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(To be filled in the
OMR Sheet)

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No.

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प्रश्नपुस्तिका सीरीज
Question Booklet Series

D

**M.Sc (Microbiology) First Semester,
Examination, February/March-2022**

MIC-1001

General Microbiology

Time : 1:30 Hours

Maximum Marks-100

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : —

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही— सही भरे, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमें से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने हैं। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET) में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वाइंट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक (O.M.R. ANSWER SHEET) पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक (O.M.R. ANSWER SHEET) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक-पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : —

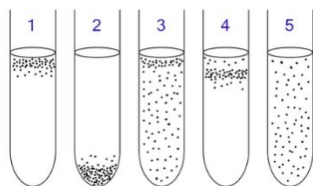
प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।

Rough Work / रफ कार्य

1. Which of the following are true for Gram-negative bacteria?
 - (A) Upon alcohol treatment, the permeability of the cell wall increases
 - (B) Crystal violet-iodine (CV-I) complex is extracted
 - (C) Pore size decreases and the CV-I complex cannot be extracted
 - (D) Alcohol treatment increases the permeability of the cell wall and the CV-I complex can be extracted
2. In Gram-staining, iodine is used as a _____.
 - (A) Fixative
 - (B) Mordant
 - (C) Solublizer
 - (D) Stain
3. Which bacteria appears purple-violet colour after staining?
 - (A) Gram-positive
 - (B) Gram-negative
 - (C) Both Gram-positive and Gram-negative
 - (D) Neither Gram-positive nor Gram-negative
4. What is the correct order of staining reagents in Gram-Staining?
 - (A) Crystal violet, alcohol, iodine solution, safranin
 - (B) Crystal violet, iodine solution, alcohol, safranin
 - (C) Crystal violet, safranin, alcohol, iodine solution
 - (D) Iodine solution, crystal violet, alcohol, safranin
5. The generation time for E.coli under optimal conditions is _____.
 - (A) 20 minutes
 - (B) 35 minutes
 - (C) 2 minutes
 - (D) 13 minutes
6. Growth of bacterial population follows:
 - (A) Arithmetic progression
 - (B) Geometric progression
 - (C) Both of the above
 - (D) None of the above

7. In the growth equation: $n = 3.3 (\log_{10} N - \log_{10} N_0)$, n stands for:
- (A) Total population
 - (B) Initial population
 - (C) Number of generations
 - (D) Growth constant
8. Mass sterilization of disposable plasticware can be sterilize using:
- (A) Gamma radiation
 - (B) X ray
 - (C) UV rays
 - (D) None of the above
9. Example of a differential and enrichment media is:
- (A) Blood agar
 - (B) Nutrient Agar
 - (C) Dextrose Agar
 - (D) Trypticase Soy Agar
10. Which of the following is true regarding growth types of organisms in tube 3 and tube 5 in above given figure?
- (A) In Tube 3, Facultative anaerobes can grow with or without oxygen because they can metabolise energy aerobically or anaerobically
 - (B) In tube 3, Aerotolerant organisms do not require oxygen as they metabolise energy anaerobically
 - (C) In Tube 5, Facultative anaerobes can grow with or without oxygen because they can metabolise energy aerobically or anaerobically
 - (D) In tube 5, Aerotolerant organisms require oxygen as they metabolise energy anaerobically

11.



In the above figure, tube no 4 represents:

- (A) Obligate aerobes
 - (B) Microaerophiles
 - (C) Facultative aerobes
 - (D) Facultative anaerobes
12. Which of the following techniques can be used for obtaining pure culture sample?
- (A) Streaking
 - (B) Flaming
 - (C) Staining
 - (D) Fixing
13. Which of the following techniques are not used for generating synchronous culture?
- (A) Helmscutter
 - (B) Nutrition deficiency
 - (C) Temperature Shock
 - (D) Nephelometry
14. Fungal cell wall is composed of:
- (A) Chitin
 - (B) Cellulose
 - (C) Starch
 - (D) Laminin
15. Classification of Algae is based on?
- (A) Types of reserve storage granules
 - (B) Types of photosynthetic pigments
 - (C) Cell wall material
 - (D) All of the above

16. Characteristics of continuous culture system include:
- (A) Closed system
 - (B) Open system
 - (C) Semi closed system
 - (D) None of the above
17. Organisms capable of obtaining C requirement by fixing atmospheric carbon are referred to as:
- (A) Heterotrophs
 - (B) Autotrophs
 - (C) Chemotrophs
 - (D) All of the above
18. Name the bacteria that can use methane as sole source of energy:
- (A) Methanogens
 - (B) Methanophiles
 - (C) Methanotrophs
 - (D) Capnophiles
19. Which of the following does a prokaryotic cell lack?
- (A) Ribosomes
 - (B) Metabolic processes
 - (C) Nucleic acid
 - (D) Mitochondria
20. Agar is derived from which of the following organisms:
- (A) Rhodophycophyta
 - (B) Chlorophycophyta
 - (C) Chrysophycophyta
 - (D) Pyrrophycomphyta

21. Molecular taxonomy uses which of the following as conserved regions for bacterial taxonomy:
- (A) 16s rDNA
 - (B) 18S rDNA
 - (C) Both of the above
 - (D) None of the above
22. Vegetative stage characterized by multinucleate diploid ameboid mass called a plasmodium is observed in:
- (A) Acellular slime molds
 - (B) Cellular slime molds
 - (C) Yeast
 - (D) Algae
23. Y to M shift can be observed in:
- (A) *Bacillus subtilis*
 - (B) *Candida albicans*
 - (C) Tobacco Mosaic Virus
 - (D) *Entamoeba histolytica*
24. Infectious RNA without outer proteinaceous covering is known as:
- (A) Virion
 - (B) Viroid
 - (C) Virus
 - (D) Virucide
25. Which of the following is acellular intracellular obligate pathogen?
- (A) *Mycoplasma*
 - (B) Slime mold
 - (C) Viruses
 - (D) Yeasts

26. Which type of test is used to determine whether disinfectant solutions actively used in a clinical setting are being used correctly?
- (A) Disk-diffusion assay
 - (B) Phenol coefficient test
 - (C) In-use test
 - (D) Use-dilution test
27. Bleach is an example of which group of chemicals used for disinfection?
- (A) Heavy metals
 - (B) Halogens
 - (C) Quaternary ammonium compounds
 - (D) Phenolics
28. The time required to kill all of the microbes within a sample at a given temperature is called as?
- (A) D-value
 - (B) Thermal death point
 - (C) Thermal death time
 - (D) Decimal reduction time
29. The decimal reduction time refers to the amount of time it takes to which of the following?
- (A) Reduce a microbial population by 10%
 - (B) Reduce a microbial population by 0.1%
 - (C) Reduce a microbial population by 90%
 - (D) Completely eliminate a microbial population
30. Bacteria that grows in acidic hot spring can be characterized as:
- (A) Alkalophile, mesophile
 - (B) Acidophile, thermophile
 - (C) Acidophile, mesotrophs
 - (D) Alkaliphile, thermotroph

31. In which bacterial growth phase would you observe the most endospores in a *Bacillus* cell culture?
- (A) Death phase
 - (B) Lag phase
 - (C) Log phase
 - (D) Log, lag, and death phases would all have roughly the same number of endospores
32. Which of the following is the standard resource for identifying bacteria?
- (A) *Systema Naturae*
 - (B) *Bergey's Manual of Determinative Bacteriology*
 - (C) *Haeckel's General Morphology of Organisms*
 - (D) None of the above
33. Which of the following is NOT a domain in Woese and Fox's phylogenetic tree?
- (A) *Plantae*
 - (B) *Bacteria*
 - (C) *Archaea*
 - (D) *Eukarya*
34. Autoclave was invented by:
- (A) Winogradsky
 - (B) Beijerinck
 - (C) Chamberland
 - (D) Pasteur
35. The term bacteria was given by:
- (A) Ehrenberg
 - (B) Pasteur
 - (C) Robert Koch
 - (D) Kornberg

36. Fungi prefer to grow in media that is:
- (A) Rich in sugar and acidic in nature
 - (B) Rich in nitrogen and alkaline in nature
 - (C) Rich in phosphorous and magnesium
 - (D) Basal nature
37. Organisms that prefer to grow in the temperature ranges below 15 Degree Celsius are known as:
- (A) Psychrotrophs
 - (B) Psychrophiles
 - (C) Mesophiles
 - (D) Thermophiles
38. Chemolithotrophs are organisms that can:
- (A) Use inorganic compounds as sources of energy and carbon
 - (B) Use organic compounds as sources of energy and carbon
 - (C) Both of the above
 - (D) None of the above
39. Which of the following is an example of Gram positive rod?
- (A) *Escherichia coli*
 - (B) *Pseudomonas aeruginosa*
 - (C) *Clostridium botulinum*
 - (D) *Vibrio cholera*
40. Which of the following does not act as inhibitors of cell wall synthesis?
- (A) Beta lactam
 - (B) Cephalosporins
 - (C) Fluoroquinolones
 - (D) Glycopeptides

41. Which of the following is a gaseous sterilant?
- (A) Ethylene Oxide
 - (B) Glutaraldehyde
 - (C) Carbolic acid
 - (D) Cresol
42. Heat labile substances can be sterilized using
- (A) Autoclave
 - (B) Inspissator
 - (C) Incinerator
 - (D) Filtration
43. Sterilization of oils can be performed using:
- (A) Autoclave
 - (B) Tyndallization
 - (C) Pasteurization
 - (D) Hot Air Oven
44. Autoclaving is used for sterilization of objects using moist heat for 20 minutes at:
- (A) 121 Degree Celsius at 15 psi
 - (B) 100 Degree Celsius at 15 psi
 - (C) 121 Degree Celsius at 20 psi
 - (D) 100 Degree Celsius at 15 psi
45. Which of the following microscopes is not useful for generating contrast for observing live cell samples without staining?
- (A) Upright bright field microscope
 - (B) Fluorescent microscope
 - (C) Phase contrast Microscope
 - (D) Inverted Microscope

46. The total magnification of specimen upon observing through 100x objective lens and 15x ocular lens will be:
- (A) 115X
 - (B) 1500 X
 - (C) 1015X
 - (D) 100X
47. Which of the following techniques is not useful as a long term culture preservation technique?
- (A) Agar slants
 - (B) Cryopreservation
 - (C) Lyophilization
 - (D) Glycerol Stocks
48. Chemical agents that are responsible for the killing of fungi are known as:
- (A) Fungistatics
 - (B) Fungicides
 - (C) Algicides
 - (D) Bactericides
49. Who is considered as pioneer of antiseptic surgery?
- (A) Robert Koch
 - (B) Louis Pasteur
 - (C) Charles Darwin
 - (D) Joseph Lister
50. What did Anton von Leuwenhoek call the organisms that he first observed through his rudimentary microscope?
- (A) Animals
 - (B) Animalcules
 - (C) Animalia
 - (D) Anistamanicules

51. The average size of micro-organisms is micrometer which is:
- (A) 10^{-6}m
 - (B) 10^{-9}m
 - (C) 10^{-2}m
 - (D) 10^{-3}m
52. Chemotaxonomy is the classification and identification of micro-organisms based on similarities and differences in their:
- (A) Chemical composition
 - (B) Genetic composition
 - (C) Both of the above
 - (D) None of the above
53. Which of the following distinguishes algae from plants?
- (A) Absence of photosynthetic pigments
 - (B) Absence of vascular tissue
 - (C) Absence of reserve food materials
 - (D) All of the above
54. Which of the following is an example of symbiotic relationship between fungi and algae?
- (A) Lichen
 - (B) Mycorrhiza
 - (C) Rhizobia
 - (D) All of the above

55. Arrange the processes in the order they occur during a bacterial batch culture:
- (i) Lag phase, (ii) Death phase, (iii) stationary phase, (iv) exponential growth phase:
- (A) (i), (ii), (iii), (iv)
- (B) (i), (iv), (ii), (iii)
- (C) (iii), (i), (iv), (ii)
- (D) (i), (iv), (iii), (ii)
56. The term Microbiology was first coined by:
- (A) Anton von Leuwenhoek
- (B) Robert Koch
- (C) Louis Pasteur
- (D) John Tyndall
57. Viral capsid is made of repeated protein units known as:
- (A) Procapsid
- (B) Capsomere
- (C) Centromere
- (D) None of these
58. Which of the following disinfectants have anti-viral properties?
- (A) Hydrogen peroxide
- (B) Hypochlorite
- (C) Iso propyl alcohol
- (D) All of the above

59. Media containing crystal violet and sodium deoxycholate will allow growth of:
- (A) Gram negative intestinal bacteria
 - (B) Gram positive intestinal bacteria
 - (C) Fungi
 - (D) None of the above
60. Chocolate media is an example of:
- (A) Selective and differential media for Staphylococci
 - (B) Enrichment media
 - (C) Selective and Differential media for Enterobacteriaceae
 - (D) Defined Media
61. Concentration of agar added for creating solid media is:
- (A) 0.5g%
 - (B) 1.5g%
 - (C) 10g%
 - (D) 5g%
62. Which of the following can grow in alkaline pH?
- (A) Lactobacillus
 - (B) Shigella
 - (C) Vibrio
 - (D) Staphylococcus
63. Gram positive bacteria lack which of the following:
- (A) Outer membrane
 - (B) Murein
 - (C) Teichoic acids
 - (D) Cell membrane

64. What is the mode of antimicrobial action of alcohols?
- (A) Protein denaturation
 - (B) Oxidizing agents
 - (C) Generation of heat
 - (D) Generation of ionizing radiation
65. Cocci which occur as grape shaped clusters are referred to as:
- (A) Streptococci
 - (B) Cryptococci
 - (C) Pneumococci
 - (D) Staphylococci
66. PPLO stands for:
- (A) Plasmid Position Like Organisms
 - (B) Pneumonia Pharyngitis Lung Organisms
 - (C) Pleuro Pneumoniae Like Organisms
 - (D) Pleuro Pseudomonas Like Organisms
67. Average size of cell in exponential phase is:
- (A) Greater than lag phase
 - (B) Smaller than lag phase
 - (C) No difference in size
 - (D) None of the above
68. Microbial growth by Standard Plate Count is usually quantified as:
- (A) Cfu/ml
 - (B) Pfu/ml
 - (C) Cells per ml
 - (D) Optical density

69. The total biomass of an organisms will be determined by the nutrient present in lowest concentration relative to its nutritional requirement is referred to as:
- (A) Liebig Law of Minimum
 - (B) Law of Uncertainty
 - (C) Law of requirements
 - (D) Quorum's Law
70. All the below are sporicidal in nature except:
- (A) Glutaraldehyde
 - (B) Formaldehyde
 - (C) Ethyl alcohol
 - (D) Ethylene oxide
71. Bactericidal concentration of phenol is:
- (A) 1%
 - (B) 0.5%
 - (C) 0.1%
 - (D) 0.01%
72. Which of the following is an important surface active disinfectant?
- (A) Amphoteric compound
 - (B) Cationic compounds
 - (C) Non-ionic compound
 - (D) Anionic Compound
73. Which of the following can be sterilized using hot air oven?
- (A) Nutrient Media
 - (B) Glass
 - (C) Plastic ware
 - (D) Laboratory coat

74. Which of the following is used as quality control measure for sterilization by heat?
- (A) Wilcoxon rank test
 - (B) Brown's tube
 - (C) Phenol coefficient test
 - (D) None of the above
75. Which of the following is an example of strict anaerobic bacteria?
- (A) *Proteus vulgaris*
 - (B) *Clostridium tetani*
 - (C) *Staphylococcus aureus*
 - (D) *Salmonella typhi*
76. Which of the following factors affect microbial growth?
- (A) Temperature
 - (B) pH
 - (C) Water activity
 - (D) All of the above
77. Woese classification is based on which of the following relationship?
- (A) Phenetic
 - (B) Phylogenetic
 - (C) Chemotaxonomic
 - (D) All of the above
78. How many kingdoms are established as per Whittaker Classification system?
- (A) 5
 - (B) 6
 - (C) 3
 - (D) 8

79. Example of vital stain is:
- (A) Eosin
 - (B) Methylene blue
 - (C) Neutral Red
 - (D) All of the above
80. Which type of staining is useful for observation of capsule formation in bacteria?
- (A) Simple staining
 - (B) Differential staining
 - (C) Negative staining
 - (D) Cell wall staining
81. Swan neck experiment by Louis Pasteur helped disprove the:
- (A) Theory of Abiogenesis
 - (B) Theory of Biogenesis
 - (C) Theory of Independent assortment
 - (D) Theory of recapitulation
82. Characteristic feature of ascomycetes are:
- (A) Coenocytic mycelium and formation of basidia
 - (B) Septate mycelium and formation of sac
 - (C) Both of the above
 - (D) None of the above
83. Ernst Haeckel is known for his
- (A) Biogenesis theory
 - (B) Koch's postulate
 - (C) Evolutionary theory
 - (D) Genetics study

84. Which of the following is not a contribution of Robert Koch?
- (A) Finding a cure for many diseases, including anthrax and tuberculosis
 - (B) Discovering the cause of tuberculosis
 - (C) Providing a framework for the study of diseases
 - (D) Microbiology techniques for growing and studying bacteria
85. Nitrogen fixing bacteria were identified by:
- (A) Winogradsky
 - (B) Lister
 - (C) Spallanzani
 - (D) Pasteur
86. According to Bergey's Manual of Systematics Bacteriology, bacteria without cell wall were classified as:
- (A) Firmicutes
 - (B) Tenericutes
 - (C) Gracilicutes
 - (D) Mendosicutes
87. Percentage similarity of one strain to another is calculated by:
- (A) DNA hybridization
 - (B) Protein modelling
 - (C) Numerical taxonomy
 - (D) Intuitive method
88. Type strain is used for referring to:
- (A) Genus
 - (B) Species
 - (C) Family
 - (D) Domain

89. The most common mode of nutrition in bacteria is:
- (A) Chemo heterotrophs
 - (B) Photoautotrophs
 - (C) Chemoautotrophs
 - (D) Lithotrophs
90. Which of the following statements is true regarding the domain archaea?
- (A) Cell membrane has ether-linked lipids and pseudopeptidoglycan
 - (B) Cell membrane has ester-linked lipids and peptidoglycan
 - (C) Lack presence of introns in genomic content
 - (D) Metabolism methods are photosynthesis and cellular respiration
91. Which of the following are methods for growing aerobic organisms?
- (A) Use of reducing agents in media
 - (B) Use of candle jar system
 - (C) Use of orbital shaker or sparger system
 - (D) Use of paraffin oil
92. Which of the following are not a contribution by Louis Pasteur?
- (A) Germ theory of disease
 - (B) Pasteurization
 - (C) Pure culture techniques
 - (D) Vaccination
93. Nichrome loop wire is used in which of the following techniques?
- (A) Pour-plate
 - (B) Streak-plate
 - (C) Spread-plate
 - (D) Roll-tube technique

94. Which of the following are not performed in lyophilization?
- (A) Agar slant is covered with mineral oil
 - (B) Cell suspension is frozen at -60 degree to -78degree C
 - (C) Vials are connected to high-vacuum line
 - (D) Bacterial sample is dehydrated
95. Which of the following is a mandate of microbial culture collection center?
- (A) Maintenance of cultures
 - (B) Creating a biodiversity repository
 - (C) Dissemination of cultures
 - (D) All of the above
96. Which of the following methods can be used to quantitatively measure number of cells in a sample?
- (A) Microscopically
 - (B) Pour plate and spread place method
 - (C) Spectrophotometry
 - (D) All of the above
97. Measurement of number of viable bacterial cells in culture media can be done by:
- (A) Spectrophotometry
 - (B) Plating method
 - (C) Turbidometry
 - (D) Nephelometry
98. The stage of growth phase of bacteria where maximum growth occurs is known as:
- (A) Stationary phage
 - (B) Lag phase
 - (C) Log phase
 - (D) None of the above

99. If the mean generation time of an organisms in 30 minutes, what will be cell number in 2 hours if initial count is 50 cells:
- (A) 800
 - (B) 1000
 - (C) 1200
 - (D) 2400
100. Gram positive bacteria are more susceptible to:
- (A) Ampicillin
 - (B) Streptomycin
 - (C) Tetracycline
 - (D) Erythromycin

DO NOT OPEN THE QUESTION BOOKLET UNTIL ASKED TO DO SO

1. Examinee should enter his / her roll number, subject and Question Booklet Series correctly in the O.M.R. sheet, the examinee will be responsible for the error he / she has made.
 2. **This Question Booklet contains 100 questions, out of which only 75 Question are to be Answered by the examinee. Every question has 4 options and only one of them is correct. The answer which seems correct to you, darken that option number in your Answer Booklet (O.M.R ANSWER SHEET) completely with black or blue ball point pen. If any examinee will mark more than one answer of a particular question, then the first most option will be considered valid.**
 3. Every question has same marks. Every question you attempt correctly, marks will be given according to that.
 4. Every answer should be marked only on Answer Booklet (O.M.R ANSWER SHEET). Answer marked anywhere else other than the determined place will not be considered valid.
 5. Please read all the instructions carefully before attempting anything on Answer Booklet (O.M.R ANSWER SHEET).
 6. After completion of examination please hand over the Answer Booklet (O.M.R ANSWER SHEET) to the Examiner before leaving the examination room.
 7. There is no negative marking.
- Note:** On opening the question booklet, first check that all the pages of the question booklet are printed properly in case there is an issue please ask the examiner to change the booklet of same series and get another one.