

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

M.Sc. (BIOCHEMISTRY & MOLECULAR BIOLOGY)

COURSE CODE : 368

Register Number :

\_\_\_\_\_  
*Signature of the Invigilator*  
(with date)

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COURSE CODE : 368

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. Following digestive juices are alkaline except:
 

(A) saliva	(B) gastric juice
(C) pancreatic juice	(D) succus entericus
  
2. Dead space means:
 

(A) no space
(B) temporary cessation of breathing
(C) space where gaseous exchange takes place
(D) space where gaseous exchange does not occur
  
3. Compound of haemoglobin and  $\text{CO}_2$  is known as:
 

(A) carbaminohaemoglobin	(B) carboxyhaemoglobin
(C) oxyhaemoglobin	(D) ketohaemoglobin
  
4. Contractile protein which occurs in greatest amount in the skeletal muscle is:
 

(A) actin	(B) myosin
(C) troponin	(D) tropomyosin
  
5. Counter current exchanger in kidney is constituted by the following except:
 

(A) proximal tubule	(B) ascending Henle's loop
(C) descending Henle's loop	(D) collecting duct
  
6. Which muscle is myogenic in contraction?
 

(A) Cardiac muscle	(B) Skeletal muscle
(C) Intestinal smooth muscle	(D) Both (A) and (C)
  
7. Nerve fiber becomes excited due to influx of:
 

(A) potassium ion	(B) sodium ion
(C) calcium ion	(D) chloride ion
  
8. Nature of synaptic transmission is mostly:
 

(A) thermal	(B) chemical
(C) mechanical	(D) electrochemical
  
9. An example of neurohormone is:
 

(A) vasopressin	(B) corticotrophin
(C) somatotropin	(D) somatomedin
  
10. Which statement about oxytocin is incorrect?
 

(A) Promotes child birth	(B) Promotes milk biosynthesis
(C) Promotes milk ejection	(D) Promotes semen aspiration

11. Which structure in ovary secretes progesterone?  
 (A) Corpus luteum (B) Corpus albicans  
 (C) Graffian follicle (D) Primary follicle
12. Which of the following is not a second messenger?  
 (A) Cyclic AMP (B)  $Ca^{++}$   
 (C)  $Na^{++}$  (D) Cyclic GMP
13. Direct and dominating factor of plant growth is:  
 (A) soil (B) wind  
 (C) light (D) temperature
14. Shedding of plant leaves, flowers and fruits is known as:  
 (A) abscission (B) senescence  
 (C) vernalisation (D) none of the above
15. The efficiency of any ecosystem is best depicted by pyramid of:  
 (A) number (B) energy  
 (C) biomass (D) volume
16. 'Biomes' describe:  
 (A) desert vegetation  
 (B) ecological group of plants  
 (C) ecological group of animals  
 (D) relation between plant, animal and environment
17. Ozone layer occurs in:  
 (A) troposphere (B) stratosphere  
 (C) heterosphere (D) thermosphere
18. After exponential increase a population becomes stagnant. The growth curve is:  
 (A) J-shaped (B) S-shaped  
 (C) fluctuating (D) circular
19. Earth summit of Rio de Janerio (1992) resulted in:  
 (A) compilation of red list  
 (B) establishment of biosphere reserve  
 (C) convention on biodiversity  
 (D) formation of IUCN



20. First National Park in India is:  
(A) Kanha National Park (B) Jim Corbett National Park  
(C) Kaziranga National Park (D) Satpura National Park
21. Gene bank is a method for:  
(A) *ex situ* conservation (B) *in situ* conservation  
(C) both of these (D) none of these
22. BOD stands for:  
(A) biotic oxygen demand (B) biological oxygen demand  
(C) biochemical oxygen decrease (D) none of the above
23. Eutrophication is:  
(A) lack of algae in the lake (B) excessive oxygen in the pond  
(C) abundant nekton in the pond (D) abundant fertilizers in the lake
24. Minamata disease occurs due to toxic effects of:  
(A) fluoride (B) copper  
(C) mercury (D) cadmium
25. Filariasis is caused by:  
(A) *Plasmodium vivax* (B) *Leishmania donovani*  
(C) *Wuchereria bancrofti* (D) *Ascaris lumbricoides*
26. Silver carp is a kind of:  
(A) minor carp (B) exotic carp  
(C) indigenous carp (D) cartilaginous carp
27. HIV genome consists of:  
(A) single stranded RNA (B) single stranded DNA  
(C) double stranded RNA (D) double stranded DNA
28. Antibodies are synthesized and released by:  
(A) killer cells (B) helper cells  
(C) plasma cells (D) phagocytic cells
29. Body secretions mostly contain:  
(A) IgM (B) IgA  
(C) IgD (D) IgG

30. Most common example of single cell protein (SCP) is:  
(A) Euglena (B) Spirulina  
(C) Volvox (D) None of the above
31. Fusion of protoplasts from two different varieties of plants produces:  
(A) somatic hybrids (B) genetic hybrids  
(C) distant hybrids (D) vigour hybrids
32. A bacteria commonly used as probiotics is:  
(A) Acetic acid bacteria (B) Formic acid bacteria  
(C) Lactic acid bacteria (D) Tartaric acid bacteria
33. Which of the following is a restriction enzyme?  
(A) Trypsin (B) EcoRI  
(C) Pepsin (D) Chymotrypsin
34. Which of the following method is not a method for gene transfer?  
(A) Heat shock to host cell (B) Osmotic shock to host cell  
(C) Biolistics (D) Microinjection
35. Polymerase chain reaction needs a thermostable DNA polymerase isolated from a bacterium known as:  
(A) *Thermus thermus* (B) *Thermus aquaticus*  
(C) *Thermus marina* (D) *Thermus namibiensis*
36. *Bt* cotton contains a foreign gene isolated from:  
(A) *Bacillus thuringiensis* (B) *Bacillus perfringens*  
(C) *Bacillus cereus* (D) *Bacillus subtilis*
37. Which method is a method for molecular diagnosis?  
(A) PCR (B) ELISA  
(C) Both of these (D) None of these
38. The use of a bioresource by multinational companies without proper authorization to people having traditional knowledge about the utility of the bioresource is known as:  
(A) bioterrorism (B) biopiracy  
(C) biodesign (D) biodiversity
39. The first disease cured by gene therapy in 1990 is:  
(A) adenosine deaminase deficiency (B) guanosine demainase deficiency  
(C) cytosine deaminase deficiency (D) thymine deaminase deficiency

40. RNAi is a method for:
- |                       |                      |
|-----------------------|----------------------|
| (A) activating a gene | (B) silencing a gene |
| (C) promoting a gene  | (D) enhancing a gene |
41. Disease caused by a defect in one amino acid is called as
- |                     |                    |
|---------------------|--------------------|
| (A) Cystic fibrosis | (B) Cystinuria     |
| (C) Galactosemia    | (D) Liver fibrosis |
42. Spider webs are made of the strong and pliable protein called
- |             |               |
|-------------|---------------|
| (A) Fibroin | (B) Keratin   |
| (C) Chitin  | (D) Flagellin |
43. Monooxygenases important for the detoxification of many drugs are
- |                            |                              |
|----------------------------|------------------------------|
| (A) Cytochromes P450       | (B) Isocitrate dehydrogenase |
| (C) Pyruvate decarboxylase | (D) Flexokinase              |
44. The proton-sugar transporter in bacteria is
- |              |             |
|--------------|-------------|
| (A) Uniport  | (B) Symport |
| (C) Antiport | (D) Diport  |
45. Megaloblastic anemia is the deficiency of
- |                |                |
|----------------|----------------|
| (A) Cobalamin  | (B) Thiamin    |
| (C) Riboflavin | (D) Folic acid |
46. The major plant hormone auxin causes
- |                                       |
|---------------------------------------|
| (A) Shoot growth and shoot initiation |
| (B) Splitting of the internode        |
| (C) Cell expansion                    |
| (D) Internodal elongation             |
47. Cyclins are proteins involved in regulation of
- |                        |                             |
|------------------------|-----------------------------|
| (A) cell cycle         | (B) circadian rhythm        |
| (C) membrane transport | (D) synthesis of cyclic Amp |
48. Sickle cell anemia is
- |                         |                        |
|-------------------------|------------------------|
| (A) X-linked recessive  | (B) Autosomal dominant |
| (C) Autosomal recessive | (D) None of the above  |



49. Plant material can be surface sterilized by  
 (A) Auxin (B) Cytokinin  
 (C) Both auxin and cytokinin (D) Bromine water
50. Colchicines is one of the most effective  
 (A) Spindle fiber promoter (B) DNA synthesis inhibitor  
 (C) Spindle fiber inhibitor (D) Cell suspension media
51. *Atropa belladama* produces atropine which acts as a  
 (A) Sweetner (B) Dye  
 (C) Muscle relaxant (D) Insecticidal
52. Ti plasmids belongs to a  
 (A) Natural bacterium (B) Virus  
 (C) Yeast (D) Lambda phage
53. Some restriction endonucleases possess identical and cleavage sites and are called  
 (A) Isoschizomeres (B) Isonucleases  
 (C) Isoenzymes (D) Isoendonucleases
54. When  $\Delta G$  of a reaction is negative, the reaction is  
 (A) at equilibrium  
 (B) endergonic and tends to go towards forward reaction  
 (C) endergonic and tends to go toward completion  
 (D) exergonic and tends to go toward completion
55. Tetany is caused due to dietary deficiency of  
 (A) Vitamin D (B) Vitamin A  
 (C) Iodine (D) Calcium
56. Second largest gland of the body is  
 (A) Pancreas (B) Liver  
 (C) Pituitary (D) Thyroid
57. Ovule is attached to placenta by a slender stalk called  
 (A) Pedicel (B) Petiole  
 (C) Placenta (D) Funicle
58. The pollutants released by the jet planes are  
 (A) Fogs (B) Smogs  
 (C) Colloids (D) Aerosols

59. Which one of the following is a congenital disease?  
(A) AIDS (B) Alcaptonuria  
(C) Night-blindness (D) Allergy
60. Analogous structures are those whose similarity comes from  
(A) their performing a similar function, rather than their arising from a common ancestor  
(B) their being derived from a common ancestral structure  
(C) the wing of a bird and the forelimb of a human  
(D) their performing a dissimilar function, rather than their arising from a common ancestor
61. Species of bacteria, belonging principally to the genera Bacillus and Clostridium, produce extremely heat-resistant structures called  
(A) Endospores (B) Ascospores  
(C) Exospores (D) Pilus
62. The action of pepsin requires a medium which is  
(A) Alkaline (B) Acidic  
(C) Neutral (D) Watery
63. Man has \_\_\_\_\_ pairs of salivary glands.  
(A) 3 (B) 2 (C) 5 (D) 1
64. The hormone that is responsible for male secondary sexual characters is  
(A) Prolactin (B) Vasopressin  
(C) Insulin (D) Testosterone
65. Pulmonary artery supplies  
(A) Oxygenated blood (B) Deoxygenated blood  
(C) Serum (D) Plasma
66. The final product of anaerobic respiration is  
(A) Carbohydrate (B) Glyoxylate  
(C) Succinate (D) Ethanol
67. The total capacity of lungs for accommodation is called  
(A) Tidal volume (B) Complementary volume  
(C) Supplementary volume (D) Vital capacity



68. The enzyme responsible for initiating the unwinding of double-stranded DNA (eliminating super coiling) by nicking a single strand of the DNA molecule is:
- (A) Topoisomerase (B) Gyrase  
(C) Ligase (D) Helicase
69. The enzyme that accomplishes the unwinding of the original double stranded DNA molecule, once supercoiling has been eliminated, by breaking the hydrogen bonds that hold the two strands together is:
- (A) Helicase (B) Topoisomerase  
(C) DNA Polymerase II (D) Primase
70. The enzyme that stitches Okazaki fragments together (along the lagging strand) is called
- (A) DNA Ligase (B) DNA Polymerase II  
(C) Topoisomerase (D) Holoenzyme
71. DNA Polymerase III is actually an aggregate of several different protein subunits. So it is often called a:
- (A) Holoenzyme (B) Primeosome  
(C) Replisome (D) Isoenzyme
72. A repeating DNA sequence at the end of chromosomes that prevents them from losing base pair sequences at their ends and from fusing together is called:
- (A) Telomere (B) Telomerase  
(C) A replicon (D) Centromere
73. An enzyme (used by all retroviruses) that transcribes genetic information of the virus from RNA into DNA, is:
- (A) Methylase (B) RNA polymerase  
(C) Restriction nuclease (D) Reverse transcriptase
74. In DNA, mutations at G-C sequences occur quite frequently since 5-methyl cytosine easily deaminates to form:
- (A) Thymine (B) Adenine  
(C) Guanine (D) Cytosine
75. The sequence of different amino acids in the polypeptide chain of a protein is called:
- (A) Secondary structure (B) Tertiary structure  
(C) Primary Structure (D) Quaternary structure

76. The Quaternary structure of a protein is:
- (A) Its structure resulting from interactions between amino acid side chains
  - (B) Its structure resulting from hydrogen bonds between the C=O and N-H groups of different amino acids
  - (C) Its structure resulting from the union of more than one protein molecule, called subunit proteins
  - (D) Its amino acid sequence
77. Successive amino acids in the polypeptide chains that make up a protein are held together by:
- (A) N-glycosidic bonds
  - (B) Interprotamine disulfide bonds
  - (C) Peptide bonds
  - (D) Phosphodiester bonds
78. Infectious self-reproducing agents consisting only of protein, with no nucleic acids (hypothesized in 1982 by Nobel Laureate Stanley B. Prusiner) are called:
- (A) exteins
  - (B) proteomes
  - (C) prions
  - (D) proteinoids
79. Which of the following is not an aromatic amino acid?
- (A) Phenylalanine
  - (B) Tryptophan
  - (C) Tyrosine
  - (D) Serine
80. Which of the following amino acids is polar?
- (A) Valine
  - (B) Leucine
  - (C) Isoleucine
  - (D) Histidine
81. Factor VIII - an accessory protein that participates in the intrinsic pathway of coagulation is called as
- (A) Antihemophilic factor
  - (B) Hemophilic protein
  - (C) Christmas factor
  - (D) Stuart-Prower factor
82. A mass of relatively unspecialized tissue that develops at wound sites in plants, forming a protective covering is
- (A) Callus
  - (B) Callose
  - (C) Calculi
  - (D) Caldolysin
83. Cell fusion the formation of a single hybrid cell containing the nuclei and cytoplasm from different cells is induced by
- (A) Killed Sendai virus
  - (B) Gum acacia
  - (C) Agar
  - (D) Agarose

84. A database of protein and nucleic-acid sequences is  
(A) Genapool (B) Gen Bank  
(C) Gene cluster (D) RNA family
85. The nonspecific uptake of extracellular fluid via small endocytic vesicles that pinch off from the plasma membrane is  
(A) Reverse flow (B) Pinocytosis  
(C) Homeostasis (D) Reverse osmosis
86. Each IgG antibody molecule consists of four polypeptide chains  
(A) Four polypeptide chains two non-identical light chains and two non-identical heavy chains  
(B) Two polypeptide chains  
(C) Four polypeptide chains two light chains and two identical heavy chains  
(D) Three polypeptide chains
87. One of the major glycoproteins in the plasma membrane of erythrocytes is  
(A) Glycophorin A (B) Erythropoietin  
(C) Glycosphingoproteins (D) Cerebrosides
88. Sugars that contain a free aldehyde or ketone group in the open-chain configuration are called  
(A) Reducing sugars (B) Non reducing sugars  
(C) Ketotrioses (D) Stereoisomers
89. D-glucose and D-galactose are epimers, differing only in their configuration at  
(A) C-4 (B) C-3  
(C) C-2 (D) C-1
90. Glycogen is a branched-chain polysaccharide containing glucose residues linked by  
(A)  $\alpha$ 1-4 bonds with  $\alpha$ 1-6 branch points  
(B)  $\alpha$ 1-6 bonds with  $\alpha$ 1-4 branch points  
(C)  $\alpha$ 1-2 bonds with  $\alpha$ 1-6 branch points  
(D)  $\alpha$ 1-4 bonds with  $\alpha$ 1-4 branchpoints
91. Epinephrine and glucagon stimulate  
(A) Glycogen degradation in liver (B) Glycogen formation in liver  
(C) Protein degradation in liver (D) Prostaglandins



92. Chlorophyll is a porphyrin in which  
(A) Nitrogen atoms are coordinated to a magnesium ion  
(B) Nitrogen atoms are coordinated to a copper ion  
(C) Oxygen atoms are coordinated to a magnesium ion  
(D) Carbon atoms are coordinated to a copper ion
93. Calvin cycle takes place only in  
(A) Stroma (B) Inner membrane  
(C) Outer membrane (D) Matrix
94. Nematode is a  
(A) Round worm (B) Tape worm (C) Fluke (D) Hooklet
95. A chronic granulomatous disease of the peripheral nerves and superficial tissues, particularly the nasal mucosa is  
(A) Leprosy (B) Tuberculosis  
(C) Granuloma (D) Brill's disease
96. The Calvin cycle begins by the attachment of CO<sub>2</sub> to which of the following?  
(A) RuBP (B) Glucose  
(C) Glyceraldehyde-3-phosphate (D) Acetyl CoA
97. Host-encoded proteins that provide the first line of defense against viral infections are  
(A) Interferons (B) Transposons  
(C) T cell encoded proteins (D) Tubulins
98. Many animal retroviruses have acquired transforming genes called  
(A) Oncogenes (B) Pseudogenes  
(C) Methylated genes (D) Nonmethylated genes
99. Antigenic determinants are known as  
(A) Paratope (B) Carriers (C) Epitopes (D) Markers
100. Toxic shock syndrome is caused by  
(A) Endotoxins of *Staphylococcus aureus*  
(B) Retroviruses  
(C) Exotoxins of *Staphylococcus aureus*  
(D) Lentiviruses