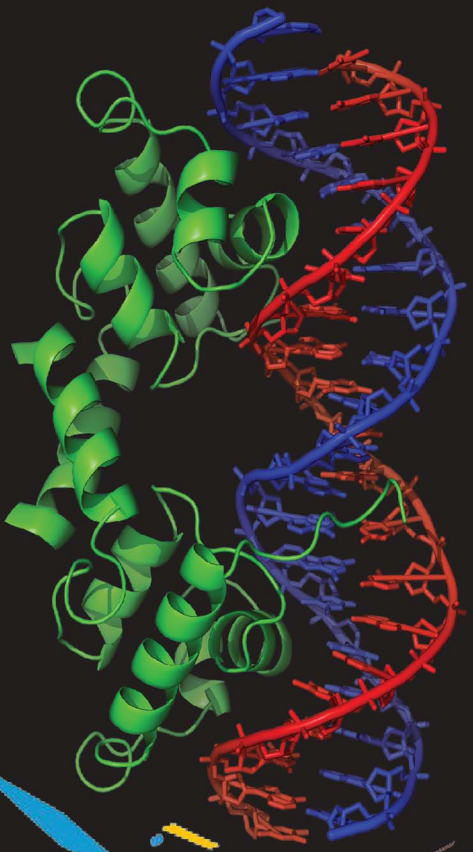
BIOCHEMISTRY
MADE EASY
A PROBLEM-BASED APPROACH



N HARIDAS

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Multiple Choice Questions and Answers

1. The action of one of the following enzymes generate GTP:

a. Succinate thiokinase
b. Phosphofructokinase
c. Bisphosphoglycerate kinase
d. Pyruvate kinase

2. The action of one of the following enzymes does not produce $NADH^+ H^+$:

a. Isocitrate dehydrogenase
b. α-ketoglutarate dehydrogenase
c. Malate dehydrogenase
d. Succinate dehydrogenase

3. One of the following is true for one turn of TCA cycle:

a. It produces two CO_2 moles
b. Produces only one CO_2 mole
c. Produces three CO_2 moles
d. Produces no CO_2 molecules

4. One of the following is not true for TCA cycle:

a. Takes place in cytoplasm
b. Amphibolic pathway
c. Related to gluconeogenesis
d. Common metabolic pathway

5. One of the following blocks glycolysis:

a. High ATP level
b. Insulin
c. Fructose 2, 6-bisphosphate
d. Low ADP & AMP level

6. One of the following is not true for glycolysis in RBC:

a. Always ends in pyruvate
b. The end product is lactate
c. 2,3-Bisphosphoglycerate is formed
d. ATP generated is less

7. One of the following is not a regulatory enzyme of glycolysis:

a. Phosphofructokinase
b. Hexokinase

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c. Pyruvate kinase
d. Phosphoglycerate kinase

8. The No. of ATP production in anaerobic glycolysis is:

a. Two
b. Four
c. Eight
d. Thirty eight

9. The No. of $NADH^+$ H^+ moles produced in glycolysis from one mole of glucose is:

a. Two
b. Four
c. One
d. None of the above

10. NADH is produced in one of the following reactions:

a. Glyceraldehyde-3-phosphate dehydrogenase
b. Pyruvate kinase
c. Hexokinase
d. Aldolase

11. One of the following statements does not pertain to HMP shunt pathway:

a. Necessary for lipogenesis
b. Necessary for steroidogenesis
c. Necessary for nucleic acid synthesis
d. Necessary glycogenesis

12. HMP shunt pathway is very active in the following tissues, *except*:

a. Adipose tissue
b. Lactating mammary gland
c. Adrenal cortex
d. Brain

13. The coenzyme used in HMP shunt pathway is:

a. NADP
b. NAD
c. FAD
d. Biotin

14. Deficiency of G6-PD leads to the following, *except*:

a. Hemolytic anemia
b. Reduced NADPH production
c. Decreased formation of reduced glutathione
d. Increased direct bilirubin level in serum

15. Von Gierk's disease leads to all the following, *except*:

a. One type of glycogen storage disease
b. Hyperuricemia

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c. Ketosis
d. Hypouricemia

16. Glycogen phosphorylase is active in:

a. Phosphorylated state
b. Dephosphorylated state
c. Glycosylated state
d. None of the above

17. Glycogen phosphorylase is activated by:

a. Phosphorylation
b. Dephosphorylation
c. Protein phosphatase-1
d. Phosphodiesterase

18. Glycogen synthase is activated by:

a. Protein phosphatase-1
b. Inhibitor-1
c. Synthase kinase
d. Phosphorylation

19. Glycogenesis requires all, *except*:

a. Branching enzyme
b. UDPG pyrophosphorylase
c. Phosphorylase kinase
d. Insulin

20. One of the following is not a gluconeogenic substrate:

a. Alanine
b. Even chin fatty acids
c. Propionate
d. Aspartate

21. Insulin does all the following, *except*:

a. Decreases gluconeogenesis
b. Decreases glycogenesis
c. Decreases glycogenolysis
d. Increase glycolysis

22. Blood glucose is increased by the following processes, *except*:

a. Increased gluconeogenesis
b. Decreased glycogenesis
c. Increased glycogenolysis
d. Increased glucose entry into cells

23. Insulin has got the following functions, *except*:

a. It is antilipolytic
b. It is lipogenic
c. It is antiketogenic
d. It favors glycogenolysis

24. One of the following is not a heteropolysaccharide:

a. Heparin
b. Chondroitin sulfate
c. Keratin
d. Dermatan sulfate

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25. One of the following is not required for thromboxane synthesis:

a. Phospholipase A2
b. Cyclooxygenase
c. Prostacyclin synthase
d. Thromboxane synthase

26. Niemann-Pick's disease is due to:

a. Accumulation of sphingomyelins
b. Lack of sphingomyelins
c. Accumulation of cerebrosides
d. Lack of cerebrosides

27. One of the following is not a lipid storage disorders:

a. Niemann-Pick's disease
b. Tay-Sachs disease
c. Wilson's disease
d. Gaucher's disease

28. Short chain and medium chain fatty acids are less in:

a. Coconut oil
b. Butter
c. Ghee
d. Red meat

29. One of the following is not a compound lipid

a. Lecithin
b. Cephalin
c. Plasmalogen
d. Ceruloplasmin

30. The buffers in RBC include the following, *except*:

a. Bicarbonate
b. Phosphate
c. Hemoglobin
d. Plasma protein

31. Plasma buffers include the following, *except*:

a. $\frac{NaHCO_3}{H_2CO_2}$
b. $\frac{Na_2HPO_4}{NaH_2PO_4}$
c. Plasma proteins
d. Citrate

32. Uncontrolled diabetes mellitus may result in:

a. Metabolic acidosis
b. Metabolic alkalosis
c. Respiratory acidosis
d. Respiratory alkalosis

33. Glutaminase action in acid base balance is important in:

a. Kidneys
b. Lungs
c. Liver
d. Heart

34. Ammonia production for regulating acid base balance takes place in:

a. Liver
b. Kidneys
c. Lungs
d. None of these

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35. One of the following is not a branched chain amino acid:

a. Valine
b. Leucine
c. Isoleucine
d. Alanine

36. One of the following is a basic amino acid:

a. Arginine
b. Leucine
c. Isoleucine
d. Valine

37. One of the following is not an essential amino acid:

a. Tyrosine
b. Phenylalanine
c. Methionine
d. Tryptophan

38. One of the following is an essential amino acid:

a. Lysine
b. Aspartic acid
c. Glutamic acid
d. Tyrosine

39. One of the following pair is said to be semi essential:

a. Aspartate and glutamate
b. Arginine and histidine
c. Phenylalanine and tyrosine
d. Leucine and isoleucine

40. Essential amino acid means:

a. Indispensable
b. Dispensable
c. More important
d. None of these

41. Glutathion is:

a. γ-Glutamyl cysteinyl glycine
b. α-Glutamyl cysteinyl glycine
c. Lysyl cysteinyl glycine
d. None of these

42. One of the chemical bonds is not seen in proteins:

a. Peptide bonds
b. Hydrogen bonds
c. Electrostatic bonds
d. Ester bonds

43. One of the following is not a first class protein:

a. Egg albumin
b. Soyabean protein
c. Caseine
d. Collagen

44. In denaturation of protein one of the following statement is not correct:

a. Can be done by heat
b. Protein loses activity
c. Loss of all the structures except primary structure
d. Loss of all the structures including primary structure

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45. All the following are true for hemoglobin, *except*:

a. It has quaternary structure
b. Exhibits "S" shaped oxygen saturation curve
c. It cannot be glycosylated
d. Each Hb molecule combines with four moles of oxygen

46. One true statement regarding myoglobin is:

a. It has tertiary structure
b. Transports oxygen
c. It is not a heme containing protein
d. It exhibits sigmoid O_2 dissociation curve

47. Sickle cell hemoglobin has got the polypeptide chains as follows:

a. 2 α and 2 S
b. 2 α and 2 γ
c. 2 β and 2 δ
d. 2 β and 2 γ

48. Sickle cell anemia is a:

a. Homozygous state
b. Heterozygous state
c. Double heterozygous
d. None of these

49. Hydrops fetalis is seen

a. When all the four alpha globin genes are defective
b. When two α globin genes are defective
c. When only one α globin gene is defective
d. When both α and β globin genes are defective

50. β-Thalassemia major occurs:

a. When both β globin genes are defective
b. When only one β globin gene is defective
c. When one α and β globin genes are defective
d. None of these

51. Glyco-Hb concentration in a diabetic patient is indicative of blood glucose level about:

a. 6 to 8 weeks before
b. 1 to 2 weeks before
c. 6 months before
d. 6 to 8 hours before

52. The half-life of plasma albumin is about:

a. 20 days
b. 40 days
c. 10 days
d. One hour

53. Plasma albumin is formed by:

a. Liver and muscle
b. Liver and lymphocytes
c. Liver alone
d. Bone marrow

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54. Complement fixation property is seen maximum with:

a. LgM
b. IgG
c. IgA
d. IgE

55. Mast cell binding and histamine release are the properties of:

a. IgA
b. IgG
c. IgM
d. TgE

56. One of the following is not true for Ig A:

a. Present in saliva
b. Present in genitourinary secretions
c. Present in respiratory tract
d. Mediates allergic response

57. The fetus gets immunity through:

a. IgG
b. IgA
c. IgM
d. IgD

58. The immunoglobin most effective against blood born bacteria is:

a. IgM
b. IgA
c. IgG
d. None of these

59. Immune system has got the properties of

a. Recognizing self from non-self
b. Specificity
c. Memory
d. All of these

60. The main components of immune system are:

a. B-lymphocytes
b. T–Lymphocytes
c. Complements
d. All of these

61. The number of complements are:

a. 5
b. 9
c. 10
d. None of these

62. In nephrotic syndrome, one of the following is correct:

a. Decrease of plasma α-2 macroglobulin
b. Albumin in plasma is increased
c. Albumin is lost in urine
d. Globulins rather than albumin is lost in urine

63. Normal plasma albumin concentration is:

a. 3 – 5.5 g%
b. 2 – 4 g%
c. 5 – 7 g%
d. 6 –8 g%

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64. One of the following does not pertain to collagen:

a. Every third amino acid is glycine
b. Hydroxy lysine and hydroxy proline are present
c. Quarter–staggered triple helix
d. Half-life is too short

65. The enzyme not required for collagen formation is:

a. Collagenase
b. Lysyl hydroxylase
c. Proly hydroxylase
d. Lysyl oxidase

66. Hemopexin binds to:

a. Free heme
b. Free iron
c. Hemoglobin
d. Calcium

67. One example of competitive inhibition is:

a. Use of allopurinol for gout
b. Lead poisoning
c. Iodo acetate poisoning
d. Fluoride inhibiting enclose

68. One of the following is not a competitive inhibition:

a. Sulfa drugs as antitiotics
b. Methotrexate as anticancer drug
c. Allopurinol
d. ATP on phosphofructokinase

69. One of the following is not a cardiac marker enzyme:

a. CKMB
b. SGOT
c. Troponin – I
d. LDH

70. Hapatoglobin binds:

a. Extracorpuscular hemoglobin
b. Plasma albumin
c. Cholesterol
d. Hemoglobin present in RBC

71. One of the following is a liver function test:

a. SGPT
b. CKMM
c. CKMB
d. Lipase

72. One of the following helps in differentiating obstructive jaundice:

a. Direct bilirubin increased
b. Urine urobilirubinogen absent
c. Alkaline phosphatase increased
d. All of the above

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73. In competitive inhibition:

a. Km is increased
b. Km is unchanged
c. V_{max} is decreased
d. V_{max} and km unchanged

74. In one of the following classes of enzyme no coenzyme is/are required:

a. Oxidoreductase
b. Transferase
c. Hydrolaze
d. Ligase

75. LDH has got _____ number of isoenzymes:

a. Three
b. Two
c. Four
d. Five

76. In heart disease, the following serum enzyme are increased:

a. LDH – 1
b. LDH – 4 and LDH – 5
c. LDH – 3 and LDH – 4
d. LDH – 5

77. One of the following attributes is not true for regulatory enzyme:

a. They are unidirectional enzymes
b. They catalyze reversible reactions
c. They have positive and negative modulators
d. Most of them are controlled by hormones

78. In obstructive jaundice, the following picture is seen:

a. Serum bilirubin – conjugated, urine urobilinogen – absent
b. Serum bilirubin – unconjugated, urine urobilinogen – excess
c. Serum bilirubin – biphasic, urine urobilinogen normal
d. Serum bilirubin – unconjugated, urine urobilinogen-absent

79. For the metabolism of bilirubin one of the given enzymes is not required:

a. UDP glucuronyl transferese
b. Bilirubin reductase
c. Beta glucuronidase
d. Ferrochelatase

80. In Crigler-Najjar syndrome type I one of the following is not true:

a. Lack of gluronyl transferase enzyme
b. Serum bilirubin unconjugated
c. Phenobarbitone and phototherapy not useful
d. Van den Berg's test – direct positive

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81. The statement incorrect for vitamin A is:

a. Retinal is for vision
b. Retinol is similar to a hormone
c. Retinoic acid is required for smooth epithelium
d. Retinoic acid can be converted to the other forms

82. The statement not correct for DNA is:

a. A = T, G =C
b. Two strands are anti-parallel
c. DNA is organized into nucleosomes
d. Present only in nucleus

83. RNA with catalytic function is:

a. t-RNA
b. Hn-RNA
c. m-RNA
d. Ribozymes

84. One of the following is not related to DNA replication:

a. DNA polymerase
b. Okazaki pieces
c. RNA primer
d. Replication direction is 3' –5'

85. PCR technique is used:

a. To get several copies of DNA
b. To get several copies of m-RNA
c. To get several copies of t-RNA
d. To amplify peptides

86. Human genome contains about:

a. 15,000 genes
b. 40,000 genes
c. 50,000 genes
d. 1 lakh genes

87. DNA replication requires:

a. Parent DNA
b. DNA polymerase
c. DNA helicase
d. All of these

88. Genome contains the following regions:

a. Unique sequences
b. Variable numbers of repeated sequences
c. Introns and exons
d. All of these

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89 Gene therapy was first done in:

a. Adenosine deaminase deficiency
b. Cystic fibrosis
c. Duchenne's muscular dystrophy
d. Huntington chorea

90. One of the following is not a post-translational modification:

a. γ-Carboxylation of glutamate in certain clotting factors
b. Conversion of tropocollagen to collagen
c. Conversion of proinsulin to insulin
d. 7 methyl GTP capping of m-RNA

91. After translation several proteins are subjected to:

a. Post-translational modifications
b. Protein folding
c. Protein targeting
d. All of these

92. One of the following diseases does not exhibit abnormal oxidation of fatty acids:

a. Refsum's disease
b. Zellweger's disease
c. Ketosis due to diabetes mellitus
d. Niemann-Pick disease

93. One of the following is due to defective protein targeting:

a. Zellweger's disease
b. Alzheimer's disease
c. Prion disease
d. Porphyrias

94. Prion disease may involve:

a. Conversion α helix to β-pleated sheet
b. Protein targeting is defective
c. Viral infection
d. None of these

95. One of the following is not related to either fatty acid oxidation or fatty synthesis:

a. Thiolase
b. Thioesterase
c. ACP
d. Aldolase

96. Oxidation of glucose in RBC produces:

a. 2 ATP
b. 8 ATP
c. 38 ATP
d. No ATP

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97. One of the following does not produce any ATP:

a. Glycolysis
b. TCA cycle
c. Beta oxidation of fatty acids
d. Alpha oxidation of fatty acids

98. One of the following enzymes bring about substrate level phosphorylation:

a. Glucokinase
b. Succinate thiokinase
c. Phosphofructokinase
d. Pyruvate dehydrogenase

99. One of the following is not an example of substrate level phosphorylation:

a. Phosphoglycerate kinase
b. Succinate thiokinase
c. Pyruvate kinase
d. Phosphorylase kinase

100. One of the following is not an anabolic process:

a. Glycogenesis
b. Lipogenesis
c. Purine synthesis
d. Uric acid formation

101. One of the following is not an enzyme of cholesterol metabolism:

a. Acetoacetly CoA synthase
b. HMG CoA synthase
c. HMG CoA reductase
d. HMG CoA lyase

102. One of the following is not synthesized from cholesterol:

a. Vitamin – D
b. Vitamin-A
c. Bile salts
d. Estrogen

103. One of the following lipoproteins is found to be more in Indians:

a. LDL
b. HDL
c. Lipoprotein (a)
d. VLDL

104. One of the following is positively correlated to atherosclerosis:

a. HDL
b. Lipoprotein (a)
c. Apoprotein A
d. Chylomicrons

105. One of the following prevents atherosclerosis:

a. HDL
b. LDL
c. VLDL
d. IDL

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403. SCID is the result of

a. Defective dystrophin protein
b. Adenosine deaminase deficiency
c. Defective purine nucleoside phosphorylase
d. None of these

404. Non-polyposis clon cancer is due to:

a. Defective nucleotide excision repair
b. Defective mismatch repair
c. Defective thymine dimer repair
d. None of the above

405. One of the following is not due to defective DNA repair mechanism:

a. Xeroderma pigmentosum
b. Ataxia, telangiectasia
c. Fancony's anemia
d. Zellweger disease

406. The Indianowin nobel prize in 2009:

a. Venkatraman
b. Khorana
c. Ramachandran
d. Subba Rao

407. Cystatin C can be used as a marker of:

a. Kidney dysfunction
b. Hepatic damage
c. Cardiac ailment
d. Brain dysfunction

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The book is written in a very lucid style and shall help the first MBBS students in their preparation for examinations. As the material is depicted in a question-answer format, the students shall find it easier to assimilate the contents. The chapters on *Statements and Comments, Case-based Questions and Answers* prepare the students to appreciate the relevance Biochemistry in Medical profession. The book caters to the *must-know* and *nice-to-know* areas.



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