%), chloroflourocarbons or

CFCs (1.4%) and nitrous oxide (N<sub>2</sub>O, 6%). Others of minor significance are water vapours and ozone.

63. Benthic animals are those, which

- (a) are submerged in area
- (b) float on the sea surface
- (c) are deep dweller in sea
- (d) are floating (free) organisms.

Answer and Explanation:

63. (c): Benthic organisms are attached or rest on the bottom sediments. Benthic animal may be divided into filter feeders, e.g. clams and deposit feeders e.g. snails.

64. Which country has the greatest contribution for the whole formation in ozone layer?

- (a) Russia
- (b) Japan
- (c) USA
- (d) Germany.

Answer and Explanation:

64. (c): Depletion in the concentration of ozone over a restricted area as spring time decline over Antarctica is called ozone hole. Depletion of ozone is due to action of sunlight over pollutants which release chemicals (e.g., chlorine) that destroy ozone. The major are chloroflourocarbons (14% of total depletion), nitrogen oxides (3.5% depletion sulphur dioxide, halon, carbon tetrachloride, methyl chloroform, chlorine, etc. Major contributor of these gases is USA.

65. The 'niche' of a species is meant for

- (a) habitat and specific functions of a species
- (b) specific place where an organism lives
- (c) specific species function and its competitive power
- (d) none of these.

Answer and Explanation:

65. (a): Niche is specific part of habitat occupied by individuals of a species which is circumscribed by its range of tolerance, range of movement, microclimate, type of food and its availability, shelter, type of predator, and timing of activity.

A habitat has several ecological niches and supports a number of species. An ecological niche is used by a single species. Two or more species cannot use the same niche despite having a mutualistic association.

66. The two great industrial tragedies namely, MIC and Chernobyl tragedies respectively occurred where and at which time?

- (a) Bhopal 1984, Ukrain 1986
- (b) Bhopal 1986, Russia 1988
- (c) Bhopal 1984, Ukrain 1990
- (d) Bhopal 1984, Ukrain 1988

Answer and Explanation:

66. (a): The Bhopal gas tragedy occurred on 3rd Dec. 1984 in which methyl isocyanate gas was released from a fertilizer manufacturing plant of Union Carbide causing death of approximately 2500 persons. Chernobyl disaster occurred on April 26, 1986, from an explosion at the chernobyl power station which released a huge radioactive cloud into the atmosphere in Ukrain.

67. The 10% energy transfer law of food chain was given by

- (a) Lindemann
- (b) Tansley
- (c) Stanley
- (d) Weismann.

Answer and Explanation:

67. (a): Energy flow in an ecosystem is always unidirectional. Only 10% of the gross productivity of producers is entrapped by herbivores for their body building. Herbivores are eaten by carnivores. Only 10% of the herbivore productivity is utilized for raising productivity of primary carnivores. The rest is consumed in ingestion, respiration, maintenance of body heat and other activities. Higher carnivores similarly are able to retain only 10% of energy present in primary carnivores. This is called the 10% law. It was given by Lindemann in 1942.

68. The most common indicator organism that represents polluted water is

- (a) C.vibrio
- (b) Entamoeba histolytica
- (c) E.coli
- (d) P.typhi.

Answer and Explanation:

68. (c): E. coli is the most common indicator of water pollution. It naturally occurs in the intestines of human beings and animals. They are commonly found in sewage and if E. coli is detected in water then it indicates fecal contamination. So if E. coli are detected in drinking water it indicates a serious health risk and that water-should not be used for drinking.

69. In coming years, skin related disorders will be more common due to

- (a) water pollution
- (b) depletion of ozone layer
- (c) pollutants in air
- (d) use of detergents.

Answer and Explanation:

69. (b): Ozone layer or shield is present in stratosphere. It functions as a shield against strong UV radiations. Protection from UV radiations is proportional to thickness of ozone layer. Depletion in the concentration of ozone over a restricted area as spring time decline over Antartica is called ozone hole. Thinning of ozone layer increases the amount of UV-B radiations reaching the earth.

It would increase occurrence of cataract, skin cancers, herpes, dimming of eye sight, photo burning, deficient functioning of immune system.

70. During adverse season, therophytes survive by

- (a) rhizomes
- (b) seeds
- (c) bulbs

(d) corms.

Answer and Explanation:

70. (b): Therophytes are those plants that survive the winter as a seed and complete their life cycle between the spring and autumn.

71. MAB stands for

- (a) mammals and biosphere
- (b) mammals and biology programme
- (c) man and biology programme
- (d) man and biosphere programme.

Answer and Explanation:

71. (d): Man and biosphere programme is an international biological programme of UNESCO (United Nations Educational Scientific and Cultural Organisation) which was started in 1971 but was introduced in India in 1986. MAB has studied human environment, impact of human interference and pollution on biotic and a biotic environments and conservation strategies for the present as well as future.

72. Formation of ozone hole is maximum over

- (a) Europe
- (b) Africa
- (c) India
- (d) Antarctica.

Answer and Explanation:

72. (d): Depletion in the concentration of ozone over a restricted area as spring time decline over Antarctica is called ozone hole. An ozone hole was discovered over Antarctica by Faman et al, 1985. It is quite large (23 million square km in 1992 and 28.3 million square km in 2000). A small ozone hole also occurs over North Pole, it was discovered in 1990. Thinning of ozone shield has also been reported elsewhere (e.g., 8% between 30° – 50° N).

73. Which of the following ecosystem has the highest gross primary productivity?

- (a) mangroves

- (b) rain forest
- (c) grassland
- (d) coral reef.

Answer and Explanation:

73. (b): Gross primary productivity is the total rate of photosynthesis, including the organic matter used up in | respiration during the measurement period.

Tropical evergreen/rain forests occur over equatorial/ subequatorial regions with abundant warmth and rainfall (200-350 cm/yr) almost throughout the year. The forests are impenetrable (= jungle) with maximum diversity, e.g., 200 types of trees in one hectare, 70-80% of all insects 80-85% of all birds. Productivity is maximum here, 12000 kcal/m<sup>2</sup>/yr.

74. Phosphate pollution is caused by

- (a) sewage and phosphate rock
- (b) sewage and agricultural fertilizers
- (c) phosphate rock only
- (d) agricultural fertilizers only.

Answer and Explanation:

74. (b): Phosphate is an important compound of fertilizer which are added to crop fields and then are passed down to water bodies during rains through run off. It is also present in sewage that is dumped into the water body. This nutrient brings about dense growth of water plants especially the algae and cause algal bloom. This algal bloom leads to oxygen depletion in water bodies and causes death of aquatic life.

75. Which of the following acts as “nature’s scavengers”?

- (a) insects
- (b) microorganisms
- (c) man
- (d) animals.

Answer and Explanation:

75. (b): Microorganisms (bacteria and mould) are decomposers of the ecosystem. They feed upon dead decaying organisms (both plant and animals) and break them into simpler compounds. These are released free in the atmosphere and are utilized by producers for the synthesis of their food materials. They are called nature's scavengers as they are consumers of dead matter.

76. In desert grasslands, which type of animals are relatively more abundant?

- (a) aquatic
- (b) fossorial
- (c) diurnal
- (d) arboreal.

Answer and Explanation:

76. (b): In deserts animals prefer to live under the earth's surface. Such animals are called fossorial. The animal residing either permanently or for most of life inside the burrows or under the earth surface are known as burrowing or fossorial animals and their mode of existence is described as subterranean or underground.

77. The supersonic jets cause pollution by the thinning of

- (a) O<sub>2</sub> layer
- (b) O<sub>3</sub> layer
- (c) CO<sub>2</sub> layer
- (d) SO<sub>2</sub> layer.

Answer and Explanation:

77. (b): Depletion of ozone is due to action of sunlight over pollutants which release chemicals (e.g., chlorine) that destroy ozone. Ozone depleting substances react with ozone present in the stratosphere and destroy the same. The major ODS are chloroflourocabons (14% of total depletion), nitrogen oxides (3.5% depletion sulphur dioxide, halon, carbon tetrachloride, methyl chloroform, chlorine, etc. Many of these are being released by jets flying in the stratosphere and rockets being fired into space.

78. Which one of the following organisms is used as indicator of water quality?

- (a) Azospirilluni
- (b) Escherichia

(c) Biggiata

(d) Chlorella.

Answer and Explanation:

78. (b): Refer answer 68.

79. If there was no CO<sub>2</sub> in the earth's atmosphere, the temperature of earth's surface would be

(a) higher than the present

(b) dependent on the amount of oxygen in the atmosphere

(c) same as present

(d) less than the present.

Answer and Explanation:

79. (d): Carbon dioxide is one of the important green house gas. It allows the shorter wavelength of infra red radiations to pass through it but does not allow these radiations to leave the earth's atmosphere. This results in warming of the atmosphere. If the amount of CO<sub>2</sub> decreases then there will not be any increase in temperature.

80. Plants such as Prosopis, Acacia and Capparis represent examples of tropical

(a) deciduous forests

(b) evergreen forests

(c) grass lands

(d) thorn forests.

Answer and Explanation:

80. (d): Tropical shrubs or thorn forests are found in places where moisture conditions are intermediate between desert and savanna on one hand and seasonal or rain forests on the other hand. Acacia and Prosopis is non-succulent perennial plants and Capparis is a prophetic shrub.

81. Carbon mono-oxide is a pollutant because

(a) reacts with haemoglobin

(b) makes nervous system inactive

(c) it reacts with O<sub>2</sub>

(d) it inhibits glycolysis.

Answer and Explanation:

81. (a): Refer answer 54.

82. How carbon monoxide, emitted by automobiles, prevents transport of oxygen in the body tissues?

(a) by forming a stable compound with haemoglobin

(b) by obstructing the reaction of oxygen with haemoglobin

(c) by changing oxygen into carbon dioxide

(d) by destroying the haemoglobin.

Answer and Explanation:

82. (a): Refer answer 54.

83. In a terrestrial ecosystem such as forest, maximum energy is in which trophic level?

(a) T<sub>3</sub>

(b) T<sub>4</sub>

(c) T<sub>1</sub>

(d) T<sub>2</sub>

Answer and Explanation:

83. (c): Each successive level of nourishment as represented by the links of the food chain is known as a trophic level. The plant producers within an ecosystem constitute the first trophic level, the herbivores form the second trophic level, and the carnivores represent third level. Additional links in the main food chain and inside chains such as those formed by parasites constitute further trophic levels. In a terrestrial ecosystem maximum energy is in trophic level because the organisms which trap solar energy are primary producers and they have got maximum energy. Only 10% energy is transferred from one trophic level to next trophic level.

84. Which of the following communities is more vulnerable to invasion by outside animals and plants?

- (a) temperate forests
- (b) oceanic island communities
- (c) mangroves
- (d) tropical evergreen forests.

Answer and Explanation:

84. (d): Tropical forests are found in tropical zone of the world and are characterised by very high temperature with rainfall in abundance. The flora of tropical rain forest is very rich and highly diversified. The tropical forests have a very rich fauna both in density as well as in varieties. The reason for this high diversity and variety of flora and fauna is the occurrence of suitable conditions in these forests. So these are more vulnerable to invasion by outside plants and animals.

85. The rate at which light energy is converted into chemical energy of organic molecules is the ecosystems

- (a) net secondary productivity
- (b) gross primary productivity
- (c) net primary productivity
- (d) gross secondary productivity.

Answer and Explanation:

85. (b): Gross primary productivity is the total energy stored in the food materials synthesized by the green plants or total rate of photosynthesis including the organic matter used up in the respiration during total photosynthesis or total assimilation.

86. The Minamata disease in Japan was caused through the pollution of water by

- (a) cyanide
- (b) methyl isocyanate
- (c) lead
- (d) mercury.

Answer and Explanation:

86. (d): Mercury is changed to water soluble dim ethyl mercury which undergoes biomagnification. Eating poisoned animals causes deformity known as minamata disease (first reported in 1952 due to eating of fish captured from Hg-contaminated minimata Bay of Japan) which is characterised by diarrhoea, hemolysis, impairment of various senses, numbness of lips, tongue, limbs, deafness, blurring of vision, mental dearrangement, meningitis and death.

87. D.D.T. is

- (a) not a pollutant
- (b) an antibiotic
- (c) a non-degradable pollutant
- (d) a biodegradable pollutant.

Answer and Explanation:

87. (c): DDT (dichloro diphenyl trichloroethane) is a non-biodegradable pesticide. It is persistent, fat soluble and shows biomagnification. So they are more harmful to higher tropic level organisms.

88. Which of the following organism is likely to have more concentration of D.D.T. in its body?

- (a) top carnivores
- (b) primary producers
- (c) herbivores
- (d) carnivores.

Answer and Explanation:

88. (a): DDT is fat soluble and persistent pesticide that shows biomagnification. It means that its concentration increase at each trophic level of food chain. Therefore top carnivores will have more concentration of toxic materials in their body.

89. Which of the following is pollution related disorder?

- (a) silicosis
- (b) pneumonicosis
- (c) fluorosis

(d) leprosis.

Answer and Explanation:

89. (c): Flourides are given out during refining of metals. Flourides cause flourosis. This is a pollution Telated disorder. When the level of flouride content in drinking water becomes as high as 3 to 12 mg/L, the water becomes polluted. It affects teeth as well as bones.

90. Energy transfer from one trophic level to other, in a food chain, is

(a) 10%

(b) 20%

(c) 1%

(d) 2%.

Answer and Explanation:

90. (a): Refer answer 67.

91. In 1984, Bhopal gas tragedy was caused due to leakage of

(a) potassium isocyanate

(b) methyl isocyanate

(c) sodium monoxide

(d) none of these.

Answer and Explanation:

91. (b): Bhopal gas tragedy occurred on 3 Dec 1984 in which a storage tank containing 36 tonnes of methyl isocyanate (MIC) burst in pesticide manufacturing plant of Union Carbide in Bhopal. MIC is one of the deadliest toxins which when inhaled even in very small dose can kill the animal. It is highly irritating to skin, eyes or mucus membrane and causes death by lung oedema. It is also a carcinogenic agent.

92. Which of the following is a secondary pollutant?

(a) PAN

(b) aerosol

(c) CO

(d) CO<sub>2</sub>

Answer and Explanation:

92. (a): Secondary pollutant is formed from a primary one through change or reaction. The secondary pollutants are more toxic than primary ones. Nitrogen oxides and hydrocarbons react photochemically to produce peroxyacyl nitrates and ozone. Peroxyacyl nitrates are produced due to photochemical reactions between nitrogen oxides and unsaturated hydrocarbons.

93. Which part of the world has a high density of organisms?

- (a) deciduous forests
- (b) tropical rain forests
- (c) grasslands
- (d) savannahs.

Answer and Explanation:

93. (b): Tropical forests are found in tropical zone of the world and are characterised by very high temperature with rainfall in abundance. The flora of tropical rain forest is very rich and highly diversified. The tropical forests have a very rich fauna both in density as well as in varieties. The reason for this high diversity and variety of flora and fauna is the occurrence of suitable conditions in these forests.

94. The maximum biomagnification would be in which of the following in case of aquatic ecosystem?

- (a) zooplanktons
- (b) phytoplanktons
- (c) fishes
- (d) birds.

Answer and Explanation:

94. (c): Pesticides sprayed over crops also pass into water bodies due to surface run-off. In excess they cause immediate and mass scale deaths of aquatic animals. Persistent pesticides (e.g. organochlorine or chlorinated hydrocarbons like DDT) pass into food chain and increase in amount per unit weight of organisms with the rise in trophic level due to their accumulation in fat.

The phenomenon is called biomagnification. e.g. 0.01-0.05 parts per billion in water, 25 parts per billion or 0.025 ppm in phytoplankton, 0.123 ppm in zooplankton, 1.04 ppm in clams and small fish, 4.83 ppm in predator fish and 124 ppm in fish eating birds like Sea Gulls. So the maximum biomagnification occurs in fishes in case of aquatic ecosystem.

95. Which of the following is the use of lichens in case of pollution?

- (a) they promote pollution
- (b) lichens are not related with pollution
- (c) they treat the polluted water
- (d) they act as bioindicators of pollutions.

Answer and Explanation:

95. (d): Lichens are bioindicators of air pollution. The algal symbiont of lichen is most vulnerable to  $\text{SO}_2$  pollution. The following chemical reactions take place during chlorophyll degradation of the phycobiont under the influence of  $\text{SO}_2$ .

96. Land mass occupied by forest is about

- (a) 30%
- (b) 60%
- (c) 11%
- (d) 22%.

Answer and Explanation:

96. (a): Land forms about  $\frac{1}{5}$  of the earth's surface. About 36.6% of the land area is covered by houses factories, roads, desert etc. And about 30% by forests, and about 22% meadows and only 11% land area is fit for tilling.

97. Which is the result of damage to relative biological effectiveness?

- (a) high temperature
- (b) pollution
- (c) radiation
- (d) low temperature.

Answer and Explanation:

97. (b): Pollution is any change in physical, chemical or biological characteristics of the environment that has the potentiality to harm human life, life of other desirable species, natural resources, cultural assets and industries. Another type of pollution is increase in CO<sub>2</sub> and other greenhouse gases and a decrease in stratospheric ozone on global scale which would be affecting air, water and land resources, biological diversity and human health. Thus pollution results in damage to biological effectiveness.

98. Which is the reason for highest biomass in aquatic ecosystem?

- (a) nano plankton, blue green algae, green algae
- (b) sea grass, and slime moulds
- (c) benthic and brown algae
- (d) diatoms.

Answer and Explanation:

98. (c): The benthic region includes all the sea floor from the wave-washed ashore-line to the greatest depths. Depending upon the penetration of light it is subdivided into two main zones: the lighted or littoral zone and the deep sea system. Due to abundance of light, water, oxygen, carbon dioxide and less salinity of water, the tidal zone is characterized by exorbitant growth of plants. The dense growth of vegetation, on the other hand, provides shelter and food for animals. A wide variety of algae, few grasses and animals of every phylum of animal kingdom are represented in this region.

99. What is the best pH of the soil for cultivation of plants?

- (a) 3.4 – 5.4
- (b) 6.5 – 7.5
- (c) 4.5 – 8.5
- (d) 5.5 – 6.5.

Answer and Explanation:

99. (d): Soil nature is described in pH values. It can be alkaline, acidic or neutral. Highly acidic and highly saline soil often remain injurious for plant growth, micro organisms etc. Soil pH strongly affects the microbial activities. Neutral or slightly acidic soil (5.5 -6.5) remain best for growth of majority of plants.

100. What is B.O.D.?

- (a) The amount of O<sub>2</sub> utilized by organisms in water
- (b) The amount of O<sub>2</sub> utilized by micro-organisms for decomposition
- (c) The total amount of P<sub>2</sub> present in water
- (d) All of the above.

Answer and Explanation:

100. (b): Strength of sewage or degree of water pollution is measured in terms of BOD (Biochemical Oxygen Demand) value. BOD may be defined as, 'number of milligrams of O<sub>2</sub> required for decomposition of one litre of waste or water by decomposing micro-organisms (bacteria)'.

101. What is the intensity of sound in normal conversation

- (a) 10-20 dB
- (b) 30-60 dB
- (c) 70-90 dB
- (d) 120-150 dB.

Answer and Explanation:

101. (b): Unit of sound level is decibel. As reference intensity, sound of noise level is taken as 100 dB. 10 dB is ten times the threshold intensity, 20 dB 100 times, 40 dB is 10<sup>4</sup>, 100 times the threshold intensity. Moderate conversation produces 60 dB sounds. Unwanted sound is noise and is therefore pollutant.

102. Plant decomposers are

- (a) monera and fungi
- (b) fungi and plants
- (c) protista and animalia
- (d) animalia and Monera.

Answer and Explanation:

102. (a): Microorganisms (bacteria and fungi) are decomposers of the ecosystem. They feed upon dead decaying living organisms (both plant and animals) and break them into simpler compounds. These are released free in the atmosphere and are utilized by producers for the synthesis of their food materials. They mainly belong to monera and fungi.

103. Which of the following is absent in polluted water?

- (a) Hydrilla
- (b) water hyacinth
- (c) larva of stone fly
- (d) blue green algae.

Answer and Explanation:

103. (c): Stone fly (plecoptera order) larva requires well aerated, non polluted water. It is absent in polluted water.

104. What is true for individuals of same species?

- (a) live in same niche
- (b) live in same habitat
- (c) interbreeding
- (d) live in different habitat.

Answer and Explanation:

104. (c): Species may be defined as the uniform interbreeding population of individuals which freely interbreed among themselves. Niche represents the habitat and functions of a species. Habitat is a specific place where an organisms lives.

105. Maximum green house gas released by which of the following country?

- (a) India
- (b) France
- (c) USA
- (d) Britain.

Answer and Explanation:

105. (c): Refer answer 64.

106. Which type of association is found in between entomophilous flower and pollinating agent:

- (a) mutualism
- (b) commensalism
- (c) cooperation
- (d) co-evolution.

Answer and Explanation:

106. (d): Co-evolution can occur in any interspecific relationship like symbiosis or mutualism. The relation between an entomophilous flower and pollinating insect shows co-evolved mutualism. In this the plant depends exclusively on the insect for pollination and the insect relies on the plant for food.

107. Two different species cannot live for long duration in the same niche or habitat. This law is

- (a) Allen's law
- (b) Gause's hypothesis
- (c) Dollo's rule
- (d) Weisman's theory.

Answer and Explanation:

107. (b): Interspecific competition is rivalry amongst members of different species. The severity of competition depends upon similarity in the requirement of food and shelter. Every type of organism has a particular niche; no two organisms can live in same niche. One of the two is eliminated. This phenomenon is called Gause hypothesis of competitive exclusion. Different organisms develop different types of variations in order to exploit niches, e.g. 14 species of Finches in Galapagos Islands.

Allen's law states that there is tendency of smaller extremities like ear, nose, tail etc in animals living in colder climate.

Weisman's germplasm theory was the ultimate blow-to discards lamarckism.

Dollo's law proposed that evolution is irreversible.

108. Bamboo plant is growing in a fir forest then what will be the trophic level of it?

- (a) first trophic level (T1)
- (b) second trophic level (T2)
- (c) third trophic level (T3)
- (d) fourth trophic level (T4).

Answer and Explanation:

108. (a): Trophic structure of ecosystem is a type of producer-consumer arrangement, in which each food level is called trophic level and the graphical representation of trophic structure of ecosystem constitutes ecological pyramids. The green plants are producers and represent the first trophic level (T1).

So bamboo plant is the first trophic level (T1).

109. Which type of association is found in between entomophilous flower and pollinating agent

- (a) mutualism
- (b) commensalism
- (c) co-operation
- (d) co-evolution

Answer and Explanation:

109. (d): Co evolution may be defined as, “evolution in two species that interact extensively with one another so that each acts as a major force of natural selection on the other”. When two species or two populations of a single species interact extensively, each exerts strong selective pressures on the other. When one evolves a new feature or modifies an old one, the other generally evolves new adaptations in response.

This constant, mutual feedback between two species is called co evolution. Animal-pollinated flowers must attract useful pollinators and frustrate undesirable visitors eating nectar or pollen without fertilizing the flower in return. The animals, in turn, have been under selective pressures to locate flowers quickly and identify the flowers that can provide them with sufficient nutrition in terms of nectar or pollen with minimum expenditure of energy. So that the entomophilous flower and the insects have coevolved.

110. Fluoride pollution mainly affects

- (a) brain

(b) heart

(c) teeth

(d) kidney

Answer and Explanation:

110. (c): Refer answer 58.

111. Escherichia coli is used as an indicator organism to determine pollution of water with

(a) heavy metals

(b) faecal matter

(c) industrial effluents

(d) pollen of aquatic plants

Answer and Explanation:

111. (b): Refer answer 68.

112. Mycorrhiza is an example of

(a) symbiotic relationship

(b) ectoparasitism

(c) endoparasitism

(d) decomposers

Answer and Explanation:

112. (a): In mutualism or symbiosis both the organisms in association are mutually benefitted and further this association is obligatory, i.e., necessary for existence of both organisms. Mycorrhiza is an example of symbiosis. It is an association between roots of higher plants and fungal hyphae. The fungal hyphae supply water and nutrients to the plant and in turn get food from the plant. So both the organisms are mutually benefitted.

113. Certain characteristic demographic developing countries are

(a) high fertility, low or rapidly falling rate, rapid population growth and age distribution

- (b) high fertility, high density, mortality rate and a very young age
- (c) high infant mortality, low fertility population growth and a very distribution
- (d) high mortality, high density, uneven growth and a very old age distribution.

Answer and Explanation:

113. (a): In developing countries the conditions are becoming better for survival of human beings. So the mortality rate or the number of individuals dying per unit of time is low.

Mortality or the average number of individuals produced by a population in a unit of time is high. So that there is rapid population growth and there are more individuals in the pre-reproductive age group. So there is young age distribution.

114. What is a keystone species?

- (a) a species which makes up only a small proportion of the total biomass of a community, yet has a huge impact community's organization and s
- (b) a common species that has plenty of biomass yet has a fairly low impact on the community organization
- (c) a rare species that has minimal impact on the biomass and on other species in the community
- (d) a dominant species that constitutes a large proportion of the biomass and which affects many other species.

Answer and Explanation:

114. (a): Keystone species are those species which has significant and disproportionately large influence on the community structure and characteristics. It has often considerably low abundance and biomass as compared to dominant species. Removal of such species causes serious disruption in structure and function of community.

115. Which of the following is expected to have the highest value (gm/m<sup>2</sup>/yr) in a grassland ecosystem?

- (a) secondary production
- (b) tertiary production
- (c) gross production (GP)
- (d) net production (NP)

Answer and Explanation:

115. (c): Productivity is rate of accumulation of energy containing organic matter by an ecosystem per unit area per unit time. It is of two types primary and secondary. Productivity at producer's level is known as primary productivity. It is two types. Gross primary productivity is primary productivity including that amount which is utilized in respiration and other metabolic activities. Net primary productivity (NPP) is primary productivity in excess to that which is utilised in respiration and other metabolic activities.

Secondary productivity is productivity at consumer's level. Since gross production includes total production including the amount utilized in respiration and other metabolic activities so it is more than other forms of productivity.

$$NP = GP - \text{Respiration}$$

116. In 1984, the Bhopal gas tragedy took place because methyl isocyanate

- (a) reacted with DDT
- (b) reacted with ammonia
- (c) reacted with CO<sub>2</sub>
- (d) reacted with water.

Answer and Explanation:

116. (d): Bhopal gas tragedy occurred on 3 Dec. 1984 in a Union Carbide pesticide plant. When water and MIC mixed, an exothermic chemical reaction started, which produced a lot of heat. As a result, the safety valve of the tank burst because of the increase in pressure. This burst was so violent that even the concrete around the tank also broke.

The high moisture content (aerosol) in the discharge while evaporating gave rise to a heavy gas which rapidly sank to the ground. It caused several of the following ailments like partial or complete blindness, disorders like, gastrointestinal disorders in many surviving people.

117. Lead concentration in blood is considered alarming if it is

- (a) 20 g / 100 ml
- (b) 30 g / 100 ml
- (c) 4 – 6 g / 100 ml
- (d) 10 g / 100 ml.

Answer and Explanation:

117. (b): Lead (Pb) is released by combustion of petrol as tetra ethyl lead is used as antiknock in petrol. This lead is very harmful and causes plumbism or lead poisoning, which disturbs nervous system, liver, kidneys in adults and also causes brain damage in children. About 150 to 400 mg of lead is stored in the body of an average adult and blood levels average about 25  $\mu\text{g}/100\text{ ml}$ . Increase to 70  $\mu\text{g}/100\text{ ml}$  of blood is generally associated with clinical symptoms. Hence a level of 30  $\mu\text{g}/100\text{ ml}$  should be considered alarming.

118. In which one of the following pairs is the specific characteristic of a soil not correctly method?

- (a) Laterite – contains aluminium compound
- (b) Terra rosa – most suitable for roses
- (c) Chernozems – richest soil in the world
- (d) black soil – rich in calcium carbonate.

Answer and Explanation:

118. (d): Black soil forms the largest group. It is developed mainly on the Deccan traps of Maharashtra, Madhya Pradesh and Kathiawar. Because of its hydrology and climatic conditions of the environment, the medium and deep black soils are very suitable for cotton cultivation. Laterite soil is rich in insoluble iron oxides and aluminium compounds, which gives laterites a reddish appearance. Chernozems are rich in nutrients (due to abundant organic rich compounds) and consequently the most fertile in the world.

119. An ecosystem which can be easily damaged but can recover after some time if damaging effect stops will be having

- (a) low stability and high resilience
- (b) high stability and low resilience
- (c) low stability and low resilience
- (d) high stability and high resilience.

Answer and Explanation:

119. (a): Stability can be defined as the power of a system to be in their state against unfavourable factors and resilience is the capability of regaining its original shape or position after being deformed. An ecosystem can be damaged easily and it must be having high resilience.

120. The maximum growth rate occurs in

(a) stationary phase

(b) senescent phase

(c) lag phase

(d) exponential phase.

Answer and Explanation:

120. (d): Maximum growth rate occurs in exponential or acceleration or log phase. The point at which the exponential growth begins to slow down is known as inflexion point.

121. Common indicator organism of water pollution is

(a) Lemna pancicostata

(b) Eichhornia crassipes

(c) Escherichia coli

(d) Entamoeba histolytica.

Answer and Explanation:

121. (c): Refer answer 68.

122. In which one of the following habitats does the diurnal temperature of soil surface vary most?

(a) shrub land

(b) forest

(c) desert

(d) grassland.

Answer and Explanation:

122. (c): Deserts are places where the diurnal temperatures vary greatly. It is extremely hot during the day time and very cold at night. This change in temperature also affects the temperature condition of the soil.

123. In your opinion, which is the most effective way to conserve the plant diversity of an area?

- (a) by tissue culture method
- (b) by creating biosphere reserve
- (c) by creating botanical garden
- (d) by developing seed bank.

Answer and Explanation:

123. (b): Biosphere reserves are multipurpose protected areas of different representative ecosystems which are meant for conservation of biodiversity or wild-life, traditional life tyle of tribals and their domesticated animals and also plant resources. Each biosphere reserve has a core zone (where no human activity is allowed), a buffer zone (with limited human activity) and manipulation zone (where human activity is allowed without degradation of ecology.

Thus the biosphere reserves protect not just wild varieties ies but also domesticated varieties of plants of an area.

124. Prolonged liberal irrigation of agricultural fields is likely to create the problem of

- (a) acidity
- (b) aridity
- (c) salinity
- (d) metal toxicity.

Answer and Explanation:

124. (c): Irrigation induced salinity can arise as a result of the use of any irrigation water, irrigation of saline water etc. combined with inadequate leaching. Since all surface and ground water contains salts to varying degrees, irrigation is often seen as the primary culprit for bringing salts into the field.

125. Which one of the following is not used for disinfection of drinking water?

- (a) chlorine
- (b) ozone
- (c) chloramine
- (d) phenyl.

Answer and Explanation:

125. (d): In a sewage efficient treatment plant (CETP) during the tertiary treatment the decreased water is chlorinated with chlorine or perchlorate salts, ozonised or irradiate with UV to kill pathogens. Phenyl is not used for disinfection of drinking water.

126. Which of the following is not true for a species?

- (a) members of a species can interbreed
- (b) gene flow does not occur between the populations of a species
- (c) each species is reproductively isolated from every other species
- (d) variations occur among members of a species.

Answer and Explanation:

126. (b): Species may be defined as an uniform interbreeding population or group of individuals which freely interbreed among themselves. Gene flow occurs between populations of a species by gene migration i.e., emigration and immigration.

127. Identify the correctly matched pair:

- (a) Basal convention – Biodiversity conservation
- (b) Kyoto protocol – Climatic change
- (c) Montreal protocol – Global warming
- (d) Ramsar convention – Ground water pollution

Answer and Explanation:

127. (b): Kyoto protocol occurred in Dec 1997. International conference held in Kyoto, Japan obtained comments from different countries for reducing overall greenhouse gas emissions at a level 5% below 1990 level by 2008-2012.

128. More than 70% of worlds freshwater is contained in

- (a) polar ice
- (b) glaciers and mountains
- (c) Antartica
- (d) Greenland.

Answer and Explanation:

128. (a): Nearly about 97% of the earth's water is saline in the oceans and seas. 3% of the earth's water is locked up on the polar ice caps. 85% of the frozen freshwater is in the Antarctic ice cap, 15% of the frozen freshwater is in the northern polar ice cap and glaciers.

129. At which latitude, heat gain through insolation approximately equals heat loss through terrestrial radiation?

(a) 22 1/2° North and South

(b) 40° North and South

(c) 42 1/2° North and South

(d) 66° North and South.

Answer and Explanation:

129. (b): Earth does not receive equal radiation at all points. The east west rotation of earth provides equal exposure to sunlight but latitude and dispersion do affect the amount of radiation received. The poles receive far less radiation than equator. This uneven heating is called differential insolation. At 40° North and South, approximately the heat gain is equal to heat loss through terrestrial radiation.

130. Animals have the innate ability to escape from predation. Examples for the same are given below. Select the incorrect example.

(a) colour change in chameleon

(b) enlargement of body size by swallowing air in puffer fish

(c) poison fangs in snakes

(d) melanism in moths.

Answer and Explanation:

130. (c): Colour change in chameleon and melanism in moths are examples of camouflage in animals adapted to prevent predation from prey. As a defence mechanism puffers have the ability to inflate rapidly, filling their extremely elastic stomach with water (or air) until they are almost spherical. This prevents them from being identified by the predator. But poison fangs in snakes are a method adopted for preying and not escaping predation.

131. Which one of the following pairs is mismatched?

(a) fossil fuel burning – release of CO<sub>2</sub>

- (b) nuclear power – radioactive wastes
- (c) solar energy – greenhouse effect
- (d) biomass burning – release of CO<sub>2</sub>.

Answer and Explanation:

131. (c): Due to heavy industrialization and transportation (modernization), CO<sub>2</sub> concentration is increasing day by day in the atmosphere. CO<sub>2</sub> has capacity for absorbing heat radiations and thus increases temperature. This increase in global temperature (global warming) is mainly due to CO<sub>2</sub> concentration is called green house effect. Complete combustion of fossil fuels and biomass releases carbon dioxide. Nuclear power plants releases radioactive wastes.

132. Which one of the following pairs is mismatched?

- (a) Tundra
- (b) Savanna
- (c) prairie
- (d) coniferous forest

Answer and Explanation:

132. (c): A biome is a major terrestrial community characterized by a distinct climate and inhabited by a particular species of plants and animals. Tundra is characterized by precipitation of less than 25 cm annually. Permafrost or permanent ice is found about a meter down from the surface; it never melts and is impenetrable to both water and roots.

Savannahs are open grasslands with scattered shrubs and trees. Coniferous forest contains evergreen trees. In these forests all plants do not shed their leaves at the same time hence forest remains always evergreen. But prairies is grassland and epiphytes and ephemerals are found in deserts.

133. Biodiversity Act of India was passed by the Parliament in the year.

- (a) 1992
- (b) 1996
- (c) 2000
- (d) 2002.

Answer and Explanation:

133. (d): The biological Act provides for conservation of biological diversity, sub sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected there with or incidental there to. The biological act of India was passed in 2002. This act of parliament received the assent of President of India on the 5th February 2003.

134. Which of the following is considered a hot-spot of biodiversity in India?

- (a) Aravalli hills
- (b) Western ghats
- (c) Indo-gangetic plain
- (d) Eastern ghats

Answer and Explanation:

134. (b): Hot-spot are areas with high density of biodiversity or megadiversity which are also the most threatened ones. Hot spots are determined by four factors, (i) Number of species/species diversity, (ii) Degree of endemism. (iii) Degree of threat to habitat due to its degradation and fragmentation (iv) Degree of exploitation. India has two hotspots-North-East Himalayas and Western Ghats.

Western Ghats occur along the western cost of India for a distance of about 1600 km in Maharashtra, Karnataka, Tamil Nadu and Kerala extending over to Srilanka.

135. Limit of BOD prescribed by Central Pollution Control Board for the discharge of industrial and municipal waste waters into natural surface waters, is

- (a) < 30 ppm
- (b) < 3.0 ppm
- (c) < 10 ppm
- (d) < 100 ppm

Answer and Explanation:

135. (a): Strength of sewage of degree of water pollution is measured in terms of BOD (Biological oxygen demand) value. BOD may be defined as, 'number of milligrams of O<sub>2</sub> required for decomposition of one litre of waste or water by decomposing micro-organisms (bacteria)'. According to central pollution control board, limit of BOD prescribed is 30 ppm (mg/d) for 3 days at 27° C.

136. Which one of the following is not used for construction of ecological pyramids?

- (a) fresh weight
- (b) dry weight
- (c) number of individuals
- (d) rate of energy flow

Answer and Explanation:

136. (a): Ecological pyramids represents the trophic structure and trophic function of an ecosystem. In an ecological pyramid, the first trophic level forms the base and successive trophic levels the tiers which make up the apex. Ecological pyramids may be of three general type's pyramid of number, pyramid of biomass and pyramid of energy.

Pyramid of biomass i.e. the living weight of the organisms of the food chain present at any time in an ecosystem forms the pyramids of biomass. The pyramid of biomass indicates the decrease or the gradual reduction in biomass at each trophic level from base to apex. Fresh weight is not used in ecological pyramids.

137. Niche overlap indicates

- (a) mutualism between two species
- (b) active cooperation between two species
- (c) two different parasites on the same host
- (d) sharing of one or more resources between the two species (2006)

Answer and Explanation:

137. (d): Niche/ecological niche is specific part of habitat occupied by individuals of a species which is circumscribed by its range of tolerance, range of movement, microclimate, type of food and its availability, shelter, type of predator, and timing of activity. A habitat has several ecological niches and supports a number of species.

An ecological niche is used by a single species. Two or more species cannot use the same niche despite having a mutualistic association. Organisms or populations in competition have a niche overlap of a limited resource for which they compete.

Both owl and cat feed on shrews and mice. They occupy the same niche because of being ecological equivalents though their habitats are different.

138. Photochemical smog pollution does not contain

- (a) PAN (peroxy acyl nitrate)
- (b) ozone
- (c) nitrogen dioxide
- (d) carbon dioxide

Answer and Explanation:

138. (d): Photochemical smog is grey or yellow brown opaque smog having oxidising environment with little smoke. Photochemical smog contains secondary pollutants or photochemical oxidants. It was first reported over Los Angeles in 1940s. Photochemical smog is formed at high temperature over cities and towns due to still air, emission of nitrogen oxides and carbohydrates from automobile exhausts and solar energy.

Nitrogen dioxides split into nitric oxide and nascent oxygen. Nascent oxygen combines with molecular oxygen to form ozone. Ozone reacts with carbohydrates to form aldehydes and ketones. Nitrogen oxides, oxygen and ketones combine to form peroxy-acyl-nitrates (PAN). In areas with intense solar radiations, photochemical smog forms brown air.

139. In which one of the following the BOD (Biochemical Oxygen Demand) of sewage (S), distillery effluent (DE), paper mill effluent (PE) and sugar mill effluent (SE) have been arranged in ascending order?

- (a)  $SE < PE < S < DE$
- (b)  $PE < S < SE < DE$
- (c)  $S < DE < PE < SE$
- (d)  $SE < S < PE < DE$ .

Answer and Explanation:

139. (b): The BOD of the given pollutants in ascending order is  $PE < S < SE < DE$

140. In a coal fired power plant electrostatic precipitators are installed to control emission of

- (a)  $NO_x$
- (b) SPM
- (c) CO

(d) SO<sub>2</sub>.

Answer and Explanation:

140. (b): SPM is suspended particulate matter which is less than 10 p.m remaining in air for more than one day to several weeks. It includes aerosol, dust, mist, smoke, soot etc.

141. Geometric representation of age structure is a characteristic of

(a) population

(b) landscape

(c) ecosystem

(d) biotic community.

Answer and Explanation:

141. (a): Population has several characteristics or attributes which are a function of the whole group and not of individual. Age distribution is one of them that is the number or the percentage of individuals in a population in different age groups. This is represented geometrically in the form of age pyramid.

142. The population of an insect species shows an explosive increase in numbers during rainy season followed by its disappearance at the end of the season. What does this show?

(a) the food plants mature and die at the end of the rainy season

(b) its population growth curve is of J-type

(c) the population of its predators increases enormously

(d) S-shaped or sigmoid growth of this insect.

Answer and Explanation:

142. (b): J-shape of growth pattern can be easily observed in algae blooms, some insects, annual plants and the lemmings of Tundra. In the beginning density of the population increases rapidly in compound interest fashion and then stops abruptly as the environmental resistance or other limiting factors become effective. These factors may be food, space, seasonal (frost, excessive rain etc.) or the termination of reproduction session.

143. Which one of the following statements is correct?

(a) Both Azotobacter and Rhizobium fix atmospheric nitrogen in root nodules of plants.

- (b) Cyanobacteria such as Anabaena and Nostoc are important mobilizers of phosphates and for plant nutrition in soil
- (c) At present it is not possible to grow maize without chemical fertilizers
- (d) Extensive use of chemical fertilizers may lead to eutrophication of nearby water bodies.

Answer and Explanation:

143. (d): Eutrophication is the phenomenon of nutrient enrichment of a water body that initially supports a dense growth of plants and animals. It is caused by runoff from fertilized fields, suburban lawns, detergent rich sewage; Eutrophication is caused by the increase in an ecosystem of chemical nutrients, typically compounds containing nitrogen and phosphorus.

It may occur on land or in water, although traditionally thought of as enrichment of Aquatic systems by addition of fertilizers into lakes, bays or other semi-enclosed waters terrestrial ecosystems are subject to similarly adverse impacts, eg cause of algal blooms.

Increased content of nitrates in soil frequently leads to undesirable changes in vegetation composition and many plant species are endangered as a result of eutrophication in terrestrial ecosystems, e.g., majority of orchid species in Europe.

144. If the mean and the median pertaining to a certain character of a population are of the same value, the following is most likely to occur

- (a) a bi-modal distribution
- (b) a T-shaped curve
- (c) a skewed curve
- (d) a normal distribution.

Answer and Explanation:

144. (d): If the mean and the median pertaining to a certain character of a population are of the same value a normal distribution is most likely to occur.

145. A high density of elephant population in an area can result in

- (a) intra specific competition
- (b) inter specific competition
- (c) predation on one another
- (d) mutualism.

Answer and Explanation:

145. (d): Competition is rivalry for obtaining the same resource. Competition is of two types, intraspecific and interspecific. Intraspecific competition is the competition amongst members of the same species for a common resource.

It may be for food, space, and mate. So if the density of elephant population in an area increases, it will lead to intraspecific competition. This will lead to the establishment of territories in elephants which will result in pushing out of the extra number securing shelter, mate and food for the rest.

146. Which one of the following ecosystem types has the highest annual net primary productivity?

- (a) tropical deciduous forest
- (b) temperate evergreen forest
- (c) temperate deciduous forest
- (d) tropical rain forest.

Answer and Explanation:

146. (d): Net primary productivity is the total organic matter stored by producers per unit area per unit time. Gross primary productivity is the total organic matter synthesized by producers in the process of photosynthesis per unit area per unit time. So

Net primary productivity = Gross productivity – Respiration and other losses.

Tropical rain forests occur over equatorial/subequatorial regions with abundant warmth and rainfall. Diversity and productivity are maximum as compared to other regions.

147. Which one of the following pairs of organisms are exotic species introduced in India?

- (a) Lantana camara, water hyacinth
- (b) water hyacinth, Prosopis cineraria
- (c) Nile perch, Ficus religiosa
- (d) Ficus religiosa, Lantana camara.

Answer and Explanation:

147. (a): As opposed to native species, which are indigenous and found naturally in an environment, animals and plant species introduced from other countries and which are not otherwise found local are termed exotic. These introduced or exotic species can adversely affect the ecosystem.

In India, large varieties of exotic animal and plant species have been introduced from other parts of the world through the ages. Some exotic plants have turned into weeds, multiplying fast and causing harm to the ecosystem, e.g. water hyacinth and Lantam camara. Water hyacinth was introduced in Indian waters to reduce pollution. It has clogged water bodies including wetlands at many places resulting in death of aquatic orgnisms.

148. Which one of the following is not a bioindicator of water pollution?

- (a) blood-worms
- (b) stone flies
- (c) sewage fungus
- (d) sludge-worms.

Answer and Explanation:

148. (b): Some plants and animals act as the measure of existing environmental conditions because of their response to these conditions. The organisms are called bioindicators. From the given options, stone flies do not act as bioindicator of water pollution.