

Ecosystem — NEET Biology PYQ (2006-2021)

Class 12 Biology · 38 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. In the equation $GPP - R = NPP$

R represents :

- (A) Radiant energy
- (B) Retardation factor
- (C) Environment factor
- (D) Respiration losses

NEET 2021

2. Which of the following statements is not correct ?

- (A) Pyramid of biomass in sea is generally inverted.
- (B) Pyramid of biomass in sea is generally upright.
- (C) Pyramid of energy is always upright.
- (D) Pyramid of numbers in a grassland ecosystem is upright.

NEET 2020 · Q60

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

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

Select the correct option:

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

NEET 2020 · Q69

4. In relation to Gross primary productivity and Net primary productivity of an ecosystem, which one of the following statements is correct?

- (A) Gross primary productivity is always less than net primary productivity.
- (B) Gross primary productivity is always more than net primary productivity.
- (C) Gross primary productivity and Net primary productivity are one and same.
- (D) There is no relationship between Gross primary productivity and Net primary productivity.

NEET 2019 · Q137

5. Which of the following ecological pyramids is generally inverted ?

- (A) Pyramid of numbers in grassland
- (B) Pyramid of energy
- (C) Pyramid of biomass in a forest
- (D) Pyramid of biomass in a sea

NEET 2018 · Q115

6. What type of ecological pyramid would be obtained with the following data?

Secondary consumer : 120 g

Primary consumer : 60 g

Primary producer : 10 g

- (A) Upright pyramid of numbers
- (B) Pyramid of energy
- (C) Inverted pyramid of biomass
- (D) Upright pyramid of biomass

NEET 2017 · Q87

7. Which ecosystem has the maximum biomass?

- (A) Forest ecosystem
- (B) Grassland ecosystem
- (C) Pond ecosystem
- (D) Lake ecosystem

NEET 2017 · Q107

8. Presence of plants arranged into well defined vertical layers depending on their height can be seen best in:

- (A) Tropical Savannah
- (B) Tropical Rain Forest
- (C) Grassland
- (D) Temperate Forest

NEET 2017 (Gujarati paper) · Q70

9. Which of the following ecologists has tried to put price-tags on nature's life support services?

- (A) David Tilman
- (B) Robert Constanza
- (C) Paul Ehrlich
- (D) Robert May

NEET 2017 (Gujarati paper) · Q99

10. The sequential events from initial stage till climax stage in a succession are called:

- (A) Ecesis
- (B) Sere
- (C) Nudation
- (D) Migration

NEET 2017 (Gujarati paper) · Q134

11. Which of the following statements is not true?

- (A) A single organism can feed at several trophic levels
- (B) Detritivores feed at all trophic levels except the producer level
- (C) Primary consumers are herbivores
- (D) Energy pyramids of an ecosystem tend to diminish at higher trophic levels

NEET 2016 Phase 2 · Q131

12. The primary producers of the deep-sea hydrothermal vent ecosystem are

- (A) green algae
- (B) chemosynthetic bacteria
- (C) blue-green algae
- (D) coral reefs

NEET 2016 Phase 1 · Q121

13. Which one of the following is a characteristic feature of cropland ecosystem?

- (A) Absence of soil organisms
- (B) Least genetic diversity
- (C) Absence of weeds
- (D) Ecological succession

NEET 2016 Phase 1 · Q152

14. The term ecosystem was coined by:

- (A) E.P. Odum
- (B) A.G. Tansley
- (C) E. Haeckel
- (D) E. Warming

15. Which of the following would appear as the pioneer organisms on bare rocks?

- (A) Lichens
- (B) Liverworts
- (C) Mosses
- (D) Green algae

AIPMT 2015

16. Vertical distribution of different species occupying different levels in a biotic community is known as:

- (A) Pyramid
- (B) Divergence
- (C) Stratification
- (D) Zonation

AIPMT 2015

17. In an ecosystem the rate of production of organic matter during photosynthesis is termed as:

- (A) Net productivity
- (B) Net primary productivity
- (C) Gross primary productivity
- (D) Secondary productivity

AIPMT 2015

18. Secondary Succession takes place on/in:

- (A) Newly cooled lava
- (B) Bare rock
- (C) Degraded forest
- (D) Newly created pond

AIPMT 2015

19. The mass of living material at a trophic level at a particular time is called:

- (A) Standing crop
- (B) Gross primary productivity
- (C) Standing state
- (D) Net primary productivity

AIPMT 2014

20. If 20 J of energy is trapped at producer level, then how much energy will be available to peacock as food in the following chain? plant → mice → snake → peacock

- (A) 0.002 J
- (B) 0.2 J
- (C) 0.0002 J
- (D) 0.02 J

NEET 2013

21. Secondary productivity is rate of formation of new organic matter by

- (A) Producer
- (B) Parasite
- (C) Consumer
- (D) Decomposer

NEET 2013

22. Which one of the following processes during decomposition is correctly described?

- (A) Fragmentation – Carried out by organisms such as earthworm
- (B) Humification – Leads to the accumulation of a dark coloured substance humus which undergoes microbial action at a very fast rate
- (C) Catabolism – Last step in the decomposition under fully anaerobic condition
- (D) Leaching – Water soluble inorganic nutrients rise to the top layers of soil

AIPMT 2012 Mains

23. The rate of formation of new organic matter by rabbit in a grassland is called

- (A) Net productivity
- (B) Secondary productivity
- (C) Net primary productivity
- (D) Gross primary productivity

AIPMT 2012 Prelims

24. Identify the possible link "A" in the following food chain: Plant → insect → frog → "A" → Eagle

- (A) Parrot
- (B) Rabbit
- (C) Wolf
- (D) Cobra

AIPMT 2012 Prelims

25. The upright pyramid of number is absent in

- (A) Grassland
- (B) Pond
- (C) Forest
- (D) Lake

AIPMT 2012 Prelims

26. Which one of the following is not a functional unit of an ecosystem?

- (A) Stratification
- (B) Energy flow
- (C) Decomposition
- (D) Productivity

AIPMT 2011 Mains

27. Which one of the following animals may occupy more than one trophic level in the same ecosystem at the same time?

- (A) Goat
- (B) Frog
- (C) Sparrow
- (D) Lion

AIPMT 2011 Mains

28. Both, hydrarch and xerarch successions lead to

- (A) Highly dry conditions
- (B) Excessive wet conditions
- (C) Medium water conditions
- (D) Xeric conditions

AIPMT 2011 Mains

29. The breakdown of detritus into smaller particles by earthworm is a process called

- (A) Mineralisation
- (B) Catabolism
- (C) Humification
- (D) Fragmentation

AIPMT 2011 Prelims

30. Of the total incident solar radiation the proportion of PAR is

- (A) More than 80%
- (B) About 70%
- (C) About 60%
- (D) Less than 50%

AIPMT 2011 Prelims

31. Mass of living matter at a trophic level in an area at any time is called

- (A) Standing state
- (B) Standing crop
- (C) Detritus
- (D) Humus

AIPMT 2011 Prelims

32. Which one of the following statements for pyramid of energy is incorrect, whereas the remaining three are correct?

- (A) It is upright in shape
- (B) Its base is broad
- (C) It shows energy content of different trophic level organisms
- (D) It is inverted in shape

AIPMT 2010 Prelims · Q170

33. The biomass available for consumption by the herbivores and the decomposers is called

- (A) Gross primary productivity
- (B) Net primary productivity
- (C) Secondary productivity
- (D) Standing crop

AIPMT 2010 Prelims · Q171

34. Which one of the following is one of the characteristics of a biological community?

- (A) Sex-ratio
- (B) Stratification
- (C) Natality
- (D) Mortality

AIPMT 2009 Prelims · Q143

35. Which one of the following types of organisms occupy more than one trophic level in a pond ecosystem?

- (A) Fish
- (B) Zooplankton
- (C) Frog
- (D) Phytoplankton

AIPMT 2008 Prelims · Q175

36. Consider the following statements concerning food chains

- (a) Removal of 80% tigers from an area resulted in greatly increased growth of vegetation**
- (b) Removal of most of the carnivores resulted in an increased population of deers**
- (c) The length of food chains is generally limited to 3-4 trophic levels due to energy loss**
- (d) The length of food chains may vary from 2 to 8 trophic levels.**

Which two of the above statements are correct?

- (A) a, b
- (B) b, c
- (C) c, d
- (D) a, d

37. 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

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

- (A) Dry weight
- (B) Number of individuals
- (C) Rate of energy flow
- (D) Fresh weight

Answer key and explanations

1. Answer: (D) Respiration losses

Net primary productivity is what remains of gross primary productivity after the producers' own respiration losses are subtracted, so R stands for respiration. Radiant energy is the input that drives GPP, not something subtracted from it.

2. Answer: (B) Pyramid of biomass in sea is generally upright.

In the sea the standing biomass of phytoplankton is smaller than that of the fishes feeding on them, so the pyramid of biomass is generally inverted, not upright. The pyramid of energy is always upright and the grassland pyramid of numbers is upright, so those statements are correct.

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

In a grassland food chain grass is the producer (first level), rabbit the primary consumer (second), crow the secondary consumer (third), and vulture the top carnivore (fourth). Hence vulture, rabbit, grass, crow is correct.

4. Answer: (B) Gross primary productivity is always more than net primary productivity.

$NPP = GPP - R$, where R is the energy used in respiration by the producers, so GPP is always greater than NPP. GPP cannot be less than or equal to NPP, because respiration losses are always present.

5. Answer: (D) Pyramid of biomass in a sea

In the sea the standing biomass of phytoplankton is far smaller than that of the fish feeding on them, so the pyramid of biomass is inverted. The pyramid of energy can never be inverted, and the grassland pyramid of numbers is upright.

6. Answer: (C) Inverted pyramid of biomass

The data are masses (biomass), and they increase from producers (10 g) to primary consumers (60 g) to secondary consumers (120 g), so the base is the narrowest level and the pyramid of biomass is inverted, as in some aquatic ecosystems. Grams are not numbers of individuals or energy units, so the other pyramid types do not fit.

7. Answer: (A) Forest ecosystem

Forests hold by far the largest standing biomass because of their massive woody trees. Grasslands have small herbaceous producers, and ponds and lakes have tiny phytoplankton with low standing crop.

8. Answer: (B) Tropical Rain Forest

Vertical stratification, with emergent trees, canopy, understorey shrubs and ground herbs, is best developed in tropical rain forests. Grasslands and savannas have mostly herbaceous layers, and temperate forests have fewer layers.

9. Answer: (B) Robert Constanza

Robert Constanza and his colleagues estimated the value of global ecosystem services at about US \$33 trillion a year. David Tilman worked on productivity-diversity experiments, Paul Ehrlich proposed the rivet popper hypothesis, and Robert May estimated global species diversity.

10. Answer: (B) Sere

The entire sequence of communities that replace one another from the pioneer stage to the climax community is called a sere, and each stage is a seral stage. Nudation (formation of a bare area), migration and ecesis (establishment) are only individual steps of succession.

11. Answer: (B) Detritivores feed at all trophic levels except the producer level

Detritivores feed on dead organic matter from every trophic level, including dead leaves and wood of producers, so excluding the producer level is false. Primary consumers are by definition herbivores, one organism such as a sparrow can feed at more than one trophic level, and energy decreases at each higher level.

12. Answer: (B) chemosynthetic bacteria

No sunlight reaches deep-sea vents, so the producers are chemosynthetic bacteria that oxidise hydrogen sulphide and other compounds to fix carbon. Green algae and blue-green algae need light, and coral reefs are shallow-water communities.

13. Answer: (B) Least genetic diversity

A cropland is a man-made ecosystem usually dominated by a single crop variety (monoculture), so its genetic diversity is very low. Soil organisms and weeds are present, and succession is prevented by repeated cultivation.

14. Answer: (B) A.G. Tansley

A. G. Tansley coined the term ecosystem in 1935. Haeckel coined the term ecology, and Odum and Warming are known for other contributions to ecology.

15. Answer: (A) Lichens

In primary succession on bare rock (xerarch), lichens are the pioneers: they secrete acids that weather rock and form a thin soil. Mosses and liverworts follow only after some soil has formed.

16. Answer: (C) Stratification

Stratification is the vertical layering of species in a community, e.g. trees at the top, then shrubs, then herbs and grasses in a forest. Zonation is a horizontal change of communities along a gradient, not vertical layering within one community.

17. Answer: (C) Gross primary productivity

Gross primary productivity is the rate of production of organic matter by photosynthesis. Net primary productivity is what remains after the producers' own respiratory loss is subtracted.

18. Answer: (C) Degraded forest

Secondary succession begins in areas where a natural community has been destroyed but soil remains, such as a degraded, burnt or cut forest, so it is faster. Newly cooled lava, bare rock and a newly created pond have no previous community and undergo primary succession.

19. Answer: (A) Standing crop

Standing crop is the mass of living material present at a trophic level at a given time. Standing state is the amount of inorganic nutrients in the soil at a given time, and productivity is a rate, not a mass.

20. Answer: (D) 0.02 J

By the 10 percent law only about one tenth of energy passes to each next trophic level: 20 J (plant) → 2 J (mice) → 0.2 J (snake) → 0.02 J (peacock). The value 0.2 J is what the snake receives, one step short of the peacock.

21. Answer: (C) Consumer

Secondary productivity is the rate at which consumers form new organic matter from the food they assimilate. Formation of organic matter by producers is primary productivity.

22. Answer: (A) Fragmentation - Carried out by organisms such as earthworm

Fragmentation, the breaking of detritus into small particles, is carried out by detritivores such as earthworms. Humus decomposes extremely slowly, leaching carries soluble nutrients down into lower soil layers, and catabolism is enzymatic breakdown, not the last anaerobic step.

23. Answer: (B) Secondary productivity

Secondary productivity is the rate at which consumers such as a rabbit form new organic matter. Gross and net primary productivity refer only to producers (green plants).

24. Answer: (D) Cobra

A cobra eats frogs and is in turn eaten by an eagle, so it fits between them. A parrot and a rabbit are herbivores that do not eat frogs, and a wolf is not normally preyed on by an eagle.

25. Answer: (C) Forest

In a forest, a few large trees support many herbivores (insects, birds), so the pyramid of numbers is inverted or spindle-shaped rather than upright. Grassland, pond and lake ecosystems have upright pyramids of numbers.

26. Answer: (A) Stratification

Stratification is the vertical layering of species, a structural feature of an ecosystem. Productivity, decomposition, energy flow and nutrient cycling are the functional aspects.

27. Answer: (C) Sparrow

A sparrow eats grains and fruits (primary consumer) as well as insects (secondary consumer), so it occupies two trophic levels at once. A goat is strictly herbivorous and a lion strictly a top carnivore; a frog feeds mainly on insects.

28. Answer: (C) Medium water conditions

Hydrarch succession moves from water towards drier conditions and xerarch from dry towards wetter conditions, so both end in a mesic (medium water) climax. Neither ends in extreme wet or xeric conditions.

29. Answer: (D) Fragmentation

Breaking detritus into smaller particles by detritivores such as earthworms is fragmentation.

Humification is the formation of humus, and mineralisation is the later release of inorganic nutrients from humus.

30. Answer: (D) Less than 50%

Of the total incident solar radiation, less than 50 percent is photosynthetically active radiation (PAR, 400–700 nm). Plants capture only about 2–10 percent of this PAR.

31. Answer: (B) Standing crop

Each trophic level holds a certain mass of living material at a given time, called the standing crop, measured as biomass or number per unit area. Standing state refers to the amount of nutrients in the soil, and detritus and humus are dead organic matter.

32. Answer: (D) It is inverted in shape

Because energy is lost at each transfer, the energy at each trophic level is always less than at the level below. The pyramid of energy is therefore always upright with a broad base and can never be inverted.

33. Answer: (B) Net primary productivity

Net primary productivity is gross primary productivity minus what plants lose in respiration. It is the biomass actually available to herbivores and decomposers. Standing crop is the biomass present at a given moment, not the rate of production available to consumers.

34. Answer: (B) Stratification

Stratification, the vertical layering of different species such as trees, shrubs and herbs, is a structural feature of a community. Sex ratio, natality and mortality are attributes of a single-species population.

35. Answer: (A) Fish

Fish in a pond may feed on plants or algae (primary consumer) as well as on zooplankton or smaller fish (secondary or higher consumer), so they occupy several trophic levels. Phytoplankton are only producers and zooplankton are mainly primary consumers.

36. Answer: (B) b, c

Removing predators lets herbivores like deer multiply, and because only about 10% of energy passes to each higher level, food chains are usually limited to 3–4 trophic levels. Removing tigers would reduce vegetation through overgrazing rather than increase it, and 8-level chains do not occur.

37. Answer: (D) tropical rain forest

Tropical rain forests have high temperature, abundant rainfall and year-round sunlight, giving the highest net primary productivity among terrestrial ecosystems. Deciduous and temperate forests have seasons that limit growth.

38. Answer: (D) Fresh weight

Pyramids are built from numbers, biomass measured as dry weight, or energy flow. Fresh weight is not used because water content varies a lot between organisms and would distort the biomass comparison.

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