

A

16603

120 MINUTES

- Who among the following scientists advocated surgeons 'to wash their hands before attending delivery to avoid infection of the new-born' and developed carbolic acid as the first antiseptic?
A) Louis Pasteur B) Robert Koch
C) Joseph Lister D) Alexander Fleming
- All of the following components of a retrovirus are encoded by the viral genome, except:
A) reverse transcriptase B) viral RNAs
C) capsid proteins D) envelope lipids
- Which of the following is the exact role of the heterocysts in blue green algae?
A) Nitrogen fixation
B) Fragmentation of filaments for vegetative reproduction
C) Asexual reproduction
D) All of the above
- Which of the following is NOT true about Oomycetes?
A) They are known as water moulds
B) They cause seedling blights, damping-off, root rots and foliar blights
C) Oomycetes are not at all related to algae
D) The nuclei of vegetative cells of these fungi are typically diploid
- In the exponential phase of growth of a bacterial culture, 100 cfu/ml cells increased to 3200 cfu/ml cells in 2 hours. What is the generation time for this bacterium?
A) 12 minutes B) 15 minutes C) 24 minutes D) 30 minutes
- In which of the following bryophyte, the sporophyte at maturity has reduced to the sporangia?
A) Reboulia B) Riccarida
C) Riccia D) Marchantia
- Which of the following is NOT true about Rhynia?
A) Rhynia has apical sporangium
B) Rhynia is a single-species genus of Devonian vascular plants
C) Rhynia gwynne-vaughanii was the sporophyte generation of a vascular plant
D) Life cycle of Rhynia is haplontic
- Improved nutritional quality in crop plants by breeding is known as
A) Biomagnification B) Biomining
C) Biofortification D) Bioremediation

35. Cambial ring and radially arranged vascular tissue with limited number of xylem groups are common in (i) -----, whereas large number of radially arranged xylem groups without a cambial ring is characteristic feature of (ii) -----
 A) i- Dicot root, ii-monocot root
 B) i-Dicot root, ii- Monocot root at the beginning of secondary thickening
 C) i-Dicot root at the beginning of secondary thickening, ii-Monocot root
 D) i-Dicot stem, ii-Monocot root
36. Formaldehyde, ethanol, methanol and picric acid are (i) -----, while nigrosin and Indian Ink are (ii) -----
 A) i-Killing agents, ii- acid Cytological stains
 B) i- Fixing agents, ii-Negative stains
 C) i-Fixing agents, ii- Nuclear stains
 D) i- Killing agents, ii- Fixing agents
37. Match the following and choose the correct combinations from the options given below
- | | |
|-----------------------|--------------------------------------|
| 1. Apomixis | 6. Banana |
| 2. Parthenocarpy | 7. Seed without fertilization |
| 3. Androgenesis | 8. Pollination, but no fertilization |
| 4. Pseudogamy | 9. Haploid angiosperms |
| 5. Adventive embryony | 10. Embryo from nucellus |
- A) 1-6, 2-7, 3-9, 4-8, 5-10 B) 1-6, 2-7, 3-8, 4-9, 5-10
 C) 1-7, 2-6, 3-9, 4-8, 5-10 D) 1-7, 2-8, 3-6, 4-10, 5-9
38. When a plant of chromosomal type pollinates a plant of type AA, what chromosome constitution of embryo and endosperm is expected in the resulting seeds
 A) diploid zygote of type Aa and triploid endosperm of type AAa
 B) diploid zygote of type aa and triploid endosperm of type Aaa
 C) diploid zygote of type AA and triploid endosperm of type AAa
 D) diploid zygote of type Aa and triploid endosperm of type aaa
39. Match the following and choose the correct combination from the options given below
- | | |
|----------------------------------|-------------------------|
| 1. Melissopalynology | 5. Poly embryony |
| 2. Pollen vitality | 6. Self incompatibility |
| 3. <i>in vitro</i> fertilization | 7. Acetocarmine |
| 4. Embryo from endosperm | 8. Honey |
- A) 1-8, 2-7, 3-6, 4-5 B) 1-8, 2-5, 3-6, 4-7
 C) 1-7, 2-8, 3-5, 4-6 D) 1-8, 2-5, 3-7, 4-6
40. Tests that identify monosaccharide, starch, lipids and proteins in plant tissues are -----(i),-----(ii),-----(iii) and .----(iv) respectively
 A) i-Benedict's solution, ii- Lugol's iodine, iii-Sudan Red, iv-Buired test
 B) i-Lugol's iodine, ii-Sudan Red, iii-Buired test, iv-Benedict's solution
 C) i-Benedict's solution, ii- Lugol's iodine, iii- Buired test, iv- Sudan Red
 D) i-Sudan Red, ii-Buired test, iii-Benedict's solution, iv- Lugol's iodine

41. Which is NOT true about carrier assisted transport of minerals across root membrane?
- A) Carrier assisted transport is active transport
 - B) Ions move across membrane against a concentration gradient
 - C) Osmotic pressure play a significant role in the transport
 - D) It depends on energy availability
42. Which of the following is TRUE about photorespiration?
- A) Photorespiration is a biochemical process in plants under conditions of water stress
 - B) Photorespiration takes place in C₃ plants
 - C) Photorespiration is temperature independent
 - D) Photorespiration is very common in dicot plants
43. Which of the following statement is NOT true?
- A) Ammonical form of N₂ is available in soil in the form of urea or NH₄⁺ in free state
 - B) Free ammonium is the only utilizable form of N₂ that can be directly incorporated into amino acids
 - C) Plant absorb NO₃ ions not by just diffusion process, but facilitated by specific carriers
 - D) Certain higher plants have the potential to utilize molecular N₂ directly
44. Which is NOT true about Auxins?
- A) It suppress the growth of side buds
 - B) Stimulate root growth
 - C) Control tropic movements
 - D) Regulate senescence
45. Gardeners pinch off the tips of plants to stimulate their side growth. Which one of the following is implicated in this phenomenon?
- A) auxin
 - B) gibberellins
 - C) cytokinin
 - D) abscisic acid
46. The red/far-red responsive photoreceptors first discovered in plants utilize covalently attached ----- that enable photoconversion between red-absorbing (P_r) and far-red-absorbing (P_{fr}) forms
- A) Bilin chromophores
 - B) Protein chromophores
 - C) Photo-chromophores
 - D) Red chromophores
47. Dichlorophenyl dimethyl urea is a herbicide which kills the plants by
- A) inhibition of respiration
 - B) destroying the chloroplast
 - C) inhibiting the flow of electrons from water to NADP⁺
 - D) inhibiting PS I and photolysis of water

48. A mutant plant lacked plastocyanin, upon illumination of this plant
- plastoquinol will remain in oxidized state
 - plastoquinol will remain in reduced state
 - ferredoxin will remain in oxidized state
 - NAD will remain in oxidized state
49. Plant mitochondria were treated with antimycin A and sodium azide. This would lead to
- increased cyanide resistant respiration and reduced ATP synthesis
 - increased cytochrome oxidation
 - increased cyanide resistant respiration and increased ATP synthesis
 - reduced nuclear mitochondrial interaction
50. Two proteins have the same molecular mass and have identical net charge of pH 7. The best way to separate them would be to use
- SDS-PAGE
 - native gel electrophoresis
 - cation exchange chromatography
 - anion exchange chromatography
51. Which of the following is NOT a factor for the polar transport system of auxin movement in plants?
- Acidic properties of auxin
 - pH difference between cell wall and cytoplasm
 - localized auxin-anion efflux carrier channels in plasma membrane
 - proton pump operating in the cell membrane
52. Genes transfer in rice plant to produce “Golden rice” was obtained from
- carrot
 - the plant - Daffodil and a bacterium - *Erwinia*
 - E.coli* and Daffodil
 - sunflower and cotton
53. Among the hormone induced activities in plants, which of the following is (are) that of Gibberellins?
- Rate of cell division, flowering, increase in size of leaves and fruits, seed and bud dormancy, induction of growth at low temperatures
 - Increase in size of leaves and fruits, seed and bud dormancy, induction of growth at low temperatures, cell elongation and apical dominance
 - Apical dominance, rate of cell division, flowering and increase in size of leaves and fruits
 - Cell elongation and cell division alone
54. Among the plant compounds such as alkaloids, amides, amino acids, cellulose, proteins, DNA, RNA, enzymes, vitamins, lipids, hormones, pectin and lignin, which contain no nitrogen?
- All of them contain nitrogen
 - lignin, cellulose, vitamin and alkaloid
 - lignin, cellulose, lipid and pectin
 - Lipid, lignin, cellulose and vitamin

55. Which of the following is NOT true about Alternate Oxidase (AOX) in plant respiration?
- AOX is a e a typical feature of plant respiration
 - AOX enable cyanide resistant respiration
 - AOX lowers the energy efficiency of respiration
 - AOX and Cytochrome pathway are one and the same
56. Which are the end products of Citric acid cycle per every Acetyl CoA consumed?
- 3 NADH, 1 FAD/FADH₂ and 1 ATP
 - 2 NADH, 1 FAD/FADH₂ and 1 ATP
 - 3 NADH, 1 FAD/FADH₂ and 2 ATP
 - 3 NADH, 2 FAD/FADH₂ and 1ATP
57. Match the following and choose the correct match:
- | | |
|--------------|------------------------------------|
| 1. Zinc | 5. Enzyme activator |
| 2. Magnesium | 6. Active in Chlorophyll formation |
| 3. Copper | 7. Component of Chlorophyll |
| 4. Hydrogen | 8. Component of organic molecule |
- 1-6, 2-7, 3-5, 4-8
 - 1-8, 2-6, 3-5, 4-7
 - 1-6, 2-5, 3-7, 4-8
 - 1-5, 2-7, 3-6, 4-8
58. Match the following and choose the correct combination:
- | | |
|------------------|------------------------|
| 1. Abscisic acid | 5. Seed germination |
| 2. Auxins | 6. Delaying senescence |
| 3. Cytokinins | 7. Weed control |
| 4. Gibberellins | 8. Stomatal closure |
- 1-8, 2-7,3-5, 4-6
 - 1-6, 2-5, 3-7, 4-8
 - 1-5, 2-8, 3-6, 4-7
 - 1-8, 2-7, 3-6, 4-5
59. Match the following and choose the correct answer:
- | | |
|------------------|-----------------------|
| 1. Molybdenum | 5. Stress Molecule |
| 2. Leghemoglobin | 6. Bacterial cell |
| 3. Nif genes | 7. Host cell |
| 4. Proline | 8. Nitrogen Reductase |
- 1-6, 2-5, 3-6, 4-7
 - 1-8, 2-5, 3-6, 4-7
 - 1-8, 2-7, 3-6, 4-5
 - 1-5, 2-8, 3-6, 4-7
60. Match the following and choose the correct answer:
- | | |
|-----------------------------------|---------------------------------|
| 1. pH higher than cytosol | 5. Co-enzyme Q |
| 2. Proton motive force | 6. Mitochondrial matrix |
| 3. Tendency to accept an electron | 7. Inner Mitochondrial membrane |
| 4. Ubiquinone | 8. Reduction potential |
- 1-6, 2-7, 3-8, 4-5
 - 1-8, 2-7, 3-5, 4-6
 - 1-8, 2-7, 3-6, 4-5
 - 1-5,2-6, 3-7, 4-8

71. Consanguinity shows a strong association with which pattern of inheritance?
 A) Autosomal recessive B) Autosomal dominant
 C) X-linked dominant D) X-linked recessive
72. The chromosome map unit is -----
 A) Centimorgan B) Millimorgan
 C) millimendel D) centisutton
73. In Mendel's F₂ generation of the red and white flower crossing, the dominant to recessive ratio was-----
 A) 1:3:1 B) 3:1 C) 4:0 D) 9:3:3:1
74. An Hfr strain of E.coli contains:
 A) Vector of yeast or bacterial origin which is used to make many copies of a particular DNA sequence
 B) A bacterial chromosome with a human gene inserted
 C) A bacterial chromosome with the F factor inserted
 D) A human chromosome with a transposable element inserted
75. In humans pointed Eyebrows are dominant to smooth Eyebrows and Widow's peak (downward pointed frontal hairline) is dominant to continuous Hairline. What phenotypic ratio would you expect in the offspring from a cross between an individual heterozygous for both genes and an individual homozygous recessive for both genes?
 A) 9:3:3:1 B) 1:1:1:1
 C) 1:2:1:2:4:2:1:2:1 D) 9:3:4
76. The genotypes of a husband and wife are I^AI^B x I^Ai. Among the blood types of their children, how many different genotypes and phenotypes are possible?
 A) 2 genotypes; 3 phenotypes B) 3 genotypes; 4 phenotypes
 C) 4 genotypes; 4 phenotypes D) 4 genotypes; 3 phenotypes
77. A cross between two true breeding lines one with dark blue flowers and one with bright white flowers produces F₁ offspring that are light blue. When the F₁ progeny are selfed a 1:2:1 ratio of dark blue to light blue to white flowers is observed. What genetic phenomenon is consistent with these results?
 A) epistasis B) incomplete dominance
 C) codominance D) inbreeding depression
78. Mendel's law of segregation, as applied to the behavior of chromosomes in meiosis, means that:
 A) Pairing of homologs will convert one allele into the other, leading to separation of the types
 B) Alleles of a gene separate from each other when homologs separate in meiosis I, or in meiosis II if there is a single crossover between the gene and the centromere
 C) Genes on the same chromosome will show 50% recombination
 D) Alleles of a gene will be linked and passed on together through meiosis

79. What are the assumptions of Hardy Weinberg equilibrium?
- A) Small population size, random mating, no selection, no migration, no mutation
 B) large population size, random mating, no selection, no migration, no mutation
 C) large population size, random mating, heterozygotes survive the best, no migration, no mutation
 D) large population size, like individuals mate, no selection, no migration, no mutation
80. Which of the following can be used for transferring the DNA into host cells?
 P. Transformation Q. Sonication R. Transfection S. Electroporation
- A) only P can be used B) Q and R can be used
 C) Q, R and S can be used D) P, R and S can be used
81. Contribution of various greenhouse gases to total global warming in the decreasing order is
- A) Carbon dioxide, Methane, CFCs
 B) Methane, Carbon dioxide, CFCs
 C) Carbon dioxide, CFCs, Methane
 D) Methane, CFCs, Carbon dioxide
82. Match the items in List - I with List - II and select the correct answer using codes given below:
- | | |
|-------------------------|--|
| List - I | List - II |
| (a) Montreal Convention | (i) Ozone depletion |
| (b) Rio - Summit | (ii) Greenhouse gas |
| (c) Ramseur Convention | (iii) Convention on Biological Diversity |
| (d) Kyoto Protocol | (iv) Wetlands Convention |
- Code:
- | | | | | |
|----|-------|-------|------|------|
| | (a) | (b) | (c) | (d) |
| A) | (iii) | (ii) | (i) | (iv) |
| B) | (iv) | (iii) | (i) | (ii) |
| C) | (i) | (iii) | (iv) | (ii) |
| D) | (i) | (ii) | (iv) | iii) |
83. Name the biologist who coined the concept of ecosystem?
- A) Earnest Haeckel B) A G Tansley
 C) Charles Elton D) Charles Darwin
84. Green plants represent the ----- structural component of an ecosystem
- A) Producer B) Consumer
 C) Decomposer D) Green
85. In which year the UN convention on biological diversity was enacted?
- A) 1972 B) 2004 C) 2002 D) 1992

86. Which one of the following is the single largest air pollutant?
A) Carbon dioxide B) Nitrogen
C) Carbon monoxide D) PAN
87. The evolutionary theory proposed by Charles Darwin was:
A) Change in populations through time as a result of mutations
B) The spontaneous generation of new organisms
C) The passing on of genes from one generation to the next
D) Change in populations through time as a response to environmental change
88. A sudden major climatic change would most likely initially result in:
A) A rapid increase in adaptive radiation
B) A rapid increase in extinction rates
C) A sharp increase in numbers of species
D) Plants and animals developing new characteristics in order to cope with environmental changes
89. Which of the following statements are correct?
(1) On 5th June 1992 the first world conference on environment took place
(2) 5th June is the world environment day, which commemorate the date of 1st world conference on environment
(3) UNEP was created by the UN General Assembly in 1972
A) All the three statements are correct
B) 2nd and 3rd statements are correct
C) 3rd statement alone is correct
D) 1st statement alone is correct
90. Study the following statements and select the correct choice
1. Nutrient cycles are unidirectional
2. Energy flow can be cyclic
A) Both are false
B) Both are true
C) Statement 1 is true but 2 is false
D) Statement 2 is true but 1 is false
91. Study the following statements and select the correct choice from below
1. India is a signatory to the international agreement 'Convention on Biodiversity'
2. Panchayath/Village level biodiversity committee is mandatory as per Indian Biodiversity Act
A) Both the statements are true
B) Both the statements are true and the 1st is not the correct reason for the 2nd
C) Statement 1 is true but statement 2 is wrong
D) Statement 1 is wrong but statement 2 is correct

98. Match the following and choose the correct combination
- | | |
|--------------------------|--------------------|
| 1. Secondary pollutant | 6. CO |
| 2. Primary air pollutant | 7. Nitrate |
| 3. Ozone depletion | 8. PAN |
| 4. Greenhouse effect | 9. CO ₂ |
| 5. Methaemoglobinemia | 10. CFC |
- A) 1-6, 2-7, 3-10, 4-8, 5-9 B) 1-7, 2-6, 3-9, 4-10, 5-8
C) 1-8, 2-6, 3-10, 4-9, 5-7 D) 1-7, 2-6, 3-10, 4-9, 5-8
99. Match the following and choose the correct answer from below
- | | |
|-------------------------------|--------------------------------------|
| 1. Varieties of a species | 6. IUCN |
| 2. Alpha diversity | 7. India |
| 3. Use in crop improvement | 8. Genetic diversity |
| 4. 8.1% of world biodiversity | 9. Diversity in an ecosystem |
| 5. Endangered species | 10. Scientific value of biodiversity |
- A) 1-8, 2-10, 3-9, 4-6, 5-7 B) 1-10, 2-9, 3-6, 4-7, 5-8
C) 1-8, 2-9, 3-10, 4-7, 5-6 D) 1-8, 2-10, 3-6, 4-7, 5-9
100. The forces that can change the frequency of an allele in a population are
- A) forward mutation, gene conversion, natural selection, recombination
B) selection, mutation, migration, inbreeding, random genetic drift
C) dominance, family selection, fitness, diversification
D) gene interaction, gene transfer, gene mutation, out breeding
101. The culturing of cells in liquid agitated medium is called -----
- A) Liquid Culture B) Suspension Culture
C) Agitation culture D) Uniform culture
102. Which of the following is best suited for the production of virus free plants?
- A) Embryo culture B) Ovule Culture
C) Meristem culture D) Anther culture
103. Batch cultures are a kind of suspension culture where, -----
- A) Medium is continuously replaced
B) Medium is loaded only at the beginning
C) No depletion of medium occurs
D) Cellular wastes are continuously removed
104. Which is model organism database?
- A) GOLD B) PROMISE C) SGD D) SCOP
105. Blast programme is used for -----
- A) Translate protein sequence B) Translate DNA database
C) Translate input sequence D) None of these

106. Which of the following character(s) is/are common among Pteridophytes and bryophytes
- dependent gametophyte on sporophyte
 - dependent sporophyte on gametophyte
 - multicellular sex organs with sterile jacket cells
 - absence of sporophyte
107. The most commonly used method of quantifying primary productivity of a pond ecosystem involves measurement of the amount of
- CO₂ utilized
 - autotroph biomass
 - oxygen released
 - Organic carbon
108. Centre of diversity refers to the area where cultivated plant species and or their wild relatives show
- low competition with unrelated species
 - highest variation
 - high ecosystem diversity
 - highest variation and high ecosystem diversity
109. Assume that you are the President of a plant biotechnology company and you want to offer your customers a new variety of cucumber that tastes great, lasts longer on the shelf, and is less susceptible to insect damage. Which method will be the most precise and produce plants with the desired characteristics quicker?
- Traditional plant breeding
 - Genetic modification through genetic engineering
 - Mutation breeding
 - Breeding for such properties are quite impossible
110. Which of the following Environment related Act is/are correctly mentioned?
- Environment Protection Act, 1986
 - Wildlife Protection Act, 1972
 - Water (Prevention and Control of Pollution) Act, 1981
 - Air (Prevention and Control of Pollution) Act, 1974
- Only (1) and (2)
 - Only (3) and (4)
 - Only (1), (2) and (3)
 - Only (1), (2) and (4).
111. Which of the agricultural challenges below cannot be solved with transgenic techniques?
- Crops are damaged by frost
 - Crops are killed by a virus
 - Public concern about safety of synthetic pesticides
 - Public preference for organic vegetables

112. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as -----
 A) Dedifferentiation B) Redifferentiation
 C) Micropropagation D) Differentiation culture
113. Which is the most commonly used vector in crop improvement?
 A) Plasmid B) Cosmid
 C) Phasmid D) Agrobacterium
114. Synthetic seed is produced by encapsulating somatic embryo with -----
 A) Sodium alginate B) Sodium chloride
 C) Calcium alginate D) Sodium acetate
115. Hormone pair for a callus to differentiate are -----
 A) Auxin and cytokinin B) Cytokinins and gibberillin
 C) Auxin and abscisic acid D) Auxin and Ethylene
116. Environment conditions that favour false smut in paddy include -----
 A) High soil nitrogen, rain, high relative humidity (>90%) and temperature ranging from 25–35 °C
 B) Low temperature (15-20 °C), low soil nitrogen content, rain, high relative humidity (100%)
 C) Low nitrogen in soils and rain, low relative humidity (< 60%)
 D) None of the above
117. In a crop improvement programme, haploids are significant because
 A) can grow optimal in adverse situations
 B) requires minimum fertilizers
 C) produce homozygous lines on diploidisation
 D) ideal for studying meiotic process
118. Match the following and choose the correct combination given below
 1. Northern blot 5. Specific DNA fragments
 2. Southern blot 6. Specific RNA Fragments
 3. Western blot 7. Specific Proteins
 4. Eastern blot 8. Post translational modifications of proteins
- A) 1-6, 2-7, 3-5, 4-8 B) 1-6, 2-5, 3-8, 4-7
 C) 1-6, 2-5, 3-7, 4-8 D) 1-5, 2-8, 3-6, 4-7

119. Which among the following statement on traditional DNA markers are NOT true?
1. RAPD (Random Amplified Polymorphic DNA), utilize a large number of short DNA primers with varying sequences, this technique exploits differences in the primer binding sites as different DNA will be amplified by the polymerase chain reaction (PCR)
 2. RFLP (Restriction Fragment Length Polymorphism): Indirectly measure DNA sequence differences based upon the varying lengths of DNA fragments resulting from cutting it with restriction enzymes. These "fragment length polymorphisms" are visualized by hybridizing the cut DNA with labeled probes from DNA libraries
 3. AFLP (Amplified Fragment Length Polymorphism): Utilizing restriction enzymes and a large number of short DNA primers with varying sequences, this technique exploits differences in the primer binding sites as different DNA will be amplified using PCR
 4. SSR (Simple Sequence Repeat) or microsatellite, exploits differences in DNA sequences between two PCR products based on the presence or absence of restriction enzyme cutting sites; These markers are often designed from RFLP markers
- A) 1 and 2 are not true B) 2 and 3 are not true
 C) 1, 2 and 3 are not true D) 4 alone is not true
120. Three babies were mixed up in a hospital. After consideration of the data below, which of the following represent the correct baby and parent combinations?

Couple Blood groups	I A and A	II A and B	III B and O
Baby blood groups	1 B	2 O	3 AB

- A) I-3, II-1, III-2 B) I-1, II-3, III-2
 C) I-2, II-3, III-1 D) I-2, II-1, III-3