

ENTRANCE EXAMINATION – 2017**M.Sc. Molecular Microbiology****Subject Code: N-13**

Time: 2 hours

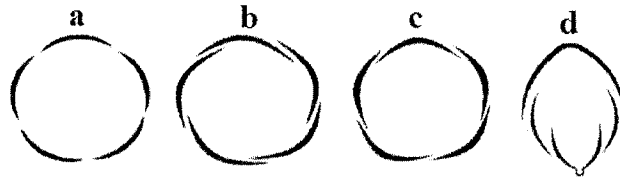
Maximum Marks: 100

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.
2. Answers are to be marked only on the **OMR answer sheet** following instructions provided there upon.
3. Hand over the OMR answer sheet to the Invigilator before leaving the examination hall.
4. The question paper contains **100** questions (**Part-A**: Question Nos. **1-25** and **Part-B**: Questions Nos. **26-100**) of multiple-choice printed in **16** 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 **Parts A and B**. For each wrong answer, 0.33 mark will be deducted.
8. Calculators and mobile phones are NOT allowed.

PART - A

1. The mode of arrangement of sepals or petals in floral bud with respect to the other members of the same whorl is known as aestivation. Find out the right order from the figure given below:



- A. (a) Valvate (b) Twisted (c) Imbricate (d) Vexillary
 B. (a) Valvate (b) Imbricate (c) Twisted (d) Vexillary
 C. (a) Valvate (b) Twisted (c) Imbricate (d) Vexillary
 D. (a) Imbricate (b) Vexillary (c) Twisted (d) Valvate
2. Sucker fish like *Echeneis* attaches to the underside of a shark by means of its sucker which is a modified dorsal fin located on its head. Name the association exhibited by these individuals wherein the former gets benefited by its association while the later is almost unaffected.
- A. Parasitism
 B. Commensalism
 C. Symbiosis
 D. Predatory
3. The main constituent of cuticle is 'cutin' which is made up of:
- A. A mixture of phenylpropanoids
 B. A mixture of polysaccharides
 C. Polymers of galacturonan molecules
 D. A mixture of hydroxy fatty acids
4. Which of the following statements is **not true** for Hfr strains of *Escherichia coli*?
- A. F factor is integrated in the genome
 B. Chromosomal markers are transferred from donor to recipient
 C. They act as donors in the cross
 D. Progeny of the cross always becomes F⁺
5. When a flower can be divided into two radial halves in any radial plane passing through the center is called as:
- A. Zygomorphic flower
 B. Actinomorphic flower
 C. Asymmetric flower
 D. Pleomorphic flower

6. A researcher was conducting Widal test in his lab. For what purpose this test is conducted?
- This test is conducted on Widal named paper to know the pH of human blood
 - This is a type of serological test to identify the typhoid causing bacteria in patient
 - This is a type of serological test to identify the type of heavy metal present in human blood
 - This is a type of serological test to identify the filarial parasite in the human blood
7. When benzaldehyde reacts with phenylhydrazine, the resulting compound is:
- Bezaldehyde phenylhydrazone
 - Benzyl alcohol
 - Toluene
 - 3-Phenylpropenal
8. The union of a hypha with another, resulting in intercommunication of their genetic material and this phenomenon is called:
- Axotrophy
 - Ascogeny
 - Ascotromy
 - Anastomosis
9. The **incorrect** pair among the following is:
- Cyanobacteria - Primary producer
 - Grass hopper - Primary consumer
 - Eagle - Top carnivore
 - Zooplankton - Secondary consumer
10. The Protein-Energy Malnutrition (PEM) observed in infants and children resulting from simultaneous deficiencies of proteins and calories causes:
- Jaundice
 - Gaucher's disease
 - Marasmus
 - Appendicitis
11. Match the following proteins with their biological role:
- | | |
|---------------|----------------------------------|
| 1. Albumin | a. Blood clotting plasma protein |
| 2. Fibrinogen | b. Osmotic balance of blood |
| 3. Globulin | c. Blood anticoagulant |
| 4. Heparin | d. Antibodies in defense |
- 1d, 2b, 3c, 4a
 - 1b, 2a, 3d, 4c
 - 1c, 2a, 3d, 4b
 - 1b, 2a, 3c, 4d

12. In the common daisy, the genes A and a, B and b represent two pairs of alleles acting on flower color. A and B are both required for color. How many plants with colourless flowers will be found in the F₂ of a cross between two colorless plants, one homozygous for A and the other homozygous for B?
- A. 4 in 16
B. 6 in 16
C. 7 in 16
D. 9 in 16
13. In plants, molybdenum deficiency causes one of the following symptoms:
- A. Necrosis and molting
B. Chlorosis
C. Wilting
D. Increase in length of internodes
14. What is the chemical nature of "Taurine"?
- A. It is an amino sulfonic acid widely distributed in animal tissue
B. It is a compound which contain urea and toluene found in patient suffering from urinary tract infection
C. When mammalian urine contain heavy metal, it is called taurine
D. It is urea containing compound which is used as pesticide as well as fertilizers
15. An example of non-protein amino acid among the following:
- A. Arginine
B. Canavanine
C. Hydroxyproline
D. Histidine
16. The mechanism by which resistance to a virulent strain of plant pathogenic virus is conferred by prior exposure of plants to a less or inactive form of the virus is called as:
- A. Infestation
B. Cross protection
C. Crossing over
D. Incineration
17. Which of the following shows vestigial stomata?
- A. Eichhornia
B. Nerium
C. Capparis
D. Hydrilla
18. Which one among the following is spliced out of a HnRNA?
- A. Introns
B. Exons
C. Start codons
D. Stop codons

19. What is cyclostomata?
- A. When open stomata looks like a cycle structure
 - B. It is the part of chloroplast which helps in transpiration in night
 - C. It is the name of a class in vertebrata division
 - D. It is the name of fish which emits light
20. A cross is made with *Drosophila* having genotype **Ab/aB** with another genotype **ab/ab**. If these genes are closely linked and there is no chance of crossing over occurring in this region, the resulting progeny would be:
- A. All progeny will be phenotypically **Ab**
 - B. All progeny will be phenotypically **aB**
 - C. 50% of the progeny will be phenotypically **AB** and 50% phenotypically **ab**
 - D. 50% of the progeny will be phenotypically **Ab** and 50% phenotypically **aB**
21. Cystolith is made of one of the following:
- A. Calcium oxalate
 - B. Calcium carbonate
 - C. Sodium hydroxide
 - D. Sodium chloride
22. Cobalt-60 radiation is generally used in pharmaceutical and animal husbandry sectors. For what purpose this radiation is used?
- A. This radiation is used to treat retinal disorder in human and animals
 - B. This radiation is used for treating embryonic disorder in human and animal
 - C. This radiation is used for boosting immune system
 - D. This radiation is used for cold sterilization of antibiotics, hormones, medical equipment and pasteurize meat product
23. Sulfonamide or sulfa drugs are structurally related to sulfanilamide which is an analogue of :
- A. p-Aminobenzoic acid
 - B. Folic acid
 - C. Cytosine
 - D. D-Alanyl-D-alanine
24. 'Sigatoka' disease of Banana and 'Katte' disease of *Cardomum* are caused respectively by:
- A. A fungus and a virus
 - B. A virus and a viroid
 - C. A bacteria and fungus
 - D. A viroid and virus

25. Sickle cell anemia is a monogenic disorder that produces abnormal hemoglobin S (HbS) resulting in sickling of erythrocytes. Which of the following is **incorrect** about sickle cell anemia?
- A. Carriers of the sickle cell allele are resistant to malaria
 - B. Red blood cells carrying mutant hemoglobin become sickle shaped when deprived of oxygen
 - C. Individuals with two copies of the sickle cell gene have the disease
 - D. Individuals afflicted with sickle-cell anemia are two times more likely to be males than to be females

PART – B

26. The rate of transpiration can be measured by:
- A. Manometer
 - B. Photometer
 - C. Potometer
 - D. Auxanometer
27. The process by which glycogen is converted into glucose is known as:
- A. Glucogenesis
 - B. Glycogenesis
 - C. Lipogenesis
 - D. Glycogenolysis
28. During mRNA processing which of the following is added to the 5' end of the mRNA transcript?
- A. 7-Methyl guanosine cap
 - B. Series of adenine bases
 - C. Introns
 - D. Ribosomes
29. Which of the following bacteriophages was used by Seymour Benzer for fine structure analysis of rII region?
- A. P2 phages
 - B. T4 phages
 - C. M13 phages
 - D. λ Phages
30. Kranz anatomy is found in one of the following:
- A. C3 plants
 - B. C4 plants
 - C. C2 plants
 - D. Succulent plants

31. The process of formation of the 'formed elements' of blood comprising of erythrocytes, leucocytes and platelets is called as:
- A. Hematology
C. Haemopoiesis
- B. Serology
D. Haemocentesis
32. Bordeaux mixture is used in vine yards to prevent downy mildew and powdery mildew is a mixture of:
- A. Copper sulphate and slaked lime
C. Magnesium sulphate and common salt
- B. Zink sulphate and slaked lime
D. Cupric sulphate and caustic soda
33. Cyclosporine A, which is used as an immune suppressive agent in organ transplant patients is isolated from:
- A. *Colletotrichum officinarum*
C. *Saccharomyces cervicia*
- B. *Clostridium botilicum*
D. *Trichoderma polysporum*
34. DCMU (Dichlorophenyl dimethyl urea) also called "Diuron" is a potent herbicide which kills plants by:
- A. Inhibiting Calvin cycle
C. Inhibiting of PS-I
- B. Inhibiting respiration
D. Inhibiting of PS-II
35. In some of the vertebrate the alimentary canal, urinary and reproductive tract open into a common chamber which opens into exterior. This chamber is known as:
- A. Cloaca
C. Cecum
- B. Ureter
D. Osculum
36. The membrane-bound organelle which detoxifies molecules such as hydrogen peroxide in the cell is:
- A. Glyoxysome
C. Liposome
- B. Peroxisome
D. Chromosome
37. All of the following statements are true of DNA mutations except one of the following:
- A. Recessive mutations arise due to loss of function
B. Dominant mutations arise due to gain of function
C. Majority of the mutations are recessive in nature
D. Dominant mutations are not expressed in heterozygous condition but only in homozygous condition

38. Indole 3-acetic acid (IAA) generally inhibits growth in one of the following plant parts:
- A. Roots
B. Leaves
C. Stem
D. Flower bud
39. Which of the following causes Kala-azar in man?
- A. *Leishmania donovani*
B. *Taenia solium*
C. *Entamoeba histolytica*
D. *Fasciola hepatica*
40. Select the molecule which has only one π bond:
- A. $\text{CH} \equiv \text{CH}$
B. $\text{CH}_3\text{CH} = \text{CH}_2$
C. $\text{CH}_3\text{CH} = \text{CHCOOH}$
D. $\text{CH}_2 = \text{CHCHO}$
41. A fungus which grows on bread obtains its food by:
- A. Photosynthesis
B. Making its own food out of inorganic ions
C. Secreting enzymes into bread
D. Engulfing bread particles
42. Colchicine, a chemical mutagen, is obtained from which part of *Colchicum autumnale*?
- A. Rhizome
B. Succulent leaves
C. Bulb
D. Corn
43. A special characteristic feature of cnidarians comprising of jelly fish and corals, is the occurrence of:
- A. Polymorphism
B. Haemotocysts
C. Hermaphroditism
D. Nematocysts
44. The generation of carbon dioxide during respiration takes place in:
- A. Cytoplasm
B. Nucleus
C. Mitochondrion
D. Vacuole
45. Which one of the following is used in the reclamation of alkaline soils?
- A. Rhizobia
B. *Selaginella rupestris*
C. Blue green algae
D. Diatoms

46. In nature, phenotypic variability is essentially continuous because of all the reasons listed below **except**:
- A. Each genotype produces a discrete phenotype without being affected by environmental variability
 - B. Many genes contribute to a given phenotype
 - C. Environmental variability affects phenotype
 - D. There is phenotypic overlap between different genotypes
47. Identify an anamniote among the following:
- A. Fish
 - B. Reptiles
 - C. Aves
 - D. Mammals
48. X – rays are produced when one of the following event takes place:
- A. UV rays strike a metal target
 - B. Infra-red rays strike a metal target
 - C. Cathode rays strike a metal target
 - D. Radio waves strike a metal target
49. The unique feature of Mycoplasmas which distinguishes them from other prokaryotes is:
- A. Presence of murrain in cell walls
 - B. Presence of chitin in cell walls
 - C. Presence of peptidoglycan cell wall
 - D. Absence of cell wall itself
50. Algae are always:
- A. Blue-green
 - B. Photosynthetic
 - C. Eukaryotic
 - D. Unicellular
51. Uricotelic animals are those that excrete nitrogenous waste in the form of uric acid. Which among the following is a uricotelic organism?
- A. Birds
 - B. Frogs
 - C. Bony fish
 - D. Mammals
52. The two strands of the DNA double helix are held together by:
- A. Hydrogen bonds
 - B. C=C double bonds
 - C. Hydrophobic bonds
 - D. Peptide bonds

53. When performing a tetrad analysis in yeast, it is noticed that the ascus contains four kinds of ascospores, one that is like each of the parents and two that are recombinants. What is this kind of ascus called?
- A. Parental ditype
B. Non-parental ditype
C. Tetratype
D. Recombinant ditype
54. Which among the following is celebrated as a world environmental day?
- A. August 8th
B. June 5th
C. May 7th
D. June 28th
55. The nature of nutrition of most of the parasitic protozoa is:
- A. Mesozoic
B. Holozoic
C. Archenozoic
D. Parazoic
56. Which of the following salt has the same value of Vant's Hoff factor as that of $K_3[Fe(CN)_6]$:
- A. $Al_2(SO_4)_3$
B. $Al(NO_3)_3$
C. $FeSO_4$
D. Na_2SO_4
57. McFadyean's reaction is employed for the presumptive diagnosis of:
- A. Anthrax
B. Tetanus
C. Typhoid
D. Mycobacterium
58. The chemical substance found abundantly in the middle lamella of plant cells is:
- A. Suberin
B. Lignin
C. Cellulose
D. Pectin
59. Excessive richness of nutrients in waterbodies result in dense growth of plant life by a process called:
- A. Pasteurization
B. Biofertilization
C. Eutrophication
D. Bioremediation
60. Phosphorylation-dephosphorylation of proteins is an important mechanism of enzyme:
- A. Synthesis
B. Degradation
C. Regulation
D. Turnover

61. Which one of the following is a secondary pollutant?
- A. CO
B. CO₂
C. SO₂
D. PAN (Peroxy acetyl nitrate)
62. The stages of parasitic protozoa that actively feed and multiply are called as:
- A. Trophozoites
B. Hydrozoites
C. Cysts
D. Colon
63. Grignard reagent react with ketones with subsequent hydrolysis to give
- A. 2° alcohol
B. 3° alcohol
C. Ketone
D. Carboxylic acid
64. A psychrophilic halophile would be a microbe that prefers the following conditions:
- A. Warm temperatures and increased amounts of pressure
B. Cold temperatures and increased amounts of salt
C. Cold temperatures and the absence of oxygen
D. Warm temperatures and increased amounts of acid
65. Krebs cycle starts with the formation of a 6-carbon compound by chemical reaction between:
- A. Malic acid and acetyl CoA
B. Fumaric acid and acetyl CoA
C. Oxaloacetic acid and acetyl CoA
D. Succinic acid and acetyl CoA
66. Which among the following is commonly called as “subabul”?
- A. *Prosopis juliflora*
B. *Leucaena leucocephala*
C. *Pithecalobium saman*
D. *Albizia lebbek*
67. Lysozyme is present in one of the following:
- A. Cerebro-spinal fluid
B. Saliva
C. Urine
D. Sweat
68. The respiratory quotient is more than unity when the respiratory substrate is:
- A. Organic acid
B. Sugar
C. Protein
D. Fat

69. Which of the following is not a method by which organisms genetically resist drugs?
- A. Transfer of R factor
 - B. Synthesis of enzymes that inactivate the drug
 - C. Decrease in drug uptake and drug permeability into the cell
 - D. Modification of an essential metabolic pathway
70. Hydathodes possess the following in their anatomy:
- A. Oil secreting glands
 - B. Water secreting glands
 - C. Honey glands
 - D. Mucilage secreting glands
71. One of the following functions describes the role of contractile vacuoles in a protozoa organism:
- A. Maintain osmotic balance by continuous water expulsion
 - B. Creates sites of food digestion
 - C. Contain specific enzymes to catalyze degradation
 - D. Reaction centers for photosynthesis
72. White lead is a mixture of the following compounds:
- A. An allotrope of lead
 - B. Lead sulphate
 - C. Lead carbonate + Lead sulphate
 - D. Basic lead carbonate
73. The most selective antibiotics are those that interfere with the synthesis of:
- A. Bacterial Cell walls
 - B. Bacterial DNA
 - C. Bacterial Plasma membrane
 - D. Bacterial RNA
74. Blue green algae are often found associated with:
- A. *Citrus*
 - B. *Cycas*
 - C. *Azadirachta*
 - D. *Phoenix*
75. One of the following is a remarkably hardy fresh water fish, though surviving in waters of very low oxygen saturations, high salinities and high temperatures can be used in biological control of mosquitoes/larvicidal fish is:
- A. Carp
 - B. Eel
 - C. *Gambusia*
 - D. Cat fish

76. An organic acid which undergoes both dehydrogenation and decarboxylation is:
- A. Malic acid
B. Ketoglutaric acid
C. Oxalosuccinic acid
D. Isocitric acid
77. A phenomenon called 'pseudodominance' could be demonstrated in a heterozyote when it carries a
- A. Deletion
B. Duplication
C. Paracentric inversion
D. Reciprocal translocation
78. Root parasite producing largest flower is:
- A. *Striga*
B. *Rafflesia*
C. *Santalum*
D. *Orobanche*
79. Aristotle's lantern, a masticatory apparatus consisting of five large calcareous plates surrounding the mouth and used for feeding forms a characteristic feature of one of the following:
- A. *Echinoidea*
B. *Asteroidea*
C. *Holothuroidea*
D. *Ophiuroidea*
80. For an acid HA, the pKa value is negative, indicating that the acid is:
- A. Completely dissociated
B. Partially dissociated
C. Not dissociated at all
D. 50 % dissociated
81. Organisms which have spore-forming stage in their life cycle and lack special locomotory organelles belong to which phylum of Protozoa?
- A. Ciliophora
B. Myxozoa
C. Apicomplexa
D. Microspora
82. Which element is essential for photolysis of water?
- A. Calcium
B. Sodium
C. Sulphur
D. Chlorine

83. The passage called 'Foramen of Monro' which inter connects the two paracoels with one another as well to the third ventricle called diacoel is found in
- A. Heart
B. Lungs
C. Brain
D. Kidney
84. Which mineral is essential for the activity of the enzyme nitrate reductase?
- A. Copper
B. Iron
C. Molybdenum
D. Magnesium
85. Which type of genomics studies the transcripts and proteins expressed by a genome?
- A. Comparative genomics
B. Structural genomics
C. Proteo genomics
D. Functional genomics
86. Safranin stains are produced from:
- A. Lignified cells
B. Starch
C. Pyrenoids
D. Cork tissues
87. A special voice box which is characteristic of birds and is located at the posterior end of the trachea and its junction with the bronchi for producing sound is called as:
- A. Larynx
B. Pygostyle
C. Symsacrum
D. Syrinx
88. Which of the following molecule possesses a dipole moment?
- A. CH_4
B. CH_3CH_3
C. CHCl_3
D. $\text{HC} \equiv \text{CH}$
89. Viruses are not capable of doing one of the following things:
- A. Pickup and carry genes from their host cells
B. Carry genes coding for specific proteins
C. Code for enzymes different from those of the host
D. Grow and replicate on their own
90. A sudden change from anaerobic to aerobic respiration due to availability of O_2 is
- A. Richmond-Lang effect
B. Emerson effect
C. Pasteur effect
D. Warburg effect

91. Classification of the phylum Porifera is based on one of the following:
- A. Reproduction
 - B. Spicules
 - C. Branching
 - D. Symmetry
92. The shrunken condition of a cell is brought about by the process of:
- A. Osmosis
 - B. Plasmolysis
 - C. Imbibition
 - D. Diffusion
93. The physiologically receptive state in which a bacterial cell is able to be transformed is called as:
- A. Activated
 - B. Competent
 - C. Lysogenic
 - D. Inducible
94. What is the substrate in protoplasmic respiration?
- A. Carbohydrates
 - B. Fats and oils
 - C. Proteins
 - D. Organic acids
95. A steroid hormone, secreted by a pair of prothoracic glands in the thorax of insects and by Y organs in crustaceans which stimulates moulting and metamorphosis is:
- A. Thyroxine
 - B. Pheromone
 - C. Ecdysone
 - D. Androgen
96. The type of glass used in making lenses and prisms is:
- A. Pyrex glass
 - B. Quartz glass
 - C. Jena glass
 - D. Flint glass
97. The toxin of *Staphylococcus aureus* that may result into scalded skin syndrome is
- A. Enterotoxin
 - B. Leucocidin
 - C. Epidermolytic toxin
 - D. Haemolysin
98. When a cell is fully turgid, which of the following will be zero?
- A. Suction pressure
 - B. Wall pressure
 - C. Turgor pressure
 - D. Osmotic pressure

99. A substance produced upon viral infection in a cell that can protect other cells from further infection is

- A. Serotonin
- C. Histamine

- B. Interferon
- D. Progesterone

100. All of the following species are considered coliforms except

- A. *Enterobacter aerogenes*
- C. *Salmonella typhi*

- B. *Klebsiella pneumonia*
- D. *Escherichia coli*

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