Ultimate KCET Crash Course 2026

BOTANY

Organisms and population; Ecosystem ,Biodiversity and conservation

DPP: 1

Q1 Match the following:

Column A		Column B	
a.	Ectoparasite	i.	Lives inside host body
b.	Endoparasite	ii.	Lays eggs in host nest
c.	Brood parasitism	iii.	Lice on humans
d.	Host-specific parasite	iv.	Single-species host dependence

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

Q2 Which interaction benefits one species while the other remains unaffected ?
(A) Mutualism
(B) Parasitism
(C) Commensalism
(D) Predation

Q3 Assertion (A): Competitive exclusion principle states that two species with identical niches cannot coexist indefinitely.
Reason (R): Continuous competition for identical resources leads to elimination of one species.
(A) Both A and R are correct and R explains A
(B) Both A and R are correct but R does not explain A
(C) A is correct but R is incorrect
(D) A is incorrect but R is correct

Q4 An orchid attracts pollinators without offering nectar by mimicking the appearance of a female insect. This strategy demonstrates:
(A) Mutualism with reward
(B) Predatory deception
(C) Sexual deceit
(D) Competitive mimicry

Q5 A graph plotting population density against time shows an asymptote despite continued reproduction. Which factor is most directly responsible for this pattern?
(A) Increase in natality
(B) Constant intrinsic rate
(C) Carrying capacity of habitat
(D) Absence of immigration

Q6 Under unlimited resource availability, population growth follows a/an:
(A) Logistic curve
(B) Sigmoid pattern
(C) Exponential or geometric pattern
(D) Irregular fluctuating pattern

Q7 Exponential population growth curve equation is represented by
(A) $\frac{dN}{dt} = rN$
(B) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
(C) $\frac{dN}{dt} = rN\left(\frac{K}{K+N}\right)$
(D) $\frac{dN}{dt} = dN$

Q8 The process by which detritivores break down detritus into smaller particles is called _____.
(A) Leaching (B) Anabolism
(C) Fragmentation (D) Stratification

Q9 The mass of living material at a trophic level at a particular time is called
(A) net primary productivity
(B) standing crop
(C) gross primary productivity
(D) standing state.

Q10 Which inverted pyramid is observed in a sea or pond ecosystem ?
(A) Pyramid of biomass
(B) Pyramid of number
(C) Age structure
(D) Ecological succession

Q11 Assertion: Decomposers are essential for ecosystem stability.
Reason: They recycle nutrients back to producers.
(A) Both correct, and Reason explains Assertion
(B) Both correct, but Reason does not explain Assertion
(C) Assertion correct, Reason incorrect
(D) Assertion incorrect, Reason correct

Q12 Which statement correctly describes humus?
(A) Rapidly decomposing, crystalline substance
(B) Dark, amorphous and resistant to microbial action
(C) Formed only under anaerobic conditions
(D) Immediately mineralised by microbes

Q13 If 10 joules of energy is available at the producer level, then amount of energy present at the level of secondary consumers is
(A) $10\ \text{J}$
(B) $1\ \text{J}$
(C) $0.1\ \text{J}$
(D) $0.01\ \text{J}$.

Q14 Plants capture only _____ per cent of the PAR and this small amount of energy sustains the entire living world.
(A) 100%
(B) 50%
(C) 1.0 – 1.2%
(D) 2 – 10%

Q15 According to the rivet popper hypothesis, which species loss is most dangerous?
(A) Rare inconspicuous species
(B) Species with minimal ecological roles
(C) Key functional species
(D) All species have equal effects

Q16 Ex situ conservation primarily becomes essential when:
(A) Habitat is completely intact
(B) Species are abundant in the wild
(C) Species face immediate extinction risk
(D) National parks exceed carrying capacity

Q17 Species richness generally decreases as one moves
(A) From poles to equator
(B) From equator to poles
(C) From temperate to tropical latitudes
(D) From equator to temperate regions and then increases again

Q18 The historic Convention on Biological Diversity ('The Earth Summit') held in Rio de Janeiro in _____.
(A) 2002 (B) 1992
(C) 2010 (D) 1996

Q19 The term 'The Evil Quartet' is related with _____.
(A) Four major causes of forest loss
(B) Four major causes of biodiversity losses
(C) Four major causes of air pollution
(D) Four major causes of population explosion

Q20 If log A= 4, Z= 0.3 and log C = 0.8, find the value of log 'S' _____.
(A) 3.76 (B) 100
(C) 4.24 (D) 2

Q21 Select the option with correct match
(A) Wildlife sanctuary - Ex situ conservation
(B) Biodiversity hotspots - High degree of endemism
(C) Zoological park of India -In-situ conservation
(D) Sacred groves of Meghalaya - Ex-situ conservation

Q22 Hotspots are characterized by _____.
(A) Very high species richness
(B) High degree of endemism
(C) Region of accelerated habitat loss
(D) All of these

Q23 Which of the following is NOT included under narrowly utilitarian benefits ?
(A) Construction materials
(B) Medicinal products
(C) Oxygen generation
(D) Firewood

Q24 Assertion (A): The scientific name of tiger is Panthera tigris, where Panthera is the genus.
Reason (R): In binomial nomenclature, the first word represents the genus, and the second word represents the species.
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true, but R is false.
(D) A is false, but R is true.

Q25 In binomial nomenclature, the scientific name of an organism consists of:
(A) Genus and family
(B) Genus and species
(C) Family and species
(D) Order and genus

Q26 Which of the following is the correct sequence of taxonomic categories from highest to lowest rank?
(A) Kingdom, Phylum, Order, Class, Family, Genus, Species
(B) Kingdom, Phylum, Class, Order, Family, Genus, Species
(C) Kingdom, Class, Phylum, Order, Family, Genus, Species
(D) Kingdom, Order, Phylum, Class, Family, Genus, Species

Q27 How many of the following organisms belong to order Carnivora?
Human, gorilla, gibbon, cat, dog, lion
(A) Two (B) Three
(C) Four (D) Five

Q28 Taxonomic hierarchy refers to
(A) stepwise arrangement of all categories for classification of plants and animals.
(B) a group of senior taxonomists who decide the nomenclature of plants and animals.
(C) a list of botanists or zoologists who have worked on taxonomy of a species or group.
(D) classification of a species based on fossil record.

Q29 Find out the missing category 'X' Species → Genus → X → Order → Class
(A) Class (B) Subspecies
(C) Variety (D) Family

Q30 Taxon is a
(A) unit of classification
(B) species
(C) highest rank of classification
(D) group of closely related organisms

Answer Key

Q1	B
Q2	C
Q3	A
Q4	C
Q5	C
Q6	C
Q7	A
Q8	C
Q9	B
Q10	A
Q11	A
Q12	B
Q13	C
Q14	D
Q15	C
Q16	C
Q17	B
Q18	B
Q19	B
Q20	D
Q21	C
Q22	D
Q23	C
Q24	A
Q25	B
Q26	B
Q27	B
Q28	A
Q29	D
Q30	D

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Ectoparasites like lice live externally.

Endoparasites occupy internal organs such as liver or RBCs.

Brood parasites lay eggs in another bird's nest.

Host-specific parasites infect only one host species.

Each pair reflects direct information from the interactions described.

Video Solution:

Q2 Text Solution:

In this interaction, only one species benefits.

The other species experiences neither harm nor benefit.

Examples include orchids on mango branches.

Barnacles on whales also display this interaction.

Cattle egrets benefit from insects flushed out by grazing cattle.

Video Solution:

Q3 Text Solution:

1. Species occupying identical niches compete for the same resources.
2. Continuous competition reduces survival chances for one species.
3. Eventually the better adapted species dominates.
4. The weaker competitor becomes locally extinct or shifts niche.
5. This principle explains limits to species coexistence.

Video Solution:

Q4 Text Solution:

Pollination achieved without reward.

Visual mimicry triggers mating behavior.

Pollinator unknowingly transfers pollen.

Result of tight co-evolution.

High specificity ensures success.

Video Solution:

Q5 Text Solution:

1. Carrying capacity is the maximum population supported by habitat.
2. It reflects finite availability of resources.
3. Growth slows as population approaches K.
4. An asymptote indicates stabilisation at K.
5. This is characteristic of logistic growth.

Video Solution:

Q6 Text Solution:

Unlimited food and space allow full expression of reproductive potential.

This results in exponential or geometric growth.

Growth follows dN/dt = rN.

N increases rapidly without environmental limits.

Produces a J-shaped growth curve.

Video Solution:

Q7 Text Solution:

A. dN/dt = rN

- The equation **dN/dt = rN** represents **exponential population growth**, where:
  - **dN/dt** is the rate of change of the population size (N) with respect to time (t).
  - **r** is the intrinsic rate of growth, representing how quickly the population grows.
  - **N** is the current population size.

This equation assumes unlimited resources and no environmental constraints, leading to exponential growth.

Video Solution:

Q8 Text Solution:

C) Fragmentation.

- **Fragmentation** is the process where detritivores break down detritus (dead organic matter) into smaller particles. This is an important step in the decomposition process.

- **Leaching** involves the removal of soluble substances from detritus, **anabolism** refers to the building of complex molecules in living organisms, and **stratification** refers to the vertical distribution of species in an ecosystem.

Thus, fragmentation is the correct term for breaking down detritus into smaller particles.

Video Solution:

Q9 Text Solution:

Standing crop is the total amount of living material in a specified population at a particular time, expressed as biomass (standing biomass) or its equivalent in terms of energy. The standing crop may vary at different times of the year; for example, in a population of deciduous trees between summer and winter.

Video Solution:

Q10 Text Solution:

A. Pyramid of biomass

In aquatic ecosystems like seas or ponds, the pyramid of biomass is often inverted. This is because the biomass of producers (like phytoplankton) is lower than that of primary consumers (like zooplankton) at any given time, although phytoplankton reproduce rapidly to sustain the ecosystem.

Video Solution:

Q11 Text Solution:

1. Decomposers break down organic matter.
2. Nutrients are returned to soil and water.
3. Producers depend on recycled nutrients.
4. Without decomposers, nutrient lock-up occurs.
5. Stability depends on this recycling.

Video Solution:

Q12 Text Solution:

Humus is dark-coloured and amorphous in nature.

It resists microbial degradation and decomposes slowly.

Acts as a stable nutrient reservoir due to its colloidal nature.

Formed during humification in soil.

Undergoes slow mineralisation by specific microbes.

Video Solution:

Q13 Text Solution:

According to the 10% rule of energy transfer, only about 10% of the energy from one trophic level is transferred to the next. Producers receive 10 joules, primary consumers get about 1 joule, and secondary consumers receive roughly 10% of 1 joule, which equals 0.1 joule. This significant loss in energy explains why food chains rarely exceed four to five trophic levels.

Video Solution:

Q14 Text Solution:

D. 2 – 10%.

Plants are able to capture only a small fraction of the sunlight that reaches the Earth, which is referred to as Photosynthetically Active Radiation (PAR). Out of the total light available, they capture about 2– 10% of PAR to convert it into chemical energy through photosynthesis. This small percentage is what sustains the energy flow in ecosystems, supporting all life forms either directly or indirectly.

Video Solution:

Q15 Text Solution:

Key species act like rivets on the airplane's wings.

Their removal can destabilize entire ecosystems.

Functional roles determine ecosystem impact.

Loss of minor species shows less visible effects initially.

Thus ecological function, not abundance, drives risk.

Video Solution:

Q16 Text Solution:

Ex situ approaches remove organisms from shrinking habitats.

Used when natural populations are critically endangered.

Allows controlled protection and specialized care.

Includes zoos, botanical gardens, cryopreservation, etc.

Prevents total loss when in situ options are insufficient.

Video Solution:

Q17 Text Solution:

Latitudinal diversity decreases away from the equator.

Tropics consistently show the highest species richness.

Temperate and polar regions show a steep decline.

This gradient is observed across multiple taxa.

Provided examples clearly show decreasing trends with latitude.

Video Solution:

Q18 Text Solution:

B. 1992.

The historic Convention on Biological Diversity (CBD), commonly referred to as 'The Earth Summit,' took place in Rio de Janeiro in 1992. This summit aimed to address global environmental issues, including the conservation of biodiversity, sustainable development, and the equitable sharing of the benefits arising from genetic resources. The CBD is a key international treaty that emphasizes the importance of biodiversity for ecological health and human well-being.

Video Solution:

Q19 Text Solution:

B. Four major causes of biodiversity losses.

The term "The Evil Quartet" refers to the four main causes of biodiversity loss: habitat loss and fragmentation, over-exploitation, alien species invasion, and co-extinctions. These factors are driving species to extinction at an accelerated rate.

Video Solution:

Q20 Text Solution:

D. 2

To solve for log 'S' using the species-area relationship equation:

Log S = log C + Z log A

We are given:

- log C = 0.8
- Z = 0.3
- log A = 4

Now, substitute these values into the equation:

Log S = 0.8 + 0.3 × 4

First, calculate:

0.3 × 4 = 1.2

Now add:

Log S = 0.8 + 1.2 = 2

Thus, log S = 2.

Video Solution:

Q21 Text Solution:

B. Biodiversity hotspots - High degree of endemism

1. **Wildlife sanctuary - Ex situ conservation**:
   - **Incorrect**. Wildlife sanctuaries are areas where animals are protected in their natural habitat, which is an example of **in situ conservation**.
2. **Biodiversity hotspots - High degree of endemism**:
   - **Correct**. Biodiversity hotspots are regions with a high level of species richness and endemism. For example, the Western Ghats in India.
3. **Zoological park of India - In-situ conservation**:
   - **Incorrect**. Zoological parks are examples of **ex situ conservation**, as animals are maintained outside their natural habitats.
4. **Sacred groves of Meghalaya - Ex-situ conservation**:
   - **Incorrect**. Sacred groves are patches of forests conserved due to cultural and religious beliefs, which is an example of **in situ conservation**.

Video Solution:

Q22 Text Solution:

D. All of these.

Hotspots are regions that are characterized by:
- Very high species richness: They contain a significant number of different species compared to other areas.
- High degree of endemism: These areas have a large proportion of species that are not found anywhere else in the world.
- Region of accelerated habitat loss: They are experiencing rapid habitat destruction and degradation, which threatens the unique species that inhabit these regions.

Thus, all of these characteristics are essential to defining biodiversity hotspots.

Video Solution:

Q23 Text Solution:

Narrow utilitarian benefits are direct economic resources.

These include food, fibre, wood, medicines.

Atmospheric services are indirect benefits.

Oxygen generation falls under broadly utilitarian roles.

Hence it is excluded from narrow categories.

Video Solution:

Q24 Text Solution:

Both A and R are true, and R is the correct explanation of A Explanation: The scientific name of tiger is Panthera tigris, where Panthera is the genus (A is true), and R correctly explains the rule of binomial nomenclature.

Video Solution:

Q25 Text Solution:

Genus and species Explanation: Binomial nomenclature consists of two parts: the genus name and the species name.

Video Solution:

Q26 Text Solution:

Kingdom, Phylum, Class, Order, Family, Genus, Species Explanation: This is the correct sequence of taxonomic categories from highest to lowest rank as per the taxonomic hierarchy.

Video Solution:

Q27 Text Solution:

Order Primata comprising monkey, gorilla and gibbon is placed in class Mammalia along with order Carnivora that includes animals like tiger, cat and dog.

[New NCERT Class 11th Page No. 7]

Video Solution:

Q28 Text Solution:

Taxonomic hierarchy is the arrangement of various taxonomic categories in a hierarchical order, with species occupying the lowest level and kingdom at the highest level.

[New NCERT Class 11th Page no. 6]

Video Solution:

Q29 Text Solution:

- Taxonomic hierarchy is the process of organizing organisms into successive levels of biological classification.
- Classification can be arranged in either decreasing order (from kingdom to species) or increasing order (from species to kingdom).
- Each level in this hierarchy is called a taxonomic category or rank.
- In this classification system:
  - Kingdom is ranked the highest.
  - Followed by division, class, order, family, genus, and species.

Video Solution:

Q30 Text Solution:

Taxon is a grouping of organisms of any level in hierarchial classification which is based on some common characteristics. It represents real biological objects placed in any category while category itself is an abstract term.

Video Solution: