Ecosystem Important Questions With Answers

NEET Biology 2023

1. In grass-deer-tiger food chain, grass biogass is one tonne. The tiger biomass shall be _____.
   a) 100 kg **b) 10 kg** c) 200 kg d) 1 kg

   Solution : -
   According to 10% law of Lindemann, if I tonne (1000 kg) biomass is present in grass, only 10% of it means 100 kg will go into deer and in tiger the biomass will be only 10 kg, i.e. 10% of deer's biomass.

2. Organisms which are associated with first as well as third trophic level are
   a) macrophytes b) phytoplanktons c) chemoautotrophs **d) insectivorous plants**

   Solution : -
   Trophic level is a functional level. A single species may occupy more than one trophic level. Insedivorous plants are producers, occupying first trophic level. They also eat insects and thus, occupy third trophic level also.

3. Among the following, where do you think the process of decomposition would be the fastest?
   a) Tropical rainforest b) Antarctic c) Dry arid region d) Alpine region

   Solution : -
   Tropical rainforests have the optimum conditions of moisture and temperature. Consequently, the rate of decomposition in tropical rain forests is also high.

4. During the process of decomposition:
   a) CO_2 is consumed and O_2 is released **b) O_2 is consumed and CO_2 is released**
   c) CO_2 is consumed and H_2O is released d) none of these

   Solution : -
   Decomposition is the process that concerns breakdown of complex organic matter by decomposers to inorganic raw materials like carbon dioxide, water and various nutrients. Oxygen is required by aerobic bacteria for decomposition.

5. During ecological succession: _____.
   a) the establishment of a new biotic community is very fast in its Primary Phase.
   b) the numbers and types of animals remain constant.
   c)
   the changes lead to a community that is in near equilibrium with the environment and is called pioneer community.
   d) the gradual and predictable change in species composition occurs in a given area.

   Solution : -
   During ecological succession, the gradual and predictable change in species composition occurs in given area. During ecological succession, some species colonise and their population increases whereas population of other species decline or even eliminated from that area.

6. For net primary productivity energy captured is

a) 1-5% of incident radiation b) 2 - 5% of PAR **c) 0.8 - 4% of incident radiation** d) 2 - 10% of PAR

7. What is the amount of average price tag on nature's life support services determined by Robert Constanza and his colleagues?
   a) US $ 3 trillion a year b) US $ 13 trillion a year c) US $ 23 trillion a year **d) US $ 33 trillion a year**

8. Increase in concentration of the toxicant at successive trophic levels is known as : _____.
   a) Biodeterioration b) Biotransformation c) Biogeochemical **d) Biomagnification**

   Solution : -
   Increase in concentration of the toxicant at successive trophic levels is known as biomagnifications. Biomagnification is the process of accumulation of toxicant such as the pesticide or metal in successive tropic levels and it is maximum in highest tropic level.

9. In an ecosystem, which one shows one-way passage
   a) free energy b) carbon c) nitrogen d) potassium

   Solution : -
   The flow of energy in any ecosystem is unidirectional. The only source of energy is sunlight. It gets trapped by producers then it flows from herbivores to carnivores or consumers at different trophic level.

10. Pyramid of numbers is
    a) always upright b) always inverted **c) either upright or inverted** d) neither upright nor inverted

    Solution : -
    Ecological pyramids are pictorial representation of relationship between organisms at different trophic levels, regarding energy, biomass or number. Pyramid of numbers can be either upright or inverted. For example, in a grassland ecosystem, pyramid of number will be upright because number of primary consumers are less than primary producers and that of secondary consumers are less than primary consumers and so on. On the other hand, in a parasitic food chain the pyramid of number will be inverted.

11. Match the trophic levels with their correct species examples in grassland ecosystem.

Column I	Column - II
(a) Fourth trophic level	(i) Crow
(b) Second trophic level	(ii) Vulture
(c) First trophic level	(iii) Rabbit
(d) Thirdhophic level	(iv) Grass

    a) (iv) (iii) (ii) (i) b) (i) (ii) (iii) (iv) **c) (ii) (iii) (iv) (i)** d) (iii) (ii) (i) (iv)

    Solution : -
    (a) Fourth trophic level (ii) Vulture
    (b) Second trophic level (iii) Rabbit
    (c) First trophic level (iv) Grass
    (d) Third trophic level (i) Crow

12. In a terreskial ecosystem such as forest, maximum energy is in which trophic level?
    a) T_1 b) T_2 c) T_3 d) T_4

    Solution : -
    There is 90% loss of energy at every trophic level. Therefore, maximum energy is at T_1 level.

13. Pick up the correct food chain.
    a) Grass→ Chameleon → Insect → Bird b) Grass → Fox → Rabbit → Bird
    c) Phytoplankton → Zooplankton → Fish d) Fallen leaves → Bacteria → Insect larvae

    Solution : -

The correct food chain is: Phytoplankton → Zooplankton → Fish

i.e. Producers → Primary consumer → Secondary consumer.

14. Out of the total proposed cost of various ecosystem services, cost of climate regulations and habitat for wildlife are

    a) 50% b) 10% **c) 6%** d) 25%.

    Solution : -

    Robert Constanza and his colleagues have put the value of ecosystem services to 33 trillion dollars a year. Out of which 50% is proposed for formation of soil, prevention of flood and mitigating droughts. The value of 10% each for nutrient cycle and recreation and 6% for climate regulation and habitat preservation for wild flora and fauna has been proposed.

15. If producer is a large tree that supports a number of herbivorous animals which are further attacked by ectoparasites, the pyramid of number shall be

    a) Inverted b) Upright c) Irregular d) Spindle shaped

16. The plant which bears clinging roots is _____.

    a) podostemon **b) orchid** c) Trapa d) Screwpine

    Solution : -

    Clinging roots are modified adventitious roots meant for providing mechanical support. These arise from the axils of leaves or nodes of the stem and pierce the substratum plant to facilitate fixation e.g. orchids, ivy.

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

    a) Forest b) Desert c) Mountain **d) Ocean**

    Solution : -

    Oceanic biome or ecosystem occupies more than two-thirds of the earth's surface. This is the most stable ecosystem.

18. The slow rate of decomposition fallen logs is due to :

    a) Poor nitrogen content b) Anaerobic environment c) Low cellulose content **d) Low moisture content**

    Solution : -

    The cellulose content in the fallen log is high and the environment around the fallen logs is aerobic due to the presence of oxygen

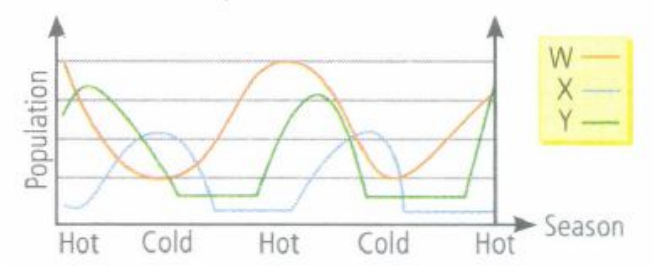
19. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by : _____.

    a) Xanthophyll b) Carotene c) Cytochrome **d) Leghemoglobin**

    Solution : -

    During biological nitrogen fixation, inactivation of nitrogenise by oxygen poisoning is prevented by leghaemoglobin. Leghaemoglobin acts as a oxygen scavenger. It combines rapidly with oxygen and thus no harm to nitrogenase.

20. The graph given below shows the variations in the populations of producers, primary consumers and secondary consumers as well as the amount of dissolved mineral salts in a pond.



Which one of the following correctly matches each graph?

a)

Producer population	Primary consumer population	Secondary consumer population
X	Y	W

b)

Producer population	Primary consumer population	Secondary consumer population
W	X	Y

c)

Producer population	Primary consumer population	Secondary consumer population
W	**Y**	**X**

d)

Producer population	Primary consumer population	Secondary consumer population
X	W	Y

21. Edaphic factor refers to

a) water **b) soil** c) relative humidity d) altitude

Solution : -

Edaphic factors are classified under the abiotic factors affecting an ecosystem. Edaphic factors include factors of soil, e.g., soil texture, substratum, topography, mineral composition, pH, etc. These factors can influence the distribution and interrelationships of organisms, as well as rate of decomposition

22. Productivity is the rate of production of biomass expressed in terms of

(i) (kcal m^{-3})yr^{-1}

(ii) $g^{-2}yr^{-1}$

(iii) $g^{-1}yr^{-1}$

(iv) (kcal m^{-2})yr^{-1}

a) (ii) b) (iii) **c) (ii) and (iv)** d) (i) and (iii)

Solution : -

(None of the options is correct): The rate of synthesis of energy containing organic matter or biomass by any trophic level per unit area in unit time is described as its productivity. It is measured as weight (e.g., g/m^2/yr) or energy (e.g., Kcal/m^2/yr). Hence, only unit (iv) is correct.

23. **Assertion:** The loss of biologically useful energy as heat with every energy transfer in a food chain is a consequence of the second law of thermodynamics.

Reason: Energy does not remain trapped permanently in any organism, it is either passed on to higher trophic level or becomes available to detritivores and decomposers after the organism dies.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. d) If both assertion and reason are false

Solution : -

According to second law of thermodynamics, every activity involving energy transformation is accompanied by dissipation of energy. In other words, the loss of biologically useful energy as heat with every energy transfer in a food chain is a consequence of the second law of thermodynamics. Every time energy is transferred from one place to another or transformed from one kind to another, some of it is converted into heat. An organism transfers chemical energy from glucose or fatty acids to ATP (cellular respiration) and then to the chemical bonds of new molecules (during molecular synthesis), and transforms chemical energy into active transport of molecules, muscle contractions, and a variety of other activities, which are essential to life. Because every living organism continuously converts chemical energy into heat, there is always a loss of chemical energy with each step in a food chain. Energy does not remain trapped permanently in any organism. It is either passed on to the higher trophic level or becomes available to detrivores and decomposers after the organism dies. Death of organism is the beginning of the detritus food chain/web.

24. Amount of living material and nutrients present in different trophic levels and soils at any given time are called respectively
    a) Standing sate and standing crop **b) Standing crop and standing state**
    c) Standing state and standing quality d) Biomass and standing crop

25. The annual net primary productivity of the whole biosphere is approximately
    a) 150 billion tons b) 160 billion tons **c) 170 billion tons** d) 180 billion tons

    Solution : -
    The annual net primary productivity of the whole biosphere is approximately 170 billion tons. Out of this, oceans contribute 55 billion tons.

26. Earth is a/an
    a) Open system b) Closed system **c) Both (1) & (2)** d) None of these

27. Mr. X is eating curd/yoghurt. For this food intake in a food chain he should be considered as occupying
    a) first trophic level b) second trophic level **c) third trophic level d) fourth trophic level.**

    Solution : -
    Mr. X eating curd/yoghurt should be considered as occupying third trophic level. Producers or green plants (first trophic level) are consumed by herbivores (second trophic level) and from them curd/yoghurt (made from dairy breed) is consumed by third trophic level organisms like man.

28. An orderly sequence of community development on an area is called
    a) Succession b) cover c) Establishment d) Diversity

29. Percentage of photosynthetically active radiation (PAR) that is captured by plants in synthesis of organic matter is:
    a) 50-70% b) 30-40% c) 80-100% **d) 2-10%.**

    Solution : -
    About 1-5% of incident solar energy or 2-10% of PAR is captured by the photosynthetic organisms for the synthesis of organic matter (Gross primary productivity). Roughly 20% of it is consumed in respiration so that net capture of energy (net primary productivity) is 0.8-4% of incident radiation or 1.6-8% of PAR.

30. Among the following biogeochemical cycles, which one does not have losses due to respiration?
    a) Phosphorus b) Nitrogen c) Sulphur **d) All of the above**

    Solution : -
    Phosphorus, nitrogen, and sulphur do not loss due to respiration because they are not particularly involved in gaseous exchange.

31. **Assertion:** Temperature and soil moisture are the important climatic factors that regulate the process of decomposition.
    Reason: Warm and moist environment favours decomposition whereas low temperature and anaerobiosis inhibit decomposition.
    a) If both assertion and reason are true and reason is the correct explanation of assertion.
    b) If both assertion and reason are true but reason is not the correct explanation of assertion.
    c) If assertion is true but reason is false. d) If both assertion and reason are false

    Solution : -
    Decomposition is largely an oxygen-requiring process. The rate of decomposition is controlled by chemical composition of detritus and climatic factors. Temperature and soil moisture are the most important climatic factors that regulate decomposition through their effects on the activities of soil microbes. Warm and moist environment

favour decomposition whereas low temperature and anaerobiosis (due to excessive moisture) inhibit decomposition resulting in build up of organic materials.

32. The term ecosystem was coined by _____.
a) E.P. Odum **b) A.G Tansley** c) E.Haeckel d) E. Wanning

Solution : -
Sir A.G. Tansley was an English botanist and a pioneer in the science of ecology who coined the term ecosystem.

33. Which of the following is most important in water cycle?
a) Transpiration through leaves **b) Evaporation from the oceans** c) Percolation of water into the ground
d) Absorption of capillary water by plants

Solution : -
Evaporation from the oceans is the most important in water cycle, because it comprises of the major part of global water cycle.

34. The function of reservoir pool is to meet with the deficit of nutrient that occurs due to
a) imbalance in rate of efflux and influx of nutrients b) only efflux of nutrients c) ceased nutrient cycle
d) none of these

35. **Assertion:** The process of nitrification involves the decomposition of proteins of dead plants and animals, and nitrogenous wastes like urea, uric acid, etc. of animals to ammonia.
Reason: Nitrogen cycle is a sedimentary cycle.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. **d) If both assertion and reason are false.**

Solution : -
The process of decomposition of proteins of dead plants and animals, and nitrogenous wastes like urea, uric acid etc., of animals to ammonia is referred to as ammonification. Ammonification is a part of nitrogen cycle. Nitrogen cycle is a type of gaseous nutrient cycle.

36. The pyramid which cannot be inverted in a stable ecosystem is that of _____.
a) biomass b) number **c) energy** d) A11 of the above

Solution : -
Pyramid of energy is graphic representation of amount of energy trapped per unit time and area in different trophic levels of a food chain with producers forming the base and top carnivores or consumers the tip. It is always upright in shape.

37. Match column I with column II and select the correct option from the given codes

Column I	Column II
A. Artemisia tridentata	(i) Grows better in overgrazed area
B. Capparis spinosa	(ii) Dominate in areas destructed by fires
C. Pteris aquilina and Pyronema	(iii) Indicates intense soil erosion
D. Amaranthus and Chenopodium	(iv) Saline soils

a) A-(i), B-(ii), C-(iii), D-(iv) b) A-(ii), B-(iii), C-(iv), D-(i) c) A-(iii), B-(i), C-(ii), D-(iv)
d) A-(iv), B-(iii),C-(ii), D-(i)

38. The slow rate of decomposition of fallen logs in nature is due to the _____.
a) low moisture content b) poor nitrogen content c) anaerobic environment around them
d) low cellulose content

Solution : -

The slow rate of decomposition of fallen logs in nature is due to their low moisture content. The microorganisms are involved in decomposition of complex compounds of dead protoplasm of producers and consumers absorb some of the decomposition products and release simple substances. In fallen logs, amount of cellulose is high. The environment around the fallen logs is aerobic i.e. O_2 is Present.

39. **Assertion:** Herbivores are also called as key industry animals because they convert plant matter into animal matter.
Reason: Decomposers play a pivotal role in the ecosystem and they indirectly support the producers.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false d) If both assertion and reason are false

Solution : -
According to Elton (1939), herbivorous animals are key industry animals as they convert plant matter into animal matter and all other consumers' (higher animals') lives are dependent upon these primary consumers. Decomposers (also called as transformers) transform organic compounds into simple inorganic compounds. Saprophytic fungi and bacteria belong to this category. They act upon dead bodies of plants and animals and decompose them to their elemental stage. These in turn can be used by producers for their growth and photosynthetic activity. In this way, decomposers indirectly support the producers and play a pivotal role in ecosystem.

40. **Assertion:** Oceans are a low productivity ecosystems despite occupying about 70% of the earth's surface.
Reason: In aquatic ecosystems, productivity is limited by light which decreases with increasing water depth.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false

Solution : -
Productivity levels of an ecosystem depend upon plant species inhabiting a particular area, their photosynthetic capacity, availability of nutrients, sunlight, moisture and a variety of other environmental factors. The annual net primary productivity of the whole biosphere is approx. 170 billion tons (dry weight) of organic matter. Of this, despite occupying about 70% of earth's surface, oceans contribute only 32% of the total productivity (55 billion tons out of 170 billion tons). Thus, oceans are a low productivity ecosystems. It is because in oceans, productivity is limited by light which decreases with increasing water depth.

41. Gross primary productivity is
a) Rate at which organic molecules are formed in an autotroph
b) Rate at which organic molecules are used up by autotroph
c) Storage of organic molecules in the body of an autotroph
d) Rate at which organic molecules are transferred to next higher trophic level

42. A food web
a) Decreases variety of food but increases quantity of food at each trophic level
b) Increases variety as well as quantity of food at each trophic level
c) Increases variety of food at each trophic level d) Can be depicted by ecological pyramid

43. During the stages of succession in a given ecosystem, the following changes in characteristics may be observed.

	Characteristic	Stages in ecosystem development	
		Early	Late
A.	Total organic matter	Low	High
B.	Species diversity	Low	High

C.	Size of organism	Small	Large
D.	Productivity	Low	High
E.	Food chains	Short	Long

Which one of the characteristics, A, B, C, D or E is responsible for the apparent high degree of stability associated with a climax ecosystem?

a) B b) D c) A d) E

Solution : -

High species diversity is the most important factor in bringing stability to a climax ecosystem.

44. Study the following statements regarding food chains and select the correct ones.
(i) Removal of 80% tigers from an area resulted in greatly increased growth of vegetation.
(ii) Removal of most of the carnivores resulted in an increased population of deers.
(iii) The length of food chains is generally limited to 3-4 trophic levels due to energy loss.
(iv) The length of food chains may vary from 2 to 8 trophic levels.
a) (i) and (ii) **b) (ii) and (iii)** c) (i) and (iii) d) (iii) and (iv)

45. **Assertion:** In nature, the recycling of carbon is essentially a self-regulating feedback system.
Reason: The reservoir pool of carbon consists of free CO_2 in the atmosphere.
a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. d) If both assertion and reason are false

Solution : -

Biogeochemical cycle of carbon is a gaseous cycle. Its cycling pool consists of 6 x 1014 kg (29%) of free CO_2 in the atmosphere and 1.45 x 1015 kg (71%) of dissolved CO_2 in the oceans. Oceans also regulate the amount of CO_2 in the atmosphere. Reservoir pool of carbon is lithosphere. Lithosphere contains 2.8 x 1021 kg of carbon. Natural exchange between lithosphere and hydrosphere or atmosphere is a very slow process. Major exchange in carbon cycle occurs between organisms and the atmosphere or hydrosphere. This cycling is a self-regulated feedback system but has recently been upset due to rapid deforestation and increasing combustion of fossil fuels.

46. Which is a functional aspect of ecosystem?
a) Productivity b) Species composition c) Diversity d) Life cycle

47. Climax community is in a state of
a) non-equilibrium **b) equilibrium** c) disorder d) constant change

48. Study the four statements (i-v) given below and select the two correct ones out of them
(i) A lion eating a deer and a sparrow feeding on grain are ecologically similar in being consumers.
(ii) Predator st ar ftsh Pisaster helps in maintaining species diversity of some invertebrates.
(iii) Predatois ultimately lead to the extinction' of prey species.
(iv) Production of chemicals such as nicotine, strychnine by the plants are metabolic disorders.
The two correct statements are _____.
a) (ii) and (iii) b) (iii) and (iv) **c) (i) and (iv)** d) (i) and (ii)

Solution : -

For the construction of ecological pyramids fresh weight is not used because the total fresh weight does not change into energy. Thus we can say that fresh weight is not continuous in the tropic levels.

49. In a comparative study of grassland ecosystem and pond ecosystem, it may be observed that
a) the abiotic components are almost similar b) the biotic components are almost similar

c) both biotic and abiotic components are different d) primary and secondary consumers are similar.

Solution : -

Grassland ecosystem is a terrestrial ecosystem and pond ecosystem is an aquatic ecosystem, hence both their abiotic and biotic components would be different.

50. Which of the following is expected to have the highest value (gm/m^2/yr) in a grassland ecosystem?
a) Secondary Production b) Tertiary Production **c) Gross Production (Gp)** d) Net Production (NP)

Solution : -

Gross production (GP) is expected to have highest value in grassland ecosystem. We obtain Net production after subtracting the respiratory utilisation from gross production. Secondary and tertiary production is related with secondary and tertiary consumers respectively.