ENTRANCE EXAMINATION FOR ADMISSION, MAY 2013.

Ph.D. (MICROBIOLOGY)

COURSE CODE : 128

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 128

Time : 2 Hours Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you –1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. Gycine and Valine are the example of

(A) Aliphatic amino acid (B) Aromatic amino acid

(C) Heterocyclic amino acid (D) None of these Above

2. The sequence of 3 nucleotides in polynucleotide chains of the DNA Molecule is called

(A) Nonsense codon (B) Triplet code

(C) Chain Termination (D) Genetic code

3. Which one of the following is an autotrophic aerobic bacterium?

(A) Clostridium (B) Azotobacter

(C) Rhodospirillum (D) All of these

4. CO_2 evolved is more than O_2, When

(A) Fat is oxidized (B) Sucrose is oxidized

(C) Glucose is oxidized (D) All of these Above

5. Triglycerides may be

(A) Only solid (B) Only liquid

(C) Solid or liquid (D) None of these above

6. If spherical bacteria found in cubical arrangement of eight or more called as

(A) Staphylococci (B) Streptobacilli

(C) Streptococci (D) Sarcinae

7. Which one of the following is not a part of bacterial flagellum?

(A) Basal Granule (B) Hook

(C) Filament (D) Connective

8. What is the approximate percentage of protein in the ribosome of bacteria?

(A) 10-15% (B) 20-25%

(C) 60-80% (D) 30-50%

9. According to Avery, Mc Leod and Mc Carthy the substance responsible for transformation was

(A) RNA (B) DNA

(C) Both DNA and RNA (D) Protein

10. Bacteria reproduce asexually by

(A) Transverse binary fission
(B) Filament Fragmentation
(C) Budding
(D) All of these above

11. Which of the following extracellular enzymes produced by Group A streptococci?

(A) Streptokinase
(B) Hyaluronidase
(C) M Protein
(D) Deoxyribonuclease C

12. Which one of the following is not a characteristics of Enterobacteriaceae?

(A) Ferment glucose
(B) Reduce nitrates to nitrites
(C) Oxidase positive
(D) Gram negative

13. Which of the following virulence factors of E. coli is important for attachment to host epithelial cells in the pathogenesis of urinary tract infections?

(A) Aerobactin
(B) Alpha hemolysin
(C) Urease
(D) Pili

14. Which of the following amino acids can form hydrogen bonds with their side (R) groups?

(A) Asparagine
(B) Aspartic acid
(C) Glutamine
(D) All of these

15. The isoelectric point of an amino acid is defined as the pH

(A) Where the molecule carries no electric charge
(B) Where the carboxyl group is uncharged
(C) Where the amino group is uncharged
(D) Of maximum electrolytic mobility

16. D-Alanine and L-Alanine are technically known as

(A) Anomers
(B) Enantiomers
(C) Epimers
(D) Polymer

17. In a polypeptide average mass of an amino acid residue is

(A) 110 daltons
(B) 118 daltons
(C) 80 daltons
(D) 150 daltons

18. Which of the following is a nonprotein amino acid?

(A) Dopamine
(B) Hydroxylysine
(C) Cystine
(D) None of these

19. In SDS-PAGE, the protein sample is first

(A) Treated with a reducing agent and then with anionic detergent followed by fractionation by electrophoresis

(B) Fractionated by electrophoresis then treated with an oxidizing agent followed by anionic detergent

(C) Treated with a oxidizing agent and then with anionic detergent followed by fractionation by electrophoresis

(D) None of the above

20. In a gel filtration column

(A) Smaller proteins enter the beads more readily

(B) Large proteins elute first

(C) Both (A) and (B)

(D) Large proteins enter the beads more readily

21. The pH of a solution is determined by

(A) Concentration of salt

(B) Relative concentration of acids and bases

(C) Dielectric constant of the medium

(D) Environmental effect

22. Which of the following fungi is most likely to be found within reticuloendothelial cells?

(A) *Histoplasma Capsulatum*

(B) *Sporothrix Schenckii*

(C) Cryptococcus neoformans

(D) Candida albicans

23. Aspergillosis is recognized in tissue by the presence of

(A) Metachromatic granules

(B) Pseudohyphae

(C) Septate hyphae

(D) Budding cells

24. Which of the following is the metabolically active form of Chlamydia trachomatis?

(A) Elementary body

(B) Jolley body

(C) Extracellular body

(D) Reticulate body

25. Which of the following statements regarding mycoplasmas is not correct?

(A) Mycoplasmas are the smallest free-living micro-organisms

(B) Mycoplasmas are resistant to cell wall active antibiotics

(C) Mycoplasmas are common commensals of the respiratory and urogenital tracts

(D) Mycoplasmas stain well with the Gram's stain

26. The major virulence factor of Haemophilus influenzae type b is

(A) Its surface pili
(B) Its surface polysaccharides
(C) Its cell wall
(D) Its cell membrane

27. A common characteristic of Capnocytophaga, Moraxella, and Eikenella is that they

(A) Are anaerobic
(B) Are part of the normal flora of the upper respiratory tract
(C) Cause urinary tract infections
(D) Are gram positive

28. Most humans become infected with legionella by

(A) Water source
(B) Tick exposure
(C) Mosquito exposure
(D) Direct contact with another person who is infected

29. An important characteristic of mycobacteria is that they are

(A) Gram negative
(B) Rapid growing (doubling time 15 minutes)
(C) Acid fast
(D) Alpha hemolytic

30. An important characteristic of all fungal infections is that

(A) They are usually transmitted from person to person
(B) They are usually simple and straightforward to treat
(C) They cause serious disease in debilitated, and/or immunocompromised patients
(D) They are usually mixed infections with a combination of fungi and bacteria in the same tissue site

31. Rabies reaches the central nervous system by

(A) Hematogenous distribution
(B) Neurotropic spread
(C) Entry into brain within macrophages
(D) Both (A) and (B)

32. Creutzfeldt-Jakob disease is caused by

(A) JC virus
(B) Pumuula virus
(C) Prions
(D) SV40 virus

33. HIV is the same as

(A) HTLV III
(B) HTLV II
(C) HTLV I
(D) None of the above

34. Enteroviruses are most closely related to which of the following viruses

(A) Herpes simplex
(B) Hepatitis C
(C) Hepatitis A
(D) Rotavirus

35. All of the following are true statements regarding viruses except

(A) They contain both RNA and DNA
(B) The nucleic acid may be single or double stranded
(C) They are obligate intracellular parasites
(D) They reproduce using host cell energy

36. Which of the following is the most important structure related to microbial attachment to cells?

(A) Flagellum
(B) Plasmid
(C) Peptidoglycan
(D) Glycocalix

37. Which of the following is not true related to endotoxins?

(A) Endotoxins are secreted from cells
(B) Can be linked to Meningococcemia
(C) Produced by gram negative microorganisms
(D) Can cause fever

38. Which of the following characterizes the Domain Bacteria?

(A) Prokaryotic cells; ether linkages in phospholipids
(B) Eukaryotic cells; ester linkages in phospholipids
(C) Complex cellular structures
(D) Prokaryotic cells; ester linkages in phospholipids

39. The outstanding characteristic of the Kingdom Fungi is

(A) Absorption of dissolved organic matter
(B) All members are photosynthetic.
(C) Absorption of dissolved inorganic matter
(D) All members are microscopic.

40. Which of the following are found primarily in the intestines of humans?

(A) Gram-negative aerobic rods and cocci

(B) Facultatively anaerobic gram-negative rods

(C) Aerobic, helical bacteria

(D) Gram-positive cocci

41. Which of the following genera is an anaerobic gram-negative rod?

(A) Bacteroides (B) Treponema

(C) Escherichia (D) Staphylococcus

42. Which of the following is not an enteric pathogen?

(A) Shigella (B) Salmonella

(C) Escherichia (D) Campylobacter

43. What is a nanometer?

(A) 1/1,000,000,000 of a meter (B) 1/100,000 of a meter

(C) 1/1,000,000 of a meter (D) 1,000,000,000 meters

44. What is Archaea?

(A) Archaea is a classification for organisms that have two nuclei

(B) Archaea is a classification for organisms that use phagocytosis

(C) Archaea is a classification of an organism that identifies prokaryotes that do not have peptidoglycan cell walls

(D) Archaea is a classification of an organism that identifies prokaryotes that have peptidoglycan cell walls.

45. Which of the following characteristics do not occur in prokaryotic cells?

(A) Cellular organization

(B) Thylakoid membranes within chloroplasts

(C) Oxygenic photosynthesis

(D) Anaerobic respiration

46. Phagocytosis is not a characteristic of which groups?

(A) Protozoans (B) Algae

(C) Fungi (D) Archaea

47. Which group(s) of microorganisms is (are) thought to be the oldest living organisms?

(A) Eukaryotes
(B) Heterotrophic prokaryotes
(C) Archaea
(D) Viruses

48. Plaques are:

(A) Clear areas in a lawn of cultured cells caused by virus infection
(B) Stained areas in a cell culture indicating cells infected by a virus
(C) Virus colonies on agar
(D) Bacterial colonies on agar

49. Which compounds produced by microorganisms can cause fever in humans and can withstand autoclaving?

(A) Endotoxin
(B) Lipid A
(C) Lipopolysaccharide
(D) Peptidoglycan

50. What is an enrichment culture?

(A) Something that provides growth for all microorganisms
(B) Something that inhibits growth for all microorganisms
(C) An infectious culture
(D) Something that provides growth for a certain microorganism but not for others

51. Bacteria harbouring prophages are called

(A) Lysogenic bacteria
(B) F^+ factor
(C) Resistant transfer factor
(D) Transposon

52. Who developed the technique of growing viruses in chick embryo?

(A) Goodpasture
(B) Ruska
(C) Lansteiner
(D) Bejerinck

53. Sporulation occurs at which phase of growth curve

(A) Lag phase
(B) Log phase
(C) Stationary phase
(D) Decline phase

54. Micro-aerophilic bacteria

(A) Pseudomonas
(B) Brucella
(C) Hemophilus
(D) Pneumococci

55. Organisms which die at once on drying

(A) Mycobacterium tuberculosis
(B) Staphylococcus aureus
(C) Treponema pallidum
(D) Clostridium

56. Bacteria growing at alkaline pH

(A) Lactobacilli
(B) Pseudomonas
(C) Vibrio cholorae
(D) Neisseria gonorrhea

57. Diseases which are constantly present in particular area:

(A) Epidemic
(B) Endemic
(C) Pandemic
(D) Prosodemic

58. Immunoglobulin transported through placenta

(A) IgG
(B) IgM
(C) IgA
(D) IgD

59. Cytotoxic hypersensitivity is

(A) Type I
(B) Type II
(C) Type III
(D) Type IV

60. Clostridium causing food poisoning is

(A) Clostridium tetani
(B) Clostridium perfringens
(C) Clostridium botulinum
(D) Clostridium butyricum

61. What is the purpose of antigen-presenting MHC proteins on cells that are not part of the immune system?

(A) They evolved to alert the immune system to the presence of intracellular pathogens
(B) They evolved to prevent tissue transplantation between individuals
(C) They evolved to rid the cell of endogenous protein
(D) They have no known function in non-immunological tissues

62. Fungal cells that reproduce by budding are seen in the infected tissues of patients with

(A) Candidiasis, cryptococcosis, and sporotrichosis
(B) Mycetoma, candidiasis and mucormycosis
(C) Tinea corporis, tinea unguium, and tinea versicolor
(D) Sporotrichosis, mycetoma and aspergillosis

63. Which of the following is not the characteristics of histoplasmosis?

(A) Person to person transmission

(B) Specific geographic distribution

(C) Yeasts in tissue

(D) Mycelial phase in the soil

64. Infection with dermatophyte is most often associated with

(A) Intravenous drug abuse

(B) Inhalation of the organism from contaminated bird feces

(C) Adherence of the organism to perspiration moist skin

(D) Fecal-oral transmission

65. Each of the following statements concerning Candida albicans is correct except

(A) *C. albicans* is a budding yeast that forms psuedohyphae when it invades tissue

(B) *C. albicans* causes thrush

(C) *C. albicans* is transmitted primarily by respiratory aerosol

(D) Impaired cell mediated immunity is an important predisposing factor to disease

66. Strep throat is a bacterial infection that can be followed several weeks later by rheumatic fever, an autoimmune disorder affecting the heart. How can the bacterial infection lead to the autoimmune disorder?

(A) Antibodies against Streptococcus cross react with a glycoprotein on heart valves

(B) The heart valves are weakened by the massive immune response to the bacterium

(C) Streptococcus bacteria escape the immune system and take up residence in the heart

(D) Streptococcus stimulates the heart valves to make antibodies

67. A peptide bonds forms between the ———— and the ———— of another amino acid

(A) Central carbon, central carbon

(B) Amino group, carboxyl group

(C) Side group, central carbon

(D) The two side groups

68. Which of the following does NOT apply to true triglycerides?

(A) They are water insoluble

(B) They are non-polar

(C) They all have three fatty acids

(D) They contain a phosphate

69. Which of the following is true for ALL nucleotides?

(A) They contain ribose, a phosphate and a nitrogenous base

(B) They are double-stranded and anti-parallel

(C) They contain a pentose, a phosphate and a nitrogenous base

(D) They contain deoxyribose, a phosphate and a nitrogenous base

70. Select which is not true

(A) RNA is single stranded

(B) DNA is missing an oxygen on C'2

(C) RNA contains thymine

(D) DNA is double stranded

71. Which of the following indicates that the pK of an acid is numerically equal to the pH of the solution when the molar concentration of the acid and its conjugate base are equal?

(A) Michaelis-Menten equation

(B) Haldanes equation

(C) Henderson-Hasselbalch equation

(D) Hardy-Windberg law

72. The endoplasmic reticulum

(A) Is the site of photosynthesis

(B) Makes phospholipids

(C) Makes proteins

(D) None of the above

73. Very small molecules enter the cell by

(A) Exocytosis

(B) Active transport

(C) Phagocytosis

(D) Diffusion

74. Genetic engineering manipulates gene products at the level of

(A) The protein

(B) Amino acids

(C) DNA

(D) RNA

(E) Enzymes

75. A molecule that consists of a piece of DNA from one organism combined with the DNA from a member of another species is called

(A) Restricted DNA

(B) B. Recombinant DNA

(C) Transgenic DNA

(D) Bioengineered DNA

76. Salt dissolves well in water as water molecules

(A) Form hydrogen bonds with the positively and negatively charged ions

(B) Make nonpolar covalent bonds with the positively charged ions only

(C) Surround the ions because of their charge but do not form hydrogen bonds

(D) Share electrons with the ions to make polar covalent bonds

77. Buffer solutions

(A) Will always have a pH of 7

(B) Are rarely found in living systems

(C) Cause a decrease in pH when acids are added to them

(D) Tend to maintain a relatively constant pH

78. The strength of an acid depends on

(A) Number of neutrons gain

(B) Electronegativity

(C) Number of double bonds

(D) Number of protons released

79. A small, circular DNA molecule used as a vector to transmit foreign DNA is

(A) Plasmid

(B) Prion

(C) Liposome

(D) Lipofectin

80. Bacteriophages can be used as vectors in recombinant DNA experiments because they

(A) Are small and made of double-stranded DNA

(B) Are circular and easily imported into bacteria or yeast

(C) Insert their genetic material into bacteria

(D) Are resistant to protective restriction systems

81. The first drug produced using recombinant DNA technology was

(A) Insulin

(B) Streptokinase

(C) TPA

(D) EPO

82. A drug produced using recombinant DNA technology that is used illegally by athletes is

(A) Insulin

(B) Streptokinase

(C) TPA

(D) EPO

83. A multicellular organism that carries a specific genetic change in each cell because of an intervention at the fertilized egg stage is a

(A) Transversion

(B) Transition

(C) Transgenic

(D) Transformant

84. Tiny fat bubbles used to deliver genes are:

(A) Electropores

(B) Phospholipids

(C) Cholesterols

(D) Liposomes

85. Present times and temperatures used for pasteurization of milk is based on the
(A) Destruction of Clostridium botulinum
(B) Destruction of Clostridium sporogenes
(C) Destruction of Coxiella burnetii
(D) Destruction of Escherichia coli O157:H7

86. Luciferase involved in the emission of a light or bioluminescent in species in this genus
(A) Alcaligenes
(B) Lactococcus
(C) Micrococcus
(D) Photobacterium

87. The reason that fats contain more energy than simple sugars, is fats have many more
(A) Carbon atoms
(B) Hydrogen atoms
(C) Covalent bonds
(D) Hydrogen bonds

88. Pseudomonas aeruginosa produces the following pigment (s)
(A) Bacterioruberins
(B) Carotenoids
(C) Prodigiosin
(D) Pyocyanin

89. Species which produces a crystal protein used as a bioinsecticide
(A) Aeromonas salmonicida
(B) Bacillus subtilis
(C) Bacillus thuringiensis
(D) Flavobacterium aquatile

90. Species responsible for yersiniosis
(A) Proteus vulgaris
(B) Yersinia enterocolitica
(C) Yersinia ruckeri
(D) Yersinia pestis

91. Species considered to be the most heat resistant sporeformer found in foods
(A) Bacillus stearothermophilus
(B) Bacillus cereus
(C) Clostridium botulinum
(D) Clostridium sporogenes

92. Foodborne illness due to a neurotoxin produced in the food
(A) Botulism
(B) Clostridium perfringens gastroenteritis
(C) Listeriosis
(D) Salmonellosis

93. Movement of DNA from one bacteria to another through a tubular bridge or pilus
(A) Conjugation
(B) Transposition
(C) Transfection
(D) Transduction

94. Which of the following is not one of Koch's postulates?

(A) The organism is regularly found in lesions of the disease

(B) The organism can be isolated from diseased tissues in pure culture on artificial media

(C) Inoculation of this pure culture produces a similar disease in experimental animals

(D) Treatment of the disease with a broad spectrum oral antimicrobial dependably eradicates the organism and cures the disease

95. Which of the following diseases are not transmitted by ticks?

(A) Ulceroglandular tularemia

(B) Bubonic plague

(C) Relapsing fever

(D) Lyme disease

96. Characteristics of a bacterial capsule is

(A) All bacteria have one

(B) It is composed of peptidoglycan

(C) It is an important mechanism for protecting a bacteria against ingestion by PMNs

(D) It is what causes the gram stain reaction

97. Infections caused by anaerobes are

(A) Usually confined to the abdomen

(B) Never seen in the lung because of its excellent blood supply

(C) Mixed

(D) Rapidly progressive

98. The most important characteristic of diarrhea caused by Vibrio cholera is

(A) Profound watery diarrhea

(B) Severe abdominal pain

(C) Massive bloody diarrhea

(D) Renal insufficiency

99. Helicobacter pylori

(A) Is the presumed cause of colon cancer

(B) Is the cause of most cases of acute food poisoning in the U.S.

(C) Is the cause of about 90% of peptic ulcers in the U.S.

(D) Is urease negative

100. A common type of nosocomial infection is

(A) Urinary tract infection

(B) Meningitis

(C) Cellulitis

(D) Gastroenteritis
