

4-13

ENTRANCE EXAMINATION-2012

M.Sc Molecular Microbiology

Time: 2 hours

Maximum Marks: 100

HALL TICKET NO.

INSTRUCTIONS

Please read carefully before answering the questions:

1. Enter your Hall ticket number both on the top of this page and on the OMR answer sheet without fail.
2. Answers are to be marked only on the OMR answer sheet following the instructions provided there upon.
3. Hand over both the question paper booklet and OMR answer sheet at the end of examination.
4. The question paper contain **100** questions (**Part-A:** Question Nos. **1-25** and **Part-B:** Question Nos. **26-100**) of multiple choice typed in **20** pages, including this page. One OMR answer sheet is provided separately. **Please check.**
5. The marks obtained in **Part-A** will be used for resolving the tie cases.
6. Each question carries one mark.
7. There is negative marking for wrong answers in **PART A and B**. For each wrong answer, 0.33 of a mark will be deducted.
8. Calculators and mobile phones are not allowed.

PART-A

1. The active site of an enzyme mainly
 - A. Polar and non-polar amino acids
 - B. Is the part of the enzyme where its substrate can fit
 - C. Can be used over and over again
 - D. Is not affected by pH and temperature

2. An inhibitor that changes the overall shape and chemistry of an enzyme is known as a(n)
 - A. Noncompetitive inhibitor
 - B. Allosteric inhibitor
 - C. Competitive inhibitor
 - D. Steric inhibitor

3. The non-superimposable mirror image forms of a chiral molecule which represent optically active isomers are called
 - A. Enantiomer
 - B. Diastereomers
 - C. Meso compound
 - D. Tautomerism

4. The second law of thermodynamics says
 - A. Heat energy
 - B. At the atomic level, motion is continuous
 - C. Motion energy converts to heat energy
 - D. Entropy increases

5. Sporogony of malaria parasite occurs in
 - A. RBCs and Liver of man
 - B. Stomach wall of mosquito
 - C. Salivary gland of male anopheles
 - D. Salivary gland of female anopheles

6. Role of mycorrhiza is to increase
 - A. Phosphorous availability
 - B. Potash availability
 - C. Nitrogen availability
 - D. Calcium availability

7. Classification based on genetic and evolutionary relationships among the taxa is called
- Artificial
 - Natural
 - Phylogenetic
 - Sexual
8. What pigments occur in blue-green algae
- Phycocyanin and phycoerythrin
 - Lycopene and rhodopin
 - Spirilloxanthin and rhodopin
 - Spheroidene and Okeonone
9. Benzene reacts with ozone to give a triozone which on treatment with Zn/H_2O yields
- Maleic anhydride
 - Glyoxal
 - Toluic Acid
 - Benzoic acid
10. How much energy is released when one of the high-energy bonds in ATP is broken?
- 7.3 kcal/mol
 - 7.3 cal/mol
 - 730 kcal/mol
 - 730 cal/mol
11. Select the false matching
- Sugarcane virus I – virus
 - Meloidogyne* – Nematode
 - Xanthomonas* – Bacterium
 - Leptosphaeria* – Myxomycete
12. DNA replication is one of the most important cellular activity. At what stage the replication of DNA takes place?
- During prophase 1 of meiosis
 - During metaphase of mitosis
 - During interphase of two mitotic cycle
 - During G1 phase of cell cycle

13. Which of the following organism is employed in production of acetone, butanol, ethanol (ABE process)

- A. *Bacillus sp.*
- B. *Clostridium sp.*
- C. *Aspergillus sp.*
- D. *E.coli*

14. Match the following

- | | |
|--------------|------------------------|
| L. Anthrax | 1. Monoclonal antibody |
| M. Rabies | 2. Hormone |
| N. Hepatitis | 3. <i>Bacillus sp.</i> |
| O. Humulin | 4. Zoonotic disease |
| P. Abzyme | 5. Recombinant vaccine |

- A. L-3; M-4; N-5; O-2; P-1
- B. L-5; M-4; N-3; O-2; P-1
- C. L-1; M-3; N-4; O-5; P-2
- D. L-2; M-1; N-5; O-3; P-4

15. Bacterial cell walls have

- A. Murein
- B. Glycoprotein
- C. Chitin
- D. Keratin

16. The central fissure divides the cerebral cortex into which of the following

- A. Hemispheres
- B. Primary and association cortex
- C. Anterior and posterior regions
- D. Secondary and association cortex

17. Which of the following plays an important role in the limbic system?

- A. Digestion
- B. Respiration
- C. Nerve system
- D. Emotional behavior

18. Sleeping sickness in man is caused by

- A. Diplococcus
- B. Entamoeba
- C. Leishmania
- D. Trypanosoma

19. Which of the following can be used in biofertilizers?

- A. Azolla
- B. Aspergillums
- C. Riccia
- D. Selaginella

20. Inherited Rh gene is found in—

- A. Rh individuals
- B. AB blood group individuals
- C. Blood group individuals
- D. Rh+ individuals

21. Schlemm's canal is present in—

- A. Eye
- B. Cochlea
- C. Spinal cord
- D. Vertebrae

22. Cinnamon (Dalchini) is obtained from

- A. Folded leaves
- B. Unopened flower bud
- C. Stem bark
- D. Roots

23. What happens during glycogenolysis?

- A. Glycogen is converted into glucose
- B. Glucose is oxidized to yield ATP
- C. Amino acid is broke down to yield glucose
- D. Glucose is converted into glycogen

24. Re-absorption of water in kidney is controlled by

- A. Aldosterone
- B. Anti-diuretic hormone (ADH)
- C. Oxytocin
- D. Growth Hormone (GH)

25. Sex determination in humans and *Drosophila* is similar because

- A. All males from both species always have one Y chromosome
- B. Males have one X chromosome and females have two X chromosomes
- C. The ratio of X chromosomes to sets of autosomes determines maleness or femaleness
- D. Females are hemizygous

PART-B

26. Haploid number of chromosomes in rice is (gene)
- A. 14
 - B. 12
 - C. 18
 - D. 20
27. Which of the following is known as white bottom mushroom?
- A. Helminthosporium
 - B. Volvariella
 - C. Lentinus
 - D. Agaricus
28. The biggest flower in plant kingdom is
- A. Banana
 - B. Rafflesia
 - C. Ficus
 - D. Urea
29. Which of the following substances can be synthesized only by plants?
- A. Proteins
 - B. Cellulose
 - C. Fats
 - D. Urea
30. Nitrogen fixing algae with heterocyst is
- A. Lynghya
 - B. Gleocapsa
 - C. Nostoc
 - D. Oscillatoria
31. Diatoms belong to
- A. Chlorophyceae
 - B. Bacillariophyceae
 - C. Dinophyceae
 - D. Cryptophyceae

32. Simplest sporophyte in bryophytes found in
- A. Marchantia
 - B. Anthoceros
 - C. Riccia
 - D. Funaria
33. Roots of the pteridophytes are
- A. Tap root system
 - B. Modified root system
 - C. Adventitious root system
 - D. None
34. Intrapetiolar stipule present the family
- A. Rubiaceae
 - B. Apocyanaceae
 - C. Asclepiadaceae
 - D. Rutaceae
35. Castor oil extracted from the seed part of
- A. Endosperm
 - B. Embryo
 - C. Cotyledons
 - D. All the above
36. A process in which fruits are produced without fertilization of the ovule is called as
- A. Somatic embryogenesis
 - B. Parthenocarpy
 - C. Stenospermocarpy
 - D. All the above

37. The response of an organism to touch or contact stimuli is called...
- A. Photoperiodism
 - B. Thigmotropism
 - C. Cell-to-cell movement
 - D. All the above
38. Which of the following statements is false
- A. Food chains are inter connected in a ecosystem
 - B. Oligotrophic lakes are mainly found in temperate climates
 - C. Energy is completely utilized from one trophic level to another
 - D. Algal blooms leads to eutrophication
39. Which of the following is the carbon source for autotrophs?
- A. Photosynthesis
 - B. Organic molecules
 - C. CO₂
 - D. Soil
40. Separation of proteins in a gel that contains chemical which establishes a pH gradient when the electric charge is applied is generally known as
- A. Isoelectric focusing
 - B. Pulse field gel electrophoresis
 - C. Electroporation
 - D. Immunoelectrophoresis
41. When red-flowered snapdragons are crossed with white-flowered snapdragons, all of the offspring have pink flowers. When these pink-flowered snapdragons are crossed, what proportion of offspring would be expected to have pink flowers
- A. 1/4
 - B. 2/3
 - C. 3/4
 - D. 1/2

42. Which among the following is a photosynthetic compound

- A. Retinol
- B. Rhodopsin
- C. Melanin
- D. Sclerotin

43. Lichen is a mutual relationship between

- A. Algae & bacteria
- B. Algae & moss
- C. Algae & fungi
- D. Fungus & moss

44. Hydra belongs to

- A. Porifera
- B. Coelenterata
- C. Platyhelmintha
- D. Nematoda

45. Waste product of Adenine and Guanine metabolism is excreted as

- A. Urea
- B. Ammonia
- C. Uric acid
- D. Allantoin

46. Corpora striata occurs in

- A. Diencephalons
- B. Cerebellum
- C. Cerebrum
- D. Medulla

47. Nuhn's glands are present in

- A. Intestine
- B. Tongue
- C. Skin
- D. Stomach

48. The cell theory was given by

- A. Ernest Haeckel
- B. Robert Koch
- C. Rudolf Virchow
- D. Schleiden & Schwann

49. Mammalian kidneys are

- A. Pronephros
- B. Epinephros
- C. Metanephros
- D. Mesonephros

50. Stem cells are defined as

- A. The first cells of mitosis in meristem region
- B. Cells harvested from brain stem
- C. The cells found in the fluid of spinal chord
- D. Embryonic cells with no predetermined development pathway

51. Which among the following is not related to eye-illness

- A. Otitis
- B. Glaucoma
- C. Conjunctivitis
- D. Astigmatism

52. In birds—

- A. Left oviduct and right aortic arch are present
- B. Left oviduct and left aortic arch are present
- C. Right oviduct, left ovary and right aortic arch are present
- D. Left oviduct, left ovary and right aortic arch are present

53. Heparin is formed by

- A. Kidney cells
- B. Liver cells
- C. Blood cells
- D. Bone marrow

54. Mammillary bodies are attached to the ventral side of—
- A. Olfactory lobe
 - B. Cerebral hemisphere
 - C. Diencephalon
 - D. Medulla oblongata
55. Periderm is produced from
- A. Ark-cambium
 - B. Pro-cambium
 - C. Secondary cortex
 - D. Vascular cambium
56. The brain tissue is found in which of the following?
- A. Ventricles
 - B. Cerebral hemispheres
 - C. Cerebral cortex
 - D. Cerebellum
57. Which dominant protein localized in skin, tendon, and bone
- A. Fibrous protein
 - B. Globular protein
 - C. Membrane Protein
 - D. All above
58. An unusual infectious agent composed of protein in misfolded form is known as
- A. Prion
 - B. Paranemic
 - C. Punnett square
 - D. Processed pseudogene
59. Which of the following is NOT a property of mammalian signal recognition particle (SRP)?
- A. It targets nascent secretory polypeptides to the rough endoplasmic reticulum
 - B. It contains a signal peptidase activity
 - C. It temporarily arrests translation
 - D. It contains both RNA and several proteins

60. In lysosomal storage disorder I-cell disease, all the hydrolases normally found in lysosome are found in blood stream. Which of the following is the most likely the cause of this disease?
- A. Lack of phosphorylation of lysosomal enzymes
 - B. A mutation in clathrin gene
 - C. Inability of ER to form lysosomal vesicles
 - D. A non-functional proton pump in the lysosomal membrane
61. When diethyl malonate and urea react in the presence of sodium ethoxide, it leads to the formation of
- A. Biuret
 - B. Malonic acid
 - C. Barbituric acid
 - D. Uric acid
62. In the presence of AlCl_3 , benzene and n-propyl bromide react in Friedel-Craft's reaction to form
- A. n-Propyl benzene
 - B. 1,2 Dipropyl benzene
 - C. 1,4-Dipropyl benzene
 - D. Isopropyl benzene
63. Acetone will be obtained by the ozonolysis of
- A. 1-Butene
 - B. 2-Butene
 - C. Isobutene
 - D. 2-butyne
64. Methyl group attached to benzene can be oxidized to carboxyl group by reacting with
- A. Fe_2O_3
 - B. AgNO_3
 - C. KMnO_4
 - D. Cr_2O_3
65. Ethylene is formed by the dehydration of
- A. Ethyl alcohol
 - B. Acetic acid
 - C. Ethyl acetate
 - D. Propyl alcohol

66. When diethyl malonate and urea react in presence of sodium ethoxide, the product formed is
- A. Biuret
 - B. Malonic Acid
 - C. Barbituric Acid
 - D. Uric Acid
67. When phenol is treated with chloroform in aqueous sodium hydroxide solution followed by acid-hydrolysis, the product obtained is
- A. Salicylic acid
 - B. Salicylaldehyde
 - C. Phenolphthalein
 - D. Sodium phenoxide and Chlorobenzene
68. In case of benzene, the number of π -electrons are
- A. 3
 - B. 6
 - C. 9
 - D. Benzene does not contain π -electrons
69. Which of the following has sp power of 2 hybridisation?
- A. C_2H_4
 - B. C_2H_6
 - C. $BeCl_2$
 - D. C_2H_2
70. Which of the following compound has chiral structure?
- A. CH_3CHOH
 - B. $CH_3CH_2CHCH_2CH_3-Br$
 - C. $(C_2H_5)_2CH-Br$
 - D. $CH_2=CH-CHCH_3-NH_3$
71. The polypeptide is composed of
- A. Glucose
 - B. Amino acid
 - C. Nucleotide
 - D. Glycerol

72. What is the mass of one molecule of CO₂?

- A. 44 gms
- B. 7.307×10^{-23} gms
- C. 7.307×10^{-22} gms
- D. 88 gms

73. Trypsin hydrolysis cleaves on these amino acids

- A. Arg-Ala
- B. Tyr-Lys
- C. Tyr-Arg
- D. Arg-Lys

74. What is fluid mosaic model

- A. All lipid and protein molecules diffuse more or less easily
- B. It is the diffusion of lipid-soluble substances through the lipid bilayer.
- C. It is the movement of lipids and integral proteins within the lipid bilayer.
- D. It is the solubility of water in the membrane.

75. Dipole-dipole interactions stabilizes the protein with

- A. Van der Waals forces
- B. Covalent forces
- C. Ionic forces
- D. Hydrogen bonding forces

76. Glycans are

- A. Disaccharides
- B. Polysaccharides
- C. Proteins
- D. Glycoprotein

77. Identify the molecule of CH₃(CH₂)₅CH=CH(CH₂)₇COOH

- A. Arachidinic acid
- B. Arachidonic acid
- C. Palmitoleic acid
- D. Palmitic acid

78. In a lipid bilayer, _____ fatty acid tails face each other within the bilayer and form a region that excludes water
- A. Hypertonic
 - B. Hyperosmotic
 - C. Hydrophilic
 - D. Hydrophobic
79. Enzyme is a
- A. They are not specific in selection of its substrates
 - B. Lower the activation energy of a reaction
 - C. They more allosteric
 - D. Make endergonic reactions proceed spontaneously
80. NAD⁺
- A. Enzyme
 - B. Oxido-reductants
 - C. Coenzyme
 - D. Highly energetic compound
81. Which of the following are not required to carry out the PCR?
- A. Antibodies directed to against the encoded protein
 - B. Short oligonucleotide primers
 - C. A method for heating and cooling the mixture periodically
 - D. None of the above
82. Inability of a pathogen to infect a plant or to the presence of a substance in the plant incompatible with the pathogen is called
- A. Silencing
 - B. Acquired resistance
 - C. Non host resistance
 - D. Systemic acquired resistance

83. Dependence of bacterial or spore behavior and pathogenicity on their cells reaching a certain density by sensing the concentration of certain signal molecules in their environment is called
- A. Quorum sensing
 - B. Concentration gradient
 - C. Quarantine sensing
 - D. Sucrose gradient
84. The transfer of genetic material from one bacterium to another by means of a bacteriophage is called as
- A. Transformation
 - B. Transcription
 - C. Transduction
 - D. Translation
85. The concurrent parasitism of a host by two pathogens in which the symptoms or other effects produced are of greater magnitude than the sum of the effects of each pathogen acting alone is
- A. Synergism
 - B. Symbiosis
 - C. Co-infection
 - D. Transient expression
86. In the cross $AaBb \times AaBb$, what proportion of offsprings would have the same phenotype as the parents?
- A. $3/4$
 - B. $3/16$
 - C. $9/16$
 - D. $1/16$
87. Assuming Hardy-Weinberg equilibrium, what would be the genotype frequency of heterozygotes, if the frequency of the two alleles at the gene being studied are 0.7 and 0.3
- A. 0.09
 - B. 0.21
 - C. 0.42
 - D. 0.49

88. Non-disjunction involving the X chromosomes may occur during oogenesis and produces two kinds of eggs. If normal sperm fertilize these two types, which of the following pairs of genotypes are possible?
- A. XXY and XO
 - B. XX and XY
 - C. XYY and XO
 - D. XYY and YO
89. Electrophoretic mobility shift assays can be performed to detect
- A. The parts of a gene sequence that encode proteins
 - B. The parts of a gene sequence that are introns
 - C. The DNA or RNA binding proteins
 - D. Protein-protein interactions
90. The following scientist made an essential contribution to the discovery of DNA structure but died before the Nobel Prize was awarded
- A. James Watson
 - B. Francis Crick
 - C. Maurice Wilkins
 - D. Rosalind Franklin
91. A three-point testcross was made involving the genes, A, B and C. If the most abundant classes are ABc and abC and the rarest classes are aBC and Abc, which gene is in the middle
- A. A
 - B. B
 - C. C
 - D. Either A or C
92. Find the odd one among the inclusion bodies known to be present in prokaryotes
- A. Glycogen granules
 - B. PBHB granules
 - C. Cyanophycin granules
 - D. Polyphosphate granules

93. The outer membrane (OM) in Gram negative bacteria is more permeable than the plasma membrane (PM) because
- A. The OM is thinner than the PM
 - B. The OM has unique protein assemblies that permeate substances
 - C. The OM is not a permeability barrier
 - D. The OM becomes a fluid in liquid media
94. Type I secretion pathway in bacteria is also referred to
- A. TT protein secretion pathway
 - B. ABC protein secretion pathway
 - C. Tet protein secretion pathway
 - D. None of the above
95. This dye used in anaerobic jar (system used to grow anaerobic bacteria), which will become colourless in the absence of oxygen
- A. Congo red
 - B. Crystal violet
 - C. Methylene blue
 - D. Carmine
96. One among the following is regulated by quorum sensing in several bacteria
- A. Degradation of cellulose
 - B. Virulence
 - C. Protein secretion
 - D. Fatty acid biosynthesis
97. Which among the following can be sterilized by using dry heat?
- A. Nutrient media
 - B. Labile substances
 - C. Glassware
 - D. Platicware

98. Any suspected organism is finally accepted as the cause of a specific disease when it fulfills certain criteria formulated by Koch. Koch's postulates are
- I. The organism must be consistently associated with the disease in question
 - II. The organism must be isolated from diseased plant in pure culture
 - III. The organism of pure culture must be capable of mutation
 - IV. The organism of pure culture when inoculated back into healthy plant, must be capable of reproducing the symptoms of the disease
- A. I and II are correct
 - B. I,II and IV are correct
 - C. I,II and III are correct
 - D. All are correct
99. Match the following combinations and choose the correct answer from codes given below
- I. Endemic – Incidence periodical and in wide areas
 - II. Epidemic – constantly occurring disease from year to year in moderate to severe form
 - III. Epiphytotic – incidence periodical and environmental condition dependent
 - IV. Sporadic – Incidence irregular and in lesser areas
- A. III and IV are correct
 - B. I and II are correct
 - C. I, II and III are correct
 - D. All are correct
100. Which of the following processes is NOT an example of allosteric regulation?
- A. Regulation of phosphofructokinase activity by 2, 6-bisphosphate
 - B. Catabolite repression by CAP in E.Coli
 - C. Regulation of Lac Operon by allolactose
 - D. Inactivation of nitrogenase by ADP-ribosylation