



BOARD KCET PYQ (2024)

Kannada

BOTANY

1. The role of Filiform apparatus in synergids is to
[KCET 2024]

(A) Protect the egg apparatus
(B) Endosperm formation
(C) Guide the entry of pollen tube
(D) Prevention of gamete entry

2. Transfer of pollen grains from the anther to the stigma of another flower of the same plant is called
[KCET 2024]

(A) Xenogamy (B) Autogamy
(C) Cleistogamy (D) Geitonogamy

3. Match the content of List I with List II:
[KCET 2024]

List I		List II	
1.	Polyembryony	p.	Black pepper
2.	Perisperm	q.	Banana
3.	False fruit	r.	Lemon
4.	Parthenocarpy	s.	Apple

Choose the **correct** option from the following :

(A) 1-r, 2-p, 3-s, 4-q
(B) 1-p, 2-r, 3-s, 4-q
(C) 1-q, 2-p, 3-s, 4-r
(D) 1-r, 2-s, 3-p, 4-q

4. Test cross in Pea plant is [KCET 2024]

(A) A cross between F_2 tall plant and recessive parent
(B) A cross between F_2 dwarf plant and recessive parent
(C) A cross between F_2 tall plant with dominant parent
(D) A cross between two F_1 plants

5. The genotype ratio of incomplete dominance is
[KCET 2024]

(A) 3: 1 (B) 1: 2: 1
(C) 1: 1: 2 (D) 9: 3: 3: 1

6. Find the **incorrect** statement among the following:
[KCET 2024]

(A) In sex linked recessive traits the gene is transmitted from unaffected carrier female to some of male progeny
(B) Accumulation of phenylpyruvic acid in brain results in mental retardation
(C) Individuals affected by Down's Syndrome will have congenital heart defect and are more intelligent
(D) Turner's Syndrome is caused due to the absence of one X-chromosome

7. In a dihybrid cross between a true breeding round yellow seeded and true breeding wrinkled green seeded pea plant, the ratio of segregation of round and wrinkled seed traits in F_2 is: [KCET 2024]

(A) 9: 1 (B) 3: 1
(C) 9: 3 (D) 3: 3

8. Following representation and denote a few steps of Griffith Experiment. Identify the correct one(s).
[KCET 2024]

P. R strain $\rightarrow$ Inject into mice $\rightarrow$ Mice die
Q. S strain (Heat killed) $\rightarrow$ Inject into mice $\rightarrow$ Mice die
R. R strain $\rightarrow$ Inject into mice $\rightarrow$ Mice live
(A) P only (B) R only
(C) P and R (D) R and R

9. In tRNA the region that binds with mRNA is
[KCET 2024]

(A) Anticodon loop of RNA
(B) Amino acid acceptor end of tRNA
(C) Amino acyl synthetase loop of tRNA
(D) Ribosomal binding loop of tRNA



10. The mRNA has Untranslated Regions (UTRs)
[KCET 2024]

- (A) At 3'-end beyond Terminator codon
- (B) At 5'-end before AUG
- (C) At both 3'-end and 5'-end beyond Terminator codon and before AUG respectively
- (D) AUG and Terminator codon flanks the UTR

11. In Structural gene, the template DNA strand has nucleotide sequences
3'-ATGCATGCATGCATGC-5'.
Find the correct and complimentary nucleotide sequence on the coding strand.

[KCET 2024]

- (A) 5'-ATGCATGCATGCATGC-3'
- (B) 3'-GCATGCATGCATGCAT-5'
- (C) 5'-TACGTACGTACGTACG-3'
- (D) 3'-TACGTACGTACGTACG-5'

12. Read the following statements:

Statement I : All vertebrates develop a row of vestigial gill slits during the embryonic stage.

Statement II : Embryos always pass through the adult stages of other animals

Which of the following options is **correct** with reference to these statements? [KCET 2024]

- (A) Statement I is correct, Statement II is incorrect
- (B) Statement I is incorrect, Statement II is correct
- (C) Both Statements I and II are correct
- (D) Both Statements I and II are incorrect

13. Identify the bacterial disease among the following:
[KCET 2024]

- (A) Brown rust of wheat
- (B) Tobacco mosaic disease
- (C) Black rot of crucifers
- (D) Late blight of potato

14. Match the nutrients given in List I with the source in List II:

[KCET 2024]

List I		List II	
1	Vitamin A	p	Bitter gourd
2	Single cell protein	q	Beans
3	Vitamin C	r.	Carrots
4	Protein	s	Spirulina spp

- (A) 1 - p, 2 - q, 3 - r, 4 - s
- (B) 1 - r, 2 - s, 3 - p, 4 - q
- (C) 1 - p, 2 - r, 3 - s, 4 - q
- (D) 1 - q, 2 - s, 3 - p, 4 - r

15. The chemical substances which are produced by some microbes which can kill or retard the growth of other microbes are known as:

[KCET 2024]

- (A) Statins
- (B) Streptokinases
- (C) Cyclosporins
- (D) Antibiotics

16. Select the **correct** statement from the following:
[KCET 2024]

- (A) Methanobacterium is an aerobic bacteria found in the rumen of cattle
- (B) Biogas is produced by the activity of aerobic bacteria
- (C) Biogas is pure methane
- (D) Activated sludge in sediment tanks is a rich source of aerobic bacteria

17. Which of the following is not a parasitic adaptation?

[KCET 2024]

- (A) Loss of unnecessary sense organs
- (B) Absence of adhesive organs or suckers
- (C) Loss of digestive system
- (D) High reproductive capacity



18. Match the type of adaptation given in List I with their examples given in List II. Select the option showing **correct** combination. [KCET 2024]

List I (Type of adaptation)		List II (Examples)	
1.	Biochemical adaptation	p.	Desert lizards
2.	Behavioural adaptation	q.	Deep sea fishes
3.	Physiological adaptation	r.	Opuntia
4.	Morphological adaptation	s.	Kangaroo rats

- (A) 1-q, 2-r, 3-s, 4-p
 (B) 1-p, 2-q, 3-r, 4-s
 (C) 1-q, 2-p, 3-s, 4-r
 (D) 1-s, 2-r, 3-q, 4-p
19. The annual net primary productivity of the biosphere is approximately
 (A) 170 billion tons
 (B) 55 billion tons
 (C) 170 million tons
 (D) 55 million tons
20. The natural reservoir of phosphorus is [KCET 2024]
 (A) Rocks (B) Soil solution
 (C) Detritus (D) Atmosphere
21. The sequence of communities of primary succession in water is [KCET 2024]
 (A) Phytoplanktons → Scrubs → Free floating hydrophytes → Rooted hydrophytes → Grasses → Trees
 (B) Phytoplanktons → Free floating hydrophytes → Rooted hydrophytes → Trees → Scrubs
 (C) Free floating hydrophytes → Scrubs → Phytoplanktons → Rooted hydrophytes → Grasses → Trees
 (D) Phytoplanktons → Rooted hydrophytes → Free floating hydrophytes → Reed swamps → Marsh meadows → Scrubs → Trees
22. A strict protection of biodiversity hotspots could reduce the ongoing mass extinction by almost [KCET 2024]

- (A) 20 % (B) 25 %
 (C) 30 % (D) 35 %

23. Identify the incorrect match with respect to recently extinct animals and their place of extinction according to IUCN Red List. [KCET 2024]

- (A) Dodo-Mauritius
 (B) Quagga-Africa
 (C) Thylacine-Australia
 (D) Steller's Sea Cow-North America

24. According to the hypothesis proposed by environmental biologists, a relatively constant environment in tropics promotes [KCET 2024]

- (A) Niche specialization and lesser species diversity.
 (B) Niche specialization and greater species diversity.
 (C) Niche diversity and lesser species specialization.
 (D) Niche diversity and greater species specialization.

25. In the prevention of air pollution, the role of scrubber is to remove [KCET 2024]

- (A) Particulate SO₂ (B) Liquid SO₂
 (C) Gaseous SO₂ (D) Liquid SO₂

26. Match List I with List II and choose the correct answer. [KCET 2024]

List I		List II	
1	Nitrogen rich fertilizers	p	Ozone depletion
2	Carbon dioxide	q	Eutrophication
3	Carbon monoxide	r.	Greenhouse effect
4	CFC s	s.	Air pollutant

- (A) 1-p, 2-q, 3-r, 4-s
 (B) 1-q, 2-r, 3-s, 4-p
 (C) 1-R, 2-S, 3-P, 4-r



- (D) 1-s, 2-p, 3-q, 4-r
27. Which of the following exhibits a haplodiplontic lifecycle? **[KCET 2024]**
 (A) *Fucus* (B) *Chlamydomonas*
 (C) *Gelidium* (D) *Ectocarpus*
28. When a flower has both stamens and carpels it is described as **[KCET 2024]**
 (A) Asexual (B) Unisexual
 (C) Bisexual (D) Dioecious
29. Which of the following statement is correct with reference to vacuoles? **[KCET 2024]**
 (A) It is membrane bound and contains storage proteins and lipids.
 (B) It is membrane bound and contains water and excretory substance.
 (C) It lacks membrane and contains air.
 (D) It lacks membrane and contains water and excretory substances.
30. The enzyme Recombinase is required at which stage of Meiosis I? **[KCET 2024]**
 (A) Pachytene (B) Zygotene
 (C) Diplotene (D) Diakinesis
31. The water potential of pure water is: **[KCET 2024]**
 (A) One (B) More than one
 (C) Zero (D) Less than zero

32. Match the pigments given in List I with their colour in chromatogram given in List II.

KCET 2024]

List I (Pigments)		List II (Colour in chromatogram)	
1	Chlorophyll 'b'	p.	Yellow orange
2	Carotenoids	q.	Orange red
3	Chlorophyll 'a'	r.	Yellow
4	Xanthophylls	s.	Yellow green

Choose the **correct** option from the following:

- (A) 1-s, 2-t, 3-r, 4-q
 (B) 1-t, 2-p, 3-s, 4-r
 (C) 1-p, 2-q, 3-r, 4-t
 (D) 1-t, 2-p, 3-r, 4-s
33. Which is the intermediate compound that links the end product of Glycolysis with TCA Cycle? **[KCET 2024]**
 (A) Acetyl CoA
 (B) Pyruvic Acid
 (C) OAA
 (D) Citric Acid
34. Auxins : Apical dominance : : Gibberellins _____ **[KCET 2024]**
 (A) Adventitious shoot formation
 (B) Accelerates abscission
 (C) Closure of stomata
 (D) Bolting



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Hint & Solution

1. (C)

1. Synergids are two specialized cells present beside the egg cell in the embryo sac.
2. At the micropylar end of synergids, finger-like wall thickenings called filiform apparatus are present.
3. These structures help in directing the pollen tube towards the egg apparatus.
4. They also assist in absorption and transfer of nutrients into the embryo sac.
5. One synergid degenerates before pollen tube entry, facilitating discharge of male gametes.
6. Filiform apparatus plays an important role in fertilization by ensuring proper guidance of the pollen tube

2. (D)

1. Geitonogamy refers to transfer of pollen grains from one flower to another flower of the same plant.
2. It usually requires a pollinating agent like wind or insects.
3. Genetically, it resembles self-pollination because both flowers belong to the same plant.
4. Functionally, it behaves like cross-pollination since pollen transfer occurs between different flowers.
5. It maintains parental genetic characters with very little variation.
6. It differs from autogamy, where pollen transfer occurs within the same flower.

3. (A)

1. Polyembryony is the occurrence of more than one embryo in a seed and is commonly seen in Citrus and Lemon.
2. Perisperm is residual nucellus remaining in the seed after fertilization; Black pepper shows perisperm.
3. False fruits develop from floral parts other than ovary; Apple develops mainly from thalamus.
4. Parthenocarpy is development of fruit without fertilization.
5. Banana is a common naturally parthenocarpic fruit and hence seedless.
6. These examples are important standard biological illustrations.

4. (A)

1. Test cross is used to determine the genotype of an individual showing dominant phenotype.
2. The unknown dominant plant is crossed with a homozygous recessive plant.
3. In pea plant, tallness is dominant over dwarfness.
4. A tall F₂ plant may be homozygous dominant (TT) or heterozygous (Tt).
5. Crossing it with dwarf plant (tt) reveals the genotype based on offspring ratio.
6. If all offspring are tall, parent is TT; if 1:1 ratio appears, parent is Tt.

5. (B)

1. In incomplete dominance, neither allele completely dominates the other.



2. The heterozygous condition shows an intermediate phenotype.
 3. Example: Snapdragon flower colour.
 4. Red flower (RR) crossed with white flower (rr) produces pink flowers (Rr).
 5. Selfing of F₁ pink flowers gives F₂ ratio: 1 Red : 2 Pink : 1 White.
 6. Both genotypic and phenotypic ratios become 1:2:1.
- 6. (C)**
1. Down syndrome occurs due to trisomy of chromosome 21.
 2. Affected individuals often show mental retardation and developmental delay.
 3. They may possess broad palm, short stature and congenital heart defects.
 4. Intelligence level is usually lower than average.
 5. Therefore, the statement “more intelligent” is biologically incorrect.
 6. Turner syndrome occurs due to absence of one X chromosome (XO).
- 7. (B)**
1. Round seed shape is dominant over wrinkled seed shape.
 2. In a dihybrid cross, each character segregates independently.
 3. Considering only seed shape:
Round = R, Wrinkled = r.
 4. F₁ plants are heterozygous (Rr).
 5. Selfing of F₁ gives phenotypic ratio 3 round : 1 wrinkled.
 6. This demonstrates the law of segregation.
- 8. (B)**
1. Griffith worked with *Streptococcus pneumoniae* bacteria.
 2. R strain bacteria are non-virulent and do not kill mice.
 3. Live S strain bacteria are virulent and kill mice.
 4. Heat-killed S strain alone does not kill mice.
 5. Thus statement “R strain injected into mice → mice live” is correct.
 6. Griffith concluded that some transforming principle transferred virulence.
- 9. (A)**
1. Transfer RNA carries amino acids to ribosome during translation.
 2. It possesses an anticodon loop containing three bases.
 3. These bases pair complementarily with codons on mRNA.
 4. Correct codon-anticodon pairing ensures accurate protein synthesis.
 5. Amino acid acceptor end lies opposite to anticodon loop.
 6. This mechanism maintains fidelity of translation.
- 10. (C)**
1. Mature mRNA contains coding and non-coding regions.
 2. The 5' untranslated region lies before initiation codon AUG.
 3. The 3' untranslated region lies after termination codon.
 4. UTRs help in stability and efficient translation of mRNA.
 5. They regulate ribosome binding and translation efficiency.
 6. Both 5' and 3' ends contain untranslated regions.
- 11. (C)**
1. DNA strands are complementary to each other.
 2. Adenine pairs with thymine and guanine pairs with cytosine.
 3. Template strand given:
3'-ATGCATGCATGCATGC-5'
 4. Complementary coding strand becomes:
5'-TACGTACGTACGTACG-3'
 5. Coding strand has polarity opposite to template strand.



6. Some printed options are erroneous, but this is the biologically correct sequence.

12. (A)

1. Vertebrate embryos show common developmental features.
2. Presence of pharyngeal or gill slits indicates common ancestry.
3. These structures are temporary and vestigial in higher vertebrates.
4. Embryos do not pass through adult stages of lower organisms.
5. Early embryonic similarities support evolution.
6. Therefore, Statement I is correct and Statement II is incorrect.

13. (C)

1. Black rot of crucifers is caused by *Xanthomonas campestris*.
2. It affects cabbage, cauliflower and related plants.
3. Brown rust of wheat is caused by fungus.
4. Tobacco mosaic disease is caused by virus.
5. Late blight of potato is caused by *Phytophthora*.
6. Hence only Black rot is bacterial.

14. (B)

1. Carrot is rich in beta carotene, precursor of Vitamin A.
2. Spirulina is protein-rich microbial biomass used as SCP.
3. Bitter melon contains Vitamin C.
4. Beans are rich plant protein sources.
5. SCP helps in overcoming protein deficiency.
6. Such nutrient sources are important in balanced diet.

15. (D)

1. Antibiotics are substances produced by microorganisms.
2. They inhibit or kill other microbes.
3. Penicillin was discovered from *Penicillium* fungus.

4. Streptomycin and tetracycline are other examples.
5. Antibiotics are widely used in medicine.
6. They revolutionized treatment of infectious diseases.

16. (D)

1. Activated sludge contains large amounts of aerobic bacteria.
2. These microbes decompose organic matter in sewage.
3. *Methanobacterium* is anaerobic, not aerobic.
4. Biogas is a mixture of methane, CO₂ and other gases.
5. Methanogens produce methane under anaerobic conditions.
6. Thus, option D is correct.

17. (B)

1. Parasites usually possess hooks or suckers for attachment.
2. These organs help them remain attached to host tissues.
3. Many parasites lose unnecessary sense organs.
4. Digestive system may be reduced or absent.
5. High reproductive capacity increases survival chances.
6. Therefore, absence of suckers is not a parasitic adaptation.

18. (C)

1. Deep sea fishes possess biochemical adaptations to high pressure.
2. Desert lizards show behavioural adaptation by basking.
3. Kangaroo rats conserve water physiologically.
4. *Opuntia* has reduced leaves and succulent stem.
5. Adaptations help organisms survive in extreme environments.
6. Different organisms evolve specialized survival strategies.

**19. (A)**

1. Net Primary Productivity (NPP) refers to the amount of organic matter remaining after respiration losses.
2. Producers synthesize food through photosynthesis.
3. Part of this energy is utilized for respiration and the rest is stored as biomass.
4. The annual NPP of the entire biosphere is approximately 170 billion tons of dry organic matter.
5. NPP represents the energy available for consumers in the ecosystem.
6. It is an important ecological parameter to measure ecosystem productivity.

20. (A)

1. Phosphorus is an essential nutrient required for ATP, nucleic acids and phospholipids.
2. The phosphorus cycle is a sedimentary cycle.
3. Its major reservoir exists in rocks and sediments.
4. Weathering releases phosphate ions into soil and water.
5. Plants absorb phosphates and transfer them through food chains.
6. Unlike nitrogen cycle, atmosphere has almost no role in phosphorus cycling.

21. (D)

1. Primary succession in aquatic habitat is called hydrarch succession.
2. It begins with phytoplankton community in water bodies.
3. Rooted submerged and floating hydrophytes gradually appear.
4. Reed swamp and marsh meadow stages develop due to sediment accumulation.
5. Scrub stage is followed by tree stage forming climax forest.
6. The process converts aquatic habitat gradually into mesic terrestrial habitat.

22. (C)

1. Biodiversity hotspots are regions rich in endemic species.

2. These areas face high levels of habitat destruction.
3. Conservation of hotspots protects maximum biodiversity.
4. Strict protection can reduce mass extinction significantly.
5. Approximately 30% reduction in extinction can occur through hotspot conservation.
6. India contains important hotspots like Western Ghats and Himalayas.

23. (D)

1. Dodo became extinct from Mauritius.
2. Quagga became extinct from Africa.
3. Thylacine or Tasmanian tiger disappeared from Australia/Tasmania.
4. Steller's sea cow was found near Bering Sea region.
5. Therefore, matching it with North America is incorrect.
6. Human activities played major role in extinction of many species.

24. (B)

1. Tropical regions remain climatically stable for long periods.
2. Stable environments allow organisms to evolve specialized niches.
3. Niche specialization reduces competition among species.
4. This promotes coexistence of large number of organisms.
5. Therefore, tropical areas possess greater species diversity.
6. Tropical rainforests are examples of highly diverse ecosystems.

25. (C)

1. Scrubbers are devices used to remove harmful gases from industrial exhaust.
2. They are commonly installed in thermal power plants.
3. Scrubbers mainly remove sulphur dioxide gas.
4. Exhaust gases are passed through lime or limestone slurry.



5. Sulphur dioxide reacts to form harmless precipitates.
 6. This helps reduce acid rain and air pollution.
- 26. (B)**
1. Excess nitrogen fertilizers cause eutrophication in water bodies.
 2. Carbon dioxide is the major greenhouse gas.
 3. Carbon monoxide is a poisonous air pollutant.
 4. CFCs destroy ozone layer in stratosphere.
 5. Ozone depletion increases UV radiation reaching Earth.
 6. Human activities significantly contribute to these environmental issues.
- 27. (D)**
1. In haplodiplontic life cycle, both haploid and diploid phases are multicellular.
 2. Ectocarpus exhibits alternation of generations.
 3. Sporophyte and gametophyte are independent phases.
 4. Chlamydomonas generally shows haplontic cycle.
 5. Fucus shows diplontic life cycle.
 6. Hence Ectocarpus is the correct example.
- 28. (C)**
1. A flower possessing both androecium and gynoecium is called bisexual.
 2. Such flowers contain both male and female reproductive structures.
 3. They are also called hermaphrodite flowers.
 4. Examples include Hibiscus and mustard.
 5. Unisexual flowers possess either stamens or carpels only.
 6. Bisexual flowers may undergo self or cross pollination.
- 29. (B)**
1. Vacuoles are membrane-bound organelles found mainly in plant cells.
 2. The surrounding membrane is called tonoplast.
 3. Vacuoles contain cell sap, water and dissolved substances.
 4. They may also store pigments and excretory products.
 5. Vacuoles help maintain turgor pressure in cells.
 6. Large central vacuole is characteristic of mature plant cells.
- 30. (A)**
1. Pachytene is a substage of Prophase I of meiosis.
 2. Homologous chromosomes pair completely during this stage.
 3. Crossing over occurs between non-sister chromatids.
 4. Recombinase enzyme catalyzes exchange of chromosomal segments.
 5. Crossing over produces genetic recombination.
 6. This process increases genetic variation among offspring.
- 31. (C)**
1. Water potential represents the free energy of water.
 2. Pure water under standard conditions has water potential equal to zero.
 3. Addition of solute decreases water potential.
 4. Water moves from higher water potential to lower water potential.
 5. Water potential is represented by Ψ_w .
 6. It is important in osmosis and water transport in plants.
- 32. (B)**
1. Chlorophyll a is the primary photosynthetic pigment and appears blue-green.
 2. Chlorophyll b appears yellow-green.
 3. Carotenoids appear yellow-orange in chromatograms.
 4. Xanthophylls appear yellow.
 5. Pigments can be separated using paper chromatography.
 6. Different pigments absorb different wavelengths of light.

**33. (A)**

1. Glycolysis occurs in cytoplasm producing pyruvate.
2. Pyruvate enters mitochondria for aerobic respiration.
3. It undergoes oxidative decarboxylation.
4. Pyruvate converts into Acetyl CoA.
5. Acetyl CoA enters Krebs cycle by combining with oxaloacetic acid.
6. Therefore, Acetyl CoA acts as link between glycolysis and TCA cycle.

34. (D)

1. Gibberellins are plant growth hormones promoting stem elongation.
2. Bolting refers to sudden elongation of internodes before flowering.
3. This phenomenon is common in rosette plants like cabbage and beet.
4. Gibberellins stimulate cell elongation and division.
5. Auxins are associated with apical dominance.
6. Therefore, gibberellins are correctly associated with bolting.