

DEPARTMENT OF PLANT SCIENCES  
ENTRANCE EXAMINATION, 23 rd February, 2013

**M. Sc Molecular Microbiology**

Time: 2 hours

Maximum Marks: 100

HALL TICKET NO.

## **INSTURCTIONS**

**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.
2. Answers are to be marked only on the **OMR answer Sheet** following the instructions provided there upon.
3. Hand over the OMR answer sheet at the end of the examination to the Invigilator.
4. The question paper contain **100** multiple choice questions (**Part-A:** Question No. 1-25 and **Part B:** question Nos 26-100) in 18 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 and there is **negative marking** for wrong answers. For each wrong answer, **0.33** of a mark will be deducted.
7. Calculations and Mobile Phones are not allowed.

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### **Part-A**

1. Peritrichous flagella means
  - A. Flagella are spread fairly evenly over the whole surface
  - B. Having one flagellum
  - C. One flagellum attached at each end
  - D. Cluster of flagella at one end or ends

2. Tyndallization is one of the methods used for sterilization of the a heat-sensitive materials, which is also known as
- A. Dry heat sterilization
  - B. Fractional steam sterilization
  - C. Membrane sterilization
  - D. Radiation sterilization
3. The capability of a cell to develop into a complete individual is called:
- A. Totipotency
  - B. Prepotency
  - C. Precarious
  - D. Teratology
4. Wildlife sanctuaries are examples of
- A. Ex-situ conservation
  - B. In-situ conservation
  - C. In- vitro conservation
  - D. Ex- vitro conservation
5. 'Mangroves' that grow in saline coastal sediment habitats in the tropics and subtropics are having an adaptation of specialized set of aerating roots which enable the plant to breath are called as
- A. Scidarophores
  - B. Pnematophores
  - C. Haustopores
  - D. Xanthophores
6. The mitochondria were known in the nineteenth century to be osmotically active on the basis of evidence that
- A. the mitochondrial matrix is hypertonic to the cellular cytoplasm
  - B. mitochondria were derived from a symbiotic bacterium
  - C. mitochondria are surrounded by a semi permeable membrane
  - D. the mitochondrial matrix is hypertonic to the cellular cytoplasm
7. Nucleotide bases and aromatic amino acids absorb light respectively at
- A. 280 and 260 nm
  - B. 270 and 280 nm
  - C. 260 and 270 nm
  - D. 260 and 280 nm

8. Bar eye character of *Drosophila* is due to
- A. Deletion in region of 16A of X chromosome
  - B. Due to presence of additional X-chromosome
  - C. Duplication in region of 16A of X chromosome
  - D. due to a point mutation in eye-locus
9. Large quantities of dipicolinic acids are present in
- A. Bacterial cell wall
  - B. Bacterial endospore
  - C. Bacterial cytoplasm
  - D. None of the above
10. Sabin or Salk vaccine is given for
- A. Chicken pox
  - B. Polio
  - C. Hepatitis B
  - D. Small pox
11. Enzyme neuraminidase is carried by which of the following viruses?
- A. Human immunodeficiency virus
  - B. Influenza virus
  - C. Epstein-Barr virus
  - D. Adenovirus
12. Which of the following best describes the algae known as diatoms?
- A. Cells are encased in rigid walls composed of cellulose coated with silicon
  - B. Cells have intricate shells of silicon dioxide with two halves
  - C. Cells have flagella and a light-detecting eye spot
  - D. Cells contain carotenoid pigments as well as chlorophyll A and B
13. In Lac operon, Lac y and Lac Z codes for.....
- A.  $\beta$  galactosidase and  $\beta$  galactoside permease
  - B.  $\beta$  galactoside permease and  $\beta$  galactosidase
  - C.  $\beta$  galactosidase and  $\beta$  galactoside transacetylase
  - D.  $\beta$  galactoside transacetylase and  $\beta$  galactosidase

14. Isoschizomers' recognize

- A. Same recognition site and different recognition sequence
- B. Same recognition site and recognition sequence
- C. Same recognition sequence but different recognition site
- D. Different recognition site and different recognition sequence

15. Match the following organs and diseases associated

- |          |                    |
|----------|--------------------|
| a. Lung  | 1. Asphyxiation    |
| b. Liver | 2. Trachoma        |
| c. Heart | 3. Atherosclerosis |
| d. Eye   | 4. Hepatitis       |

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

16. "Biodiversity conference 2012" is held in this city

- A. Hyderabad
- B. New Delhi
- C. Bengaluru
- D. Ahmadabad

17. Primary differences between cilia and flagella are

- A. Number, length and direction of force
- B. Arrangement of microtubules
- C. Length and location of basal bodies
- D. How the microtubules are fused to each other

18. Sickle cell anemia is due to single nucleotide polymorphism (A → T) of  $\beta$ -globulin gene at position 6 causes the following change in amino acid

- A. Valine → leucine
- B. Aspartic acid → valine
- C. Asparagine → leucine
- D. Glutamic acid → valine

19. 'Mango malformation' in Mango orchards is caused by

- A. *Fusarium mangiferae*
- B. *Pseudomonas mangiferae*
- C. *Xanthomonas mangiferae*
- D. *Alternaria anther*

20. Oxygen carrying blood pigment in certain annelids is

- A. hemoglobin
- B. hemocyanin
- C. Chlorocruorin
- D. haemoerythrin

21. Archeal cells usually contain pseudo-peptidoglycan which is mainly composed of

- A. N-acetyltalosaminuronic acid and D-amino acids
- B. N-acetyltalosaminuronic acid and L-amino acids
- C. N-acetylmuramic acid and L-amino acids
- D. N-acetylmuramic acid and D-amino acids

22. The DNA that codes for a protein's primary structure in eukaryotes is

- A. Exon
- B. Gene
- C. Intron
- D. Promoter

23. Given five alleles at a sex-linked locus in humans, the number of different male genotypes possible is:

- A. 15
- B. 10
- C. 5
- D. 25

24. Polydactyly is a condition caused by a dominant gene in which people have extra fingers and/or toes. Some people with this gene may only have an extra digit on one foot or one hand. This is an example of:

- A. variable expressivity
- B. variable penetrance
- C. variable epistasis
- D. the appearance of novel phenotypes

25. Use of genetically engineered or naturally occurring organism to treat the contaminated soil or water.

- A. Bio sparging
- B. Bio stimulation
- C. Bio augmentation
- D. Phyto-degradation

## PART-B

26. The science of vegetable growing, dealing with the culture of non-woody (herbaceous) plants for food is called

- A. Floriculture
- B. Herbiculture
- C. Sericulture
- D. Olericulture

27. Folic acid is obtained from

- A. Meat
- B. Dairy products
- C. Grains
- D. Leafy vegetables

28. Most fish do not sink in water because of the presence of

- I. swim bladder
- II. air bladder
- III. air sacs
- IV. air in spongy bones

- A. I and II are correct
- B. II and III are correct
- C. III and IV are correct
- D. I, II, III and IV are correct

29. What is the purpose for which the IMViC tests are conducted?

- A. To confirm whether the culture is a bacterium or a fungus
- B. To test whether the bacteria can utilize methyl red or not
- C. To differentiate two closely related members of enterobacteriaceae
- D. To inhibit the growth of *Escherichia coli* and *Enterobacter aerogenes*

30. One of the following antibiotics is known to be penicillinase resistant cell wall biosynthesis inhibitor and is used against Gram-positive bacteria
- A. Chloramphenicol
  - B. Erythromycin
  - C. Streptomycin
  - D. Vancomycin
31. The cross linkage of antigens by antibodies is called as
- A. Cross reaction
  - B. Complement fixation
  - C. Agglutination
  - D. All of them
32. The vast and dominant woodlands in Europe, Asia, North America and mountains such as Himalayas are wooded with
- A. all gymnosperms, except conifers
  - B. only angiosperms
  - C. only conifers
  - D. angiosperms and all gymnosperms except conifers
33. The process of formation of nitrate from Ammonia is
- A. Nitrate assimilation
  - B. Ammonia assimilation
  - C. Nitrification
  - D. Nitration
34. Tetanus toxin produced by *Clostridium tetani* is known to work as a
- A. Neurotoxin that blocks nerve impulses to muscle relaxation pathway
  - B. Cytotoxin that causes massive destruction of red blood cells
  - C. Enterotoxin that causes secretion of large amounts of fluids and electrolytes that result in diarrhea
  - D. Cytotoxin that causes vasodilation that results in the characteristic rash
35. A mobile genetic element characterized by inverted repeats is:
- A. Transposon
  - B. Transversion
  - C. Transition
  - D. Interferon

36. The chain of events leading to the establishment of the pathogen in a plant is called:

- A. Tolerance
- B. Virulence
- C. Parthenogenesis
- D. Pathogenesis

37. 'Prothrombin' which helps in clotting of blood is released by

- A. lymphocytes
- B. erythrocytes
- C. monocytes
- D. blood platelets

38. Ramapithecus and Cro-Magnon are considered

- A. ancestors of modern man
- B. ancestors of monkey
- C. ancestors of lion
- D. None of the above

39. Protein molecules produced by a pathogen to suppress host immune responses are called:

- A. Elicitors
- B. Effectors
- C. Promoters
- D. Receptors

40. Many plant pathogenic fungi produce appressoria prior to penetrating the plant tissue. Most of the appressoria involved in penetration contain specialized substance called

- A. L-Micropine
- B. D-Micropine
- C. Macerozyme
- D. Melanine

41. Poison glands of snakes are homologous to

- A. Electric organs of fishes
- B. Stings of rays
- C. Sebaceous glands of mammals
- D. Salivary glands of vertebrates



42. The adhesion protein present on the surface of *Rhizobium* is
- A. Peptidoglycan
  - B. Rhicadhesin
  - C. Lipid layer
  - D. Teichoic acid
43. The chromosomal number present in *Caenorhabditis elegans*?
- A. 3    B. 6    C. 9    D. 12
44. Bacterial photosynthesis occurs in
- A. Thylakoids
  - B. Mitochondria
  - C. Nucleus
  - D. Plasma membrane
45. The first direct demonstration of the role of bacteria in causing disease came from the study of ..... by the German physician Robert Koch
- A. *Bacillus anthrax*
  - B. *Bacillus thuringiensis*
  - C. *Candida albicans*
  - D. *Bacillus popilliae*
46. The term 'Probiotics' refers to
- A. Antibiotics
  - B. Microbial dietary supplement
  - C. Vitamins
  - D. Plant based dietary supplement
47. What is the heaviest of the twenty amino acids?
- A. Tryptophan
  - B. Lysine
  - C. Arginine
  - D. Phenylalanine
48. In an organism, if the normal diploid number of chromosomes is 8, how many CHROMATIDS are present in each daughter cell at the end of meiosis I?
- A. 2                                  B. 4                                  C. 8                                  D. 16

49. Match the following

- |                                    |                        |
|------------------------------------|------------------------|
| a) Contagium vivum fluidum         | 1) Felix d'Herelle     |
| b) Animal viruses can form plaques | 2) Paul Berg           |
| c) Killers of Bacteria             | 3) Renato Dulbecco     |
| d) Recombinant DNA molecule        | 4) Martinus Beijerinck |

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

50. The most important buffer for maintaining acid-base balance in the blood is

- A. Carbonic acid-bicarbonate buffer  
B. A-3, B-4, C-2, D-1  
C. A-4, B-3, C-1, D-2  
D. Tris-glycine buffer

51. The compound leaves of *Mimosa pudica* fold inward and droop and also close up when touched. This type of movements are termed as

- A. Cell to cell and systemic movement  
B. Nyctinastic movement  
C. Seismonastic movements  
D. Vander wall movement

52. The perception of gravity by roots is aided by:

- A. Amyloplasts  
B. Chromoplasts  
C. Chloroplasts  
D. Gravoplasts

53. The electron transport chain for respiration is found in

- A. the mitochondrial membrane  
B. the mitochondrial matrix  
C. the cell cytoplasm  
D. the vacuole

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- A. a-1, b-2, c-3, d-4  
B. a-2, b-1, c-4, d-3  
C. a-3, b-4, c-2, d-1  
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54. An organism partly or totally deficient on a substance, the addition of which significantly promotes the growth of the organism is termed as

- A. Biotroph
- B. Auxotroph
- C. Heterotroph
- D. Anamorph

55. Which type of cells secrete antibodies

- A. Plasma cells
- B. macrophages
- C. B-cells
- D. T-cells

56. Which of the following amino acids is most compatible with an  $\alpha$ - helical structure

- A. Tryptophan
- B. Alanine
- C. Proline
- D. Leucine

57. Which of the following is a part of the embryo of a seed?

- A. root hairs
- B. radicle
- C. fibrous roots
- D. taproot

58. Conversion of pyruvic acid into ethyl alcohol is facilitated by the enzymes

- A. carboxylase
- B. phosphatase
- C. dehydrogenase
- D. carboxylase and dehydrogenase

59. GnRH is secreted by

- A. Anterior pituitary
- B. Posterior pituitary
- C. Hypothalamus
- D. Uterus

60. What is the difference between "Salting in" and "Salting out"?
- A. "Salting in" is addition of a pinch of salt to increase the solubility of a protein, while "salting out" is addition of excess of salt to precipitate it out
  - B. "Salting in" is addition of excess of salt to precipitate proteins while "salting out" is addition of salt to increase the solubility of protein.
  - C. "Salting in" and "salting out" are methods used in the purification of proteins through protein precipitation and differ from each based on their pH.
  - D. "Salting in" is addition of a pinch of salt to precipitate proteins and "salting out" is removal of salt from protein
61. Dr. Subhash Mukherjee's works are associated in the birth of first Indian test tube baby named after Kalimaa 'Durga' in the year
- A. 1976
  - B. 1977
  - C. 1978
  - D. 1987
62. Ptyalin is an enzyme produced in the
- A. Pituitary glands
  - B. Thyroid glands
  - C. Salivary glands
  - D. Pancreas
63. Cervical cancer is the second most common cancer in women worldwide. The virus associated with it is
- A. HIV
  - B. Influenza
  - C. Human Papilloma virus
  - D. Vaccinia virus
64. The phenomenon of migration of fish from marine to fresh water is known as
- A. Amphidromous
  - B. Catadromous
  - C. Potamomodromous
  - D. Anadromous
65. The presence of a secondary metabolite in chillies makes it so hot
- A. Novaminidine
  - B. Capsaicine
  - C. Pyocyanin
  - D. Vincristine

66. Plants growing on sand are called as

- A. chasmophytes
- B. oxylophytes
- C. lithophytes
- D. psammophytes

67. The hormone that stimulates 'Leydig cells' to produce testosterone is

- A. Follicle stimulating hormone
- B. Gonadotropin-releasing hormone
- C. Luteotrophic hormone
- D. Oxytocin

68. 'Creutzfeldt-Jacoby disease' results in rapidly progressive dementia, leading to memory loss, personality changes and hallucinations in humans is caused by

- A. virus
- B. viroid
- C. prion
- D. mycoplasmas

69. 'Elephantiasis' is a disease that is characterized by the thickening of the skin and underlying tissues, especially in the legs and male genitals. In some cases the disease can cause certain body parts, such as the scrotum, to swell to the size of a basketball is caused by

- A. *Wuchereria bancrofti*
- B. *Tripanosoma sps*
- C. *Thiomargarita nambiensis*
- D. *Xenoderma pigmentosum*

70. What is the difference between "flocculum" and "coagulum"?

- A. "Flocculum" is an irreversible state of denaturation while "coagulum" is a reversible state of denaturation
- B. "Flocculum" is a reversible state of denaturation while "coagulum" is a an irreversible state of denaturation
- C. "Flocculum" is a process of denaturation of proteins while "coagulum" is a process of renaturation of proteins
- D. "Flocculum" is a process of renaturation of proteins while "coagulum" is a process of denaturation of proteins

71. Why is glutathione called a pseudopeptide?

- A. In glutathione both  $\alpha$  and  $\gamma$  carboxyl groups participate in peptide bond formation
- B. In glutathione both  $\alpha$  and  $\delta$  carboxyl groups participate in peptide bond formation
- C. In glutathione instead of  $\alpha$ -carboxyl group, the  $\gamma$ -carboxyl participates in the peptide bond formation
- D. In glutathione instead of  $\alpha$ -carboxyl group, the  $\delta$ -carboxyl participates in the peptide bond formation

72. In which form Glucose is stored in animals?

- A. Starch
- B. Dextrins
- C. Glycogen
- D. Cellulose

73. Radical vascular bundles are those in which

- A. xylem is surrounded by phloem
- B. phloem is surrounded by xylem
- C. xylem and phloem occur on the same radius
- D. xylem and phloem occur on the different radii

74. Osmosis is the flow of solution from higher concentration to a solution of lower concentration through a semi permeable membrane. What is incorrect in this statement?

- A. Exact concentration of solution is not given
- B. Character of semi permeable membrane is not given
- C. The flow of solution is not possible through semi permeable membrane
- D. All are incorrect

75. "Bradford calorimetric protein estimation" is based on these two amino acid interaction with the dye coomassie Brilliant Blue G-250

- A. Arginine and Lysine
- B. Tryptophane and Tyrosine
- C. Alanine and Glycine
- D. Alanine and Valine

76. The respiratory pigment present in the haemolymph of cockroach is called as

- A. Haemocyanin
- B. Haemoerythrin
- C. Haemozoin
- D. Nematocyanin

77. This enzyme is involved in the regulation of supercoiled nature of DNA

- A. DNA polymerase
- B. Helicase
- C. Topoisomerase
- D. DNA primase

78. Pollination by wind is called

- A. anemophily
- B. Entomophily
- C. hydrophily
- D. zoophily

79. 'Glochidium larvae' are characteristic of

- A. Mollusca
- B. Porifera
- C. Protozoa
- D. Arthropoda

80. Out of proteins, lipids and carbohydrates present in a cell membrane, what is true?

- A. Lipids are maximum
- B. Carbohydrates are minimum
- C. Carbohydrates are maximum
- D. All three are in equal proportion

81. For light dependent reaction light is necessary because

- A. It is the source for electrons
- B. It splits the water molecule
- C. It energizes the electrons in the reaction center
- D. It pumps the electrons to generate ATP

82. Which pair of amino acids absorbs the most UV light at 280 nm?

- A. Threonine & Histidine
- B. Cystein & Asparagine
- C. Trptophane & Tyrosine
- D. Phenylalnine & Proline



83. -----is the first enzyme that has been crystallized by James B. Sumner and proved that indeed enzymes are proteins in the year-----

- A. Urease, 1926
- B. Amylase, 1927
- C. Carbonic anhydrase, 1928
- D. Glyoxilase, 1925

84. A mRNA is 999 nucleotides long, including initiation and termination codons. The number of amino acids in the protein translated from this mRNA is

- A. 333
- B. 323
- C. 331
- D. 332

85. "Diauxic growth" means

- A. Growth of an organism under aerobic and anaerobic conditions
- B. Growth of an organism in the presence of two carbon substrates
- C. Organism utilizing two carbon substrates one followed by the other
- D. Organism utilizing two carbon substrates simultaneously

86. Buffer keeps the pH of the solution stable by

- A. Converting strong acid to weak
- B. Converting weak acid to strong
- C. Converting weak base to strong
- D. Converting strong base to weak

87. IUPAC nomenclature for guanine

- A. 6-amino purine
- B. 2-aminohypoxanthine
- C. 2- methyl purine
- D. d) 2-amino 6- oxy purine

88. 'Protoplasts' can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with

- A. cellulolytic enzymes
- B. pectolytic enzymes
- C. both cellulolytic and pectolytic enzymes
- D. proteolytic enzymes

89. The cohesion-tension theory of water movement helps to explain how water moves from soil into roots

- A. Through the phloem
- B. Through the xylem
- C. From leaf to roots
- D. Into the guard cells

90. Which of the following is not a significant biological oxidizing agent?

- A.  $\text{Fe}^{3+}$
- B.  $\text{O}_2$
- C. FAD
- D.  $\text{NAD}^+$

91. Quartz crystals normally used in quartz clocks etc is chemically

- A. Germanium oxide
- B. Silicon dioxide
- C. Sodium silicate
- D. A mixture of germanium oxide and silicon dioxide

92. Which is the precursor for citric acid cycle?

- A. Glucose
- B. Fumaric Acid
- C. Succinyl CoA
- D. Acetyl CoA

93. Galactose and Glucose are-

- A. Epimers
- B. Anomers
- C. Isomers
- D. Stereo isomers

94. FAD is reduced to  $\text{FADH}_2$  during

- A. Electron transport phosphorylation
- B. Krebs cycle
- C. Glycolysis
- D. Fermentation

95. Maltose is composed of

- A. galactose + glucose
- B. glucose + ribose
- C. glucose + glucose
- D. glucose + fructose

96. This bacterium has evolved a mechanism to introduce bacterial DNA that gets randomly integrated into the plant genome and change the properties of plants, which has been exploited for genetic engineering of plants.

- A. *Pseudomonas fluorescens*
- B. *Agrobacterium tumefaciens*
- C. *Azotobacter croococcum*
- D. *Rhizobium meliloti*

97. Asafoetida is latex obtained from

- A. Stem of *Euphorbia tirucalli*
- B. Stem of *Manihot esculentum*
- C. Roots of *Ferula*
- D. Roots of *Euphorbia hirta*

98. The ploidy of a plant with  $2n-1-1$  number of chromosomes is referred as:

- A. Double trisomy
- B. Nullisomy
- C. Monosomy
- D. Double monosomy

99. Gametophyte is dominant phase in the following plant group

- A. Pteridophyta
- B. Gymnosperm
- C. Bryophyta
- D. Angiosperm

100. The simplest method that detects the presence of bacteria by detecting the difference in electrical conductivity between bacterial cells and the surrounding medium is the main principle in

- A. Nephelometer
- B. Conductivity meter
- C. Flow cytometer
- D. Densitometer

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For Rough work