

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

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 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. An aromatic amino acid is

(A) Lysine	(B) Tyrosine
(C) Taurine	(D) Arginine

2. The true statement about solutions of amino acids at physiological pH is
 - (A) All amino acids contain both positive and negative charges
 - (B) All amino acids contain positively charged side chains
 - (C) Some amino acids contain only positive charge
 - (D) All amino acids contain negatively charged side chains

3. Sulphur containing amino acid is

(A) Methionine	(B) Leucine
(C) Valine	(D) Asparagine

4. Restriction endonucleases which recognize and cut same recognition sequences are known as

(A) isoschizomers	(B) isoaccepting endonucleases
(C) isozymes	(D) abzymes

5. A radioactive element is sometimes used to trace the pathway of chemical reactions in the cell. If newly synthesized proteins are radioactive, the radioactive element used could be

(A) sodium	(B) chlorine
(C) nitrogen	(D) potassium

6. A net gain of water tends to occur
 - (A) in a hypoosmotic solution from an isosmotic solution
 - (B) in an isosmotic solution from a hyperosmotic solution
 - (C) in a hyperosmotic solution from a hypoosmotic solution
 - (D) in a hypoosmotic solution from a hyperosmotic solution

7. Many surface proteins are anchored by

(A) polar amino acids	(B) hydrogen bonding amino acids
(C) nonpolar fatty acids	(D) nonpolar amino acids

8. A, B, and O blood groups are marked by surface

(A) glycoproteins	(B) glycolipids
(C) glyco carbohydrates	(D) glycerol

9. The number of sub classes of Ig G is
(A) 2 (B) 3
(C) 4 (D) 8
10. PTH
(A) Reduces the renal clearance or excretion of calcium
(B) Increases renal phosphate clearance
(C) Increases the renal clearance of calcium
(D) Decreases the renal phosphate clearance
11. δ -Cells of islet of langerhans of pancreas produce
(A) Pancreatic polypeptide (B) Pancreatic lipase
(C) Somatostatin (D) Insulin
12. A microscope in which an image is formed by passing an electron beam through a specimen and focusing the scattered electrons with magnetic lenses is called a
(A) transmission electron microscope (B) scanning electron microscope
(C) phase-contrast microscope (D) fluorescent microscopy
13. Transmission electron microscopy is best for high magnification viewing of
(A) internal structure of fixed cells.
(B) internal structure of live, motile cells.
(C) surface structure of fixed cells.
(D) surface membranes of live, motile cells.
14. Which of the following is NOT equivalent to 10 micrometers?
(A) 0.0001 cm (B) 0.01 mm
(C) 10,000 nm (D) 100,000 Angstroms
15. To make a vaccine against chicken cholera that would not kill the chicken, Pasteur
(A) treated the sample with heat to kill the microorganisms.
(B) attenuated the strain by repeatedly passaging it in culture.
(C) used a related but different microorganism from animals.
(D) used very small, non-lethal amounts of material.
16. The first observation that bacteria-like organisms could be found in normal air was by
(A) Anton Leeuwenhoek (B) Louis Pasteur
(C) Robert Koch (D) Joseph Meister

17. Bacteria accomplish chemotaxis by
- (A) Steering toward better growth conditions
 - (B) Making long, uninterrupted runs when conditions are good
 - (C) Frequently stopping and tumbling to better sense good conditions
 - (D) Stopping movement when conditions are good
18. When the two ecosystems overlap each other, the area is called
- (A) Habitat
 - (B) Niche
 - (C) Ecotone
 - (D) Ecotype
19. Which of following two hormones are essential for induced breeding of fishes ?
- (A) TSH and ACTH
 - (B) Oestrogen and progesterone
 - (C) FSH and LH
 - (D) Vassopressin and oxytocin
20. ACTH induces rise in
- (A) Cyclic AMP
 - (B) Cyclic GMP
 - (C) Calcium
 - (D) Magnesium
21. Transgenic animals are for improvement of the quality of
- (A) Milk
 - (B) Meat
 - (C) Eggs
 - (D) All of the above
22. Hormones
- (A) Act as coenzyme
 - (B) Act as enzyme
 - (C) Influence synthesis of enzymes
 - (D) Belong to B-complex group
23. The movement of sodium ions from an area of higher concentration to an area of lower concentration is called _____.
- (A) active transport
 - (B) osmosis
 - (C) diffusion
 - (D) phagocytosis
24. During cytokinesis in plants:
- (A) a bundle of actin microfilaments called the contractile ring, pinch the cell in half
 - (B) small vesicles, directed by the phragmoplast, move to the spindle
 - (C) a cleavage furrow encircles the cell
 - (D) cytoplasmic division is called cleavage

25. During the Ras pathway:
- (A) cytoplasmic protein kinases are activated
 - (B) the growth factor receptor is dephosphorylated
 - (C) growth factors bind to receptors in the cytoplasm
 - (D) leads to the production of translation factors
26. Sister chromatids:
- (A) are created when DNA is replicated
 - (B) are separated during mitosis
 - (C) are attached at the centromere prior to division
 - (D) all of the above
27. DNA damaged by sunlight:
- (A) has undergone depurination
 - (B) has lost its phosphate groups
 - (C) has formed pyrimidine dimers
 - (D) has lost its hydrogen bonds
28. IgA antibody is the first line of defense against infections at the mucous membrane. It is usually an early specific antibody. Which of the following statements regarding IgA is not true?
- (A) Complement fixation tests for IgA antibody will be positive if specific IgA antibody is present
 - (B) IgA is not found in saliva, therefore an IgA diagnostic test on saliva would have no value
 - (C) IgA can be destroyed by bacterial proteases
 - (D) IgA is absent in colostrum
29. An immunoglobulin molecule always contains
- (A) 1 κ and 3 λ type of chains
 - (B) 2 κ and 2 λ type of chains
 - (C) 3 κ and 1 λ type of chains
 - (D) 2 κ and 2 λ chains
30. A flower which can be divided into two equal halves by only one plane is
- (A) Zygomorphic
 - (B) Actinomorphic
 - (C) Regular
 - (D) Perfect
31. Which one of the following bacterium is used for production of transgenic plants?
- (A) *Escherichia coli*
 - (B) *Bacillus thuringiensis*
 - (C) *Staphylococcus aureus*
 - (D) *Agrobacterium tumefaciens*

32. Spindle fibre is made up of
(A) Humulin (B) Intermediate filament
(C) Flagellin (D) Tubulin
33. Co-repressors
(A) trigger the shutdown of gene translation
(B) trigger the shutdown of gene transcription
(C) trigger the shutdown of cell replication
(D) trigger the shutdown of the immune system
34. The theory that organelles have evolved from bacteria engulfed by a long-ago cell is called
(A) the exobacterial theory (B) the amoebic theory
(C) the Big Gulp theory (D) the endosymbiont theory
35. Both mitochondrial DNA and chloroplast DNA are overwhelmingly inherited
(A) from the maternal side (B) from the paternal side
(C) from both parents (D) from symbiotic bacteria
36. Who first described microorganisms such as bacteria?
(A) Louis Pasteur (B) Robert Koch
(C) Fannie Hesse (D) Anton von Leeuwenhoek
37. Credit for the first vaccine for the prevention of human disease is generally given to:
(A) Edward Jenner for the prevention of small pox.
(B) Louis Pasteur for the prevention of rabies.
(C) Louis Pasteur for the prevention of anthrax.
(D) Robert Koch for the prevention of tuberculosis.
38. Hyperglycemic effect of glucocorticoids is due to
(A) Inactivation of protein phosphatase
(B) Inactivation of fructose 1,6-biphosphatase
(C) Stimulation of synthesis of pyruvate carboxylase
(D) Stimulation of synthesis of eltroxykinase
39. Which immunoglobulin is the primary antibody in saliva, tears, and intestinal and genital secretions?
(A) IgG (B) IgM
(C) IgE (D) IgA

40. Ribozyme is
- (A) Not a regular enzyme but has the action of an enzyme
 - (B) Catalyzes self splicing of pre-tRNA segment
 - (C) Self-splicing of RNA is also found in rRNA, mRNA, chloroplast tRNA, rRNA and mRNA
 - (D) All the above
41. According to fluid mosaic model the correct sequence of plasma membrane is
- (A) Lipid – protein – protein – lipid
 - (B) Protein – protein – lipid – lipid
 - (C) Protein - lipid – lipid – protein
 - (D) All of these
42. The number of chromosomes can be increased in plants by applying
- (A) Thermo treatment mechanism
 - (B) Hormone treatment
 - (C) Colchicine treatment
 - (D) Hybrid vigor
43. The unique property of the DNA polymerase I is
- (A) High Processivity
 - (B) 5' to 3' exonuclease activity
 - (C) 3' to 5' exonuclease activity
 - (D) High rate of synthesis
44. An important difference between eukaryotic and prokaryotic replication is
- (A) eukaryotic DNA polymerases are faster
 - (B) more DNA polymerases are found in eukaryotes
 - (C) multiple origins of replication in eukaryotes
 - (D) RNA primers are not required in eukaryotes
45. Which system for stably introducing foreign genes into eukaryotic cells does not involve the integration of the foreign DNA into the host chromosomes?
- (A) Retroviral Vectors
 - (B) Transgenic Mice
 - (C) Gene gun
 - (D) Yeast artificial Chromosome
46. Approximately how many moles of ATP will be generated as a result of oxidation of one mole of $FADH_2$?
- (A) 2
 - (B) 3
 - (C) 4.5
 - (D) 6
47. Which of the following is not coded by MHC genes?
- (A) Components of complement pathway
 - (B) Immunoglobulin
 - (C) Glycoproteins
 - (D) Antigen presenting proteins

48. Which is least likely to occur for removal of cancer cells?
(A) T-cell based cytotoxicity (B) Complement fixation
(C) Autophagy (D) Phagocytosis
49. Regulation of trp operon by binding of tryptophan to trp repressor is termed as
(A) Repression (B) Induction
(C) Anti termination (D) Attenuation
50. Oxygenase activity of RUBISCO generates
(A) Two molecules of PGA (3C)
(B) Two molecules of Phosphoglycolate (2C)
(C) One molecule each of PGA and phosphoglycolate
(D) Two molecules each of PGA and phosphoglycolate
51. Which is true for β -oxidation of fatty acids?
(A) Formation of malonyl CoA
(B) Formation of acetoacetyl ACP
(C) Transport of acyl CoA into mitochondria
(D) Use of NADPH₂
52. Enzymes do not interfere with
(A) free energy of reaction
(B) rate of reaction
(C) activation energy of transition state
(D) reaction equilibrium
53. Covalent bond formation between two atoms takes place by
(A) transfer of electron from one atom to other
(B) one side sharing of electrons
(C) electron sharing by both interacting atoms
(D) affinities between two atoms
54. The main difference between cellulose and starch molecule is
(A) the type of linkage between glucose subunits
(B) that only cellulose contains ribose building blocks
(C) that only starch is made from glucose building blocks
(D) the type of monosaccharide used to form these polymers

55. Two functions of rough endoplasmic reticulum are to
- (A) detoxify and transport drugs
 - (B) modify and activate hormones
 - (C) synthesize and transport enzymes
 - (D) join with and hydrolyze food vacuoles
56. All of the following are correct about the X and Y chromosomes except?
- (A) There are 78 active genes on the Y chromosome
 - (B) Females have one X and one Y chromosome
 - (C) In early meiosis, identical chromosomes can repair mutations
 - (D) X and Y chromosomes cannot pair and exchange genetic information
57. In many countries, DDT is banned as an insecticide because
- (A) it can be broken down by insects.
 - (B) it is not readily biodegradable.
 - (C) it is less effective in killing insect pests.
 - (D) it is poisonous to plants.
58. In the process of Kreb's cycle
- (A) ADP is converted into ATP
 - (B) Pyruvic acid is converted into ATP
 - (C) Acetyl CoA is converted into CO₂ and water
 - (D) Glucose is converted into CO₂
59. 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
60. In the hybridoma technology the marker enzyme responsible for selection of hybridoma cells
- (A) Thymidine kinase
 - (B) HGPRT
 - (C) HPGRT
 - (D) Dihydrofolate reductase
61. Erucic acid is present in
- (A) Mustard oil
 - (B) Sunflower oil
 - (C) Til oil
 - (D) Palm oil

62. 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
63. Example for DNA viruses are
- (A) Caulimo viruses
 - (B) BMV
 - (C) TMV
 - (D) Retrovirus
64. Reverse transcriptase catalyses the formation of
- (A) DNA on an DNA template
 - (B) DNA on an RNA template
 - (C) RNA on an DNA template
 - (D) RNA on an RNA template
65. Bacteria spores:
- i. are resistant to antibiotics
 - ii. allow the bacteria to multiple in adverse condition
 - iii. are usually formed by Gram-negative bacteria
 - iv. can be identified with Gram stains.
 - v. are killed by temperature of 120° for 20 minutes.
- (A) i & v are only true
 - (B) i & iii are only true
 - (C) only v is true
 - (D) All the above are true
66. Z-DNA is charactrised by
- (A) Left handed helix
 - (B) Right handed helix
 - (C) Bending of nitrogen bases to helix axis at an angle other that perpendicular
 - (D) Both (A) and (B)
67. Nickel and chromium compounds can cause cancer of
- (A) Skin
 - (B) Lungs
 - (C) Heart
 - (D) Liver
68. Which of the following is not formed during anaerobic respiration?
- (A) Pyruvic acid
 - (B) Ethyl alcohol
 - (C) CO₂
 - (D) Acetyl Co A
69. Type of chemical bond between glucose and fructose in sucrose
- (A) α 1,4-glycosidic bond
 - (B) β 1,4-glycosidic bond
 - (C) α 1,2-glycosidic bond
 - (D) β 1,2-glycosidic bond

70. Approximately what percentage of the DNA in the human genome is both transcribed and translated?
- (A) 70% (B) 50%
(C) 20% (D) 3%
71. In a charged transfer RNA, the nucleotide bound to the amino acid is adenosine (A), and the next two nucleotides are cytosines (C). What can you tell about the DNA codon to which this transfer RNA corresponds?
- (A) the first position is A, but you can't tell about the others from the information given
(B) you can't tell anything about the codon from the information given
(C) the codon is TGG
(D) the codon is ACC
72. What is the main target of natural selection?
- (A) The population (B) The species
(C) Individual phenotype (D) Individual genotype
73. Below are listed a few cell organelles.
- | | | |
|----------------|-----------------|--------------------------|
| 1. Nucleus | 2. Lysosomes | 3. Endoplasmic Reticulum |
| 4. Peroxisomes | 5. Mitochondria | 6. Chloroplast |
- Organelles not enclosed by two phospholipid membranes are:
- (A) 2, 3, 6 (B) 1, 3, 4
(C) 2, 3, 4 (D) 2, 4, 6
74. Hexose mono-phosphate shunt is an additional pathway for oxidation of glucose. It generates NADPH essential for fatty acids synthesis. This pathway predominates in all except one of the following tissues. This tissue is
- (A) adipose tissue (B) lactating mammary gland
(C) adrenal cortex (D) skeletal muscle
75. The lowest levels of activity of superoxide dismutase and catalase is found in
- (A) Aerobes (B) Facultative anaerobes
(C) Micro-aerobes (D) Obligate anaerobes
76. Gibberellins are known as to break dormancy in cereal seeds. This dominantly is due to the secretion of:
- (A) protease (B) lipase
(C) alpha amylase (D) cellulase

77. Bacterial Rho protein is a
 (A) Helicase (B) Kinase
 (C) Phosphatase (D) None of the above
78. 'Zinc fingers' are important in cellular recognition because they are
 (A) at the catalytic site of many kinases
 (B) characteristic of palindrome structures of unique-sequence DNA
 (C) a structural motif in many DNA-binding proteins
 (D) structures with high redox potential
79. The enzyme that changes Ribulose to xylulose is a
 (A) Isomerase (B) Transferase
 (C) Epimerase (D) Anomerase
80. Vitamin A is stored in the liver in the form of
 (A) Free retinol (B) Retinyl acetate
 (C) Retinyl stearate (D) Retinyl palmitate
81. A mutation deleting an upstream activating sequence for a single gene would be expected to be
 (A) polar (B) *cis*-dominant
 (C) *trans*-dominant (D) silent
82. In vertebrate genes, transcription regulatory regions that contain CpG islands are inactivated by which CpG modification?
 (A) Myristylation (B) Phosphorylation
 (C) Acetylation (D) Methylation
83. 2-amino, 6-Oxy purine is
 (A) Hypoxanthine (B) Xanthine
 (C) Guanine (D) Adenine
84. The rate limiting step of fatty acid synthesis is catalyzed by
 (A) Acetyl CoA carboxylase (B) ATP citrate lyase
 (C) Malic enzyme (D) *Pyruvate dehydrogenase*
85. In a hybridization experiment a plant shows phenotypic ratio of 15:1. How many genes control the trait for observed phenotypic ratio?
 (A) one (B) two
 (C) three (D) polygene

86. Parkinson's disease is associated with
- (A) an underproduction of γ -aminobutyrate
 - (B) an underproduction of dopamine
 - (C) an overproduction of histamine
 - (D) an overproduction of γ -aminobutyrate (GABA)
87. A restriction endonuclease that recognizes the base pair sequence GATC (where N can be any nucleotide) will cleave random DNA on average every
- (A) 256 bp
 - (B) 625 bp
 - (C) 1024 bp
 - (D) 4096 bp
88. Which one of the following is not a cytokine?
- (A) Arachidonic acid
 - (B) Interleukins
 - (C) Interferon
 - (D) Tumour necrosis factor
89. Identify the following point mutation in mRNA UAU to UAU AAC CUA and UUG CUA to UUG CUG AUA
- (A) transition and frame shift respectively
 - (B) frame shift and transition respectively
 - (C) transversion frame shift respectively
 - (D) frame shift and transitive respectively
90. Which of the following is not a trait of an anabolism in the metabolism process?
- (A) The process of breaking down complex molecules to release energy
 - (B) Nutrients and molecules form complex molecules
 - (C) Uses simple sugars as building blocks for more complex molecules
 - (D) Uses amino acids as building blocks for more complex molecules
91. A shiny, sticky colony of *Streptococcus pneumoniae* is likely to be
- (A) nonencapsulated and nonpathogenic
 - (B) nonencapsulated and pathogenic
 - (C) encapsulated and pathogenic
 - (D) encapsulated and non-pathogenic
92. Reversal UV effect is called
- (A) tautomeric shift
 - (B) thymine dimer
 - (C) photo oxidation
 - (D) photo reactivation

93. Liposomes are used in
 (A) Drug delivery (B) Tissue engineering
 (C) Vaccine production (D) rDNA
94. NSAIDS are used as
 (A) Antibiotics (B) Anti-inflammatory agents
 (C) Laxatives (D) Hormones
95. CCA end of a tRNA molecule is called as -----
 (A) Anticodon loop (B) Acceptor end
 (C) DHU loop (D) Extra arm
96. TATA box is present at
 (A) -30 (B) -10
 (C) -75 (D) None of the above
97. The catabolic end product of purines in humans is
 (A) Ammonia (B) Uric acid
 (C) Urea (D) Allantoin
98. The percentage of triglycerides is more in
 (A) VLDL (B) HDL
 (C) Chylomicrons (D) LDL
99. Which of the following is not part of the lac operon of *E. coli*?
 (A) Genes for inducible enzymes of lactose metabolism
 (B) Genes for the repressor, a regulatory protein
 (C) Gene for RNA polymerase
 (D) A promoter, the RNA polymerase binding site
100. What is the difference between apoptosis and necrosis?
 (A) Apoptosis is a controlled program of cellular destruction; necrosis is cell death due to damage
 (B) Apoptosis is a property of all differentiated cells; necrosis only occurs to undifferentiated cells
 (C) Apoptosis is cell death due to damage that occurs during embryogenesis; necrosis is cell death due to damage that occurs during adulthood.
 (D) Apoptosis is the death of a differentiated cell; necrosis is the death of an undifferentiated cell.