

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

Ph.D. (CLINICAL BIOCHEMISTRY)

COURSE CODE : 164

Register Number :

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*Signature of the Invigilator*  
(with date)

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COURSE CODE : 164

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) or (E) 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. Which is the appropriate time for collection of blood for estimating most of its biochemistry constituents?  
(A) Fasting time (B) Post prandial time  
(C) Immediately after meals (D) After giving a stimulant
2. Emergency biochemical investigations in blood are  
(A) Glucose (B) Urea and Creatinine  
(C) Electrolytes (D) All of the above
3. What is the preferred specimen for analysis of glucose (sugar) in blood?  
(A) Heparinised plasma (B) Fluoride oxalate plasma  
(C) Serum (D) EDTA plasma
4. Fasting plasma true glucose level is  
(A) 70-110 mg/100 ml (B) 80-120 mg/100 ml  
(C) 100-140 mg/100 ml (D) 150-250 mg/100 ml
5. Hyperglycemia occurs in  
(A) Hyperinsulinism (B) Hypopituitarism  
(C) Diabetes mellitus (D) Hypothyroidism
6. Diabetes mellitus can be detected by which test using urine specimen?  
(A) Rothera's test (B) Benedict's test  
(C) Hay's test (D) Benzidine test
7. Which method is used to estimate blood glucose?  
(A) Folin Wu method (B) O-Toluidine method  
(C) GOD-POD method (D) All of the above
8. Which of the following tests is useful in the investigation of patients with symptoms of hypoglycemia?  
(A) Glucagon test (B) Tolbutamide test  
(C) Leucine sensitivity test (D) All of the above
9. Amount of glucose given for a patient during GTT is  
(A) 10 gm (B) 30 gm  
(C) 60 gm (D) 75 gm

10. Determination of glycosylated hemoglobin in blood is used to monitor
- (A) Sickle cell anemia (B) Liver cirrhosis  
(C) Diabetes mellitus (D) Thalassemia
11. The renal threshold for glucose is
- (A) 80 mg/dl (B) 100 mg/dl (C) 180 mg/dl (D) 200 mg/dl
12. In the fasting adult, the sugar in CSF is
- (A) 15-45 mg/dl (B) 45-80 mg/dl (C) 70-110 mg/dl (D) 80-120 mg/dl
13. Blood cholesterol is elevated in which of the following condition?
- (A) Hypothyroidism (B) Hyperthyroidism  
(C) Hypoinsulinism (D) None of the above
14. Estimation of serum triglycerides is of diagnostic importance in
- (A) Multiple myeloma (B) Hyperlipidemias  
(C) Nephrotic syndrome (D) Jaundice
15. In Frederickson's classification of the hyperlipoproteinemia, type II A is associated with
- (A) Decreased LDL Level (B) Increased plasma cholesterol level  
(C) Increased triglyceride level (D) All of the above
16. Which of the following substances will be responsible for the characteristic milkiness noted in the plasma in postprandial hyperlipemia?
- (A) Chylomicrons (B) Cholesterol  
(C) Triglycerides (D) Free fatty acids
17. Normal plasma protein levels varies in the range
- (A) 3.2-5.8 g/10 ml (B) 5.0-7.5 g/10 ml  
(C) 6.0-8.0 g/10 ml (D) 7.5-8.5 g/10 ml
18. Raised plasma protein levels are commonly found in
- (A) Dehydration (B) Paraproteinaemias  
(C) Infective hepatitis (D) All of the above
19. Hypoalbuminemia occurs in
- (A) Tetany (B) Oedema  
(C) Dehydration (D) None of the above

20. Which of the following serum protein fractions is increased in cirrhosis of liver?
- (A)  $\gamma$  - Globulin (B)  $\alpha_2$  - Globulin  
(C)  $\alpha_1$  - Globulin (D) Albumin
21. Which of the changes in serum electrophoretic pattern is diagnostic of nephritic syndrome?
- (A) Increased albumin (B) Increased  $\alpha_1$  - Globulin  
(C) Increased  $\alpha_2$  - Globulin (D) Increased  $\gamma$  - Globulin
22. Bence jones proteins may be excreted in urine of patients suffering from
- (A) Diabetic mellitus (B) Multiple myeloma  
(C) Diabetes insipidus (D) Hematuria
23. Immunoglobulin deficiency is observed in
- (A) Malignant disease (B) AIDS  
(C) Newborn infants (D) All of the above
24. Tumor marker enzyme in prostatic cancer is
- (A) Alkaline phosphatase (B) Acid phosphatase  
(C) CPK (D) LDH
25. Hypercalcemia is seen in
- (A) Malignant disease (B) Excessive secretion of calcitonin  
(C) Secondary hyperparathyroidism (D) None of the above
26. The level of serum phosphate is usually reduced below normal in
- (A) Hypoparathyroidism (B) Tetany  
(C) Vitamin D resistant rickets (D) All of the above
27. Plasma iron concentration is typically higher in
- (A) Hypochromic microcytic anemia (B) Rheumatoid arthritis  
(C) Hepatitis (D) Acute hemolytic episode
28. Wilson's disease is characterized by the deposition of one of the following minerals in the tissues
- (A) Cobalt (B) Copper (C) Iron (D) Zinc

29. The important biochemical abnormalities in Cushing's syndrome include  
(A) Hypokalemia (B) Hyponatremia  
(C) Hypoglycemia (D) None of the above
30. Bile acids are synthesized from  
(A) Simple fatty acids (B) Cholesterol  
(C) Sialic acid (D)  $\beta$  - Hydroxy butyric acid
31. Essential fatty acids are  
(A) Synthesized from the liver  
(B) Stored in the adipose tissue  
(C) Cannot be synthesized by the body  
(D) Converted to Vitamin D by UV light
32. A competitive inhibitor of an enzyme  
(A)  $\uparrow$ ses  $K_m$  without affecting  $V_{max}$  (B)  $\downarrow$ ses  $K_m$  without affecting  $V_{max}$   
(C)  $\uparrow$ ses  $V_{max}$  without affecting  $K_m$  (D)  $\downarrow$ ses  $V_{max}$  without affecting  $K_m$
33. Insulin does all of the following except  
(A) Enhance glucose transport into muscle  
(B) Enhance glycogen formation by liver  
(C) Enhance amino acid transport into muscle  
(D) Enhance gluconeogenesis in liver
34.  $\alpha$  - Tocopherol  
(A) Functions primarily as an antioxidant  
(B) Deficiency is commonly formed in adult  
(C) Is found in high concentration in whole grains and cereals  
(D)  $\uparrow$ ses urinary excretion of calcium
35. Triglycerides are digested in the intestine by the enzyme  
(A) Amylase (B) Protease  
(C) Cellulose (D) Lipase
36. Recurrent kidney stones are composed of  
(A) Calcium oxalate (B) Calcium phosphate  
(C) Citric acid (D) Uric acid

37. RNA molecules that exhibit catalytic activity are called
- (A) mRNAs
  - (B) ribonucleases
  - (C) ribosomes
  - (D) ribozymes
  - (E) ribonucleotides
38. Which of the following hormones initiates biological actions by crossing the plasma membrane and then binding to a receptor?
- (A) Glucagon
  - (B) Estradiol
  - (C) Insulin
  - (D) Norepinephrine
  - (E) Adrenocorticotrophic hormone
39. The major mechanism of turnover of molecular components of the plasma membrane occurs through
- (A) Endocytosis of patches of membrane
  - (B) Diffusion of individual molecules into the cytoplasm
  - (C) Recovery of specific components by selective receptors
  - (D) Expulsion of integral molecules into the extracellular medium
  - (E) The concerted action of multifunctional enzyme complexes.
40. Virus-mediated transfer of cellular genetic material from one bacterial cell to another by means of virus particles is called
- (A) induction
  - (B) transfection
  - (C) transformation
  - (D) transposition
  - (E) transduction
41. Incubation of gram-negative bacteria with lysozyme in an isotonic medium causes rod-shaped bacteria to assume a spherical shape. The cause of this phenomenon is
- (A) Absorption of water
  - (B) Destruction of the cell wall
  - (C) Destruction of the cytoskeleton
  - (D) Damage to the plasma membrane
  - (E) Change in gene expression
42. In addition to proteins, major components of very low density lipoproteins (VLDL) circulating in the blood of a normally fed mammal include
- (A) Triacylglycerol, cholesterol, and phospholipid
  - (B) Triacylglycerol, squalene and phospholipids
  - (C) Triacylglycerol, squalene and sphingosine
  - (D) Monoacylglycerol, cholesterol, and phospholipids
  - (E) Monoacylglycerol, squalene and sphingosine

43. Which of the following is meant by the statement that glucose and mannose are epimers?
- (A) One is an aldose and the other is a ketose  
 (B) One is a pyranose and the other is a furanose  
 (C) They are mirror images of each other  
 (D) They rotate the plane of light in opposite directions  
 (E) They differ only in the configuration about one carbon atom
44. 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  
 (E) Thiolase
45. All of the following are capable of forming hydrogen bonds with water EXCEPT
- (A) Methanol (B) Acetamide  
 (C) Methyl acetate (D) Ethanolamine  
 (E) Hexane
46. Which are the cholesterol esters that enter cells through the receptor-mediated endocytosis of lipoproteins hydrolyzed?
- (A) Endoplasmic reticulum (B) Lysosomes  
 (C) Plasma membrane receptor (D) Mitochondria
47. Which of the following phospholipids is localized to a greater extent in the outer leaflet of the membrane lipid bilayer?
- (A) Choline phosphoglycerides (B) Ethanolamine phosphoglycerides  
 (C) Inositol phosphoglycerides (D) Serine phosphoglycerides
48. All the following processes occur rapidly in the membrane lipid bilayer except
- (A) Flexing of fatty acyl chains  
 (B) Lateral diffusion of phospholipids  
 (C) Transbilayer diffusion of phospholipids  
 (D) Rotation of phospholipids around their long axes
49. The monosaccharide units are linked by  $\alpha 1 \rightarrow 4$  glycosidic linkage in
- (A) Maltose (B) Sucrose (C) Cellulose (D) Cellobiose



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50. Which of the following is a non-reducing sugar?  
 (A) Isomaltose (B) Maltose (C) Lactose (D) Trehalose
51. Which of the following is a reducing sugar?  
 (A) Sucrose (B) Trehalose (C) Isomaltose (D) Agar
52. N-Acetylglucosamine is present in  
 (A) Hyaluronic acid (B) Chondroitin sulphate  
 (C) Heparin (D) All of these
53. Iodine gives a red colour with  
 (A) Starch (B) Dextrin (C) Glycogen (D) Inulin
54. Amylose is a constituent of  
 (A) Starch (B) Cellulose (C) Glycogen (D) None of these
55. Synovial fluid contains  
 (A) Heparin (B) Hyaluronic acid  
 (C) Chondroitin sulphate (D) Keratin sulphate
56. Gluconeogenesis is decreased by  
 (A) Glucagon (B) Epinephrine (C) Glucocorticoids (D) Insulin
57. The component of cartilage and cornea is  
 (A) Keratosulphate (B) Chondroitin sulphate  
 (C) Cadmium sulphate (D) Antimony sulphate
58. Benedict's test is less likely to give weakly positive results with concentrated urine due to the action of  
 (A) Urea (B) Uric acid  
 (C) Ammonium salts (D) Phosphates
59. Active transport of sugar is depressed by the agent:  
 (A) Oxaloacetate (B) Fumarate (C) Malonate (D) Succinate
60. The general test for detection of carbohydrates is  
 (A) Iodine test (B) Molisch test (C) Barfoed test (D) Osazone test

61. Conversion of glucose to glucose-6-phosphate in human liver is by  
 (A) Hexokinase only  
 (B) Glucokinase only  
 (C) Hexokinase and glucokinase  
 (D) Glucose-6-phosphate dehydrogenase
62. The following is an enzyme required for glycolysis  
 (A) Pyruvate kinase  
 (B) Pyruvate carboxylase  
 (C) Glucose-6-phosphatase  
 (D) Glycerokinase
63. The normal glucose tolerance curve reaches peak is  
 (A) 15 min  
 (B) 1 hr  
 (C) 2 hrs  
 (D) 2½ hrs
64. Oxidative decarboxylation of pyruvate requires  
 (A) NADP<sup>+</sup>  
 (B) Cytochromes  
 (C) pyridoxal phosphate  
 (D) COASH
65. The total Glucose in the body is \_\_\_\_\_ gms  
 (A) 10-15  
 (B) 20-30  
 (C) 40-50  
 (D) 60-80
66. Pyruvate kinase requires \_\_\_\_\_ ions for maximum activity.  
 (A) Na<sup>+</sup>  
 (B) K<sup>+</sup>  
 (C) Ca<sup>2+</sup>  
 (D) Mg<sup>2+</sup>
67. ATP is 'wasted' in Rapoport-Luebering cycle in RBCs as otherwise it will inhibit  
 (A) Phosphoglucomutase  
 (B) Phosphohexo isomerase  
 (C) Phosphofructo kinase  
 (D) Phosphoenol pyruvate carboxy kinase
68. The amino acid from which synthesis of the protein of hair keratin takes place is  
 (A) Alanine  
 (B) Methionine  
 (C) Proline  
 (D) Hydroxyproline
69. In one molecule of albumin the number of amino acids is  
 (A) 510  
 (B) 590  
 (C) 610  
 (D) 650
70. Plasma proteins which contain more than 4% hexosamine are  
 (A) Microglobulins  
 (B) Glycoproteins  
 (C) Mucoproteins  
 (D) Orosomucoids
71. After releasing O<sub>2</sub> at the tissues, hemoglobin transports  
 (A) CO<sub>2</sub> and protons to the lungs  
 (B) O<sub>2</sub> to the lungs  
 (C) CO<sub>2</sub> and protons to the tissue  
 (D) Nutrients

72. Ehlers-Danlos syndrome characterized by hypermobile joints and skin abnormalities is due to  
 (A) Abnormality in gene for procollagen (B) Deficiency of lysyl oxidase  
 (C) Deficiency of prolyl hydroxylase (D) Deficiency of lysyl hydroxylase
73. Proteins are soluble in  
 (A) Anhydrous acetone (B) Aqueous alcohol  
 (C) Anhydrous alcohol (D) Benzene
74. A cereal protein soluble in 70% alcohol but insoluble in water or salt solution is  
 (A) Glutelin (B) Protamine (C) Albumin (D) Gliadin
75. Many globular proteins are stable in solution inspite they lack in  
 (A) Disulphide bonds (B) Hydrogen bonds  
 (C) Salt bonds (D) Non polar bonds
76. The hydrogen bonds between peptide linkages of a protein molecules are interfered by  
 (A) Guanidine (B) Uric acid (C) Oxalic acid (D) Salicylic acid
77. In the total proteins the percentage of  $\alpha$ -globulin is about  
 (A) 2.4-4.4% (B) 10.0-21.0% (C) 6.1-10.1% (D) 1.2-2.0%
78. Most frequently the normal albumin globulin ratio (A : G) is  
 (A) 1.0 : 0.8 (B) 1.5 : 1.0 (C) 2.0 : 1.0 (D) 2.4 : 1.0
79. In Thymol turbidity test the protein involved is mainly  
 (A) Albumin (B)  $\alpha_1$ -Globulin (C)  $\alpha_2$ -Globulin (D)  $\beta$  Globulin
80. In quaternary structure, subunits are linked by  
 (A) Peptide bonds (B) Disulphide bonds  
 (C) Covalent bonds (D) Non-covalent bonds
81. Daily excretion of nitrogen by an adult man is about  
 (A) 15-20 mg (B) 1.5-2 gm (C) 5-10 gm (D) 15-20 gm
82. Maple syrup urine diseases is an inborn error of metabolism of  
 (A) Sulphur-containing amino acids (B) Aromatic amino acids  
 (C) Branched chain amino acids (D) Dicarboxylic amino acids
83. Cystinuria results from inability to  
 (A) Metabolise cysteine (B) Convert cystine into cysteine  
 (C) Incorporate cysteine into proteins (D) Reabsorb cystine in renal tubules

84. The defective enzyme in histidinemia is  
(A) Histidine carboxylase (B) Histidine decarboxylase  
(C) Histidase (D) Histidine oxidase
85. All the following statements about phenylketonuria are correct except  
(A) Phenylalanine cannot be converted into tyrosine  
(B) Urinary excretion of phenylpyruvate and phenyllactate is increased  
(C) It can be controlled by giving a low-phenylalanine diet  
(D) It leads to decreased synthesis of thyroid hormones, catecholamines and melanin
86. All the following statements about albinism are correct except  
(A) Tyrosine hydroxylase (tyrosinase) is absent or deficient in melanocytes  
(B) Skin is hypopigmented  
(C) It results in mental retardation  
(D) Eyes are hypopigmented
87. SGOT level in an adult is  
(A) 5–40 units/dl (B) 1–4 units/dl  
(C) 5–15 units/dl (D) 50–100 units/dl
88. Activity of ceruloplasmin shown in vitro  
(A) Reductase (B) Hydrolase (C) Ligase (D) Oxidase
89. Increased serum alanine during fasting is due to  
(A) Breakdown of muscle proteins  
(B) Decreased utilization of non essential amino acids  
(C) Leakage of aminoacids to plasma  
(D) Impaired renal function
90. Mechanism by which  $\text{NH}_3$  is removed from the kidneys is  
(A) Urea formation (B) Uric acid formation  
(C) Creatinine formation (D) None of these
91. Low density plasma proteins are rich in  
(A) Chylomicrons (B) Cholesterol  
(C) Triglycerides (D) Phospholipids

92. Transcortins are  
(A) Mucoproteins (B) Glycoproteins  
(C) Metalloproteins (D) Lipoproteins
93. Proteins that carries Iron into different tissues is  
(A) Ceruloplasmin (B) Trans cortin  
(C) Mucoproteins (D) Glycoproteins
94. A dietary deficiency of tryptophan and nicotinate leads to  
(A) Beri Beri (B) Xerophthalmia  
(C) Anemia (D) Pellegra
95. Which one of the following is an essential amino acid?  
(A) Arginine (B) Tyrosine  
(C) Phenylalanine (D) Proline
96. One of the following amino acid is solely ketogenic  
(A) Lysine (B) Alanine  
(C) Valine (D) Glutamate
97. Along with  $\text{CO}_2$ ,  $\text{NH}_3$  and ATP, the amino acid that is needed in urea cycle is  
(A) Alanine (B) Isoleucine  
(C) Aspartate (D) Glycine
98. The example of metalloproteins  
(A) Siderophilin (B) OREES mucoid  
(C) Elastin (D) All of these
99. The example of chromoprotein  
(A) Salmine (B) Catalase  
(C) Zein (D) Gliadin
100. Deamination is \_\_\_\_\_ of amino group  
(A) Removal (B) Addition  
(C) Supplementation (D) None of these
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