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ENT-60

Total No. of Pages : 18

M.Sc. MICROBIOLOGY
Entrance Examianation 2026
Sub. Code: 58717

Day and Date : Tuesday, 21-07-2026
Time : 02.30 p.m. to 04.00 p.m.

Total Marks : 100

Instructions

- 1) All questions are compulsory.
- 2) Each question carries 1 mark.
- 3) Answers should be marked in the given OMR sheet by darkening the appropriate option.
- 4) Follow the instructions given on OMR Sheet.
- 5) Rough work shall be done on the sheet provided at the end of question paper.

1. is known as the "Father of Antiseptic Surgery" for introducing the use of carbolic acid to sterilise surgical instruments and wounds.

A) Joseph Lister

B) Edward Jenner

C) Ignaz Semmelweis

D) Paul Ehrlich
2. are group of microorganisms having chlorophyll and produces its own food

A) Fungi

B) Algae

C) Protozoa

D) Viruses
3. are the bacterial genera well-known for producing endospores.

A) Escherichia and Salmonella

B) Mycobacterium and Pseudomonas

C) Staphylococcus and Streptococcus

D) Bacillus and Clostridium.
4. is used as mordant in Gram staining procedure.

A) Grams iodine

B) Crystal violet

C) 95% Ethanol

D) Basic fuchsin

5. is the limit of resolution for a standard light microscope.
A) 2 mm
B) 0.2 μm
C) 20 μm
D) 0.002 μm
6. is the color of the metachromatic granules appear after the complete Albert's staining procedure.
A) Green
B) Bluish-black
C) Bright red
D) Yellow
7. In a GasPak jar system, the catalyst used to facilitate the reaction between hydrogen and oxygen is
A) Platinum
B) Silver
C) Copper
D) Palladium pellets
8. In lyophilization, "sublimation" refers to the transition of water from
A) Liquid to gas
B) Solid to liquid
C) Solid to gas
D) Gas to solid
9. A culture medium of which the exact chemical composition is known is called.....
A) Complex media
B) Natural media.
C) Synthetic media
D) Semi-solid media
10. If a microbiologist observes dark colonies with a metallic green sheen on EMB agar, then is most likely being detected.
A) *Escherichia coli*
B) *Staphylococcus aureus*
C) *Streptococcus faecalis*
D) *Bacillus subtilis*
11. discovered the phenomenon of diauxic growth in 1940.
A) Robert Koch
B) Louis Pasteur
C) Jacques Monod
D) Alexander Fleming

12. molecules is regenerated at the end of the TCA cycle to accept a new Acetyl-CoA.

A) Citric acid	B) Malate
C) Oxaloacetate	D) Succinate
13. The purpose of Ethidium Bromide (EtBr) in gel electrophoresis is

A) To visualize DNA bands under UV light

B) To stabilize the pH of the buffer

C) To provide a charge to the DNA

D) To act as a molecular weight marker
14. In a colorimeter, the purpose of the blank or control solution is

A) To increase absorbance

B) To reduce the intensity of light

C) To eliminate the absorbance of the solvent

D) To increase the transmittance
15. According to lock and key hypothesis the lock represents an and the
represents a key

A) Enzyme, substrate	B) Substrate, Lock
C) Substrate, enzyme	D) Enzyme, key
16. Insertion or deletion of nucleotides not in multiples of three results in mutation.

A) Point	B) Frameshift
C) Silent	D) Neutral

17. is a method of gene transfer that involves the uptake of "naked" or cell-free DNA fragments from the surrounding environment.
- A) Transduction B) Transfection
C) Conjugation D) Transformation
18. The 1918 Spanish Flu killed 50 million people worldwide within two years. This is a/an
- A) Epidemic B) Pandemic
C) Endemic D) Sporadic
19. is an iron-binding protein found in blood and tissue fluids that inhibit bacterial growth by restricting iron availability.
- A) Lactoferrin B) Ferritin
C) Transferrin D) Hemoglobin
20. Antigens that are present in some members of a species but not others (such as blood group antigens) are referred to as
- A) Xenoantigens B) Alloantigens
C) Heterophile antigens D) Isotypes
21. period is the initial part of the latent period in which the infected host does not contain any complete virion.
- A) Eclipse B) Plateau
C) Burst D) Lag
22. The viruses can be purified through precipitation with
- A) Ammonium sulphate B) Calcium sulphate
C) Sodium sulphate D) Potassium sulphate

23. The key event that establishes the lysogenic state in a lambda phage infection is the production of the repressor protein, which is coded by the

A) cro gene	B) int gene
C) el gene	D) xis gene
24. Adenovirus enters its host by process.

A) Receptor-mediated endocytosis
B) Surface melting
C) Exocytosis
D) Direct entry
25. Two copies of linear single-stranded DNA are present as genome in

A) Adenovirus	B) TMV
C) HIV	D) T4 phage
26. Capsid of Tobacco mosaic virus is made up of identical capsomeres.

A) 52	B) 2130
C) 1320	D) 12
27. causes potato spindle tuber disease.

A) Viroids	B) HIV
C) Prions	D) TMV
28. A bacteriophage capable of entering a lysogenic cycle is called a

A) Virulent phage	B) Lytic phage
C) Temperate phage	D) Avirulent phage
29. is a process in which cells undergo an indefinite number of divisions.

A) Immortalization	B) Metastasis
C) Apoptosis	D) Angiogenesis

30. Oncogene theory was proposed by
A) Lederberg B) Huebner and Todaro
C) Jacob & Monod D) Watson & Crick
31. is NOT a lymphoid progenitor cell.
A) T-cell B) B-cell
C) NK cell D) Monocyte
32. Small, bean-shaped structures that filter lymph and trap antigens are called:
A) Adenoids B) Lymph nodes
C) Thymic lobules D) Lacrimal glands
33. molecule on the helper T cell interacts with the MHC class II molecule on the APC.
A) TCR B) CD8
C) CD4 D) CD28
34. molecule present on the surface of a B cell is crucial for presenting processed antigen peptides to Helper T cells.
A) MHC Class I B) MHC Class II
C) BCR (BCR) D) CD4
35. The membrane attack complex (MAC) in the complement pathway consists of.....
A) C3b, Bb
B) C5b, 6, 7, 8, 9
C) Clq, r, s
D) C4b, 2a

36. is a common therapeutic application of monoclonal antibodies.
- A) Treatment of bacterial infections with antibiotics
 - B) Cancer immunotherapy
 - C) Production of vitamin supplements
 - D) General pain relief
37. is an immunoglobulin most commonly involved in Type I Hypersensitivity reaction.
- A) IgE
 - B) IgG
 - C) IgM
 - D) IgA
38. is a term that best describes the state of immunological unresponsiveness to self-antigens.
- A) Memory
 - B) Tolerance
 - C) Acquired immunity
 - D) Hypersensitivity
39. When two or more cytokines act together to produce an effect that is greater than the sum of their individual effects, the property is called
- A) Redundancy
 - B) Pleiotropy
 - C) Synergy
 - D) Cascade induction
40. Interferons are defined as
- A) Pro-inflammatory enzymes
 - B) Antibody components
 - C) Bacterial toxins
 - D) Antiviral glycoproteins
41. Aflatoxins are typically produced byfungal species.
- A) *Penicillium chrysogenum*
 - B) *Fusarium graminearum*
 - C) *Aspergillus flavus*
 - D) *Claviceps purpurea*

42. The production ofin beer gives a butter-like flavor.
A) ethanol
B) lactic acid
C) acetic acid
D) diacetyl
43. is the term used to describe food poisoning caused by toxins produced in food.
A) Infection
B) Sterilization
C) Fermentation
D) Intoxication
44. is the intrinsic factor most directly connected to the availability of free water for microbial metabolism.
A) pH
B) oxidation-reduction potential
C) water activity
D) nutrient content
45. The Ames test uses strains of *Salmonella typhimurium*.
A) Auxotrophic
B) Resistant
C) Thermophilic
D) Anaerobic
46. The Staphylococcal enterotoxin serotype with food poisoning outbreaks..... is most commonly associated
A) type B
B) type A
C) type C
D) type D
47. is the primary intermediate used for the production of most semi-synthetic penicillins.
A) 6-aminopenicillanic acid (6-APA)
B) Benzylpenicillin
C) 7-aminocephalosporanic acid
D) Penicilloic acid

48.is the process of separating particles from liquids based on their density differences.
- A) Filtration B) Distillation
C) Chromatography D) Centrifugation
49. An environment ofis used for cryopreservation.
- A) 0°C B) 4°C
C) -20°C D) -196°C
50. Theparameter is frequently not scaled proportionately when moving from shaking flask to bioreactor.
- A) agitation speed B) aeration rate
C) inoculum size D) medium color
51. is most commonly recognized as a potent phosphate solubilizing bacterium.
- A) Rhizobium sp. B) Azotobacter sp.
C) Pseudomonas sp. D) Nitrosomonas sp.
52. The high cation exchange capacity of soil indicates
- A) Low fertility
B) High nutrient retention
C) High acid leaching
D) High sand content
53. The toxin produced by *Bacillus thuringiensis* is activated by
- A) Low temperature B) Acidic pH
C) Alkaline pH of the gut D) Moisture

54. The process where a pesticide is transformed by a microorganism without serving as a source of energy or nutrients is called
- A) Mineralization B) Cometabolism
C) Biomagnification D) Eutrophication
55. The relationship between Rhizobium bacteria and leguminous plants, where nitrogen is fixed for the plant in exchange for nutrients, is an example of
- A) Commensalism B) Parasitism
C) Mutualism D) Amensalism
56. Azospirillum promotes plant growth mainly by
- A) Phosphate solubilization only
B) Fixing sulfur
C) Producing toxins
D) Producing phytohormones like IAA
57. The long-term storage of carbon in the geosphere is primarily in the form of....
- A) Biomass B) Atmospheric
C) Fossil fuels and rocks D) Dissolved
58. involves pathogens entering through wounds caused by pruning tools or farm machinery.
- A) Biological transmission
B) Mechanical transmission
C) Seed-borne transmission
D) Air-borne transmission

59. Bacterial Blight of Pomegranate is caused by
- A) *Xanthomonas citri*
 - B) *Xanthomonas axonopodis* pv. *punicae*
 - C) *Cercospora punicae*
 - D) *Colletotrichum gloeosporioides*
60. Ideal C:N ratio for composting is
- A) 10:1
 - B) 20:1
 - C) 30:1
 - D) 50:1
61. *E. coli* chromosome is DNA molecule.
- A) Linear single-stranded
 - B) Linear double-stranded
 - C) Circular single-stranded
 - D) Circular double-stranded
62. The Pribnow box is found in the region of prokaryotic genes.
- A) Promoter
 - B) Operator
 - C) Regulator
 - D) Structural
63. Mutation is phenotypically expressed in
- A) Homokaryotic wild-type cell
 - B) Homokaryotic mutant cell
 - C) Heterokaryotic wild-type cell
 - D) Heterokaryotic mutant cell
64. Incorporation of into mRNA suppresses nonsense mutation.
- A) 5-bromouracil
 - B) 5-fluorouracil
 - C) Acridine dyes
 - D) Nitric acid

65. Conditional lethal mutations are lethal under conditions.
A) Permissive
B) Non-permissive
C) Optimum
D) Non-dividing
66. Kappa particles reproduce by
A) Sexual reproduction
B) Binary fission
C) Budding
D) Spore germination
67. Transposon encodesgene which catalyzes its insertion into new site.
A) Integrase
B) Reverse transcriptase
C) Transposase
D) Recombinase
68. The method used for paternity determination is
A) DNA sequencing
B) DNA fingerprinting
C) PCR
D) Western blotting
69. synthesizes a DNA strand using RNA as a template.
A) Alkaline phosphatase
B) Terminal transferase
C) Polynucleotide kinase
D) Reverse transcriptase
70. restriction endonucleases are commonly used in genetic engineering.
A) Type I
B) Type II
C) Type III
D) Type IV
71. The secondary structure in enzymes is primarily stabilized by
A) Hydrogen bonds between backbone atoms
B) Peptide bonds between amino acids
C) Phosphodiester linkages
D) Ester bonds between side chains

72. Allosteric enzymes typically exhibit
- A) Hyperbolic kinetics similar to Michaelis-Menten enzymes
 - B) Sigmoidal kinetics due to cooperative binding
 - C) Linear kinetics independent of substrate concentration
 - D) No measurable kinetic behavior
73. Ion-exchange chromatography separates enzymes based on differences in
- A) Molecular size
 - B) Stability
 - C) Adsorption characteristic difference
 - D) Net charge
74. An enzyme assay is primarily used to determine
- A) Molecular weight of the enzyme
 - B) Structural conformation of enzyme
 - C) Enzymatic activity under defined conditions
 - D) Number of substrate binding sites
75. Immobilized enzymes are advantageous in industrial processes because they....
- A) Cannot be reused after reaction
 - B) Require complex recovery procedures
 - C) Can be reused and easily separated from products
 - D) Have significantly reduced catalytic efficiency
76. Covalent catalysis involves
- A) Formation of a transient covalent bond between enzyme and substrate
 - B) Alignment of substrates at the active site
 - C) Proton transfer during catalysis
 - D) Induction of strain in substrate structure

77. Increasing substrate concentration in an enzyme-catalyzed reaction generally results in
- A) Continuous linear increase without saturation
 - B) Increase in reaction velocity until V_{max} is reached
 - C) Decrease in velocity due to substrate inhibition
 - D) Immediate denaturation of enzyme
78. A low K_m value of an enzyme indicates
- A) High affinity for substrate requiring low concentration to reach half V_{max}
 - B) Low affinity for substrate requiring high concentration to reach half V_{max}
 - C) Increased maximum velocity (V_{max})
 - D) Reduced catalytic turnover number (k_{cat})
79. The GOGAT pathway is involved in assimilation of
- A) Carbon
 - B) Nitrogen
 - C) Sulphur
 - D) Oxygen
80. In the absence of arabinose, AraC protein regulates the operon by
- A) Activating transcription of structural genes
 - B) Allowing continuous gene expression
 - C) Increasing enzyme synthesis constitutively
 - D) Forming a DNA loop that represses transcription
81. The anaerobic biological method used in wastewater treatment is
- A) Trickling filter
 - B) Oxidation ponds
 - C) Activated sludge process
 - D) Biomethanation

82. Sludge is generated in large quantity during the treatment of wastewater by biological methods.
- A) aerobic B) anaerobic
- C) facultative D) both facultative and anaerobic
83. The waste generated by sugar industry includes
- A) Molasses B) Pressmud
- C) Bagasse D) All of these
84. As per standards prescribed by MPCB, the treated wastewater intended to discharge into inland surface water should have COD less thanmg/l.
- A) 150 B) 250
- C) 350 D) 450
85. If a waste water sample is evaporated, the solids remaining are called
- A) grit B) volatile solids
- C) total solids D) fixed solids
86. BOD determines the strength of present in sewage.
- A) inorganic matter B) organic matter
- C) inorganic elements D) heavy metals
87. The aerobic biological method used in wastewater treatment is
- A) Anaerobic digestion B) Septic tank
- C) Biomethanation D) Trickling filter
88. In wastewater treatment, primary treatment methods refer tooperations.
- A) physical unit B) chemical and biological unit
- C) physical and biological unit D) physical, chemical and biological unit

89. Generally, the distillery generates produced..... volume of spentwash per litre of alcohol produced.
A) 1-5
B) 12-15
C) 42-45
D) 100-120
90. In wastewater treatment, skimmers are used to remove from wastewater.
A) grit
B) oil and grease
C) dissolved solids
D) colloidal solids
91. toxin is responsible for gas gangrene.
A) Alpha
B) Beta
C) Delta
D) Entero
92. is a sexually transmitted infection caused by the spirochete bacterium *Treponema pallidum*.
A) Gonorrhea
B) Chlamydia
C) Chancroid
D) Syphilis
93. is considered a major virulence factor of *Pseudomonas aeruginosa*.
A) Enterotoxin
B) Exotoxin A
C) Tetanospasmin
D) Diphtheria toxin
94. *Vibrio cholerae* is a shaped bacillus.
A) cocci
B) spiral
C) comma
D) filamentous
95.enzyme is produced by *Staphylococcus aureus* that causes plasma clotting.
A) Catalase
B) Urease
C) Oxidase
D) Coagulase

96. Quinolones inhibit in Gram-negative bacteria.
- A) RNA polymerase B) DNA gyrase
C) Ribosomes D) Cell wall
97. The most important virulence factor of *Klebsiella pneumoniae* isantigen.
- A) Flagellar B) Endotoxin
C) K D) Exotoxin
98. Bacitracin is a polypeptide antibiotic that inhibits bacterialsynthesis.
- A) protein B) RNA
C) DNA D) cell wall
99. Hepatitis A virus is virus.
- A) RNA B) DNA
C) Retro D) Double-stranded DNA
100. Immune sera (antiserum) are preparations that contain
- A) antigens B) antibiotics
C) antibodies D) enzymes



- Rough Work -