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Booklet No.

20513

QUESTION BOOKLET

Booklet Series



*SAMPLE
DIRE-2013*

MICROBIOLOGY

Subject Code : 02

Time Allowed : 2 Hours

Maximum Marks : 100

INSTRUCTIONS FOR CANDIDATES

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2. You have to enter your Roll Number on the Question Booklet in the Box provided alongside. **DO NOT** write anything else on the Question Booklet.

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3. Candidate must fill in the necessary information in the space provided on the supplied OMR (Optical Mark Recognition) Answer Sheet before commencement of the Examination. *See directions on the backside of the OMR Answer Sheet.*
4. For marking the correct answer, darken **one** circle by **black** or **blue** ballpoint pen only. **Do not mark on more than one circle.** Darkening more than one circle against an answer will be treated as wrong answer.
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6. This Booklet contains **100 questions.** Each question carries **1 mark.** There is no negative marking for any wrong answer.
7. Possession and **use of Calculator, Mobile Phone or similar Electronic Devices is prohibited** in the Examination Hall.
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SEAL

1. Viruses that are infected and reproduced in bacteria are called
 - (A) zoophagia
 - (B) phytophagia
 - (C) bacteriophagia
 - (D) mycobacteria
2. Which of the following is *not* a eucaryote?
 - (A) Alga
 - (B) Bacterium
 - (C) Fungus
 - (D) Protozoa
3. Which of the following is *not* present in a eucaryotic cell?
 - (A) Nucleolus
 - (B) Mitochondrion
 - (C) Golgi body
 - (D) Peptidoglycan
4. Which of the following is *not* a kingdom in the classification of living organisms?
 - (A) Monera
 - (B) Protista
 - (C) Fungus
 - (D) Alga
5. Which of the following is *not* true for yeasts?
 - (A) Yeasts are eucaryotic
 - (B) Yeasts are multicellular
 - (C) Yeasts are reproduced by asexual and sexual processes
 - (D) None of the above
6. Millions of bacterial cells packed tightly together, arising from a single bacterium, are called
 - (A) colony
 - (B) pure culture
 - (C) mixed culture
 - (D) vaccine
7. The scientist who developed the concept of chemotherapy was
 - (A) Paul Ehrlich
 - (B) Elie Metchnikoff
 - (C) Louis Pasteur
 - (D) Robert Koch
8. Which of the following is *not* a contribution of Robert Koch in the field of microbiology?
 - (A) Development of pure culture technique
 - (B) Discovery of causative agent of anthrax
 - (C) Discovery of causative agent of tuberculosis
 - (D) Development of immunization technique

9. One micrometre (μm) is equivalent to
- (A) 0.001 mm
 - (B) 0.01 mm
 - (C) 0.1 mm
 - (D) 1000.0 mm
10. Which of the following is *not* a characteristic of plasmids?
- (A) Extrachromosomal, linear DNA molecules
 - (B) Capability of autonomous replication
 - (C) Capability of integration with chromosomes
 - (D) Conferring special characteristics such as toxigenicity to cells
11. Which of the following is the most useful property of a microscope?
- (A) Magnification
 - (B) Resolving power
 - (C) Phase contrast
 - (D) All of the above
12. Which of the following microscopic techniques is used to reveal surface topography of a specimen?
- (A) Bright-field microscopy
 - (B) Fluorescence microscopy
 - (C) Phase-contrast microscopy
 - (D) Scanning electron microscopy
13. Which of the following is a basic dye?
- (A) Eosin
 - (B) Methylene blue
 - (C) Eosinate of methylene blue
 - (D) None of the above
14. Okazaki fragments are produced during
- (A) replication
 - (B) translation
 - (C) transcription
 - (D) All of the above
15. Which of the following is *not* a function of bacterial capsules?
- (A) To protect against temporary drying by binding water molecules
 - (B) To inhibit the engulfment of bacteria by WBCs
 - (C) To promote attachment of bacteria to surfaces
 - (D) To prevent the cell from expanding and bursting
16. Which of the following is *not* a component of peptidoglycan?
- (A) *N*-acetylmuramic acid
 - (B) *N*-acetylglucosamine
 - (C) Teichoic acids
 - (D) Tetrapeptide

17. Nutritionally *E. coli* can be characterized as
- (A) chemotrophic
 - (B) organotrophic
 - (C) heterotrophic
 - (D) All of the above
18. Which of the following compounds is found in the spores but not in vegetative cells?
- (A) Muramic acid
 - (B) Mycolic acid
 - (C) Dipicolinic acid
 - (D) Teichoic acid
19. Which of the following serves as a source of carbohydrates in bacteriological media?
- (A) Agar
 - (B) Beef extract
 - (C) Peptone
 - (D) Yeast extract
20. An example of inorganic solidifying agent for bacteriological media is
- (A) agar
 - (B) gelatin
 - (C) silica gel
 - (D) All of the above
21. 10 bacterial cells were inoculated into a flask of liquid culture medium and incubated. At the end of the incubation period, the bacterial population increased from 10 to 320. Assuming that the bacteria are reproduced by binary fission and that no bacterial cell died, the number of generations that took place is
- (A) 4
 - (B) 5
 - (C) 6
 - (D) 8
22. The manner in which bacterial growth is expressed using microscopic method is
- (A) colony-forming unit
 - (B) dry weight of cells in mg/ml
 - (C) number of cells per ml
 - (D) optical density
23. Which of the following culture media is used to provide selective growth of gram-negative intestinal bacteria such as *Salmonella* and *Shigella*?
- (A) Fluid thioglycolate
 - (B) Nutrient agar
 - (C) MacConkey's agar
 - (D) Soybean casein digest agar

24. Which of the following methods is best suited for selecting endospore-forming bacteria from a mixed culture?
- (A) Incubation at high temperature, e.g., 55 °C
 - (B) Heating the mixed culture to 80 °C for 10 minutes before inoculation
 - (C) Inoculating into a low-pH medium
 - (D) All of the above
25. In which of the following methods for isolating pure cultures, can subsurface colonies develop?
- (A) Streak-plate method
 - (B) Roll-tube method
 - (C) Pour-plate method
 - (D) Spread-plate method
26. Bacteria can be preserved by covering the growth on agar slant with which oil?
- (A) Sterile turpentine oil
 - (B) Sterile peanut oil
 - (C) Sterile liquid paraffin oil
 - (D) All of the above
27. The inorganic portion of an enzyme is called
- (A) apoenzyme
 - (B) coenzyme
 - (C) cofactor
 - (D) holoenzyme
28. Lyase, a major class of enzymes, catalyses which of the following reactions?
- (A) Electron transfer
 - (B) Transfer of functional groups
 - (C) Formation of bonds
 - (D) None of the above
29. In which of the following mechanisms for the regulation of enzyme activity, the first metabolite of a pathway participates as effector molecule?
- (A) Energy-link control
 - (B) Feedback inhibition
 - (C) Precursor activation
 - (D) General process
30. In which of the following mechanisms for the regulation of enzyme activity, participation of effector molecule is *not* required?
- (A) Energy-link control
 - (B) Feedback inhibition
 - (C) Precursor activation
 - (D) General process

31. The operon consists of
- (A) structural gene
 - (B) operator gene
 - (C) repressor gene
 - (D) All of the above
32. Which of the following is *not* true for bacterial genomes?
- (A) Chromosomes are diploid
 - (B) Chromosomes consist of circular DNA molecule
 - (C) DNA molecules are double-stranded
 - (D) Consist of single chromosome
33. Which of the following enzymes removes the RNA primer during replication of DNA?
- (A) DNA polymerase I
 - (B) DNA polymerase II
 - (C) DNA polymerase III
 - (D) RNA polymerase
34. DNA polymerase III has which of the following activities?
- (A) 3'-5' nuclease activity
 - (B) 5'-3' nuclease activity
 - (C) 3'-5' polymerase activity
 - (D) 5'-3' polymerase activity
35. DNA polymerase I has which of the following activities?
- (A) 3'-5' nuclease activity
 - (B) 5'-3' nuclease activity
 - (C) 5'-3' polymerase activity
 - (D) None of the above
36. Removal of the phosphate group from the nucleotide yields
- (A) deoxyribose sugar
 - (B) pyrimidine base
 - (C) purine base
 - (D) Nucleoside
37. Which of the following is *not* true referring to chromosome of a typical bacterium?
- (A) Chromosome is circular
 - (B) Chromosome comprises of double-stranded DNA
 - (C) Double helix has free ends
 - (D) Chromosome is supercoiled
38. Large DNA molecules of eucaryotes have how many of the following origins, i.e., points of initiation for replication?
- (A) 0
 - (B) 1
 - (C) 10
 - (D) 100

39. If a polypeptide chain contains 300 amino acids, then the gene coding for this polypeptide chain must contain how many of the following base pairs?
- (A) 100
 - (B) 300
 - (C) 900
 - (D) 1
40. If a gene coding for a polypeptide chain contains 300 nucleotide base pairs, then the polypeptide chain contains how many of the following amino acids?
- (A) 900
 - (B) 300
 - (C) 100
 - (D) 1
41. The substitution of adenine for guanine in the sequence of a gene is termed as which of the following types of mutation?
- (A) Insertion
 - (B) Deletion
 - (C) Transversion
 - (D) None of the above
42. The addition of one or more nucleotides in a gene is termed as which of the following types of mutation?
- (A) Transition
 - (B) Transversion
 - (C) Deletion
 - (D) None of the above
43. The units of DNA which move from one DNA molecule to another are called
- (A) viruses
 - (B) plasmids
 - (C) transposons
 - (D) All of the above
44. Which of the following is *not* true for an Hfr $\times$ F⁻ cross?
- (A) F factor becomes integrated into chromosome
 - (B) Frequency of recombination is high
 - (C) Transfer of F factor is low
 - (D) None of the above
45. Which of the following mechanisms of genetic recombination was discovered by Zinder and Lederberg?
- (A) Transformation
 - (B) Conjugation
 - (C) Transduction
 - (D) Mutation

46. For DNA synthesis, which of the following is required?
- (A) Primer
 - (B) Promoter
 - (C) Lipase
 - (D) All of the above
47. Which of the following is *not* gram-negative?
- (A) Pseudomonas
 - (B) Enterobacter
 - (C) Rickettsia
 - (D) Clostridium
48. Which of the following is *not* gram-positive?
- (A) Vibrio
 - (B) Staphylococcus
 - (C) Bacillus
 - (D) Mycobacterium
49. The distinctive features—
- (I) Cell slope is curved
 - (II) Cells have polar flagella
 - (III) Cells are oxidase-positive
- are of which of the following bacterial families?
- (A) Rhizobiaceae
 - (B) Pseudomonadaceae
 - (C) Vibrionaceae
 - (D) Enterobacteriaceae
50. Which of the following families is noted for producing organic acids as a result of fermentative metabolism?
- (A) Bacteroidaceae
 - (B) Pasteurellaceae
 - (C) Vibrionaceae
 - (D) Enterobacteriaceae
51. The category of bacteria comprising of methanogenic bacteria, extreme halophiles and thermoacidophiles are grouped under which of the following?
- (A) Eubacteria
 - (B) Archaeobacteria
 - (C) Cyanobacteria
 - (D) All of the above
52. Which of the following is *not* true for extreme halophile?
- (A) Chemoorganotrophic, require 17%–23% NaCl
 - (B) Gram-negative
 - (C) Anaerobic
 - (D) Colonies are red to orange
53. Which of the following is *not* true for thermoacidophile?
- (A) Aerobic
 - (B) Gram-positive
 - (C) Able to grow under acidic conditions
 - (D) Able to grow under high temperature

54. Which of the following genera in bacteriology has been divided into largest number of species?

- (A) Spirochaeta
- (B) Escherichia
- (C) Corynebacterium
- (D) Streptomyces

55. Which of the following species of Streptomyces produces the antibiotic amphotericin B?

- (A) *S. nodosus*
- (B) *S. venezuelae*
- (C) *S. fradiae*
- (D) *S. rimosus*

56. Which of the following is *not* true for fungi?

- (A) Eucaryotic
- (B) Aerobic
- (C) Use inorganic carbon
- (D) Cell wall composed of chitin

57. Which of the following is *not* true for fungi?

- (A) Eucaryotic
- (B) Optimum pH for growth is 3.8-5.6
- (C) Sensitive to penicillin
- (D) Do not require light

58. Which of the following is *not* a bacterium?

- (A) Streptomyces
- (B) Actinomyces
- (C) Dermatophilus
- (D) None of the above

59. Which of the following is *not* a fungus?

- (A) Dermatophilus
- (B) Rhizopus
- (C) Mucor
- (D) None of the above

60. Which of the following is *not* a characteristic of *Mucor*?
- (A) Used in the manufacture of cheese
 - (B) Mycelia are nonseptate
 - (C) Exhibit dimorphism
 - (D) Are common bread molds
61. In commensalism, which of the following is a type of symbiotic association between a Protozoa and its host?
- (A) The Protozoa is benefitted while the host is neither injured nor benefitted
 - (B) Both the Protozoa and host are benefitted
 - (C) The Protozoa is benefitted while the host is injured
 - (D) Both the Protozoa and the host are injured
62. The causative agent of African sleeping sickness is
- (A) virus
 - (B) bacterium
 - (C) fungus
 - (D) Protozoa
63. Polyhedral bacteriophages are icosahedral in shape, which means the capsid has
- (A) 12 triangular facets
 - (B) 18 triangular facets
 - (C) 10 triangular facets
 - (D) 20 triangular facets
64. Which of the following viruses contains double-stranded RNA?
- (A) Reovirus
 - (B) Retrovirus
 - (C) Poliovirus
 - (D) Rhabdovirus
65. Which of the following is a suitable medium for cultivation of virus?
- (A) Peptone agar
 - (B) Soybean casein digest
 - (C) Fluid thioglycolate
 - (D) None of the above
66. The temperature of steam under 20 lb/in² pressure in an autoclave is
- (A) 115.0 °C
 - (B) 121.5 °C
 - (C) 126.5 °C
 - (D) 131.0 °C

67. Electromagnetic radiation of which of the following wavelengths has highest bactericidal efficiency?

- (A) 265 nm
- (B) 365 nm
- (C) 565 nm
- (D) 665 nm

68. Which of the following methods would be appropriate for sterilization of a heat-labile antibiotic solution?

- (A) Dry heat using hot-air oven
- (B) UV radiation
- (C) Filtration through membrane filters
- (D) Gaseous using ethylene oxide

69. Which of the following methods would be appropriate for sterilization of hospital linen?

- (A) Moist heat
- (B) Dry heat
- (C) Gamma radiation
- (D) Gaseous

70. In iodophor povidone-iodine, what is the role of povidone?

- (A) It acts as solubilizer/carrier for iodine
- (B) It causes slow release of iodine
- (C) It imparts nonstaining and nonirritant properties
- (D) All of the above

71. A common example of quaternary ammonium compound is

- (A) CTAB
- (B) IPA
- (C) ETO
- (D) PUP-I

72. The test organism employed in phenol coefficient test for evaluation of disinfectants is

- (A) *E. coli*
- (B) *Candida albicans*
- (C) *Aspergillus niger*
- (D) *Salmonella typhi*

73. Degree of pathogenicity is referred to as

- (A) virulence
- (B) attenuation
- (C) exaltation
- (D) None of the above

74. Chemically exotoxins are

- (A) proteins
- (B) lipopolysaccharides
- (C) fats
- (D) All of the above

75. Which of the following is *not* true for endotoxins?

- (A) Produced by gram-negative bacteria
- (B) Lipopolysaccharides
- (C) Heat stable
- (D) Neutralized by antitoxins

76. Which of the following leukocytes is non-phagocytic?

- (A) Neutrophils
- (B) Eosinophils
- (C) Lymphocytes
- (D) Monocytes

77. Which of the following cell types is phagocytic?

- (A) Lymphocytes
- (B) Plasma cells
- (C) Macrophages
- (D) All of the above

78. Which of the following serum substances allows microbes to be easily ingested by phagocytes?

- (A) Complement
- (B) Opsonin
- (C) Agglutinin
- (D) Lysozyme

79. Which of the following is an example of null cell?

- (A) Natural killer cell
- (B) T cell
- (C) B cell
- (D) None of the above

80. Clinical or subclinical infection is an example of which of the following types of acquired immunity?

- (A) Active and natural
- (B) Active and artificial
- (C) Passive and natural
- (D) Passive and artificial

81. Which of the following is *not* a primary characteristic of generalized immune response?

- (A) Discrimination
- (B) Specificity
- (C) Anamnesis
- (D) Transferability by serum

82. The ability of immune system to elicit a larger specific response more quickly when induced by a second exposure to the same foreign antigen as a result of immunologic memory is called

- (A) hypersensitivity reaction
- (B) anamnestic response
- (C) autoimmune response
- (D) active response

83. Which of the following is *not* a property of haptens?

- (A) Low molecular weight
- (B) Specificity
- (C) Immunogenicity
- (D) Nonimmunogenicity

84. Which of the following is *not* true for immunoglobulin G?

- (A) Most common and accounts for 80% of immunoglobulins in serum
- (B) Subdivided into four subclasses as IgG₁, IgG₂, IgG₃ and IgG₄
- (C) Capable of passing from mother to foetus via placenta
- (D) Exists in pentameric form

85. Which of the following immunoglobulins has the highest molecular weight?

- (A) IgG
- (B) IgA
- (C) IgM
- (D) IgE

86. Which of the following immunoglobulins is present in the lowest amount in serum?

- (A) IgG
- (B) IgA
- (C) IgM
- (D) IgE

- 87.** Cell-mediated immunity includes all of the following, except
- (A) immunity to intracellular parasites
 - (B) rejection of foreign tissue grafts
 - (C) resistance to cancers
 - (D) lysis of bacterial cells
- 88.** Which of the following is *not* true for double-antibody sandwich ELISA procedure?
- (A) Antigen adsorbs to the wall surface
 - (B) Enzyme-labelled specific antibody is added which binds to the antigen
 - (C) Antibody-antigen-antibody sandwich is formed
 - (D) Degradation of enzyme substrate produces a colour change
- 89.** Dick test is used to determine susceptibility to
- (A) diphtheria
 - (B) scarlet fever
 - (C) tuberculosis
 - (D) polio
- 90.** The etiologic agent of dengue fever is
- (A) Protozoa
 - (B) bacterium
 - (C) virus
 - (D) fungus
- 91.** Salmonella may cause all of the following infections, except
- (A) enteric fever
 - (B) gastroenteritis
 - (C) septicemia
 - (D) vulvovaginitis
- 92.** Which of the following is *not* true for H antigens of Salmonella?
- (A) Heat-labile
 - (B) Flagellar
 - (C) Protein
 - (D) Polysaccharide
- 93.** Which of the following is *not* true for mycoplasmas?
- (A) Lack cell wall
 - (B) Excrete hydrogen peroxide for causing tissue damage
 - (C) Parasites of mucous membrane
 - (D) Susceptible to penicillin

94. Which of the following is *not* true for Sabin's oral polio vaccine?

- (A) It consists of live attenuated polio virus
- (B) It consists of all the three types of polio virus
- (C) It stimulates the production of IgA in intestine
- (D) It is 70%–90% effective in preventing polio

95. The rabies virus is a

- (A) single-stranded RNA virus
- (B) double-stranded RNA virus
- (C) double-stranded DNA virus
- (D) single-stranded DNA virus

96. Which of the following is a double-stranded RNA virus?

- (A) Picornaviridae
- (B) Rhabdoviridae
- (C) Reoviridae
- (D) Retroviridae

97. Which of the following is a single-stranded DNA virus?

- (A) Adenoviridae
- (B) Parvoviridae
- (C) Papovaviridae
- (D) Retroviridae

98. Which of the following is *not* a species of malarial parasite?

- (A) *P. vivax*
- (B) *P. histolytica*
- (C) *P. ovale*
- (D) *P. malariae*

99. Which of the following agents is effective against bacteria, fungi, spores and viruses?

- (A) Phenol
- (B) Glutaraldehyde
- (C) Mercurous chloride
- (D) Acriflavine

100. Shigellosis is best diagnosed by

- (A) stool examination
- (B) sigmoidoscopy
- (C) stool culture
- (D) enzyme

SPACE FOR ROUGH WORK

SEAL

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