

M. Sc. BIOTECHNOLOGY

1. In mitochondria, cristae acts as sites for :
(A) Protein synthesis (B) Breakdown of flavoproteins
(C) Oxidation-reduction reaction (D) None of these
2. In germinating seeds, fatty acids are exclusively degraded in the :
(A) Mitochondria (B) Proplastids
(C) Glyoxysomes (D) Peroxisomes
3. The two subunits of ribosome remain united at a critical ion level of :
(A) Calcium (B) Manganese
(C) Magnesium (D) All of these
4. Which of the following cell organelles is concerned with glycosylation of proteins?
(A) Golgi bodies (B) Peroxisomes
(C) Endoplasmic reticulum (D) Mitochondria
5. Microtubule is involved in the :
(A) Muscle contraction (B) Cell division
(C) DNA recognition (D) All of these
6. Which of the following is correct with regard to aneuploidy ?
(A) inversion
(B) $2n + 1$
(C) All aneuploid individuals die before birth
(D) $2n$

7. Cyclin dependent kinases :
- (A) act as mitotic poison
 - (B) cause dissembly of the microtubules
 - (C) control various phases of cell cycle
 - (D) All of the above
8. The beginning of which state of prophase is marked by terminalization of chiasmata and inhibition of RNA synthesis ?
- (A) Pachytene
 - (B) Diplotene
 - (C) Diakinesis
 - (D) Zygotene
9. NADPH_2 is generated through :
- (A) Photosystem II
 - (B) Anaerobic respiration
 - (C) Glycolysis
 - (D) Photosystem I
10. Nastic movements differ from tropic movements is being :
- (A) Movement of variation
 - (B) Stimulated by chemicals
 - (C) Non-directional
 - (D) All of these
11. Geometrical isomers differ in :
- (A) Position of functional group
 - (B) Spatial arrangement of atoms
 - (C) Position of atoms
 - (D) Length of carbon chains

12. Endosperm is formed during double fertilization by :
- (A) Two polar nuclei and one male gamete
 - (B) One polar nuclei and one male gamete
 - (C) Ovum and male gamete
 - (D) One polar nuclei and two male gamete
13. The maturation of anthers and stigmas at different times in the same flower is known as :
- (A) Dichogamy
 - (B) Cleistogamy
 - (C) Chasmogamy
 - (D) None of these
14. Albinism is a congenital disorder resulting from the lack of enzyme :
- (A) Tyrosinase
 - (B) Xanthine oxidase
 - (C) Catalase
 - (D) Fructokinase
15. Which one of the following conditions in humans is correctly matched with its chromosomal abnormality/linkage ?
- (A) Down syndrome - n DD autosomes + XO
 - (B) Klinefelter syndrome - DD autosomes + XXY
 - (C) Colourblindness - Y-linked
 - (D) Erythroblastosis foetalis - X-linked
16. Haploids are more suitable for mutational studies because :
- (A) All mutations are expressed in haploids
 - (B) Haploids are more stable than diploids
 - (C) Mutagens penetrate more effectively in haploids
 - (D) Haploids are more abundant in nature than diploids

17. Ratio of complementary genes is :
- (A) 9 : 3 : 4 (B) 12 : 3 : 1
(C) 9 : 3 : 3 : 4 (D) 9 : 7
18. DNA elements which can switch their positions are called :
- (A) Cistrons (B) Transposons
(C) Exons (D) Introns
19. Probiotics are :
- (A) Live microbial food supplement
(B) Cancer inducing microbes
(C) Food allergens
(D) All of the above
20. Which of the following is *not* a petro crop ?
- (A) *Calotropis peocera* (B) *Euphorbia royleana*
(C) *Hevea* sp. (D) *Sesbania rostrata*
21. Which of the following is correct pair of a sanctuary and its main protected wild animal ?
- (A) Kaziranga – Musk deer (B) Gir – lion
(C) Sunderban – Rhino (D) All of these
22. Which of the following is *not* included under *in-situ* conservation ?
- (A) National park (B) Sanctuary
(C) Botanical garden (D) Biosphere reserve

23. Photochemical smog pollution does not contain :
- (A) Carbon dioxide (B) PAN
(C) Ozone (D) Nitrogen oxide
24. Hormone produced in allergic reaction is :
- (A) Aldosterone (B) Glucocorticoids
(C) Adrenaline (D) Noradrenaline
25. Which class of MHCs occur over antigen presenting cells ?
- (A) MHC-I (B) MHC-II
(C) MHC-III (D) All of these
26. Extranuclear chromosomes occur in :
- (A) Peroxisomes and ribosomes
(B) Chloroplast and mitochondria
(C) Mitochondria and ribosomes
(D) Chloroplast and lysosomes
27. Cancerous cells can be easily destroyed by radiations due to :
- (A) rapid cell division (B) lack of nutrition
(C) fast maturation (D) All of these
28. Inbreeding depression is due to :
- (A) Decreased homozygosity (B) Increased heterozygosity
(C) Increased homozygosity (D) Outcrossing

29. Geocarpic fruit is :

- (A) Potato
- (B) Peanut
- (C) Onion
- (D) Garlic

30. A clone is a colony of :

- (A) Cells having similar shape
- (B) Cells having different shape
- (C) Cells having similar genetic constitution
- (D) Cells having different genetic constitution

31. Which of the following pairs is *not* correctly matched ?

- (A) Vitamin B₁₂ – Pernicious anemia
- (B) Vitamin B₁ – Beri-Beri
- (C) Vitamin C – Scurvy
- (D) Vitamin B₂ – Pellagra

32. Phenetic classification is based on :

- (A) Dendograms based on DNA characteristics
- (B) Sexual characteristics
- (C) The ancestral linkage of existing organisms
- (D) Observable characters of existing organisms

33. During anaerobic digestion of organic waste, which one of the following is left undegraded ?

- (A) Cellulose
- (B) Hemicellulose
- (C) Lipids
- (D) Lignin

34. Differentiation of shoot is controlled by :
- (A) High gibberellin : auxin ratio
 - (B) High gibberellin : cytokinin ratio
 - (C) High auxin : cytokinin ratio
 - (D) High cytokinin : auxin ratio
35. Chemiosmotic theory of ATP synthesis in chloroplast and mitochondria is based on :
- (A) Proton gradient
 - (B) Accumulation of K^+ ions
 - (C) Accumulation of Na^+ ions
 - (D) All of these
36. Which of the elements is responsible for nodulation in legumes ?
- (A) Molybdenum
 - (B) Manganese
 - (C) Magnesium
 - (D) Potassium
37. Blind spot of human eye is the region where :
- (A) All sensory cells are absent
 - (B) Distribution of rods and cones is not uniform
 - (C) Intensity of light is perceptible
 - (D) Colour vision is possible
38. Hormone adrenaline and pigment melanin is formed from which amino acid ?
- (A) Tryptophan
 - (B) Proline
 - (C) Glycine
 - (D) Tyrosine

39. FSH plays an important role in :
- (A) Spermatogenesis (B) Milk production
(C) Na and K metabolism (D) Rise in blood calcium
40. Gamma-Aminobutyric Acid (GABA) is an :
- (A) Excitatory neurotransmitter (B) Enzyme
(C) Inhibitory neurotransmitter (D) Steroid
41. Mast cells of connective tissue contain :
- (A) Vasopressin and relaxin (B) Heparin and histamine
(C) Heparin and calcitonin (D) Serotonin and melanin
42. Which of the following pairs is correct ?
- (A) Sweat – temperature regulation
(B) Saliva – Sense of food taste
(C) Sebum – Sexual attraction
(D) Humerus – Hind leg
43. The layer of cells that secretes enamel of tooth is :
- (A) Osteoblast (B) Odontoblast
(C) Dentoblast (D) Ameloblast
44. Genetic drift operates in :
- (A) Small isolated population
(B) Large isolated population
(C) Fast reproductive population
(D) Slow reproductive population

45. Which of the following are kingdoms ?
- (A) Monera (B) Protista
(C) Animalia (D) All of these
46. Mycorrhizae is an example of :
- (A) Amensalism (B) Commensalism
(C) Parasitism (D) Symbiosis
47. Maximum carbon in the world is found in :
- (A) Oceans (B) Coal mines
(C) Antarctica (D) Forests
48. Which statement is correct about centre of origin of plants ?
- (A) Frequency of dominant genes is more
(B) More diversity in improved variety
(C) Climatic conditions are more favourable
(D) None of the above
49. International ozone day is celebrated on :
- (A) 21st April (B) 5th June
(C) 22nd April (D) 16th September
50. Which of the following carries most energy ?
- (A) UV rays (B) Infra red light
(C) Microwaves (D) Millimeter waves

51. Water pollution is best assessed by determining :
- (A) DO (B) BOD and turbidity
(C) Hardness, DO and acidity (D) Hardness and alkalinity
52. Which of the following statements is *not* correct about energy flow in an ecosystem?
- (A) Pyramid of energy is always right
(B) Energy flow is unidirectional
(C) Energy flow is cyclic
(D) Ecological efficiency is generally 10%
53. Find the undistilled beverage from the following :
- (A) Vodka (B) Rum
(C) Beer (D) Whiskey
54. Which of the following is considered a hot spot of biodiversity in India ?
- (A) Aravalli hills (B) Western Ghats
(C) Indo-Gangetic plains (D) Eastern Ghats
55. Which of the following is *not* a bird sanctuary ?
- (A) Govind Sagar Sanctuary (B) Ranganathittu Sanctuary
(C) Ghana Sanctuary (D) Singhori Sanctuary
56. Human immuno deficiency virus (HIV) has a protein coat and a genetic material which is :
- (A) Double-stranded RNA (B) Double-stranded DNA
(C) Single-stranded DNA (D) Single-stranded RNA

57. Which of the following is correct match ?
- (A) Reserpine – Tranquilizer (B) Cocaine – Opiate narcotic
(C) Morphine – Hallucinogenic (D) Bhang – Analgesic
58. Which of the following microorganisms is used for the production of citric acid in industries ?
- (A) *Acetobacter suboxydans* (B) *Aspergillus niger*
(C) *Streptococcus lactis* (D) None of these
59. A transgenic food crop which may help in solving the problem of nightblindness is :
- (A) Golden rice (B) Flavr Savr tomatoes
(C) Starlink maize (D) Bt soyabean
60. ELISA is used to detect viruses where the key reagent is :
- (A) Alkaline phosphatase (B) Catalase
(C) DNA probe (D) RNAase
61. Plasmids are used in genetic engineering because they are :
- (A) easily available
(B) able to integrate with host chromosome
(C) able to replicate along the chromosomal DNA
(D) contain DNA sequences coding for drug resistance

62. The cutting of DNA by restriction endonucleases results in the fragments of DNA which are separated by :
- (A) Gel filtration chromatography
 - (B) Centrifugation
 - (C) Gel electrophoresis
 - (D) Thin layer chromatography
63. The technique in which a foreign DNA is precipitated on the surface of the tungsten or gold particles and shot into the target cells is known as :
- (A) Microinjection
 - (B) Electroporation
 - (C) Biolistics
 - (D) None of these
64. In which step of DNA profiling, nitrocellulose membrane is used ?
- (A) Denaturation
 - (B) Autoradiography
 - (C) Blotting
 - (D) DNA amplification
65. A set of genes or cDNA is immobilized on a glass slide and used in transcriptome studies is called :
- (A) Proteome
 - (B) Microarray
 - (C) DNA chip
 - (D) Genome
66. When phenol is treated with CHCl_3 and NaOH , the product formed is :
- (A) Benzaldehyde
 - (B) Salicylaldehyde
 - (C) Salicylic acid
 - (D) Benzoic acid

67. Lactic acid on oxidation by alkaline KMnO_4 gives :
- (A) Tartaric acid (B) Cinnamic acid
(C) Propionic acid (D) Pyruvic acid
68. CuSO_4 dissolves in excess of KCN to give :
- (A) $\text{Cu}(\text{CN})_2$ (B) CuCN
(C) $[\text{Cu}(\text{CN})_4]^{3-}$ (D) $[\text{Cu}(\text{CN})_4]^{2-}$
69. Which one of the following alloy *does not* contain copper ?
- (A) Bronze (B) Brass
(C) German silver (D) Misch metal
70. Carbon-14 dating method is based on the fact that :
- (A) Ratio of carbon-14 and carbon-12 is constant
(B) Carbon-14 is the same in all objects
(C) Carbon-14 is highly insoluble
(D) None of the above
71. Dry ice is an example of :
- (A) Ionic crystal (B) Covalent crystal
(C) Molecular crystal (D) Metallic crystal
72. Human genome contains about :
- (A) 2 million base pairs (B) 3 billion base pairs
(C) 4 billion base pairs (D) 4.5 billion base pairs

73. Two-dimensional gels are used to :
- (A) Separate DNA fragments (B) Separate RNA fragments
(C) Separate different proteins (D) All of these
74. The first step in calculating median is :
- (A) Calculate the range (B) Arrange the data
(C) Count the data (D) None of these
75. Which of the following ecosystems constitutes a systematic link between terrestrial and marine ecosystems ?
- (A) Mangrove forests (B) Evergreen forests
(C) Rain forest (D) None of these
76. Which of the following are the major characteristics of deciduous forests ?
- (A) They do not loose their leaves
(B) They shed their leaves annually
(C) They depend upon other factors for their food
(D) None of the above
77. Mendel's law of independent assortment holds good for genes situated on the :
- (A) non-homologous chromosomes
(B) homologous chromosomes
(C) extranuclear genetic element
(D) All of the above

78. Analogous organs arise due to :
- (A) Divergent evolution (B) Artificial selection
(C) Genetic drift (D) Convergent evolution
79. Which of the following statements is true ?
- (A) Wings of birds and insects are homologous organs.
(B) Human hands and bird's wings are analogous organs.
(C) Human hands and bat's wings are analogous organs.
(D) Flipper of penguin and dolphin are analogous organs
80. The different forms of interbreeding species that live in different geographical regions are called :
- (A) Sibling species (B) Sympatric species
(C) Allopatric species (D) Polytypic species.
81. Nucleoproteins were the first substance to give the sign of :
- (A) Species (B) Evolution
(C) Life (D) Genes
82. The result of extreme lack of proteins is :
- (A) Malaria (B) Typhoid
(C) Kwashiorkor (D) None of these
83. The first experiment regarding evolution of life was performed by :
- (A) Watson and Crick (B) Oparin and Haldane
(C) Urey and Miller (D) Meselson and Stahl

- 84.** Homology indicates :
- (A) Common ancestry
 - (B) Divergent evolution
 - (C) Both (A) and (B)
 - (D) None of these
- 85.** Which of the following are produced by microorganisms ?
- (A) Alcoholic beverages
 - (B) Fermented dairy products
 - (C) Bread
 - (D) All of these
- 86.** What are the cell wall structural components of fungi ?
- (A) Peptidoglycan
 - (B) Cellulose
 - (C) Chitin
 - (D) Chitin, Cellulose, or Hemicelluloses
- 87.** Acridine orange is which type of mutagen ?
- (A) Chemical compounds
 - (B) Transposons
 - (C) Base analog
 - (D) Intercalating agents
- 88.** Which of the following causes dilation of capillaries ?
- (A) Inflammation
 - (B) Cell mediated response
 - (C) Humoral response
 - (D) Complement cascade
- 89.** Epitopes are :
- (A) Specific part of antigen that is reactive
 - (B) Part of antigen to which antibody binds
 - (C) Small molecules that couple to carrier proteins
 - (D) Protein of antigen displayed on MHC

90. Each of the following agents is a recognized cause of diarrhoea, except :
- (A) *Clostridium perfringens* (B) *Vibrio cholerae*
(C) *Enterococcus faecalis* (D) *Escherichia coli*
91. In higher organisms, the SA node helps :
- (A) Opening of the tricuspid valve
(B) Initiation of heartbeat
(C) Conduction of blood
(D) Opening of bicuspid valve
92. Which of the following pair of diseases is caused by two genes located on X chromosome ?
- (A) Colourblindness and phenylketonuria
(B) Colourblindness and haemophilia
(C) Colourblindness and hypertrichosis
(D) Colourblindness and albinism
93. Which cell organelles are involved in apoptosis ?
- (A) Lysosomes (B) Golgi
(C) Mitochondria (D) Endoplasmic Reticulum
94. Which of the following neurotransmitters is secreted by the pre-ganglionic of neurons of sympathetic nervous system ?
- (A) Epinephrine (B) Dopamine
(C) Norepinephrine (D) Acetylcholine

- 95.** Smallest bone in the human body is :
- (A) Malleus (B) Stapes
(C) Incus (D) Hyoid Bone
- 96.** Who discovered the ABO blood group system ?
- (A) Thomas Cooley (B) Karl Landsteiner
(C) Camillo Golgi (D) Ernst Haeckel
- 97.** PDB stands for :
- (A) Protein Data Bank (B) Protein Data Base
(C) Protein Derived Base pair (D) None of these
- 98.** An example of homology and similarity tool is :
- (A) PROSPECT (B) EMBOSS
(C) RASMOL (D) BLAST
- 99.** Which of the following is responsible for specifying the 3D shape of a protein ?
- (A) Peptide bond
(B) Amino acid sequence
(C) Interaction with other polypeptides
(D) Interaction with molecular chaperons
- 100.** Alleles are :
- (A) Alternate forms of genes
(B) Linked genes
(C) Chromosomes that have crossed over
(D) Homologous chromosomes

GENERAL APTITUDE

101. Direction : Study the following information carefully and answer the question given below :

It has been given that :

A is + from point B states B is to the NORTH of A.

A is = from point B states B is to the SOUTH of A.

A is || from point B states A is to the EAST of B.

A is * from point B states A is to the WEST of B.

Now, S is = 20 m from point P. Point Q is = 15 m from point R. Point U is +15 m from Point V. Point T is ||20 m from point V. Point U is ||16 m from point Q. Point R is ||30 m from point P.

What is the shortest distance between the point T and the point which is to the East of Q ?

(A) 24 m

(B) 25 m

(C) 26 m

(D) 30 m

102. Complete the series :

383 394 407 414 419 ?

(A) 429

(B) 438

(C) 446

(D) 452

103. Direction : Study the following information carefully and answer the question given below :

'B + A' means 'A is son of B'

'B × A' means 'A is father of B'

'A % B' means 'A is son-in-law of B'

'B – A' means 'A is wife of B'

'A * B' means 'B is brother of A'

'A # B' means 'B is the only sister of A'

Which symbol will come in place of question mark in the following equation to show that V is daughter-in-law of L ?

V + Z × T ? L

(A) +

(B) %

(C) #

(D) ×

104. Direction : Read the information carefully and answer the question given below:

In a certain code language,

'speak nicely to all' is coded as "ka cu ma he"

'all are like us' is coded as " si fo he to"

'teach us lesson nicely' is coded as " po ma fo re"

'lesson like all humans' is coded as "he re gu si"

What would be the code for "humans teach" ?

(A) gu fo

(B) he fo

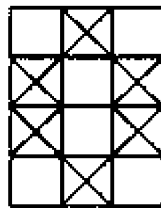
(C) gu po

(D) ma re

105. Venerate : Worship :: Extol : ?

- (A) Glorify
- (B) Homage
- (C) Compliment
- (D) Recommend

106. Find the number of squares in the given figure :



- (A) 23
- (B) 20
- (C) 18
- (D) 12

107. **Direction :** Read the following information carefully and answer the question given below :

Eight friends P, Q, R, S, T, U, V and W are standing in a straight line facing north, but not necessarily in the same order.

R and W are immediate neighbours of S. V is immediate neighbour of U and W. T and Q are immediate neighbours of P. Neither T nor R is at the extreme ends of the line. U is on the right of T.

Who among the following sits second to the left of W ?

- (A) P
- (B) R
- (C) S
- (D) U

108. In this question, there is a statement followed by two arguments I and II. Read carefully and choose the right option from the given possible answers :

Given answers :

- (a) Only argument I is strong (b) Only argument II is strong
(c) Either I or II is strong (d) Neither I nor II is strong

Statement—Should internal assessment in college be abolished ?

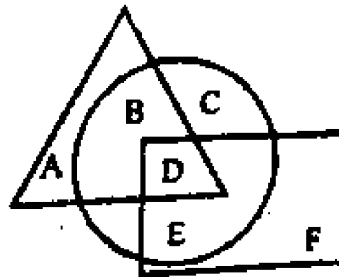
Arguments—

I. Yes, this will help in reducing the possibility of favoritism.

II. No, teaching faculty will lose control over students.

- (A) a (B) b
(C) c (D) d

109. In the given figure, the circle represents boys, triangle represents players and square represents rural. What portion represents rural sports boys ?



- (A) E (B) D
(C) F (D) B

110. Arrange the words given below in a meaningful manner :

1. Rainbow 2. Rain 3. Sun 4. Happy 5. Child

- (A) 2, 1, 4, 3, 5 (B) 2, 3, 1, 5, 4
(C) 4, 2, 3, 5, 1 (D) 4, 5, 1, 2, 3

GENERAL ENGLISH

111. Direction : Which of the phrases given below should replace the phrase given in bold in the following sentence to make the sentence grammatically correct ?

He made himself master of practically every branch of medieval learning, and **has a thoroughly knowledge of** the sources and the bibliography of his subject.

- (A) having a thorough knowledge of
- (B) has had a thorough knowledge to
- (C) have a thoroughly knowledge for
- (D) had a thorough knowledge of

112. The five sentences (labelled 1, 2, 3, 4, 5) given in this question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the sentences and key in this sequence of five numbers as your answer.

1. The implications of retelling of Indian stories, hence, takes on new meaning in a modern India.
2. The stories we tell reflect the world around us.
3. We cannot help but retell the stories that we value — after all, they are never quite right for us — in our time.
4. And even if we manage to get them quite right, they are only right for us — other people living around us will have different reasons for telling similar stories.
5. As soon as we capture a story, the world we were trying to capture has changed.

- | | |
|-----------|-----------|
| (A) 25341 | (B) 25314 |
| (C) 23541 | (D) 23514 |

113. Fill in the blank :

Which magazine do you subscribe.....?

- (A) for (B) of
(C) to (D) in

114. Direction : Select the option which contains the part of the sentence which has an error (spelling, grammatical or contextual) :

The world recyclable plastic is (A)/being shipped to Asia where it is (B)/illegally dumped, buried or burned (C)/with the lightest regulations. (D)

- (A) The world recyclable plastic is
(B) illegally dumped, buried or burned
(C) with the lightest regulations.
(D) No error

115. Direction : The following question has two blanks, each blank indicating that something has been omitted. Choose the set of words for each blank that best fits in the context of the sentence :

To believe that the problem of.....journals on the UGC's white list is the sole issue awaiting.....in the university would be naive.

- (A) dangerous, test (B) silly, visit
(C) dubious, resolution (D) future, development

116. Find the correctly spelt word :

- (A) Utterance (B) Uterance
(C) Uttarance (D) Utterence

117. In this question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase :

To have a field day

- (A) a job that has to be done outside the office
- (B) a day when everything is going wrong
- (C) to be able to do something you enjoy a great deal, especially criticizing someone
- (D) a day for outdoor sports and fun activities as a group

118. Out of the four alternatives choose the one which can be substituted for the given words/sentence in the question :

Customs and habits of a particular group

- (A) Mores
- (B) Frieze
- (C) Fallow
- (D) Passe

119. Find the antonym of **GUMPTION** :

- (A) Seriousness
- (B) Apathy
- (C) Levity
- (D) Despair

120. Find the synonym of **STENTORIAN** :

- (A) Violent
- (B) Misbegotten
- (C) Loud
- (D) Stealthy