SOLVED QUESTION PAPER OF AUCET 2008

Test No 101
Biochemistry

Time: 75 min Maximum: 90marks

PART A – 40 marks

1. The major pathway for calcium excretion under normal condition is

a. Feaces
b. Sweat
c. Urine
d. Milk

Ans: c

Explanation: Kidneys play a vital role in calcium homeostasis. Normal blood calcium levels are maintained by reabsorption from tubular system. Calcium gets excreted through urine when tubular reabsorption of calcium decreases.

2. The biological value of protein depends upon

a. The digestibility alone
b. Digestibility and essential amino acid composition
c. Amino acid composition alone
d. Digestibility and leucine content

Ans: b

Explanation: Biological value (BV) is a measure of the food nitrogen in protein that the body retains. The more nitrogen from ingested protein that is actually retained in the body, the better the quality of the protein is assumed to be.

3. Tetany due to hypocalcemia results from the removal of

a. Prathyroids
b. Thyroids
c. Pituitary
d. Adrenals

Ans: a

Explanation: Low levels of calcium in the blood due to deficiency of parathyroid hormone secretion is known as hypocalcemic tetany. Characteristic symptoms are hyperexcitability of the neuromuscular system resulting into carpopedal spasms.

4. The administration of which food stuff results in the greatest specific dynamic action

a. Fat
b. Carbohydrate
c. Protein
d. Vitamins

Ans: c

Explanation: Specific dynamic action (SDA) is one of the components of metabolism. It is the amount of energy spent above resting metabolic rate, during processing of food for usage and storage. The processing of proteins is comparatively hard hence proteins lead to greatest SDA.

5. Ferritin is found in

a. Liver
b. Kidney
c. Pancreas
d. Bone

Ans: a

Explanation: Ferritin is iron binding protein and represents iron stored in the body. Ferritin is found in the liver, spleen, skeletal muscles, bone marrow and at low level in the blood.

6. The hyperglycemic factor produced by the pancreas is

a. Insulin
b. Glucagon
c. FSH
d. ACTH

Ans: b

Explanation: Glucagon produced by alpha cells in the islets of Langerhans, of pancreas raises the blood glucose level. Hence this hormone is also known as hyperglycemic-glycogenolytic factor (HGF).

7. The prostaglandins

a. Cause hypertension
b. Occur only in prostatic tissue
c. Are alicyclic fatty acid derivatives
d. Are synthesized from oleic acid

Ans: a

8. How many different codons in protein are capable of terminating polypeptide chain elongation in protein synthesis?

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

Ans: c

Explanation: UAA, UAG, and UGA.

9. Translation results in a product known as

a. Protein
b. t-RNA
c. m-RNA
d. DNA

Ans: a

10. A potent inhibitor of protein synthesis that acts as an analogue of amino acyl-t-RNA is

a. Mitomycin-C
b. Streptomycin
c. Rifamicin
d. Pyromycin

Ans: d

Explanation: The mode of action of Puromycin, is premature termination of peptide chain. The part of Puromycin which is analogous to aminoacyl end of tRNA can bind to the A site of a ribosome. As a result a peptide bond is formed but the end product does not allow the translocation to P site, hence terminating the process of protein synthesis.

11. The mature erythrocyte contains

a. Cytochromes
b. TCA enzymes
c. Pyruvic kinase
d. ATPase

Ans: d

12. Hemoglobin is responsible for what percentage of carbon dioxide transport by the blood?

a. 90
b. 50
c. 10
d. 5

Ans: c

Explanation: About 10% of respiratory carbon dioxide is bound to globin part of hemoglobin and transported in the form of carbaminohemoglobin.

13. Christmas factor is synonymous with

a. Proconvertin
b. Anti hemophilic factor B
c. Platelet accelerator
d. Factor XI

Ans: b

14. Blood plasma differ from blood serum in content of

a. Lipid
b. Erythrocytes
c. Protein
d. Carbohydrate

Ans: c

15. The naturally occurring porphyrins are

a. Usually associated with a metal
b. Usually associated with an uncharged metal ion
c. Only found in animal

d. Usually chains of pyrrole rings

Ans: a

Explanation: Examples of magnesium porphyrin and iron porphyrin are chlorophyll and hemoglobin respectively

16. Among the anticoagulants normally present in an animal is

a. Dicumarol
b. Heparin
c. Vitamin K
d. Lipoprotein Lipase

Ans: b

17. What is not a part of a hemoglobin molecule?

a. Histidine
b. Protein
c. Ferric ion
d. Vinyl groups

Ans: d

18. The normal pH of blood is

a. 7.4
b. 6.8
c. 7.7
d. 7.1 or 7.3 is confusing

Ans: a

19. Oxidation of which substance yields the most calories for gram

a. Glucose
b. Lipid
c. Animal protein
d. Glycogen

Ans: b

Explanation: Fatty acids are the stored energy reserves of the body and upon oxidation of one gram it yields 9 Kcal of energy.

20. A negative nitrogen balance is observed

a. During normal pregnancy
b. During normal child growth
c. During convalescence
d. In malnutrition

Ans: d

21. One of the following is not estimated by RIA

a. T3
b. T4
c. Insulin
d. ^{2}H- testosterone

Ans: d

22. The microorganism that can cause jaundice is

a. Streptococcus faecalis
b. Escherichia coli
c. Salmonella typhimurium
d. Plasmodium sp

Ans: b

23. Zinc is a constituent of the enzyme

a. Lactate dehydrogenase
b. Carbonic anhydrase
c. Glutamate dehydrogenase
d. Transketolase

Ans: b

24. Immature B lymphocytes

a. Produce only μ chains
b. Are progenitors of T as well as B lymphocytes
c. Express IgM on their cell surface
d. Must go through thymus to mature

Ans: c

25. Antigen is initially presented to T-lymphocytes by

a. Macrophages
b. Neutrophils
c. Plasma cells
d. Platelets

Ans: a

26. The codon for phenylalanine is

a. AAA
b. CCC
c. GGG
d. UUU

Ans: d

27. Restriction enzymes have been found in

a. Humans
b. Birds
c. Bacteria
d. Bacteriophages

Ans: c

28. Sigma and Rho factors are required for

a. Replication
b. Transcription
c. Translation
d. Polymerization

Ans: b

29. Okazaki fragments are small bits of

a. RNA
b. DNA
c. DNA with RNA heads
d. RNA with DNA heads

Ans: c

30. DNA directed RNA polymerase is

a. Replicase
b. Transcriptase
c. Reverse transcriptase
d. Polymerase III

Ans: d

31. Nucleotides are linked to one another in nucleic acids by which of the following?

a. Phosphodiester Bond
b. Phosphate ester bond
c. Glycosidic bond
d. Hydrophobic bond

Ans: a

32. One of the following is a stable isotope

a. ^{15}N
b. ^{14}C
c. ^{32}P
d. ^{131}I

Ans: a

33. One of the following is a radioactive isotope

a. ^{2}H
b. ^{15}N
c. ^{13}C
d. ^{3}H

Ans: d

34. In ELISA the enzyme label for antibody may be

a. Glucose oxidase
b. Amylase
c. Lipase
d. Succinic dehydrogenase

Ans: a

35. The half life of ^{14}C isotope is

a. 51 years
b. 5100 years
c. 510 years
d. 5100 days

Ans: b

36. GM- counter is used to measure

a. Gamma radiations
b. Protons
c. Beta-radiation
d. Alpha radiation

Ans.a

37. Kwashiorker results from

a. Vitamin A deficiency
b. Vitamin D deficiency
c. Minerals deficiency in diet
d. Protein and calorie deficiency in diet

Ans: d

38. Soyabean proteins are rich in

a. Lysine
b. Alanine
c. Glycine
d. Proline

Ans: a

Explanation: Soy protein is rich in sulphur containing amino acids like lysine.

39. Inactive plasminogen is activated by

a. Fibrinogen
b. Fibrin
c. Thrombin
d. Calcium ions

Ans: b

Explanation: Fibrin is a cofactor for plasminogen activation by tissue plasminogen activator.

40. The following enzyme is bound to the cell membrane

a. Sodium-potassium ATPase
b. Lipase
c. Pepsin
d. Hexokinase

Ans: a

Explanation: This enzyme is located in the plasma membranes of all animal cells.

41. A vitamin that acts as a reducing agent

a. Nicotinic acid
b. Riboflavin
c. Ascorbic acid
d. Folic acid

Ans: c

Explanation: Due to its action as a reducing agent Ascorbic acid or vitamin C can donate electrons to various enzymatic and a few non-enzymatic reactions.

42. Vitamin B_{12} is a

a. Porphyrin like compound
b. Fat soluble vitamin
c. Vitamin synthesized by all animals except man
d. Copper containing B vitamin

Ans: a

Explanation: Structurally Vitamin B_{12} is similar to compounds containing porphyrin rings like cytochrome, heme.

43. The growth of bacteria requiring P-amino benzoic acid is inhibited by

a. Folic acid
b. Tetrahydrofolic acid
c. Citrogorum factor
d. Sulfonamides

Ans: d

Explanation: The structure of Sulfonamides mimics P-amino benzoic acid hence they inhibit the conversion of para-aminobenzoic acid (PABA) to folic acid competitively.

44. Whole wheat is an excellent source of

a. Thiamine
b. Vitamin A
c. Ascorbic acid
d. Vitamin D

Ans: a

45. In man the principal catabolic product of purines is

a. Allantoin
b. Urea
c. Uric acid
d. Ammonia

Ans: c

46. A key substance in pyrimidine biosynthesis is

a. ATP
b. Carbamoyl phosphate
c. Thiouracil
d. $NADP^+$

Ans: b

47. In competitive inhibition

a. The Km is unchanged
b. The Km is decreased
c. Vmax is decreased
d. Vmax is unchanged

Ans: d

48. Km is

a. The substrate concentration which gives half the maximal velocity
b. The dissociation constant for the ES complex

c. Equal to the half substrate concentration required to achieve maximal velocity
d. Identical for all isoenzymes of an enzyme

Ans: a

49. An enzyme of saliva that hydrolyzes starch is

a. Pepsin
b. β- Amylase
c. α –Amylase
d. Maltase

Ans: c

Explanation: This form of amylase present in saliva breaks starch into maltose and dextrin.

50. Which one of the following is an essential cofactor in carboxylation reactions?

a. Coenzyme A
b. CTP
c. Lipoic acid
d. Biotin

Ans: d

51. A specific poison for succinic dehydrogenase is

a. Malonate
b. Arsenite
c. Cyanide
d. Malate

Ans: a

Explanation: Malonate acts as a competitive inhibitor to the enzyme succinic dehydrogenase and competes with the original substrate that is sucinate.

52. The coenzyme for transketolase is

a. Coenzyme A
b. NAD^+
c. FMN
d. TPP

Ans: d

53. Which one of the following is not a component of Coenzyme A?

a. Adenylic acid
b. Acetic acid
c. Pantothenic acid
d. Cysteamine

Ans: b

54. Dehydrogenases use as coenzymes all of the following, except

a. NAD^+
b. FAD
c. FMN^+
d. Ferriprotoporphyrin

Ans: d

55. Urea is produced by the enzyme

a. Urease
b. Glutaminase
c. Arginase
d. Uricase

Ans: c

56. The specific substrate for oxidative phosphorylation is

a. AMP
b. ADP
c. ATP
d. NADP+

Ans: b

57. An enzyme not involved in glycolysis is

a. Aldolase
b. Alpha-glycerophosphate dehydrogenase
c. Enolase
d. Pyruvate kinase

Ans: b

58. Dehydrogenases of the hexone monophosphate shunt are specific for

a. NAD^+
b. FAD
c. NADP+
d. FMN

Ans: c

Explanation: These dehydrogenases participate in the synthesis of NADPH from $NADP^+$.

59. When one molecule of glucose is completely oxidized *in vivo*, how many ATP molecules are formed?

a. 2
b. 12
c. 24
d. 36

Ans: d

60. Which amino acid undergoes transamination to form α-ketoisocaproic acid?

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

Ans: a

61. For the conversion of dUMP to TMP which one of the following is required?

a. Tetrahydrofolic acid
b. ATP
c. FMN
d. Pyridoxal phosphate

Ans: a

Explanation: dUMP is converted to dTMP (also known as TMP) by thymidylate synthase. This enzyme requires methylene-tetrahydrofolate as the methyl donor (dihydrofolate is one of the reaction products). Dihydrofolate reductase (DHFR) regenerates tetrahydrofolate from dihydrofolate.

62. Kinases require

a. Mg++
b. Mn++
c. Inorganic phosphate
d. EDTA

Ans: c

63. A fatty acid not synthesized in man is

a. Oleic acid
b. Linoleic acid
c. Stearic acid
d. Palmitic acid

Ans: b

Explanation: Essential fatty acids like linolenic, linoleic, acids cannot be synthesized by human beings and they have to be obtained through dietary sources.

64. The major site of acetoacetate formation from fatty acids is the

a. Liver
b. Kidney
c. Lungs
d. Muscle

Ans: a

Explanation: Acetoacetate is produced from fatty acids in liver. It is mainly produced during poor metabolic conditions like diabetes mellitus or when people are subjected to prolonged starvation.

65. An amino acid not involved in urea synthesis is

a. Arginine
b. Histidine
c. Citrulline
d. Ornithine

Ans: b

66. Which of the following is an essential amino acid in man?

a. Proline
b. Serine
c. Methionine
d. Tyrosine

Ans: c

67. Which amino acid possesses two asymmetric carbon atoms?

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

Ans: d

Explanation: Isoleucine has two asymmetric carbon atoms (two chiral centers). As a result it exists in four potential isomers.

68. An animal is in the positive nitrogen balance when

a. Nitrogen intake exceeds output
b. Nitrogen output exceeds intake
c. Urine is Nitrogen free
d. Urine contains nitrogen

Ans: a

69. The biological activity of the tocopherols has been attributed to their action as

a. Antioxidants
b. Carriers in the electron transport chains
c. Anticoagulants
d. Precursors of vitamin A

Ans: a

70. Vitamin K plays an essential role in

a. Preventing thrombosis
b. The biosynthesis of prothrombin and proconvertin
c. Maintaining retinal integrity
d. Preventing bile stasis

Ans: b

71. Insulin is a

a. Fructosan
b. Glucosan
c. Xylan
d. Hormone

Ans: d

72. Choline is

a. Amino acid
b. Fatty acid
c. Quaternary base
d. Sugar

Ans: c

Explanation: Choline is a quaternary saturated amine with the chemical formula (CH3)3N+CH2CH2OHX−.

73. Collagen is very rich in

a. Glycine
b. Serine
c. Aspartic acid
d. Glutamic acid

Ans: a

74. Which one of the following is not used in gel electrophoresis?

a. Agar
b. Starch
c. Polyacrylamide
d. Alumina

Ans: d

75. The common stain for proteins in electrophoresis is

a. Bromophenol blue
b. Oil red O
c. Congo red

d. Ninhydrin

Ans: a

76. TLC is very useful to determine

a. Iodine number
b. Acetyl Number
c. Saponification value
d. Fatty acid composition

Ans: d

77. In molecular exclusion chromatography the following one will come as a first fraction

a. Protein
b. Amino acid
c. Sodium chloride
d. Sugar

Ans: a

Explanation: As proteins are larger than the pore size they can not enter the pores and elute together as the first peak in the chromatogram.

78. The high acidity of cation exchange is due to

a. --- COOH
b. --- SO_3H
c. Phenolic group
d. Enolic group

Ans: b

79. For separation of proteins and nucleic acids the following ion exchange resin is preferred

a. Alumina
b. Dowex
c. DEAE- cellulose
d. Amberlite

Ans: c

Explanation: Diethyl amino ethyl cellulose (DHEA cellulose) is a resinof hydrophilic nature-modified cellulose. It can be used to separate proteins and nucleic acids.

80. The instrument commonly used to estimate electrolytes is

a. Spectrophotometer
b. Colorimeter
c. Polarimeter
d. Flame photometer

Ans: d

Explanation: Flame photometer is used to measure the electrolytes in serum or plasma.

81. Keratin is a

a. Fibrous protein
b. Globulin
c. Histone
d. Conjugated protein

Ans: a

82. Histones

a. Are proteins rich in lysine and arginine
b. Are bound covalently to DNA
c. Are identical to protamines
d. Have relatively very high molecular weights

Ans: a

83. Which one of the following polysaccharides is not a polymer of glucose?

a. Amylose
b. Amylopectin
c. Glycogen
d. Inulin

Ans: d

84. Reduction of glucone with calcium in water produces

a. Sorbitol
b. Dulcitol
c. Mannitol
d. Sorbose

Ans: a

Explanation: Sorbitol, alternatively known as glucitol, is a sugar alcohol.

85. Cytochromes are

a. Riboflavin containing nucleotides
b. Pyridine nucleotides
c. Iron-porphyrin proteins
d. Metal containing flavoproteins

Ans: c

86. Chemically heparin is a

a. Purine
b. Protein
c. Lipid
d. Carbohydrate
e.

Ans: d

87. The beer-Lamberts law relates absorption with

a. Concentration of solute and path length of the solution cell
b. Concentration of solute and height of the solution cell
c. Length and heights of solution column
d. Intensities of incident and transmitted lights

Ans: d

88. Sphingosine is

a. Unsaturated fatty acid
b. Saturated fatty acid
c. Sterol
d. Complex amino alcohol

Ans: d

89. Liebermann – Burchard reaction is to detect

a. Glycerol
b. Oleic acid
c. Cholesterol
d. Cerebroside

Ans: c

90. Iodine value of oil shows the extent of

a. Polymerization
b. Unsaturation
c. Molecular size
d. Esterification

Ans: b