

92/1

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2010.

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 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. Large spherical macroconidia with projections on the cell wall is characteristic of
 (A) *Candida tropicalis* (B) *Cryptococcus neoformans*
 (C) *Sporothrix schenckii* (D) *Histoplasma capsulatum*
2. Purine/pyrimidine ratio was worked out by
 (A) Watson (B) Nirenberg (C) Chargaff (D) Khorana
3. The roundworm of humans
 (A) *Ascaris lumbricoides* (B) *Ancylostoma duodenale*
 (C) *Wuchereria bancrofti* (D) *Trichenella spiralis*
4. The region of DNA coding for amino acids in the genome is
 (A) exon (B) intron (C) neutron (D) micron
5. Organism possessing RNA as genome is
 (A) *Caenorhabditis* (B) Lambda phage
 (C) SV 40 virus (D) Polio virus
6. Linking of two DNA molecules to form a chain
 (A) Transposition (B) Nick translation
 (C) Catenation (D) Recombination
7. Holliday structure of DNA refers to
 (A) translation (B) transcription
 (C) recombination (D) decatenation
8. Selenite F broth is a
 (A) selective medium (B) enriched medium
 (C) basal medium (D) enrichment medium
9. TAB vaccine is associated with which of the following pathogen?
 (A) *V. cholerae* (B) *S. typhi*
 (C) *T. pallidum* (D) *M. tuberculosis*

10. Which one of the following is not a protist?
 (A) Bacteria (B) Algae (C) Fungi (D) Protozoa
11. Which of the following is not associated with *B. anthracis*?
 (A) Medusa head appearance (B) String of pearl reaction
 (C) Target hemolysis (D) Inverted fir tree appearance
12. Enzyme responsible for DNA mismatch repair
 (A) Primase (B) Klenow fragment
 (C) Okazaki fragment (D) Helicase
13. Which of the following operon systems has a repressor-operator system?
 (A) Histidine (B) Phenylalanine
 (C) Leucine (D) Threonine
14. Which one of the following component is present in gram-negative bacteria but not in gram-positive bacteria?
 (A) Peptidoglycan (B) Lipid A
 (C) Capsule (D) Pili
15. Continuous feed during fermentation is used to maintain
 (A) temperature (B) water level
 (C) product concentration (D) substrate concentration
16. In transcription, binding of RNA polymerase to a DNA molecule occurs at this site
 (A) promoter (B) repressor (C) primer (D) precursor
17. M protein is a virulence factor of
 (A) HIV (B) Group A *Streptococcus*
 (C) *Plasmodium falciparum* (D) *Rickettsia*
18. Selective medium for *Leptospira* is
 (A) TCBS medium (B) GTTA medium
 (C) EMJH medium (D) PLET medium
19. The immediate precursor of eukaryotic mRNA with 5' caps and 3' poly A tail is called
 (A) tRNA (B) hnRNA (C) cDNA (D) rDNA

20. Initiation factors involved in translation binds to
 (A) tRNA (B) 30S subunit of ribosome
 (C) rRNA (D) 50S subunit of ribosome
21. Which of the following terms characterizes the interaction between a fungus and algae in a lichen?
 (A) Parasitism (B) Symbiosis
 (C) Endosymbiosis (D) Consortia
22. The vaccine for hepatitis B virus is obtained
 (A) from recombinant viruses (B) from recombinant bacteria
 (C) directly from viral DNA (D) from host antibodies
23. Number of binding sites for tRNA in a ribosome is
 (A) 2 (B) 3 (C) 4 (D) 5
24. AUG stands for the amino acid
 (A) methionine (B) valine (C) leucine (D) serine
25. Complete genome sequence is available for
 (A) *Haemophilus influenzae* (B) *Escherichia coli*
 (C) *Bacillus subtilis* (D) *Streptococcus pneumoniae*
26. Reducing agents which can be added to nutrient media of anaerobic microorganisms include
 (A) ascorbic acid (B) thioglycollate
 (C) cysteine (D) all the above
27. The universal genetic code differs in
 (A) ribosomal genes (B) mitochondrial genes
 (C) eukaryote genome (D) prokaryote genome
28. Griffith typing is associated with
 (A) *S. pyogenes* (B) *C. tetani*
 (C) *B. anthracis* (D) *S. pneumoniae*

29. Extrachromosomal DNA is present in
(A) lysosome (B) mitochondria
(C) golgi complex (D) endoplasmic reticulum
30. Rabies vaccine was first developed by
(A) Louis Pasteur (B) Robert Koch
(C) Joseph Lister (D) Edward Jenner
31. Lyophilisation is synonymous with
(A) pasteurization (B) freeze-drying
(C) autoclaving (D) filtration
32. *Lac* operon repressor prevents mRNA synthesis by
(A) binding to DNA (B) binding to RNA
(C) binding to rDNA (D) binding to mDNA
33. One gene one enzyme hypothesis was first proposed by
(A) Watson and Crick (B) Beadle and Tatum
(C) Nomura and Held (D) Hershey and Chase
34. Sabin Feldman dye test is done to diagnose
(A) Malaria (B) Filariasis
(C) Amoebiasis (D) Toxoplasmosis
35. The sulfur oxidizing bacterium is
(A) *Thiobacillus thiooxidans* (B) *Thiobacillus denitrificans*
(C) *Desulfovibrio desulfuricans* (D) *Desulfotomaculum* sp.
36. Which of the following statement is false about *Shigella dysenteriae*?
(A) Ferments mannitol (B) Does not ferment lactose
(C) Non motile (D) Produces neurotoxin
37. The process by which the bacterial cell takes up foreign DNA is
(A) translocation (B) transformation
(C) transposition (D) translation

38. Dengue virus is transmitted by
 (A) *Anopheles* mosquito (B) *Aedes* mosquito
 (C) *Culex* mosquito (D) All the above
39. Industrially, penicillin is produced by
 (A) *Penicillium chrysogenum* (B) *Penicillium notatum*
 (C) *Penicillium roqueforti* (D) All the above
40. Transposons are
 (A) jumping genes (B) extrachromosomal genes
 (C) plasmids (D) pseudogenes
41. Infection caused by dermatophytes is called as
 (A) Dermatophytosis (B) Ring worm infection
 (C) Tinea infection (D) All the above
42. In electron microscopy the type of illumination used is
 (A) Ultra violet rays (B) Gamma rays
 (C) Electron beams (D) Infra-red beams
43. For the sterilization of thermolabile solutions the following technique is used
 (A) Autoclaving (B) Boiling
 (C) Membrane filtration (D) All the above
44. Enzyme responsible for converting supercoiled DNA into a relaxed state is
 (A) endonuclease (B) topoisomerase
 (C) ligase (D) polymerase
45. Which of the following genera does not contain species that fix nitrogen symbiotically?
 (A) *Rhizobium* (B) *Frankia* (C) *Nitrobacter* (D) *Anabaena*
46. The most commonly used fixative in light microscopy for observing microorganisms is
 (A) osmic acid (B) heat (C) aldehydes (D) chloroform
47. Cloning vector
 (A) lambda bacteriophage (B) mitochondrial DNA
 (C) ribosomal DNA (D) poliovirus

48. Size of the human genome
(A) 5×10^9 bp (B) 3.5×10^9 bp
(C) 1.6×10^8 bp (D) 4×10^6 bp
49. The first successful subunit vaccine was produced for
(A) *E. coli* (B) Hepatitis B virus
(C) Polio (D) HIV
50. A repressor protein inhibits transcription by binding to the DNA at the
(A) leader (B) promoter (C) start codon (D) operator
51. Which of the following bacterium resembles Mycoplasma in being filterable?
(A) *Francisella tularensis* (B) *Yersinia enterocolitica*
(C) *Pastuerella multocida* (D) *Yersinia pseudotuberculosis*
52. In the biosynthesis of circular DNA the joining enzyme requires
(A) UTP (B) FAD (C) GTP (D) ATP
53. Minimal media must contain
(A) a source of trace elements (B) a source of pyrimidines
(C) fastidious microbes (D) sodium chloride
54. Which of the following agents simultaneously contains both DNA and RNA?
(A) Bacteria (B) Viruses (C) Virions (D) Prions
55. Louis Pasteur established the modern era of food microbiology when he demonstrated that microorganisms cause spoilage of
(A) juice (B) beer (C) wine (D) milk
56. DNA sequencing method was proposed by
(A) Watson (B) Crick
(C) Sanger (D) None of the above
57. Which of the following methods is used to culture strictly anaerobic microbes?
(A) Roll tube (B) Streaked plate
(C) Slant culture (D) Mixed culture

58. The cephalosporins belong to which of the following classes of antibiotics?
(A) Macrolides (B) Polyenes
(C) Aminoglycosides (D) Beta - lactams
59. Mutation in which a purine base is substituted by a pyrimidine base or vice versa is
(A) transformation (B) transition
(C) transversion (D) transduction
60. Wild plague was also called as
(A) Sylvaatic plague (B) Epizootic plague
(C) Urban plague (D) Endemic plague
61. A simple flocculation test which is used as a screening test for syphilis is
(A) Kahn test (B) VDRL test
(C) RPR test (D) Wasserman test
62. Which of the following does not result in recombination?
(A) Transformation (B) Conjugation
(C) Replication (D) Transduction
63. Vaccination against rabies was developed for the first time by
(A) Robert Hook (B) Edward Jenner
(C) Paul Ehrlich (D) Louis Pasteur
64. *Vibrio cholerae* can be grown best in
(A) Desoxycholate citrate agar (B) Nutrient agar
(C) TCBS agar (D) None of the above
65. The viruses transmitted by insect vectors are called
(A) Insect viruses (B) Baculovirus
(C) Arboviruses (D) None of the above
66. The reduction of gaseous nitrogen to ammonia is called
(A) nitrogen fixation (B) nitrification
(C) ammonification (D) denitrification

67. Lithoautotrophic bacteria utilize
 (A) Inorganic compounds (B) Organic compounds
 (C) Electrons (D) None of the above
68. The microbial symbiont in the roots of leguminous plants is
 (A) *Rhizobacter* (B) *Azotobacter*
 (C) *Rhizobium* (D) All the above
69. Which of the following is a neurotoxin?
 (A) Diphtheria toxin (B) Tetanous toxin
 (C) Cholera toxin (D) Shiga toxin
70. The largest group of bacteria in soil is
 (A) Actinomycetes (B) Mycobacteria
 (C) *Bacillus* (D) *Clostridium*
71. Q fever is caused by
 (A) *Rickettsia quintana* (B) *Rickettsia akari*
 (C) *Coxiella burnetti* (D) *Rickettsia siberica*
72. *Chlorella pyrenoidosa* is usually found in
 (A) Sludge digestion tank (B) Trickling filter
 (C) Oxidation pond (D) Activated sludge process
73. Name the flagellate which lives as a commensal in the ileo-caecal region
 (A) *T. vaginalis* (B) *T. hominis*
 (C) *T. tenax* (D) None of the above
74. Repression of β -galactosidase in *E. coli* by glucose is a typical example of
 (A) feedback repression (B) catabolite repression
 (C) substrate specificity (D) all the above
75. This bacterium is motile at 25°C but non motile at 37°C
 (A) *Mycobacterium tuberculosis* (B) *Erysipelothrix*
 (C) *Listeria monocytogenes* (D) none of the above

76. Single nucleus is seen in the trophozoite of
 (A) *Trichomonas* (B) *Entamoeba histolytica*
 (C) *Entamoeba coli* (D) All the above
77. Which of the following is not a modified base in tRNA?
 (A) Pseudo uridine (B) Inosine
 (C) 2-aminopurine (D) Dihydrouridine
78. Anaerobic microorganisms were first discovered by
 (A) Robert Koch (B) John Needham
 (C) Louis Pasteur (D) Ferdinand Cohn
79. Who proposed the three kingdom concept?
 (A) Buchanan (B) Koch (C) Haeckel (D) Pasteur
80. The family chromatiaceae includes
 (A) purple sulphur bacteria (B) purple non-sulphur bacteria
 (C) green sulphur bacteria (D) green non-sulphur bacteria
81. Beedle and Tatum received Noble prize for their work on
 (A) *Saccharomyces* (B) *Penicillium*
 (C) *Neurospora* (D) *Agaricus*
82. Endospores and inclusion bodies can be best detected with the help of
 (A) fluorescence microscope (B) dark field microscope
 (C) phase contrast microscope (D) bright field microscope
83. Double stranded RNA genome is seen in
 (A) Parvovirus (B) Adenovirus
 (C) Poliovirus (D) Reovirus
84. Sub units of bacterial ribosome are
 (A) 60S and 40S (B) 70S and 80S
 (C) 60S and 30S (D) 50S and 30S

85. Microbial cultures composed of cells that are all at the same stage of the cell cycle are called
- (A) axenic culture (B) mixed culture
(C) pure culture (D) synchronous culture
86. Photo transferase system in bacteria is an example of
- (A) facilitated diffusion (B) active transport
(C) passive diffusion (D) group translocation
87. Which of the following is not a basic stain?
- (A) Crystal violet (B) Safranin
(C) Methyl violet (D) Nigrosin
88. Semi rigid extension of bacterial cell wall and cell membrane is called
- (A) capsule (B) stalk (C) slime (D) prosthecae
89. Which of the following is an infection caused by dermatophytes?
- (A) Tinea nigra (B) Tinea versicolor
(C) Tinea pedis (D) All the above
90. An 18 hours broth culture of *E. coli* contains
- (A) *E. coli* cells that are all dividing exponentially
(B) *E. coli* cells that are dividing at the same rate
(C) *E. coli* cells that are all in stationary growth phase
(D) *E. coli* cells that are in all phases of growth
91. *Methylosinus trichosporium* forms
- (A) exospore (B) cyst
(C) endospore (D) myxospore
92. In alcoholic fermentation by yeast, the NADH₂ produced during glycolysis is used to reduce
- (A) acetaldehyde to ethanol (B) pyruvic acid to lactic acid
(C) fumaric acid to succinic acid (D) lactic acid to pyruvic acid

93. Best resolution attained by an electron microscope is
(A) 0.2 nm (B) 0.5 nm (C) 0.2 μ m (D) 2 nm
94. Spore staining involves the use of
(A) malachite green and safranin
(B) crystal violet and safranin
(C) lactophenol cotton blue
(D) methylene blue and carbol fuchsin
95. Fermentation as a means of obtaining energy was first realized by
(A) Tyndall (B) Pasteur (C) Robert Koch (D) Cohn
96. The photopigment present in photosynthetic halobacteria is
(A) Bacteriochlorophyll (B) Chlorophyll
(C) Bacteriorhodopsin (D) All the above
97. On the basis of the nature of their RNA genes, bacteria can be divided into two major group namely
(A) autotrophs and heterotrophs (B) prokaryotes and eukaryotes
(C) archaeobacteria and eubacteria (D) protista and monera
98. The color of the purple bacteria and green bacteria is due to their water soluble pigments called
(A) carotenoids (B) thylakoids
(C) chlorophyll (D) none of the above
99. *Deinococcus* is especially noted for its resistance to
(A) heat (B) freezing (C) drying (D) radiation
100. Bacterium once used to eradicate rat and mice
(A) *S. typhimurium* (B) *Leptospira*
(C) *S. enteritidis* (D) *Listeria*