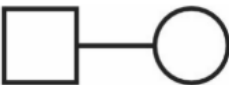


KSEAB PYQ K (2025)

Kannada

BOTANY

1. “Pollen grains are well preserved as fossils” because of the presence of “sporopollenin” as:
Statement I: Sporopollenin is the most resistant organic material known.
Statement II: No enzyme that degrades sporopollenin is so far known.
(A) Both the Statements I and II are correct
(B) Statement I is correct and Statement II is incorrect
(C) Both the Statements I and II are incorrect
(D) Statement I is incorrect and Statement II is correct
2. Which one among the given is a symbol used in human pedigree analysis for consanguineous mating?
(A) 
(B) 
(C) 
(D) 
3. Which one among these represent the flow of genetic information?
(A) mRNA → DNA → Protein
(B) Protein → mRNA → DNA
(C) DNA → mRNA → Protein
(D) DNA → Protein → mRNA
4. If the change in gene frequency occurs by chance, it is called
(A) Gene flow
(B) Mutation
(C) Genetic recombination
(D) Genetic drift
5. Which among the following is an enzyme modified by genetic engineering and used as “Clot buster”?
(A) Lipase
(B) Pectinase
(C) Protease
(D) Streptokinase
6. In which of the processes given, the humus is degraded by some microbes and release of inorganic nutrients occur?
(A) Leaching
(B) Mineralisation
(C) Catabolism
(D) Humification
7. Which one among these is an example for Ex-situ conservation?
(A) Cryopreservation
(B) Biosphere reserve
(C) National Park
(D) Sanctuaries
8. Few flowering plants have evolved a special mechanism to produce seeds without fertilization called _____.
9. Members of genus _____ form mycorrhiza and absorb phosphorous from soil and supply it to the plant.



10. Draw a neat labelled diagram of dicot embryo.
11. Differentiate between Linkage and Recombination.
12. "AUG has dual function". Justify the statement.
13. Which drug is very useful in patients who have undergone surgery? And why?
14. "Tropical regions have greater biological diversity".
Give two hypotheses proposed by ecologists in favour of the above statement.
15. List the features required for the flowers pollinated by wind.
16. In an ecosystem the number of primary producers is 4 and primary consumers is 21.
Construct an ecological pyramid for this ecosystem.
17. (A) How phenylketonuria is an example for Pleiotropy?
(B) Schematically represent the sex determination in honeybee.
18. Explain incomplete dominance with an example.
19. Write any five salient features of human genome.
20. (A) Name the biocontrol agents of aphids and mosquitoes respectively.
(B) How *Bacillus thuringiensis* can be used as biocontrol agent?
21. Give suitable terms for the following examples/statements with respect to population interactions.
(A) The method Mediterranean orchid *Ophrys* employs to get pollinated.
(B) Species facing competition might evolve mechanism that promote co-existence rather than exclusion.
(C) The parasitic bird lays eggs in the nest of its host and lets the host bird incubate them.
(D) The interaction between cattle egret and grazing cattle.
(E) The interaction in which one species is harmed while the other is unaffected.
22. Analyse the below given transcription Unit diagram and answer the given questions.
(A) Name the Parts A and B in the diagram.
(B) Which site of transcription unit provides the binding site for RNA polymerase?
(C) Write the sequence of bases of the mRNA transcribed from the template given in the diagram.
23. Failure of segregation of chromatids during cell division cycle results in _____.
(A) Haploidy
(B) Diploidy
(C) Aneuploidy
(D) Polyploidy
24. List the salient features of genetic code.



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Hint & Solution

1. (A)

1. Pollen grains have a protective outer layer called exine.
2. Exine is made up of a highly resistant substance called sporopollenin.
3. Sporopollenin can withstand high temperature, strong acids, and alkalis.
4. It protects pollen grains from decomposition and microbial action.
5. No enzyme capable of degrading sporopollenin is known, hence pollen grains remain preserved as fossils.

2. ()

Double horizontal line

1. Pedigree analysis uses standard symbols to study inheritance patterns.
2. Male is represented by square and female by circle.
3. Marriage is represented by a horizontal line between them.
4. Consanguineous mating is represented by a double horizontal line.
5. It indicates mating between close relatives.

3. (C)

1. DNA contains genetic information.
2. DNA is copied into mRNA by transcription.
3. mRNA carries the information from nucleus to cytoplasm.
4. Ribosomes translate mRNA to form proteins.
5. This sequence is called the central dogma.

4. (D)

1. Genetic drift is a random change in allele frequency.
2. It occurs due to chance events.
3. It is more prominent in small populations.
4. It may reduce genetic variation.
5. Founder effect and bottleneck effect are examples of genetic drift.

5. (D)

1. Streptokinase helps dissolve blood clots.
2. It activates conversion of plasminogen into plasmin.
3. Plasmin breaks down fibrin threads in clots.
4. It is used in treatment of myocardial infarction.
5. It is produced using biotechnology methods.

6. (B)

1. Organic matter is converted into inorganic substances by microbes.
2. This process releases minerals into soil.
3. Released nutrients become available to plants.
4. Microorganisms play an important role in nutrient cycling.
5. Mineralisation maintains soil fertility.

7. (A)

1. Ex-situ conservation protects organisms outside their natural habitat.
2. Cryopreservation involves storage at very low temperature.
3. Gametes, seeds, or tissues can be preserved.
4. It helps conserve endangered species.
5. Seed banks and tissue culture are other examples.



8. ()

Apomixis

1. Apomixis is a form of asexual reproduction in plants.
2. In this process, seeds are formed without fertilisation.
3. The embryo develops without fusion of male and female gametes.
4. It helps in maintaining desirable characters of plants.
5. It is useful in agriculture for preserving hybrid characters.

9. ()

Glomus

1. Glomus forms a symbiotic association with plant roots.
2. This association is called mycorrhiza.
3. The fungus helps plants absorb phosphate nutrients.
4. The plant provides carbohydrates to the fungus.
5. It improves plant growth and mineral nutrition.

10. ()

A dicot embryo consists of

1. Two cotyledons which store food materials.
2. Embryonal axis present between the cotyledons.
3. Plumule develops into the shoot system.
4. Radicle develops into the root system.
5. Hypocotyl and epicotyl are parts of the embryonal axis.

(Required diagram labels: Cotyledons, Plumule, Epicotyl, Hypocotyl, and Radicle.)

11. ()

Linkage	Recombination
Genes located close together on same chromosome tend to be inherited together.	Formation of new combinations of genes.
It reduces chances of separation of genes.	Occurs due to crossing over.
It maintains parental combinations.	Produces variations in offspring.
Stronger when genes are closer.	Frequency increases with distance between genes.
Observed during inheritance.	Occurs during meiosis.

12. ()

1. AUG acts as the initiation codon during translation.
2. It signals the beginning of protein synthesis.
3. AUG codes for the amino acid methionine.
4. In prokaryotes, it codes for formyl methionine during initiation.
5. Thus, AUG functions both as a start signal and as a codon for an amino acid.

13. ()

Streptokinase

1. Streptokinase is a clot-dissolving enzyme used as a thrombolytic agent.
2. After surgery, blood clots may form inside blood vessels.
3. Streptokinase activates plasminogen into plasmin, which breaks down fibrin threads.
4. Thus, it helps prevent blockage of blood vessels due to clots.

14. ()

1. Species–Area Relationship: Larger areas generally support more diversity. Tropical regions have favourable climatic conditions and large habitats.
2. More Time Hypothesis: Tropical regions remained undisturbed for millions of years, allowing more time for evolution and diversification.

15. ()

1. Wind-pollinated flowers are usually small and inconspicuous.
2. They produce a large quantity of light, dry, and non-sticky pollen grains.
3. Stamens are well exposed to release pollen easily.
4. Stigmas are large and feathery to trap airborne pollen.
5. They generally do not produce nectar or attractive colours.

16. ()

Pyramid of Numbers (Inverted at the base)

1. Primary producers form the first trophic level.
2. Given: Producers = 4, Primary consumers = 21.
3. Since consumers outnumber producers, the pyramid will be inverted at the base, with consumers at the broader upper level and producers at the narrower lower level.

17. ()

(A)

1. Pleiotropy is when one gene affects multiple traits.
2. Phenylketonuria is caused by a mutation in the gene coding for phenylalanine hydroxylase.
3. The defective enzyme leads to phenylalanine accumulation, affecting brain development and other body functions simultaneously.

(B)

1. Honeybees show haplodiploid sex determination.
2. Fertilised eggs (2n) develop into females (Queen/Worker).
3. Unfertilised eggs (n) develop into males (Drone) via parthenogenesis.

18. ()

1. It is a type of inheritance where neither allele is completely dominant, resulting in an intermediate phenotype in heterozygotes.
2. Example: Flower colour in *Mirabilis jalapa* (four o'clock plant).
3. Crossing a Red flower (RR) with a White flower (rr) results in Pink flowers (Rr) in the F1 generation.
4. Selfing F1 results in a phenotypic/genotypic ratio of 1 (Red) : 2 (Pink) : 1 (White).

19. ()

1. Contains approximately 3.2 billion base pairs.
2. Estimated number of genes is 20,000–25,000.
3. An average gene consists of 3000 base pairs, though sizes vary.
4. Less than 2% of the genome codes for proteins.
5. About 99.9% of nucleotide sequences are identical among all humans.
6. Chromosome 1 has the most genes; the Y chromosome has the fewest.

20. ()

(A)

Aphids → Ladybird beetle; Mosquito larvae → Dragonfly.

(B)

1. It is a soil bacterium that produces crystalline proteins (Bt toxins).
2. When consumed by larvae, the crystals become active in their alkaline gut.
3. The toxin damages the gut lining, killing the insect. Bt genes are now introduced into crops like Bt cotton for resistance.



21. ()
- (A) Mediterranean orchid *Ophrys* uses to get pollinated: Sexual deception.
 - (B) Species facing competition evolve mechanisms promoting coexistence: Resource partitioning.
 - (C) Parasitic bird lays eggs in host nest: Brood parasitism.
 - (D) Interaction between cattle egret and grazing cattle: Commensalism.
 - (E) Interaction where one species is harmed and other is unaffected: Amensalism.
22. ()
- A – Promoter
 - B – Structural gene
23. (C)
- Aneuploidy (abnormal chromosome number due to non-disjunction).
24. ()
1. Triplet code. 2. Each codon specifies one amino acid. 3. Nearly universal. 4. Degenerate (some amino acids have >1 codon). 5. AUG is the start codon. 6. UAA, UAG, UGA are stop codons. 7. Read continuously (non-overlapping).