

2/21

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2010.

M.Sc. (BIOTECHNOLOGY)

COURSE CODE : 303

Register Number :



Signature of the Invigilator
(with date)

COURSE CODE : 303

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. According to Broca's Wernicks how many thinking structure is in the human brain?
 (A) One (B) Two (C) Three (D) Four
2. Megofauna of soil constitute
 (A) Protozoa, Frog (B) Ticks, Milliped
 (C) Rat, Moles (D) None of these
3. cDNA synthesis for insulin in was carried out by
 (A) Hargobind Khorana (B) Maxim Gilbert
 (C) Rosalin Franklin (D) None of these
4. Which is an integral part of detergent industry?
 (A) Lipase (B) Protease
 (C) Both (A) and (B) (D) Cellulase
5. Human genome contains how many billion base pairs?
 (A) 1 (B) 2 (C) 3 (D) 5
6. Which are the persistent pesticide out of the following
 (A) Organomercuriales (B) Organophosphorous
 (C) Organochlorrines (D) Herbicides
7. Excess nitrogen in human leads to which of the following disease?
 (A) Syphillis (B) Blue baby syndrome
 (C) Carcinoma (D) Hemophilia
8. C : N ratio ideal For nutrient cycling is
 (A) 20-30 : 1 (B) 50 : 10 (C) 40 : 30 (D) 60 : 40
9. The technique of trimming plants into different shapes like animals, birds etc. is called
 (A) Topiary (B) Hedges (C) Terrarium (D) Edges
10. Which of the following is the class of highest rank coal that burns with no smoke?
 (A) Anthracite coal (B) Lignite
 (C) Bauxite (D) Aliminate

11. Cyclosporins is a drug which is a
 - (A) Antipyretic
 - (B) Antibiotic
 - (C) Immunosuppressant
 - (D) Antiarthritic
12. Creation of Dolly is a phenomenon of
 - (A) Multipotency
 - (B) Monopotency
 - (C) Pleuropotency
 - (D) None of these
13. Neuroevsticercosis is caused by
 - (A) *Taenia saginata*
 - (B) *Taenia Solium*
 - (C) *Ascaris sp*
 - (D) *Trichomonas sp.*
14. Which bacteria is commonly used as biopesticide?
 - (A) *Bacillus anthrax*
 - (B) *Streptococcus sp*
 - (C) *Pseudomonas sp*
 - (D) *Bacillus thuriengensis*
15. Leptospirosis is caused by
 - (A) Spirochaete
 - (B) Rod
 - (C) Cocci
 - (D) Dilococci
16. Which one is an example for microfauna
 - (A) Bacteria, Fungi
 - (B) Mites, Collembola
 - (C) Termites, Earthworms
 - (D) Nematodes. Protozoa
17. The cell which is capable of producing one individual is called
 - (A) Pleuripotent
 - (B) Totipotent
 - (C) Potency
 - (D) Explant cell
18. Pharmacogenetics is the science which deals with the study about the effects of variation in
 - (A) Genome
 - (B) Proteome
 - (C) Single gene
 - (D) Multiple genes

19. Barnase is
(A) Inhibitor (B) Polymer
(C) Ribonuclease (D) None of these
20. Barstar is known as
(A) Promoter (B) Transformer
(C) Inhibitor (D) All of these
21. Erucic acid is present in
(A) Mustard oil (B) Sunflower oil
(C) Til oil (D) Palm oil
22. Dormectin is used for the treatment of
(A) Malaria (B) Filariasis
(C) Pneumonia (D) None of these
23. Bio-diesel can be obtained from
(A) *Jatropha curcas* (B) *Tectona grandis*
(C) *Heliotropium indicum* (D) *Vitex negundo*
24. Eutrophication refers to
(A) Tropical rain forest
(B) Enrichment of nutrients in the water bodies
(C) Removal of nutrients from the water bodies
(D) Addition of microbes
25. Microsporogenesis means
(A) Formation of pollen grains (B) Formation of egg
(C) Formation of endosperm (D) None of these
26. Cell-matrix interaction has
(A) Binding receptor (B) Contact receptors
(C) Adhesion receptor (D) Chemo receptors

27. Which drug is referred as "Wonder Drug"?
(A) Streptomycin (B) Insulin
(C) Chloramphenicol (D) Penicillin
28. Diphyllorhynchiasis is a condition caused by consuming
(A) Raw fish (B) Raw vegetables
(C) Cooked meat (D) Raw meat
29. Mendel's work was rediscovered by
(A) Correns, De vries and Tschermak
(B) Correns, De vries and Nageli
(C) Correns, McClung and Nageli
(D) Sutton, Boveri and Tschermak
30. Retrovirus vector contain genome as
(A) SS RNA (B) DS RNA (C) SS DNA (D) DS DNA
31. Hybridoma is the
(A) Fusion of plant and animal cell
(B) Fusion of cancer cell and B cells
(C) Fusion of plum cell and microorganism
(D) Fusion of animal cell and microorganism
32. Silkworm belong to the order
(A) Lepidoptera (B) Arthropoda
(C) Diptera (D) Coleoptera
33. Jumping genes were discovered by
(A) Sanger (B) Bradford
(C) Barbara McClintock (D) Watson & Crick
34. Jacob and Monod contribution related to
(A) Transposons (B) DNA sequencing
(C) Regulation of gene expression (D) All the above

35. Example for DNA viruses are
- (A) Caulimo viruses (B) BMV
(C) TMV (D) Retrovirus
36. The organism which is called a natural genetic engineer
- (A) E.coli (B) Pseudomonas
(C) Agrobacterium (D) Rhizobium
37. Northern blotting is used to identify
- (A) Proteins (B) DNA
(C) RNA (D) Carbohydrates
38. Reverse transcriptase catalyses the formation of
- (A) DNA on a DNA template (B) DNA on an RNA template
(C) RNA on a DNA template (D) RNA on an RNA template
39. The Fusion of two aerocentric chromosome denote
- (A) Duplication (B) Inversion
(C) Deletion (D) Translocation
40. Polypeptide chain termination is by the codon
- (A) AUG (B) UCA (C) UCU (D) UAG
41. DNA replication occurs in which phase of cell cycle
- (A) Prophase (B) Interphase
(C) Anaphase (D) Telophase
42. Most suppressor mutation are associated with genes concerned with the formation of
- (A) DNA polymerase (B) Transfer RNA
(C) RNA polymerase (D) DNA ligase
43. Gene expression was analysed by
- (A) Western blotting (B) Southern blotting
(C) Northern blotting (D) South western blotting

44. OKT3 antibody is used in
(A) Cancer therapy (B) Immune suppressant
(C) Immunotoxin (D) Mouth diseases
45. Expansion of BLAST
(A) Basic Logical Algorithm Search Tool
(B) Basic Logical Alignment Search Tool
(C) Basic Longitudinal Alignment Search Tool
(D) Biological Logical Alignment Search Tool
46. Interspecific hybridization is
(A) Hybridization within a species
(B) Hybridization within a genus
(C) Hybridization between two different species
(D) Hybridization between two different varieties
47. The metal which is used Biolistic technique
(A) Tungsten (B) Gold (C) Nickel (D) Cadmium
48. Which of the following conditions will result in the inability to produce T cells?
(A) Thymectomy (B) DiGeorge's syndrome
(C) Nude mice (D) All of the above
49. Which of the following are responsible for acquired humoral immunity?
(A) B cell (B) T and B cell
(C) Both (A) and (B) (D) None of these
50. The approximate number of cells in a normal human body is
(A) 100 (B) 10 (C) 10^{14} (D) 10^{140}
51. If the genetic code consisted of four bases per codon rather than three, the maximum number of unique amino acids that could be encoded would be
(A) 16 (B) 64 (C) 128 (D) 256

52. Which of the following types of molecules is always found in prions?
- (A) Lipid (B) Protein
(C) Carbohydrate (D) DNA
53. With regard to HLA class 1 antigen which is one of the below is FALSE
- (A) they are expressed on all nucleated cells
(B) they are made up of a heavy chain and a light chain
(C) they are essential for viral antigen recognition by cytotoxic cells
(D) the genes for HLA class 1 molecules are located on chromosome 6 and 15
54. Fleming's bacterial culture during his discovery of penicillin was
- (A) *Staphylococcus aureus*
(B) *Streptococcus pneumoniae*
(C) *Penicillium notatum*
(D) *Streptomyces* spp.
55. Which one is TRUE about lymphocytes in the following?
- (A) T cells account for 20% of the circulating lymphocytes
(B) In the spleen, B cells are found in the periarteriolar areas of white pulp
(C) In the lymph nodes, T cells occupy the paracortical area surrounding the germinal centres
(D) T cells express surface Ig G
56. At what age does the thymus reach its maximal size?
- (A) During the first year of life (B) Teenage years (puberty)
(C) Between 40 and 60 years (D) After 70 years of age
57. Which one is FALSE in the complement system?
- (A) alternative pathway does not rely on antibody
(B) classical pathway is best activated by bacterial endotoxin
(C) C1 is the first enzyme complex in the classical pathway
(D) both the alternative and classical pathway converge at C3

58. Which one of the following is the disinfectant used effectively for skin?
- (A) ethyl alcohol with povidone-iodine (B) glutaraldehyde
(C) ethylene oxide (D) chloramphenicol drops
59. The main bacterial pathogens of diarrhoeal diseases
- (A) *Escherichia coli* (B) *Salmonella* spp.
(C) *Shigella* spp. (D) All of the above
60. Antibiotic that is not inhibiting cell wall synthesis includes
- (A) cefuroxime (B) vancomycin
(C) erythromycin (D) benzylpenicillin
61. Stain which is not useful in identifying fungus
- (A) Giemsa (B) Haematoxylin and eosin
(C) Gomori methanamine silver (D) PAS (periodic acid-Schiff)
62. *Treponema pallidum*
- (A) the bacteria that causes syphilis
(B) the bacteria that causes meningitis
(C) VDRL is specific for *Treponema pallidum* infection
(D) it is resistant to penicillin
63. Micro-organism that cannot cause latent infection
- (A) mycobacterium tuberculosis (B) varicella-zoster virus
(C) cytomegalovirus (CMV) (D) hepatitis A
64. With regard to IgG which one is FALSE
- (A) has a molecular weight of 150000 and is the principal immunoglobulin in secondary immune response
(B) is important in mucosal immunity
(C) is the most common circulating immunoglobulins in the serum
(D) is the only immunoglobulin capable of crossing the placenta
65. Members of the Protozoa may be motile by all of the following methods except
- (A) pseudopodia (B) flagella
(C) gliding by slime secretion (D) cilia

66. Therapy of *Leishmania donovani* is
 (A) Ceftazidime (B) Metronidazole
 (C) Praziquantel (D) Sodium stibogluconate
67. *Clostridium botulinum* is
 (A) Facultative anaerobe (B) Microaerophilic
 (C) Obligate anaerobe (D) Aerobic
68. Morphology of *Cryptococcus neoformans* is
 (A) yeast (B) intracystic trophozoite
 (C) diplococci (D) rod
69. Group of *Shigella* spp. is
 (A) Helminths (B) Fungi (C) Bacteria (D) Protozoa
70. The following are useful in the diagnosis of HIV infection
 (A) polymerase chain reaction
 (B) antibodies by enzyme-linked immunoadsorbent assay
 (C) P24 protein assay and CD4:CD8 ratio
 (D) All the above
71. Morbidity of *Coxiella burnetii* is
 (A) Pharyngitis (B) Intestinal ulcers
 (C) Conjunctivitis (D) Q fever
72. Group of *Rickettsia prowazekii* is
 (A) Helminths (B) Fungi (C) Bacteria (D) Viruses
73. Histamine is released by
 (A) macrophage (B) lymphocytes (C) neutrophils (D) basophils
74. Vancomycin
 (A) is a glycopeptide
 (B) is produced by a fungus
 (C) is bacteriostatic in action
 (D) should not be given intravitreally due to the risk retinal necrosis

75. Sterilization cannot be achieved with
- (A) gamma irradiation
 - (B) boiling in water for 15 minutes
 - (C) moist heat at 121°C for 20 minutes at 15 b pressure or dry heat at 150-170°C for 20-30 minutes
 - (D) ethylene oxide chamber
76. Which one of the following substances is not used in Gram staining?
- (A) iodine
 - (B) crystal violet
 - (C) alcohol
 - (D) cotton blue
77. Which is not true about Opsonization?
- (A) is mediated by complement components and enhances phagocytosis
 - (B) involves mainly the Fc portion of the immunoglobulins
 - (C) fibroblast play a role in this process
 - (D) is not restricted by the MHC (Major Histocompatibility Complex)
78. Amikacin
- (A) is a glycopeptide
 - (B) is a aminoglycoside
 - (C) is bacteriostatic in action
 - (D) should not be given intravitreally due to the risk of retinal necrosis
79. Which one of the following is not a Cytokine?
- (A) interleukins
 - (B) interferon
 - (C) arachidonic acid
 - (D) tumour necrosis factor
80. Mitomycin C
- (A) is an antibiotic & requires NADPH for it to become active
 - (B) inhibits DNA synthesis
 - (C) inhibits RNA and protein synthesis
 - (D) all of the above

81. One of the following is not true about Human immunodeficiency virus-1 (HIV-1)
- (A) is a retrovirus containing RNA
 - (B) binds specifically to B lymphocytes
 - (C) causes an increase in CD8 lymphocytes during seroconversion
 - (D) can be detected in infected individuals by measuring the p24 antigen
82. Which one of these is TRUE about the Fc regions of immunoglobulins?
- (A) they can be cleaved from the Fab regions by papain
 - (B) they are involved in mast cell binding
 - (C) they are involved in the activation of the complement cascade
 - (D) all of the above
83. Zymogens are stored in the
- (A) Intercellular space
 - (B) Intracellular space
 - (C) Nucleus
 - (D) Nucleolus
84. Which one is TRUE about lymphocytes in the following?
- (A) T cells account for 10% the circulating lymphocytes
 - (B) In the spleen. B cells are found in the periarteriolar areas of white pulp
 - (C) In the lymph nodes, T cells occupy the paracortical area surrounding the germinal centres
 - (D) T cells express surface IgG
85. Liquid nitrogen temperature is
- (A) 77 K
 - (B) 195 K
 - (C) 4 K
 - (D) None of the above
86. The active sites on an enzyme can be
- (A) Single
 - (B) Double
 - (C) Triple
 - (D) Several

87. With regard to the DNA structure all are true except
- (A) adenine (A) and guanine (G) are purine bases
 - (B) guanine (G) always pairs with thymidine (T) and adenine (A) with cytosine (C)
 - (C) each DNA strands have a pentose-phosphate backbone with projecting bases
 - (D) there are 64 possible codons
88. Which one of the following is not used to detect antibodies?
- (A) coagulase test
 - (B) complement fixation
 - (C) haemagglutination inhibition
 - (D) indirect immunofluorescence
89. Which ones are aminoglycoside antibiotics?
- (A) gentamicin
 - (B) amikacin
 - (C) neomycin
 - (D) all of the above
90. MHC restriction of epitope receptors occurs in which one of the following locations in the body?
- (A) thymus
 - (B) bone marrow
 - (C) lymph node
 - (D) spleen (especially for lymphocytes circulating in the blood)
91. Antibodies are
- (A) Enzymes
 - (B) Organic compounds
 - (C) Proteins
 - (D) Glycoproteins
92. The resolving power of a compound microscope is
- (A) $1\ \mu\text{m}$
 - (B) $10\ \mu\text{m}$
 - (C) $100\ \mu\text{m}$
 - (D) $0.25\ \mu\text{m}$
93. The most important cell that initiates and influences the development of a stem cell into a B-lymphocyte in the bone marrow is which one of the following?
- (A) Thymic epithelial cell
 - (B) Stromal cell
 - (C) Dendritic cell
 - (D) T-helper2 cell

94. Which of the following statements about a secondary (memory) antibody response is FALSE?
- (A) the secondary response comes from memory B cells
 - (B) the secondary response is faster
 - (C) the secondary response is primarily by IgM
 - (D) the secondary response produces more Immunoglobulins than the primary response
95. Which of the following conditions will result in the inability to produce T cells?
- (A) Thymectomy
 - (B) DiGeorge's syndrome
 - (C) Nude mice
 - (D) All of the above
96. Molecular taxonomy determined by DNA base Composition based on
- (A) % of G + C
 - (B) % of A + T
 - (C) % of A + T + G + C
 - (D) all of the above
97. Which of the following are responsible for cellular immunity?
- (A) T cell
 - (B) B cell
 - (C) Both (A) and (B)
 - (D) None of these
98. *Bacillus pertussis* is a causative agent of
- (A) Tetanus
 - (B) Whooping cough
 - (C) Botulism
 - (D) Gonorrhoea
99. A substance that is released by lymphocytes which causes blood vessels to dilate is
- (A) Histamine
 - (B) Fibrinogen
 - (C) Pyrogen
 - (D) Lysozyme
100. The cell wall of gram-positive bacteria may contribute to the development of septic shock. Identify the component which is most associated with the induction of septic shock
- (A) Capsular protein
 - (B) Endotoxin
 - (C) Peptidoglycan
 - (D) Teichoic acid