Test - 03

Ultimate KCET Crash Course 2026

BOTANY

Q1 In an ecosystem, if respiration rate of producers increases without change in photosynthesis, what happens?
(A) GPP increases and NPP remains constant
(B) NPP increases due to higher metabolism
(C) NPP decreases due to higher respiratory loss
(D) Secondary productivity increases directly

Q2

Column I	Column II
a. Rauwolfia variations	1. Ecological diversity
b. Western Ghats amphibians	2. Genetic diversity
c. Mangroves & coral reefs	3. Species diversity
d. Rice varieties in India	4. Agro-biodiversity

(A) a-3, b-2, c-1, d-4
(B) a-2, b-3, c-1, d-4
(C) a-2, b-1, c-3, d-4
(D) a-4, b-3, c-2, d-1

Q3 A pollen tube enters the ovule and specifically targets a synergid cell. Which structural feature is responsible for guiding this process?
(A) Micropyle opening
(B) Filiform apparatus
(C) Polar nuclei
(D) Antipodal cells

Q4 Which factor directly links grazing and detritus food chains?
(A) Producers
(B) Omnivores
(C) Decomposers
(D) Abiotic factors

Q5 Which condition will most likely increase yield in sugarcane?
(A) Increased ABA
(B) Application of GA_3
(C) Reduced cytokinin
(D) Increased ethylene

Q6 Which process in fungi involves fusion of cytoplasm without nuclear fusion?
(A) Karyogamy (B) Plasmogamy
(C) Meiosis (D) Sporulation

Q7

Column I		Column II	
a.	SER	p.	Protein synthesis
b.	RER	q.	Lipid synthesis
c.	Golgi	r.	Packaging
d.	Lysosome	s.	Intracellular digestion

(A) a-q, b-r, c-p, d-s
(B) a-p, b-q, c-s, d-r
(C) a-r, b-p, c-q, d-s
(D) a-q, b-p, c-r, d-s

Q8 Which arrangement is characteristic of eukaryotic cilia and flagella?
(A) 9+0 pattern (B) 9+2 pattern
(C) 8+2 pattern (D) 7+3 pattern

Q9 In a flowering plant, pollen grains are released at a stage when they already contain two male gametes. Which sequence of events must have occurred before their release?
(A) Meiosis pollen tube formation mitosis of generative cell
(B) Meiosis microspore formation mitosis of generative cell
(C) Mitosis meiosis generative cell division
(D) Meiosis fertilisation generative cell division

Q10

Column I	Column II
a. Glycolysis	1. Oxidative phosphorylation
b. Link reaction	2. Formation of acetyl-CoA
c. Krebs cycle	3. Partial oxidation of glucose
d. ETS	4. Complete oxidation of acetyl group

(A) a-3, b-2, c-4, d-1
(B) a-2, b-3, c-1, d-4
(C) a-3, b-4, c-2, d-1
(D) a-1, b-2, c-3, d-4

Q11 A plant of genotype Tt is selfed. Among the tall F_2 offspring, what proportion is expected to produce only tall progeny on further selfing?
(A) 1/3 (B) 1/2
(C) 2/3 (D) 1/4

Q12 Match the following:

Column I	Column II
a. ICBN	p. Naming animals
b. ICZN	q. Naming plants
c. Binomial nomenclature	r. Two-word naming system
d. Taxon	s. Unit of classification

(A) a-q, b-p, c-r, d-s
(B) a-p, b-q, c-s, d-r
(C) a-q, b-r, c-p, d-s
(D) a-s, b-p, c-r, d-q

Q13 A diploid cell with 2n = 16 undergoes DNA replication. The chromosome number and DNA content after replication will be:
(A) 16 chromosomes, 2C DNA
(B) 16 chromosomes, 4C DNA
(C) 32 chromosomes, 4C DNA
(D) 32 chromosomes, 2C DNA

Q14 Biogas production is more efficient in rural areas because:
(A) Higher temperature always present
(B) Availability of cattle dung
(C) Presence of more oxygen
(D) Absence of microbes in cities

Q15 A mutation deletes the promoter region of a gene. Which process will be directly affected?
(A) DNA replication
(B) Transcription initiation
(C) Translation elongation
(D) Protein folding

Q16 Statement I: RNA polymerase can initiate transcription independently
Statement II: Initiation factors are required for transcription start
(A) Both Statement I and II are correct
(B) Both Statement I and II are incorrect
(C) Statement I is correct, Statement II is incorrect
(D) Statement I is incorrect, Statement II is correct

Q17 Statement I: In racemose inflorescence, flowers develop in acropetal succession.
Statement II: The main axis continues to grow indefinitely.
(A) Both Statement I and II are correct
(B) Both Statement I and II are incorrect
(C) Statement I is correct, Statement II is incorrect
(D) Statement I is incorrect, Statement II is correct

Q18 Which feature is uniquely associated with plant cells when compared to animal cells?
(A) Ribosomes
(B) Mitochondria
(C) Plastids and cell wall
(D) Plasma membrane

Q19 Statement I: Sporopollenin protects pollen grains from environmental stress.
Statement II: It is resistant to enzymatic degradation and extreme conditions.
(A) Both Statement I and II are correct
(B) Both Statement I and II are incorrect
(C) Statement I is correct, Statement II is incorrect
(D) Statement I is incorrect, Statement II is correct

Q20 Which is the correct reason for reappearance of recessive trait in F_2?
(A) Mutation
(B) Independent assortment
(C) Segregation of alleles
(D) Dominance

Q21 Which condition would most strongly inhibit decomposition?
(A) High temperature and moisture
(B) Aerobic environment
(C) Anaerobic and low temperature conditions
(D) High nitrogen content in detritus

Q22 In a C_4 plant, inhibition of bundle sheath cell function will most directly affect:
(A) Initial CO_2 fixation by PEP carboxylase
(B) Formation of oxaloacetic acid
(C) Regeneration of phosphoenol pyruvate
(D) Operation of Calvin cycle

Q23 Which condition would most likely lead to accelerated extinction rates?
(A) Stable climate and high biodiversity
(B) Habitat loss combined with invasive species
(C) High genetic diversity in populations
(D) Balanced predator-prey relationships

Q24 Identify the correct role of bundle sheath surrounding vascular bundles in leaves.
(A) Photosynthesis only
(B) Mechanical support and protection
(C) Hormone synthesis
(D) Water absorption

Q25 The presence of fucoxanthin along with chlorophyll pigments primarily results in:
(A) Bright green coloration
(B) Red pigmentation
(C) Olive to brown coloration
(D) Colorless thallus

Q26

Column I	Column II
a. AUG	1. Peptide bond catalysis
b. UGA	2. Initiation codon
c. Anticodon	3. Stop signal
d. 23S rRNA	4. Codon recognition

(A) a-2, b-3, c-4, d-1
(B) a-2, b-3, c-1, d-4
(C) a-2, b-1, c-4, d-3
(D) a-4, b-3, c-2, d-1

Q27 Which combination produces darkest phenotype in polygenic inheritance?
(A) AABBcc (B) AaBbCc
(C) AABBCC (D) aaBBcc

Q28 Statement I: Logistic growth is more realistic than exponential growth.
Statement II: Resources are always unlimited in natural habitats.
(A) Both Statement I and II are correct
(B) Both Statement I and II are incorrect
(C) Statement I is correct, Statement II is incorrect
(D) Statement I is incorrect, Statement II is correct

Q29 In population ecology, which attribute cannot be applied to an individual?
(A) Birth (B) Death
(C) Sex (D) Birth rate

Q30 In a household fermentation setup, milk fails to convert into curd despite addition of starter culture. Which condition most likely caused failure?
(A) High temperature denaturing bacterial enzymes
(B) Absence of lactose in milk
(C) Lack of oxygen for LAB growth
(D) Excess vitamin B_{12} concentration

Answer Key

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

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Explanation:

NPP = GPP – Respiration

Increase in respiration reduces net available biomass

Less energy available to herbivores and decomposers

Energy flow to higher trophic levels declines

Ecosystem productivity efficiency decreases

Video Solution:

Q2 Text Solution:

Explanation:

Rauwolfia variation represents genetic diversity within species.

Amphibian variation across regions reflects species diversity.

Mangroves and reefs represent different ecosystems.

Rice varieties are examples of agricultural genetic diversity.

Each level represents distinct scale of biodiversity organization

Video Solution:

Q3 Text Solution:

Explanation:

Filiform apparatus present in synergids.

Provides chemical and structural guidance.

Directs pollen tube towards embryo sac.

Ensures entry through correct pathway.

Essential for successful fertilisation.

Video Solution:

Q4 Text Solution:

Explanation:

Omnivores feed on both living and dead matter

Connect GFC and DFC pathways

Increase interdependence

Enhance ecosystem stability

Example: crows, cockroaches

Video Solution:

Q5 Text Solution:

Explanation:

GA_3 increases stem elongation.

Sugarcane stores sugar in stem.

Longer stem higher yield.

ABA inhibits growth.

Ethylene mainly affects ripening.

Video Solution:

Q6 Text Solution:

Explanation:

- Plasmogamy is cytoplasmic fusion.
- Nuclei remain separate initially.
- Leads to dikaryotic stage.
- Followed by karyogamy later.
- Essential step in sexual cycle

Video Solution:

Q7 Text Solution:

Explanation:

SER synthesizes lipids.

RER synthesizes proteins.

Golgi modifies and packages.

Lysosomes digest macromolecules.

Functions are interconnected

Video Solution:

Q8 Text Solution:

Explanation:

Nine peripheral doublets present.

Two central microtubules exist.

Enables motility.

Found in cilia and flagella.

Structural integrity maintained

Video Solution:

Q9 Text Solution:

Explanation:

Microspore mother cell undergoes meiosis to form microspores.

Microspores develop into pollen grains.

Generative cell divides mitotically to form two male gametes.

This division occurs before shedding in 3-celled stage pollen.

Thus, meiosis followed by mitosis results in mature pollen.

Video Solution:

Q10 Text Solution:

Explanation:

- Glycolysis causes partial glucose breakdown
- Link reaction forms acetyl-CoA
- Krebs cycle completes oxidation of carbon
- ETS generates ATP via oxidation
- Represents sequential metabolic flow

Video Solution:

Q11 Text Solution:

Explanation:

F_2 genotypic ratio is 1 TT : 2 Tt : 1 tt.

Tall phenotype includes TT and Tt (3 individuals).

Only TT produces all tall offspring on selfing.

Among 3 tall plants, only 1 is TT.

Hence probability = 1/3.

Video Solution:

Q12 Text Solution:

- ICBN governs plant naming.
- ICZN governs animal naming.
- Binomial system uses two words.
- Taxon is classification unit.
- Each has distinct role

Video Solution:

Q13 Text Solution:

Explanation:

Chromosome number remains constant.

Each chromosome forms two chromatids.

DNA content doubles from 2C to 4C.

Replication occurs in S phase.

No increase in chromosome count.

Video Solution:

Q14 Text Solution:

Explanation:

Cattle dung is rich in methanogens

It provides substrate for anaerobic digestion

Rural areas have abundant organic waste

Oxygen presence actually reduces methane production

Urban limitation is resource availability, not microbes

Video Solution:

Q15 Text Solution:

Explanation:

Promoter is binding site for RNA polymerase

Determines start of transcription

Without promoter, enzyme cannot bind

Structural gene remains untranscribed

Gene expression is completely blocked

Video Solution:

Q16 Text Solution:

Explanation:

RNA polymerase alone cannot initiate

Requires sigma/initiation factors

These factors help recognize promoter

Ensure correct binding site

Enable transcription initiation

Video Solution:

Q17 Text Solution:

Explanation:

1. Growth of main axis is continuous.
2. Flowers arise laterally.
3. Younger flowers at top.
4. Older flowers at base.
5. Acropetal arrangement observed.

Video Solution:

Q18 Text Solution:

- Plastids perform photosynthesis/storage.
- Cell wall provides rigidity.
- Absent in animal cells.
- Essential for autotrophic nutrition.
- Maintains structural integrity.

Video Solution:

Q19 Text Solution:

Explanation:

Sporopollenin forms outer exine layer.

It is chemically inert and highly resistant.

Protects pollen from heat, chemicals, enzymes.

Enables survival in adverse conditions.

Thus both statements are correct and related

Video Solution:

Q20 Text Solution:

Explanation:

Alleles separate during gamete formation.

Recessive allele remains intact.

Fusion of two recessive alleles occurs in F_2.

Leads to expression of recessive trait.

Confirms particulate inheritance.

Video Solution:

Q21 Text Solution:

Explanation:

Decomposition is largely oxygen-dependent

Anaerobic conditions limit microbial respiration

Low temperature slows enzymatic activity

Organic matter accumulates under such conditions

Seen in bogs and cold regions

Video Solution:

Q22 Text Solution:

Explanation:

In C_4 plants, Calvin cycle occurs in bundle sheath cells.

Mesophyll cells perform initial CO_2 fixation via PEPcase.

OAA is transported to bundle sheath cells for decarboxylation.

Released CO_2 enters Calvin cycle in these cells.

Thus, disruption affects sugar synthesis directly

Video Solution:

Q23 Text Solution:

Explanation:

Habitat loss reduces available resources.

Invasive species outcompete native species.

Combined effect accelerates extinction rates.

Leads to rapid biodiversity decline.

Represents major anthropogenic threat

Video Solution:

Q24 Text Solution:

Explanation:

Cells are thick-walled.

Surround conducting tissues.

Provide structural strength.

Protect vascular elements.

Sometimes involved in metabolism

Video Solution:

Q25 Text Solution:

Explanation:

1. Fucoxanthin masks green chlorophyll.
2. Produces brownish shades.
3. Enhances light absorption in marine habitat.
4. Characteristic of certain algal groups.
5. Adaptation to underwater light conditions

Video Solution:

Q26 Text Solution:

Explanation:

AUG functions as initiation codon

UGA is one of the stop codons

Anticodon recognizes codon on mRNA

23S rRNA acts as ribozyme for peptide bond

These ensure correct translation process

Video Solution:

Q27 Text Solution:

Explanation:

Maximum dominant alleles produce strongest effect.

Each dominant allele contributes positively.

Six dominant alleles give darkest phenotype.

No recessive dilution occurs.

Shows additive gene action

Video Solution:

Q28 Text Solution:

Explanation:

Logistic growth considers resource limitation.

Natural habitats have finite resources.

Exponential growth is ideal and rarely sustained.

Carrying capacity limits population size.

Hence, Statement II is incorrect.

Video Solution:

Q29 Text Solution:

Explanation:

Birth rate refers to number of births per population unit.

It is a statistical measure across individuals.

Individuals can reproduce but not have "rate".

Population-level properties differ from individual traits.

Hence, birth rate is a population attribute.

Video Solution:

Q30 Text Solution:

Explanation:

Lactic acid bacteria convert lactose to lactic acid using enzymes sensitive to temperature

Excessively high temperature denatures enzymes, stopping fermentation

LAB are facultative anaerobes, so oxygen absence is not limiting

Lactose is naturally present in milk, so its absence is unlikely

Vitamin B_{12} is produced during fermentation, not a limiting factor

Video Solution: