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Shivaji University, Kolhapur

M.Sc. Entrance Examination 2022-2023

Biochemistry/ Biotechnology /Medical Information Management

Subject Code : 58725

Day and Date : Tuesday, 08-08-2023

Total Marks : 100

Time : 1.00 p.m. to 02.30 p.m.

- 1. Which of the following makes water a liquid at room temperature?**
 - Noncovalent interactions
 - Hydrogen bonds between water molecules
 - Van der Waals forces of attraction
 - Covalent bonding
- 2. The amino acid sequences of thousands of different proteins from many species been determined using principles first developed by?**
 - Watson and Crick
 - Edman
 - Sanger
 - Mendel
- 3. Which of the following is a function of chaperone protein?**
 - It provides a template for how the proteins should fold
 - It degrades proteins that have folded properly
 - It degrades proteins that have folded improperly
 - It rescues proteins that have folded improperly and allowed them to refold properly
- 4. Which of the following is true about phosphodiester linkage?**
 - 3'-phosphate group of one nucleotide unit is joined to the 5'-hydroxyl group of the next nucleotide
 - 3'-phosphate group of one nucleotide unit is joined to the 3'-hydroxyl group of the next nucleotide

- c) 5'-phosphate group of one nucleotide unit is joined to the 3'-hydroxyl group of the next nucleotide
- d) 5'-phosphate group of one nucleotide unit is joined to the 5'-hydroxyl group of the next nucleotide
- 5. Which of the following is true about t_m ?**
- a) The higher the content of GC base pairs, the lower the t_m
- b) The higher the content of A = T base pairs, the higher the t_m
- c) It can be as termed renaturation temperature
- d) The higher the content of G C base pairs, the higher the t_m
- 6. The number of milligrams of KOH required to neutralize the free and combined fatty acid in one gram of a given fat is called**
- a) Polenske number b) Acid number
- c) Saponification number d) Iodine number
- 7. Which of the following is a choline-containing lipid?**
- a) Phosphatidylethanolamine
- b) Phosphatidylserine
- c) Sphingomyelin
- d) Phosphatidylglycerol
- 8. Which of the following occurs in meiosis but not in mitosis?**
- a) Pairing of homologous chromosomes at metaphase plate
- b) Separation of sister chromatids at anaphase
- c) Attachment of spindle fibers to division
- d) Replication of DNA prior to start of cell kinetochore
- 9. Migration of cancerous cells from the site of origin to other part of the body forming secondary tumors is called.....**
- a) Proliferation b) Diapedesis
- c) Apoptosis d) Metastasis

10. Which of the following is the study of energy relationships and conversions in biological systems?

- a) Biochemistry
- b) Biophysics
- c) Biotechnology
- d) Bioenergetics

11. Which of the following is not an important precursor of glucose in animals?

- a) Pyruvate
- b) Glucose 6-phosphate
- c) Lactate
- d) Glycerol

12. Which of the following are exclusively glucogenic?

- a) Lysine
- b) Leucine
- c) Threonine
- d) Arginine

13. Which effects the increased levels of hydrogen ions in the inter-membrane space of the mitochondria?

- a) Decreased levels of chemiosmosis
- b) Increased levels of water in inter-membrane space
- c) Increase ATP production
- d) Decreased levels of oxidative phosphorylation

14. Which of the following plays a substantial role in linking together sister chromatids immediately after replication?

- a) Topoisomerases
- b) Histones
- c) Condensins
- d) Cohesins

15. Which of the following is an example of RNA-dependent DNA polymerase?

- a) RNA polymerase II
- b) DNA ligase
- c) Reverse transcriptase
- d) RNA polymerase I

16. Which of the following is not a step involved in gel filtration?

- a) Gel preparation
- b) Precipitation
- c) Sample application
- d) Elution of the sample

17. The polymerase chain reaction is used for.....

- a) Amplifying gene of interest
- b) Constructing RAPD maps
- c) Detecting the presence of the transgene in an organism
- d) All of the above

18. Based on which of the following enzymes Hydrolysis reactions are catalyzed?

- a) Hydrolase
- b) Oxidoreductase
- c) Isomerase
- d) Ligase

19. Which of the following is an imino acid?

- a) Serine
- b) Alanine
- c) Glycine
- d) Proline

20. Which of the following is an example of epimers?

- a) Mannose & Glucose
- b) Glucose & Ribose
- c) Galactose & Mannose
- d) Glucose & Galactose

21. The phenolphthalein indicator turns in alkaline medium.

- a) yellow
- b) colorless
- c) pink
- d) blue

22. The paper chromatography technique based on.....

- a) adsorption
- b) partition
- c) absorption
- d) size

23. The clarified sugarcane juice contains.....

- a) 20% water
- b) 60% water
- c) 85% water
- d) 0% water

24. The dielectric constant of water is.....

- a) 17.3
- b) 22
- c) 50
- d) 78.4

25.nm is the range of visible light.

- a) 180-400
- b) 400-800
- c) 100-180
- d) 800-1000

26. Which among the following is a Noble Gas?

- a) Nitrogen
- b) Hydrogen.
- c) Oxygen
- d) Helium

27. What is the bond angle between H₂O molecule?

- a) 90°
- b) 104.5°
- c) 122°
- d) 180°

28. In polar molecular solids, the molecules are held together by

- a) dipole-dipole interactions
- b) dispersion forces
- c) hydrogen bonds
- d) covalent bonds

29. Which of the following is a colligative property?

- a) Relative lowering of fluid pressure
- b) Decrease in boiling point
- c) Decrease in freezing point
- d) Change in volume after mixing

30. A pair of solution bears the same osmotic pressure. What is this pair of solutions called?

- a) Hypertonic
- b) Hypotonic
- c) Isotonic
- d) Osmolarity

31. Which of the following solutions cannot conduct electricity?

- a) Sugar in water
- b) NaCl in water
- c) MgCl₂ in water
- d) KCl in water

- 32. Which of the following will lead to an increase in the rate of the reaction?**
- Decrease in temperature
 - Decreasing concentration of reactants
 - Addition of catalyst
 - Addition of inhibitor
- 33. Which of the following colloidal system represents a gel?**
- Solid in liquid
 - Solid in gas
 - Liquid in solid
 - Liquid in gas
- 34. Which of the following is the correct Gibbs equation?**
- $\Delta G = \Delta H + T\Delta S$
 - $\Delta G = \Delta H - T\Delta S$
 - $\Delta G = \Delta H - 2T\Delta S$
 - $\Delta G = \Delta H - 3T\Delta S$
- 35. Haemoglobin is a complex compound of which metal ion?**
- Fe^{2+}
 - Fe^{3+}
 - Co^{2+}
 - Co^{3+}
- 36. Who is known as the father of Microbiology?**
- Edwin John Butler
 - Ferdinand Cohn
 - Robert Koch
 - Antoni van Leeuwenhoek
- 37. Which microorganism(s) among the following perform photosynthesis by utilizing light ?**
- Cyanobacteria, Fungi and Viruses
 - Viruses
 - Cyanobacteria
 - Fungi
- 38. Which part of the compound microscope helps in gathering and focusing light rays on the specimen to be viewed?**
- Condenser lens
 - Magnifying lens
 - Objective lens
 - Eyepiece lens

39. What is the approximate size of the bacterial cell?

- a) 1 mm in diameter
- b) 0.5 to 1.0 micrometer in diameter
- c) 2 mm in diameter
- d) 2 micrometer in diameter

40. The respiratory chain of bacteria is associated with.....

- a) cytoplasmic membrane
- b) cell wall
- c) cytoplasm
- d) mitochondrial membrane

41. Growth of bacteria or microorganisms refer to.....

- a) changes in the total population
- b) an increase in number of cells
- c) an increase in the size of an individual organism
- d) an increase in the mass of an individual organism

42. Which of the following method can be used to determine the number of bacteria quantitatively?

- a) Spread-plate
- b) Streak-plate
- c) Pour-plate and spread plate
- d) Pour plate

43. Plasmodium divides by which of the following method most commonly?

- a) Regeneration
- b) Budding
- c) Binary fission
- d) Multiple fission

44. Vaccination was invented by.....

- a) Watson
- b) Jenner
- c) Crick
- d) Pasteur

45. Sulphates are reduced to hydrogen sulphide by

- a) Thiobacillus thiooxidans
- b) Rhodospirillum
- c) Desulfotomaculum sp.
- d) Photosynthetic sulfur bacteria

46. Properties of stem cells do not include.....

- a) Potency
- b) Self-renewal
- c) Differentiation
- d) Meiosis

47. The role of vitamins used in the cell culture media is.....

- a) Source of energy
- b) Used for promotion of cell survival and growth
- c) Building block of proteins
- d) All of the above

48. Ions responsible for cell adhesion, signal transduction and cell proliferation/differentiation

- a) Na⁺
- b) K⁺
- c) Cl⁻
- d) Ca²⁺

49. Trypan Blue is used for.....

- a) Cell viability
- b) Cell imaging
- c) Cell density counting
- d) All of the above

50. What is the concentration of carbon dioxide required for culturing animal cells?

- a) 15-20%
- b) 25-50%
- c) 1-10%
- d) 2-8%

51. Totipotency refers to.....

- a) Development of fruits from flowers in a culture
- b) Development of an organ from a cell in a culture medium
- c) Flowering in a culture medium
- d) All of the above

52. Cybrids are produced by.....

- a) The nucleus of one species but from both the parent species cytoplasm
- b) The fusion of two same nuclei from the same species
- c) The fusion of two different nuclei from different species
- d) None of the above

53. What is Callus?

- a) Tissues that grow to form an embryoid
- b) An unorganised actively dividing the mass of cells maintained in a culture
- c) An insoluble carbohydrate
- d) A tissue that grows from an embryo

54. The most common solidifying agent used in micropropagation is.....

- a) agar
- b) dextran
- c) Mannan
- d) all of these

55. Which of the following is best suited method for production of virus free plants?

- a) Embryo culture
- b) Meristem culture
- c) Ovule culture
- d) Anther culture

56. Which of the following is the first genetically engineered hormone?

- a) Oxytocin
- b) Somatotropin
- c) Insulin
- d) Adrenaline

57. World's first cloned Buffalo was born in which country?

- a) India
- b) USA
- c) Russia
- d) China

58. Which of the following is a genetically modified crop?

- a) Bt-cotton
- b) Bt-brinjal
- c) Golden rice
- d) All of the above

- 59. The antibiotic resistance genes of a cloning vector are used.....**
- as selectable markers
 - to select healthy vectors
 - as sequences from where replication starts
 - to keep the cultures free from infections
- 60. Which of the following statement(s) is/are always true about the process of cloning?**
- It is possible only in animals.
 - It results in the exact replication of the cell, a living part, or an organism.
 - It results in large number of off-springs.
- A & B
 - Only B
 - B & C
 - Only A
- 61. Which of the following is not a symptom of Bean Mosaic disease?**
- Plants are bunchy
 - Leaves show mottling
 - Mosaic appearance on leaves
 - Blackening of leaflets
- 62. Which one of the following is a colonial alga?**
- Ulothrix
 - Spirogyra
 - Volvox
 - Chlorella
- 63. Find the incorrect statement**
- Agar-agar is produced from Gracilaria
 - Chlorella is used in space food
 - Mannitol is a food reserve of Rhodophyceae
 - Algin is produced by algae
- 64. Which of the following has non-flagellated isogamous gametes?**
- Spirogyra
 - Chlamydomonas
 - Volvox
 - Fucus

65. Which of the following contains chlorophyll a, b, phycoerythrin and phycocyanin?

- a) Chlorophyta
- b) Phaeophyta
- c) Rhodophyta
- d) Bacillariophyta

66. Phycology is the study of.....

- a) Algae
- b) Fungi
- c) Bacteria
- d) All the above

67. In biotechnological studies, the alga that is exploited as a rich source of protein is

- a) Spirogyra
- b) Spirulina
- c) Chlamydomonas
- d) Scytonema

68. Mucor is a...

- a) Parasitic fungus
- b) Saprophytic fungus
- c) Facultative saprophytic fungus
- d) None of the above

69. Find the true statement about bryophytes

- a) they have chloroplasts
- b) they have archegonia
- c) they are thalloid
- d) all of the above

70. In India, coniferous forests are found in.....

- a) Himalayas
- b) Western ghats
- c) Eastern ghats
- d) All the above

71. The study of relationships among different organisms is called.....

- a) Taxonomy
- b) Biology
- c) Systematics
- d) Ornithology

72. Notochord is formed by.....

- a) Mesodermal cells
- b) Ectodermal cells
- c) Epidermal cells
- d) Endodermal cells

73. The property of not having separate sexes in an organism is called as....

- a) Hermaphrodite
- b) Oogamous
- c) Homogamous
- d) Heterogamous

74. The property of emitting light from a living organism is called as....

- a) Bioluminescence
- b) Phosphorescence
- c) Biophosphorescence
- d) Cytoluminescence

75. Salamander is an example of.....

- a) Reptile
- b) Osteichthyes
- c) Amphibians
- d) Mammals

76. The word morphology means.....

- a) Study of bones
- b) Study of change
- c) Study of skin
- d) Study of structure

77. The locomotor organ of Echinoderms is called.....

- a) Parapodia
- b) Pseudopodia
- c) Setae
- d) Tube feet

78. The genotypic ratio of a dihybrid cross.....

- a) 3:1
- b) 1:2:1
- c) 12:3:1
- d) 9:3:3:1

79. The hormone testosterone is produced by.....

- a) Leydig cells
- b) Spermatoocytes
- c) Melanocytes
- d) B-cell of Pancreas

80. Which is the anti-coagulant substance in blood?

- a) Thrombin
- b) Globin
- c) Fibrinogen
- d) Heparin

81. Nucleosome is made up of.....

- a) DNA, histone core protein
- b) DNA, histone core protein, linker H1
- c) RNA, histone core protein
- d) RNA, histone core protein, linker H1

82. Which of the following regarding the basic mechanism of gene expression is correct?

- a) DNA-tRNA → protein
- b) DNA mRNA → protein
- c) RNA → mRNA → protein
- d) DNA → protein

83. Which of the ribosome subunit NOT present in prokaryotes?

- a) 50s
- b) 30s
- c) 60s
- d) None of the above

84. How is the genetic material expressed?

- a) By replication and transcription
- b) By transcription and translation
- c) By translation and modification
- d) By mutation and transposition

85. Primosome is the complex of.....

- a) Helicase + Topoisomerase
- b) Ligase + Helicase
- c) Helicase + Primase
- d) Primase + Ligase

86. The catalytic center of RNA polymerase is made up of.....subunits.

- a) α & β
- b) β & β'
- c) ω & σ
- d) α & σ

87. Name the part of a chromosome where t-loop is found.

- a) Acromere
- b) Centromere
- c) Telomere
- d) Tetraplex

88. Which of the following is not a termination codon?

- a) UGA
- b) UAC
- c) UAG
- d) UAA

89. Linking number is always a.....

- a) Whole number
- b) Prime number
- c) Integer
- d) Even number

90. The DNA replication is always.....

- a) Conservative
- b) Semiconservative
- c) Non-Conservative
- d) Dispersive

91. Integrated Circuits were used in ..generation of computers.....

- a) First
- b) Second
- c) Third
- d) Fourth

92.is also known as auxiliary memory.

- a) Secondary storage
- b) Random access memory
- c) Primary storage
- d) Cache memory

93. TELNET program is generally used for the purpose of.....

- a) Transcription
- b) Remote communication
- c) Encryption
- d) Entertainment

94. Following among is a nucleotide sequence database.

- a) Swiss-Port
- b) PubMed
- c) DDBJ
- d) PDB

95. Among following term used to define all input and output devices in a computer system.

- a) Software
- b) Hardware
- c) Shared resources
- d) Monitor

96. A polymeric membrane is vesicular systems in which the drug is confined to a cavity or inner liquid core surrounded by.....

- a) Nano matrices
- b) Nanoparticles
- c) Nanocapsules
- d) Nanowires

97. Nanomembranes have a pore size of.....

- a) 1nm-10nm
- b) 10nm-100nm
- c) 0.1nm - 1nm
- d) 100nm-1000nm

98. Disease of the heart, joints and nervous system are called.....

- a) Degenerative diseases
- b) Communicable diseases
- c) Deficiency diseases
- d) Mental diseases

99. Hemophilia disease can be transferred through.....

- a) Heredity
- b) Vector
- c) Vehicle
- d) Pollutant

100. Which of the following is a bacterial disease?

- a) Polio
- b) Tuberculosis
- c) Influenza
- d) All of the above

