



Previous Year Question Paper

SET – KERALA
BOTANY
PAPER - II
State Eligibility Test

July - 2017

(Original Question Paper with Answer Key)

Kerala State Eligibility Test - KSET



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Kerala SET Botany : July, 2017
Original Question Paper with Answer Key

A

17803

120 MINUTES

1. Recently India's central biotech regulator, Genetic Engineering Appraisal Committee (GEAC), cleared the genetically modified Mustard for commercial cultivation and recommended its approval to the environment ministry. Name the first food crop which got clearance from GEAC?
A) Brinjal B) Cotton C) Maize D) Tomato
Ans. A
2. Name the Scientists who discovered restriction enzymes.
A) Watson and Crick
B) Jacob and Monad
C) Nathan, Arber and Smith
D) Boyer and Cohen
Ans. C
3. Asexual, hollow fungal fruiting body lined inside with conidiophores is called:
A) Conidium B) Basidium C) Pycnidium D) Peridium
Ans. C
4. Match the plant organ modifications with the genus names:
a. *Cladode* 1) *Passiflora*
b. *Phylloclade* 2) *Gloriosa*
c. *Leaf tendril* 3) *Opuntia*
d. *Stem tendril* 4) *Asparagus*
A) a-4, b-3, c-2, d-1 B) a-4, b-2, c-1, d-3
C) a-3, b-4, c-1, d-2 D) a-3, b-4, c-2, d-1
Ans. A
5. The composite transposons (eg. *Tn10*) characteristically contain copies of -----
A) Introns
B) Insertion sequence
C) Genes that encode sigma factor
D) *Ac* element
Ans. B
6. Name the technology that simultaneously measures and analyzes multiple physical characteristics of single particles, usually cells, as they flow in a fluid stream through a beam of light.
A) Liquid scintillation B) Flow cytometry
C) Gel filtration D) Fast protein liquid chromatography
Ans. B
7. Xylem cavitation refers to:
A) Gas filled void in xylem B) Expansion of air bubble in xylem
C) Freezing of xylem D) Development of tension in xylem
Ans. B
8. The modern bread wheat *Triticum aestivum* is:
A) Diploid B) Hexaploid C) Triploid D) Tetraploid
Ans. B

9. A strain of bacteria possesses a temperature sensitive mutation in the gene that encodes the rho subunit of RNA polymerase. At high temperatures, rho is not functional in this strain. When these bacteria are raised at elevated temperatures, which of the following effects would you expect to see?
- Inhibition of transcription
 - All the RNA molecules produced will be longer than normal
 - All the RNA molecules produced will be shorter than normal
 - Some of the RNA molecules produced will be longer than normal
- Ans. D
10. Select the alga with unbranched thallus:
- Zygnema*
 - Ectocarpus*
 - Batrachospermum*
 - Polysiphonia*
- Ans. A
11. Match the following with the correct combination:
- | | |
|----------------------------|---|
| 1. Shine-Dalgarno sequence | a. mRNA surveillance |
| 2. tRNA Charging | b. Eukaryotic transcription initiation |
| 3. Kozak sequence | c. Prokaryotic transcription initiation |
| 4. tmRNA | d. Adenosine triphosphate |
- 1-c, 2-d, 3-b, 4-a
 - 1-c, 2-d, 3-a, 4-b
 - 1-d, 2-c, 3-b, 4-a
 - 1-d, 2-c, 3-a, 4-b
- Ans. A
12. From the following statements find out the one which is not an objective of plant embryo culture
- Clonal propagation of an elite mother plant
 - Overcoming embryo abortion due to incompatibility factors
 - Embryo rescue in distant hybridization
 - Overcoming seed dormancy
- A
13. Which of the following is not a sequence alignment tool?
- BLAST
 - FASTA
 - CLUSTAL-W
 - RASMOL
- Ans. D
14. Which of the following is not an objective of vegetative propagation?
- Multiplication of an elite variety
 - Production of 'true to the type' plants
 - Cost effective multiplication of plants
 - Production of plants which are resistant to pests
- Ans. D
15. The following are some statements about structural genes and regulator genes. Choose the combination which represents the statements which are false.
- Structural genes are transcribed into mRNA, but regulator genes are not.
 - Structural genes encode proteins that function in the structure of the cell, products of regulator genes carry out metabolic reactions
 - Structural genes encode proteins, regulator genes control the transcription of structural genes
 - Both structural and regulator genes are transcribed into mRNA
- 1 & 2 only
 - 3 & 4 only
 - 1 & 3 only
 - 2 & 4 only
- Ans. A

16. Which of the following is a rootless Pteridophyte?
 A) *Lycopodium* B) *Isoetes*
 C) *Ophioglossum* D) *Salvinia*
Ans. D
17. Presence of more than two alleles at a locus in a population is referred to as multiple alleles. If five different alleles are present at a locus how many genotypes, with respect to the locus, are possible in the population?
 A) 30 B) 25 C) 10 D) 15
Ans. D
18. Which of the following is not true about fimbriae?
 A) They are made of a protein
 B) Fimbriae allow cells to adhere to surfaces
 C) They are made of pilin
 D) They are involved in conjugation
D
19. Match the following terms with the names of the Pteridophytes:
 a. *Tassel* 1) *Osmunda*
 b. *Spike* 2) *Azolla*
 c. *Prismatic tissue* 3) *Isoetes*
 d. *Sporocarp* 4) *Ophioglossum*
 A) a-1, b-3, c-2, d-4 B) a-2, b-4, c-1, d-3
 C) a-1, b-4, c-3, d-2 D) a-2, b-4, c-3, d-1
Ans. C
20. Acetylation of histones -----
 A) stimulates translation B) stimulates transcription
 C) retards translation D) retards transcription
Ans. B
21. Select the one which is not a component of spindle:
 A) Polar microtubules B) Nonpolar microtubules
 C) Astral microtubules D) Kinetochore microtubules
Ans. B
22. In the tomato the mutant genes **o** (*oblate* = flattened fruit), **p** (*peach* = hairy fruit) and **s** (*compound inflorescence* = many flowers in a cluster) were found to be in chromosome 2. From the following data (test cross mating of an F1 heterozygote for all three genes X homozygous recessive for all three genes) determine the middle gene.

+++ - 73	o++ - 110
++s - 348	o+s - 2
+p+ - 2	op+ - 306
+ps - 96	ops - 63

 A) s B) o C) p D) Cannot be determined
Ans. B
23. Which of the following is the only living fossil representative of Gymnosperm?
 A) *Ginkgo biloba* B) *Glossopteris browniana*
 C) *Cupresus Sempervirens* D) *Pinus sylvestris*
Ans. A

24. Three linked genes **a,b,c** occupy the following linkage positions on a particular chromosome.



Choose the genotypes of the gametes which are represented the least in the pool of gametes produced by an individual with the genotype **abc/ABC**

- | | |
|----------------------------|----------------------------|
| A) Abc & ABC | B) aBC & Abc |
| C) abC & ABc | D) aBc & AbC |

Ans. D

25. Choose the correct match between the antibodies with the statements:

- | | |
|----------------------|--|
| a. <i>IgM</i> | 1) <i>can cross placenta and confer passive immunity to fetus</i> |
| b. <i>IgE</i> | 2) <i>common in body secretions</i> |
| c. <i>IgG</i> | 3) <i>appears first in response to a primary infection</i> |
| d. <i>IgA</i> | 4) <i>involved in allergic reactions</i> |

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

Ans. B

26. Choose the species of *Gnetum* which is a woody climber

- | | |
|-------------------------|-----------------------------|
| A) <i>Gnetum ula</i> | B) <i>Gnetum contractum</i> |
| C) <i>Gnetum gnemon</i> | D) <i>Gnetum trinerve</i> |

Ans. A

27. Neils Jerne, Georges Koehler and Cesar Milstein were awarded the Nobel Prize in Physiology or Medicine in 1984 for the discovery of

- | |
|--|
| A) RNA interference |
| B) Eukaryotic transcription factors |
| C) Principle for the production of monoclonal antibodies |
| D) Genetic control of early embryonic development |

Ans. C

28. Choose the correctly matched combination:

- | | |
|---------------------------------------|---|
| a. <i>lacZ</i> | 1) <i>prevents self ligation of vector</i> |
| b. <i>DMSO</i> | 2) <i>blue-white selection</i> |
| c. <i>Alkaline phosphatase</i> | 3) <i>cryoprotectant</i> |
| d. Mg^{2+} | 4) <i>Taq DNA polymerase</i> |

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

Ans. A

29. Which of the following is a suitable method for mass propagation of an elite plant which is virus infected?

A) Nodal culture B) Anther culture
C) Meristem culture D) Callus culture

Ans. C
30. The following are the steps of a technique used to differentiate organisms based on the patterns derived from the cleavage of their DNA. Identify the technique.

i. Restriction digestion of DNA
ii. Electrophoresis
iii. Southern Blotting
iv. Hybridization using probe
v. Autoradiography
vi. Analysis of autoradiogram

A) RAPD B) AFLP C) RFLP D) SNP detection

Ans. C
31. Which of the following is not a part of the gene gun or microprojectile bombardment device?

A) Rupture disk B) Macroprojectiles
C) Stopping screen D) Micromanipulator

Ans. D
32. Choose the set that represents the databases involved in the International Nucleotide Sequence Database Collaboration (INSDC)?

A) DDBJ, ENA and NCBI-GENBANK
B) DDBJ, SWISS-PROT and PROSITE
C) PDB, SWISS-PROT and PROSITE
D) DDBJ, SWISS-PROT and NCBI-GENBANK

Ans. A
33. The term used to denote the complete set of RNAs present in a cell, tissue or organism under any particular set of conditions is:

A) Transcriptome B) Metabolome
C) Proteome D) Genome

Ans. A
34. The expansion of BLAST is:

A) Beginners Local Alignment Search Tool
B) Beginners Logical Alignment Search Tool
C) Basic Local Alignment Search Tool
D) Beginners Local Alignment Software Tool

Ans. C
35. Name the gene used for the construction of the first generation Golden Rice.

A) Polygalacturonase gene from *Erwinia uredovora*
B) Phytoene synthase gene from *Erwinia uredovora*
C) Phytoene synthase gene from Daffodil
D) Polygalacturonase gene from Daffodil

Ans. C
36. Select the method of vegetative propagation in which the scion is separated from the mother plant only after the establishment of the graft union

A) Mount layering B) Cleft grafting
C) Approach grafting D) Both A and B

Ans. C

37. Vector is a self replicating DNA molecule used in gene cloning. Which of the following vectors is used to produce single stranded copies of the DNA insert?
 A) Phage λ vectors B) M 13 vectors
 C) Plasmid vectors D) Expression vectors **Ans. B**
38. Which of the following is NOT true about Retroviruses?
 A) Retroviruses use own reverse transcriptase enzyme to synthesize its DNA
 B) Retroviruses are positive-sense RNA viruses
 C) The retroviral DNA integrates itself with the host genome as a provirus
 D) Retroviruses are not used as research tool in gene delivery systems **Ans. C**
39. Observe the following edible tubers. Choose the stem tuber from them.
 A) Tapioca B) Sweet potato C) Potato D) Radish **Ans. C**
40. Suppose you inoculate three flasks of minimal medium with *E.coli*. Flask **A** contains glucose, Flask **B** contains lactose and glucose and Flask **C** contains lactose. After a few hours of incubation you test the flasks for the presence of β -galactosidase. Which flask(s) do you predict will have this enzyme?
 A) B and C B) B alone C) C alone D) A and C **Ans. C**
41. Phage lysozyme is an enzyme involved in:
 A) Breaking down of portions of bacterial cell wall
 B) Phage nucleic acid multiplication
 C) Phage coat synthesis
 D) Phage maturation **Ans. A**
42. Read the following statements about Pteridophytes and find out the wrong statement:
 i. *In heterosporic pteridophytes sex differentiation takes place in the gametophytic phase*
 ii. *The xylem is endarch in the stems of all pteridophytes*
 iii. *Pteridophytes with endosporic gametophytes will be heterosporic*
 iv. *In megaphyllous pteridophytes emergence of leaf traces leaves gaps in the stele*
 A) i and ii only B) iii and iv only
 C) i and iii only D) ii and iv only **Ans. A**
43. In a bacterial repressible operon the regulator protein is a repressor. A mutation at the operator site of that operon prevents the regulator protein from binding. Then the operon:
 A) Will never be turned on B) Will never be turned off
 C) Will undergo attenuation D) Will be repressed **Ans. B**
44. Bacteriophages can be grown in bacterial cultures on solid media. The concentration of bacteriophage suspension is usually expressed in terms of PFU. PFU stands for:
 A) Plaque forming units B) Phage forming units
 C) Particle forming units D) Peptide forming units **Ans. A**

45. Fruit colour of egg plant is an example of incomplete dominance. The egg plants produce purple, violet and white coloured fruits depending up on the genotype of the plant. The alleles involved are P and p. Homozygous dominant plants produce purple fruits, homozygous recessive plants produce white fruits and the heterozygotes produce violet fruits. If a plant with violet fruits is used in a test cross what proportion of the progeny from this cross will be with white fruits?
A) All the progeny B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) 0
Ans. C
46. Capsomeres are ----
A) Fully developed infectious viral particles
B) Subunits of viral protein coat
C) Special structure seen in the genetic material of retroviruses
D) Special structure seen in the genetic material of adenoviruses
Ans. B
47. Name the pteridophyte with the structures, velum and foramen.
A) *Ophioglossum* B) *Equisetum*
C) *Isoetes* D) *Marsilea*
Ans. C
48. Select the one which is not a reaction of photorespiration
A) Oxygenation of RuBP into 2-phosphoglycolic acid and 3-phosphoglyceric acid
B) Oxidation of glycolic acid to glyoxylate
C) Conversion of two molecules of glycine into one molecule of serine
D) Decarboxylation of malic acid to pyruvic acid
Ans. D
49. The Hardy-Weinberg law describes how reproduction and Mendelian principles affect the allelic and genotypic frequencies of a population. Which of the following statement is not an assumption of the Hardy-Weinberg law?
A) The allelic frequencies of the population do not change
B) The allelic frequencies (p and q) are equal
C) The population is randomly mating
D) The population is large
Ans. D
50. Columns A and B contain a few statements about gymnosperms and angiosperms respectively. In both the columns some statements are wrong. Find out the wrong statements.

No.	A (Gymnosperms)	No.	B (Angiosperms)
1	Heterosporous	a	Heterosporous
2	Ovules are absent	b	Produces exosporic gametophytes
3	Naked ovary present	c	Sporophytic phase is not the predominant phase in the life cycle
4	Generally xylem vessels are absent	d	Male gametes are nonmotile

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

Ans. B

51. The Birbal Sahni Institute of Palaeobotany is an autonomous institute constituted under the Department of Science and Technology, Government of India. In which State is this institute located?
A) Rajasthan B) Uttar Pradesh C) West Bengal D) Punjab
Ans. B
52. The following are some statements about cDNA libraries. Choose the combination which represents the statements which are true.
i. *cDNA library is representative of the RNA population from which it is derived*
ii. *Clones in cDNA library contains only introns*
iii. *A cDNA from the library cannot be cloned into a prokaryotic organism*
iv. *Construction of a cDNA library involves the use of reverse transcriptase*
A) i & ii only B) ii & iii only C) i & iv only D) i & iii only
Ans. C
53. The major ingredient of the Cinnamon leaf oil is -----
A) Cinnamaldehyde B) Eugenol
C) Cinnamonalcohol D) Thymol
Ans. B
54. Observe the following statements related to Eutrophication. Choose the correct statement(s).
i. Higher level of Nitrogen and Phosphorus
ii. More cyanobacterial colonies
iii. High BOD level
A) i only B) i and iii only
C) i and ii only D) All of these
Ans. D
55. Which of the following is an aggregate fruit?
A) Apple B) Custard apple
C) Pineapple D) Fig
Ans. B
56. Match the technical terms with the binomials:
a) *Gynobasic style* 1) *Artabotrys odoratissimus*
b) *Apocarpous pistil* 2) *Helianthus annuus*
c) *Cypsela* 3) *Citrus sinensis*
d) *Hesperidium* 4) *Leucas aspera*
A) a-2, b-4, c-1, d-3 B) a-2, b-3, c-4, d-1
C) a-4, b-1, c-2, d-3 D) a-4, b-1, c-3, d-2
Ans. C
57. Pick the mismatch
A) Legume - Fabaceae
B) Pome - Portulacaceae
C) Caryopsis - Poaceae
D) Siliqua - Brassicaceae
Ans. B

58. A glass tank is divided into two equal sized chambers (A and B) using a semipermeable membrane. Chambers A and B contain one liter water each. In addition chamber A contains 50 gram sucrose and chamber B contains 100 gm sucrose. Choose the expected result from the following options.
- Water will move from A to B
 - Water will move from B to A
 - Since both A and B contain equal volume of water no movement occur
 - Cannot predict
- Ans. A
59. Match the commercial products with the binomials:
- | | |
|---------------------|-----------------------------------|
| a) <i>Mace</i> | 1) <i>Glycine max</i> |
| b) <i>Soybean</i> | 2) <i>Myristica fragrans</i> |
| c) <i>Rose wood</i> | 3) <i>Dalbergia latifolia</i> |
| d) <i>Tomato</i> | 4) <i>Lycopersicon esculentum</i> |
- a-3, b-4, c-1, d-2
 - a-1, b-2, c-4, d-3
 - a-1, b-2, c-3, d-4
 - a-2, b-1, c-3, d-4
- Ans. D
60. Select the statement which is not an attribute of aquaporins?
- Aquaporins are peripheral membrane proteins
 - They form channels for the movement of water
 - Water diffuses faster through aquaporins than through membranes
 - Aquaporin activity is regulated by phosphorylation and pH
- Ans. A
61. Which ion pump generates the gradient of electrochemical potential of H^+ across the plasma membrane?
- Vacuolar H^+ -ATPase
 - H^+/K^+ -ATPase
 - H^+ -pyrophosphatase
 - Plasma membrane H^+ -ATPase
- Ans. D
62. Which of the following is a bacterium capable of nitrogen fixation?
- Nitrobacter*
 - Acetobacter*
 - Azotobacter*
 - Nitrosomonas*
- Ans. C
63. Plant cells avoid ammonium toxicity by rapidly converting the ammonium generated from nitrate assimilation or photorespiration into amino acids. An important enzyme involved in this conversion is:
- Glutamate synthase
 - Pterin
 - Nitrate reductase
 - Nitrite reductase
- A
64. The following are some statements about leghemoglobins. Select the false statement(s).
- They have lesser affinity for oxygen than the β chain of human hemoglobin
 - They are heme proteins
 - They are the most abundant proteins in the root nodule
 - They store oxygen to support nodule respiration for a few seconds
- i and iv only
 - ii and iii only
 - i only
 - iv only
- Ans. C

65. The primary structure of protein represents:
A) Linear sequence of amino acids bonded by peptide bonds
B) 3-D structure
C) Helical configuration
D) Sub unit structure
Ans. A
66. Paraquat is a widely used herbicide. It acts by blocking:
A) Photosynthetic electron flow
B) Shikimate pathway
C) Terminal respiratory pathway
D) Shoot-ward auxin transport
Ans. A
67. What strategy is used by the chloroplasts to store large amounts of reduced carbon without changing the osmotic balance of the cell ?
A) Storing the reduced carbon as sucrose
B) Storing the reduced carbon as 3-PGAL
C) Storing the reduced carbon as insoluble starch granule
D) Storing the reduced carbon as glucose-1-phosphate
Ans. C
68. Processing of the inappropriately positioned branches of amylopectin, during starch granule synthesis, is carried out by which pair of enzymes?
A) Isoamylases and D-enzyme
B) ADP glucose pyrophosphorylase and starch synthase
C) Amylases and α -glucanphosphorylases
D) Glucan-water dikinase and Phosphoglucan-water dikinase
Ans. A
69. The following are some of the reactions in glycolysis. Identify the one which produces ATP.
A) Glucose 6 phosphate to fructose 6 phosphate
B) Fructose 1,6 biphosphate to glyceraldehyde 3 phosphate and dihydroxy- acetone phosphate
C) Glucose to glucose 6 phosphate
D) 1, 3 biphosphoglycerate to 2 phosphoglycerate
Ans. D
70. Choose the mismatch
A) Auxin - Charles Darwin and Francis Darwin
B) Cytokinin - Induction of cell division
C) Gibberellin - Biosynthesis starts in mitochondrion
D) ABA - Promotes senescence
Ans. C
71. Plant protein storage vacuoles contain a compound called phytin. In seeds Phytin is the major storage form of -----
A) Phosphate B) Manganese C) Iron D) Cobalt
Ans. A

72. Choose the correct matches

- | | |
|------------------------|--|
| a) <i>Phytochrome</i> | 1) <i>FAD and MTHF pterin are chromophores</i> |
| b) <i>Calmodulin</i> | 2) <i>620-700nm and 710-850nm</i> |
| c) <i>Cryptochrome</i> | 3) <i>Photoprotection</i> |
| d) <i>Carotenoid</i> | 4) <i>Calcium ions as second messenger</i> |

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

Ans. B

73. The uptake of heavy metals can cause stress responses in plants. From the following responses select the one which is not likely to be caused by heavy metal uptake.

- A) Accumulation of ROs
 B) Hydraulic resistance
 C) Activation of programmed cell death
 D) Disruption of membrane structure

Ans. B

74. When two elements that differ in electronegativity form a covalent bond, that bond is

- A) Polarized
 B) Non-polarized
 C) Broken
 D) Double bond

Ans. A

75. Which of the following functional groups is an electrophile?

- A) Amino group
 B) Sulfide group
 C) Metal Cation
 D) Carboxylate group

Ans. C

76. Select an aldotetrose from the following list of monosaccharides

- A) Erythrose
 B) Glyceraldehyde
 C) Dihydroxyacetone
 D) Erythrulose

Ans. A

77. Chitin is the principal component of the hard exoskeleton of arthropods. Name the monomer of this homopolysaccharide.

- A) N-acetyl-D-glucosamine
 B) D-glucuronic acid
 C) Muramic acid
 D) N-acetylmuramic acid

Ans. A

78. From the given list of proteins select the one with left handed helix

- A) α -keratin
 B) Collagen
 C) Fibroin
 D) Elastin

Ans. B

79. The most common saturated fatty acid in plants is -----

- A) Palmitic acid
 B) Oleic acid
 C) Arachidonic acid
 D) Lauric acid

Ans. A

80. A conventional abbreviation of the carbon skeleton of oleic acid is 18:1(Δ^9). What does the symbol Δ^9 indicate?

- A) Number of carbon atom
 B) Number of hydrogen atom
 C) Number of double bonds
 D) Position of double bonds

Ans. D

81. Beta diversity refers to:
 A) Within habitat diversity B) Regional or landscape diversity
 C) Between habitat diversity D) Between geographical area diversity
Ans. C
82. Name a cellular site other than mitochondrion where fatty acid oxidation similar to β -oxidation takes place.
 A) Nucleus B) Chloroplast
 C) Peroxisome D) Endoplasmic reticulum
Ans. C
83. Lesch-Nyhan syndrome is associated with:
 A) Defects in salvage pathway of nucleotides
 B) Errors in DNA repair
 C) Problems in genic balance
 D) Defects in mitotic spindle fiber formation
Ans. A
84. Select the vitamin which is water soluble
 A) Vitamin K B) Vitamin A C) Vitamin C D) Vitamin E
Ans. C
85. Match the following statements with the type of inhibitor:

No.	Statement	No.	Inhibitor type
1	Binds at the active site of the enzyme	a	Uncompetitive inhibitor
2	Binds only to the enzyme substrate complex	b	Irreversible inhibitor
3	Binds to either free enzyme or enzyme substrate complex	c	Competitive inhibitor
4	Forms a covalent link with the enzyme	d	Noncompetitive inhibitor

- A) 1-c, 2-a, 3-d, 4-b B) 1-a, 2-d, 3-b, 4-c
 C) 1-b, 2-d, 3-c, 4-a D) 1-d, 2-c, 3-a, 4-b
Ans. A
86. Phosphorous cycle differs from the carbon and nitrogen cycles in which of the following aspect?
 A) It lacks a liquid phase
 B) It has no gaseous phase
 C) Activities of living organisms are not involved
 D) Absence of a solid phase
Ans. B
87. The sweetness of freshly picked corn is due to high levels of sugar in the kernels. But about 50% of the free sugar is converted to starch within one day of picking. To preserve the sweetness of fresh corn the husked ears are immersed in boiling water for a few minutes. Corn processed in this way maintains its sweetness. What is the biochemical basis for this procedure?
 A) The enzyme(s) that convert sugar to starch are inactivated by heat
 B) Sugar is modified to an inconvertible form by high temperature
 C) High temperature activates heat shock proteins and they keep the sugar intact
 D) High temperature and wetness makes the sugar not accessible to the enzyme(s)
Ans. A

88. Choose the radioisotope used in Positron Emission Tomography (PET scan).
 A) ^{14}C B) ^{32}P C) ^{13}N D) ^{37}Cl **Ans. C**
89. DNA molecule of a bacterium is 500 bp long and has 60 complete turns. The DNA molecule is:
 A) Relaxed B) Positively supercoiled
 C) Negatively supercoiled D) Looped **Ans. B**
90. Select the gas which is used as mobile phase in gas chromatography
 A) Oxygen B) Nitrogen C) Hydrogen D) Chlorine **Ans. B**
91. Choose the correct representation of the arrangement of microfilaments, microtubules and intermediate filaments in the increasing order of their diameter (nm)
 A) Intermediate filament < Microtubule < Microfilament
 B) Intermediate filament < Microfilament < Microtubule
 C) Microtubule < Intermediate filament < Microfilament
 D) Microfilament < Intermediate filament < Microtubule **Ans. D**
92. Microfilaments are fine thread like protein fibers. They are composed predominantly of ----
 A) Actin B) Tubulin
 C) Fibroin D) Intermediate filaments **Ans. A**
93. 'The unidirectional and irreversible passage through the cell cycle is brought about by the degradation of critical protein molecules at specific points in the cycle'. From the following examples select the one which is not illustrating the above statement.
 A) Proteolysis of the S-phase CDK inhibitor at the start of S phase
 B) Proteolysis of Wee 1 protein kinase at the end of metaphase
 C) Proteolysis of securin at the beginning of anaphase
 D) Proteolysis of cyclin B in late anaphase **Ans. B**
94. Consider a chromosome with segments AB.CDEFG, in which '.' represents the centromere. As a result of duplication, sequence of the segments changes to AB.CDEFEFG. This type of duplication in which the duplicated region is immediately adjacent to the original region is called as:
 A) Tandem duplication B) Segmental duplication
 C) Reverse duplication D) Displaced duplication **Ans. A**
95. Match the inflorescences with the description
 a) *Umbel* 1) *Male flowers represented by stalked stamens*
 b) *Hypanthodium* 2) *Peduncle is modified to a pear shaped structure*
 c) *Corymb* 3) *Flowers with stalks of equal length*
 d) *Cyathium* 4) *Older and younger flowers have stalks of different lengths*
 A) a-4, b-1, c-3, d-2 B) a-4, b-1, c-2, d-3
 C) a-3, b-2, c-1, d-4 D) a-3, b-2, c-4, d-1 **Ans. D**

96. Small head, distinctive cry, widely spaced eye, round face and mental retardation are the symptoms associated with Cri-du-chat syndrome. What kind of disorder causes this syndrome?
- A) Duplication B) Inversion
C) Deletion D) Translocation

Ans. C

97. Which of the following pyramids is always upright?
- A) Pyramid of numbers B) Pyramid of biomass
C) Pyramid of energy D) All of the above

Ans. C

98. Match the signaling systems with the descriptions:

No.	System	No.	Description
1	Endocrine	a	Affect only target cells in close proximity
2	Autocrine	b	Released by a cell and act on target cells at a distance
3	Paracrine	c	Act on the cell which releases the signal

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

Ans. D

99. FlavrSavr tomato was produced by:
- A) Calgene B) Mahyco C) Monsanto D) Eli Lilly

Ans. A

100. The lichen genus *Parmelia* belongs to:
- A) Ascolichens B) Basidiolichens
C) Deuterolichens D) Microlichens

Ans. A

101. A vector should have which of the following features:
- i. MCS ii. Small size iii. Multiple ori iv. Low replication speed

- A) i, ii & iii only B) ii, iii & iv only C) i, ii & iv only D) i, iii & iv only

102. In which district of Kerala the regional center of NBPGRI is located?

Ans. C

- A) Thiruvananthapuram B) Thrissur
C) Kozhikode D) Alappuzha

Ans. B

103. 'The process of isolating a desirable homozygous individual from the mixed population and multiplying the same without contamination to release as a new variety'. Which selection technique is defined in the statement?

- A) Pureline selection B) Mass selection
C) Clonal selection D) Natural Selection

Ans. A

104. Match the following organisms with the diseases:
- | | |
|----------------------------|------------------------------------|
| a) <i>Ustilagoidea</i> sp. | 1) <i>Coffee rust</i> |
| b) <i>Cephaleuros</i> sp. | 2) <i>Powdery mildew of Rubber</i> |
| c) <i>Hemileia</i> sp. | 3) <i>False smut of Paddy</i> |
| d) <i>Oidium</i> sp. | 4) <i>Red rust of tea</i> |
- A) a-4, b-2, c-1, d-3 B) a-1, b-4, c-2, d-3
 C) a-1, b-4, c-3, d-2 D) a-3, b-4, c-1, d-2
- Ans. D**
105. Ministry of Agriculture, Govt. of India made it mandatory to colour code the pesticides based on the level of toxicity. Which colour indicates 'highly toxic' pesticide?
- A) Bright red B) Bright yellow
 C) Bright blue D) Bright green
- Ans. B**
106. The process of successful establishment of a species in a new area is called:
- A) Sere B) Climax
 C) Invasion D) Ecesis
- Ans. D**
107. Find the mismatched pair
- | | |
|--|----------------|
| A) Virtually all of the water vapour occur in this layer | - Troposphere |
| B) Accounts for more than 80% mass of Earth's atmosphere | - Stratosphere |
| C) In this layer temperature go beyond 1000°C | - Thermosphere |
| D) This layer is the coldest part of Earth's atmosphere | - Mesosphere |
- Ans. B**
108. Following are some of the events in extracellular cell signaling. Arrange them in the order of their incidence
- Initiation of intracellular signal-transduction pathway(s) by the activated receptor*
 - Changes in cellular function, metabolism or development*
 - Feedback regulation and removal of the signal*
 - Binding of a signal to a specific receptor*
- A) iv, ii, i, iii B) ii, i, iv, iii C) iv, i, ii, iii D) i, ii, iv, iii
- Ans. C**
109. Select the term which denotes the percentage of assimilated energy that is incorporated into new biomass.
- A) Consumption efficiency B) Assimilation efficiency
 C) Production efficiency D) Trophic efficiency
- Ans. C**
110. Biodiversity hotspots are determined on the basis of:
- A) Number of endemic species they contain and the degree of threat they face
 B) Their nearness to national parks and biosphere reserves
 C) The country in which they belong
 D) The economic value of the region
- Ans. A**

111. Which of the following can produce an embryo during sexual reproduction?
 A) *Cyathus* B) *Funaria*
 C) *Cladophora* D) *Peziza* **Ans. B**
112. Find out the mismatched pair
 A) Francesco Redi - Disproved theory of spontaneous generation
 B) A I Oparin and J B S Haldane - Simulated early Earth
 C) Stanley Miller and Harold Urey - Abiotic formation of biological molecules
 D) Sydney Fox - Protenoids **Ans. B**
113. The following are segments of a double stranded DNA. Find out the segment which is likely to be the recognition sequence of a restriction enzyme
 A) 5'-TGGACC-3'
 3'-ACCTGG-5'
 B) 5'-TGGCCA-3'
 3'-ACCGGT-5'
 C) 5'-TGGTGG-3'
 3'-ACCACC-5'
 D) 5'-TGCCCA-3'
 3'-ACGGGT-5' **Ans. B**
114. When a small number of individuals are isolated from a large population and establish a new population the gene pool of the new population differs from the parent population. This phenomenon is known as:
 A) Migration effect B) Founder effect
 C) Immigration effect D) Speciation **Ans. B**
115. Nanandrium is produced by:
 A) *Batrachospermum* B) *Polysiphonia*
 C) *Ulothrix* D) *Oedogonium* **Ans. D**
116. The process by which organic compounds are transformed from one form to another, aided by organisms like bacteria and fungi is termed as:
 A) Biomagnification B) Bioleaching
 C) Biotransformation D) Bioadsorption **Ans. C**

117. Match column A with column B:

<u>Column A</u>		<u>Column B</u>	
1)	<i>CpG islands</i>	(a)	<i>DNA methylation</i>
2)	<i>RISC</i>	(b)	<i>Argonaute</i>
3)	<i>Riboswitches</i>	(c)	<i>regulatory sequence on mRNA</i>
4)	<i>Epigenome</i>	(d)	<i>pattern of chromatin modifications owned by individual</i>
A)	1-a, 2-b, 3-c, 4-d	B)	1-a, 2-b, 3-d, 4-c
C)	1-a, 2-c, 3-b, 4-d	D)	1-c, 2-a, 3-b, 4-d

Ans. A

118. The IUCN Red List of Threatened Species is widely recognized as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species. From the following statements select the one which is not an objective of IUCN Red List.

- A) To provide information and analyses on the status, trends and threats to species in order to inform and catalyse action for biodiversity conservation
- B) Establish a baseline from which to monitor the change in status of species
- C) Provide a global context for the establishment of conservation priorities at the local level
- D) Monitor on a continuing basis the status of the global biodiversity hotspots, record anthropogenic activities against biodiversity and to penalize the culprits

Ans. D

119. Black walnut trees produce allelopathic chemicals including juglone that interfere with the growth of other plants. What kind of ecological interaction is this?

- A) Competition
- B) Parasitism
- C) Commensalism
- D) Protocooperation

Ans. A

120. Choose an organism without a 'true nucleus'

- A) *Nostoc*
- B) *Aspergillus*
- C) *Chlorella*
- D) *Chlamydomonas*

Ans. A

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