



(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2022/2023

ACADEMIC YEAR

FIRST YEAR FIRST TRIMESTER

MAIN EXAMINATION

**FOR BACHELOR OF SCIENCE IN NURSING
DEGREE**

COURSE CODE: NUR 112

COURSE TITLE: MEDICAL BIOCHEMISTRY I

DATE: 14/12/2022

TIME: 9.00 – 12.00PM

INSTRUCTIONS TO CANDIDATES

Answer ALL Section one (1) MULTIPLE CHOICE QUESTIONS and ALL Section two (2) SHORT ANSWER QUESTIONS and any one (1) section THREE (3) LONG ANSWER QUESTION.

TIME: 3 Hours

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SECTION A: MULTIPLE CHOICE QUESTIONS
INSTRUCTION: Answer ALL questions

50 Marks

1. Functions of nucleotides includes
 - a) Information storage and transmission
 - b) Storage of chemical energy
 - c) Cell signaling
 - d) All of the above
2. Uridine present in RNA is
 - a) Nucleotide
 - b) Pyrimidine
 - c) Purine
 - d) Nucleoside
3. A DNA segment contains 100 Adenine and 100 Cytosine, how many nucleotides are present in the segment?
 - a) 100
 - b) 200
 - c) 400
 - d) 50
4. If 30 percent of the bases in a DNA molecule are Adenine, what percentage of the bases are Guanine
 - a) 20 percent
 - b) 30 percent
 - c) 60 percent
 - d) 50 percent
5. Number of milligrams of KOH required to neutralize fatty acids present in 1gram of fat is called
 - a) Potassium number
 - b) Acid number
 - c) Saponification number
 - d) Iodine number
6. Rancidity of lipids of rich-food stuff is because of
 - a) Reduction of fatty acids
 - b) Hydrogenation of unsaturated fatty acids
 - c) Dehydrogenation of saturated fatty acids
 - d) Oxidation of fatty acids
7. This is an example of derived lipid
 - a) Terpenes
 - b) Steroids

- c) Carotenoids
 - d) All of the above
8. Sigmoidal plot of substrate concentration [S] verses reaction velocity V may indicate
- a) Michaelis-Menten kinetics
 - b) Cooperative binding
 - c) Competitive inhibition
 - d) Non-competitive inhibition
9. In lactose the linkage is
- a) α 1-4 linkage
 - b) β 1-4 linkage
 - c) β 1-2 linkage
 - d) α 1-2 linkage
10. Carbohydrates accounts for
- a) 30 percent in plants, 20 percent in animals
 - b) 30 percent in plants, 10 percent in animals
 - c) 30 percent in plants, 1 percent in animals
 - d) 50 percent in plants, 50 percent in animals
11. Left-handed DNA
- a) A-DNA
 - b) B-DNA
 - c) Z-DNA
 - d) C-DNA
12. Which of the following is not polymeric?
- a) Carbohydrates
 - b) Nucleic acids
 - c) Proteins
 - d) Lipids
13. The first amino acid of any polypeptide chain in eukaryotes is
- a) Valine
 - b) Methionine
 - c) Alanine
 - d) Glycine
14. The concentration of the following is higher in intracellular fluid than in extracellular fluid
- a) Sodium
 - b) Potassium
 - c) Chloride
 - d) Bicarbonate

15. Which of the following amino acid is the odd one out?
- Pyrrolysine
 - Selenocysteine
 - Threonine
 - Citrulline
16. A pentapeptide chain has
- 5 amino acid residues and 4 peptide bonds
 - 5 amino acid residues and 3 peptide bonds
 - 4 amino acid residues and 4 peptide bonds
 - 5 amino acid residues and 5 peptide bonds
17. ----- is not a classified form of conjugated protein
- Lipoprotein
 - Glycoprotein
 - Metalloproteins
 - Complete proteins
- 18 . A holoenzyme is
- Functional unit
 - Apo-enzyme
 - Co-enzyme
 - All of the above
19. Chitin consists of
- N-Acetylmuramic acid
 - N-acetylglucosamine
 - D-galactose
 - D- mannose
20. Which of these relationships is correct within the genome of every organism
- $A=G$ and $C=T$
 - $A+T$ and $C=G$
 - $A+G$ and $C+T$
 - $A=C$ and $G=T$
21. Which of the following amino acid is known as a half cystine?
- Methionine
 - Cysteine
 - Leucine
 - Tryptophan
22. Glucose and Galactose are technically known as
- Enantiomers
 - Anomers

- c) Pyranoses
 - d) Epimers
23. Which of these amino acids can form H-bonds with its side (R) group?
- a) Aspartate
 - b) Glutamine
 - c) Asparagine
 - d) All of the above
24. If enzyme inhibitor occupies a space where normally a substrate binds, the process is called
- a) Competitive inhibition
 - b) Non-competitive inhibition
 - c) Active site
 - d) Binding site
25. Coenzymes are mostly derivatives of
- a) Enzymes
 - b) Vitamins
 - c) Proteins
 - d) Lipids
26. Which of the following mineral deficiency may result into impaired growth and development, skin lesions and loss of appetite?
- a) Zinc
 - b) Cobalt
 - c) Iron
 - d) Magnesium
27. The cells dependent solely on glucose as an energy source are
- a) Liver cells
 - b) Red blood cells
 - c) Kidney cells
 - d) Muscle cells
28. Which of the following is not a function of iron?
- a) Oxygen transport
 - b) Immune function
 - c) Brain function
 - d) Gene regulation
29. Arachidonate has 20 carbon atoms with
- a) 2 double bonds
 - b) 3 double bonds
 - c) 4 double bonds
 - d) 8 double bonds
30. What transports copper from the intestinal cells to the liver?
- a) Ceruloplasmin
 - b) Albumin
 - c) Secretin
 - d) Ferritin
31. Which pyrimidine base contains an amino group at carbon 4?
- a) Cytosine

- b) Thymine
 - c) Uracil
 - d) Xanthine
32. The molecular formula for glycine is $C_2H_5O_2N$. What would be the molecular formula for a linear oligomer made by linking ten glycine molecules together by condensation synthesis?
- a) $C_{20}H_{50}O_{20}N_{10}$
 - b) $C_{20}H_{32}O_{11}N_{10}$
 - c) $C_{20}H_{40}O_{10}N_{10}$
 - d) $C_{20}H_{68}O_{29}N_{10}$
33. Nucleoside is a pyrimidine or purine base
- a) covalently bonded to a sugar
 - b) ionically bonded to a sugar
 - c) hydrogen bonded to a sugar
 - d) none of the above
34. Cellulose fibers resemble with the protein structure in the form of
- a) β -sheets
 - b) α -helices
 - c) β -turns
 - d) None of these
35. A purine with an amine (NH_2) group on the 6th carbon is
- a) Adenine
 - b) Cytosine
 - c) Thymine
 - d) Guanine
36. Which of the following amino acids is the odd one out?
- a) Selenocysteine
 - b) Methionine
 - c) Valine
 - d) Ornithine
37. The following substances are cell inclusions except
- a) Melanin
 - b) Glycogen
 - c) Lipids
 - d) Centrosome
38. Osazones are not formed with
- a) Glucose
 - b) Fructose
 - c) Sucrose
 - d) Lactose
39. A lipid containing alcoholic amine residue is
- a) Phosphatidic acid
 - b) Ganglioside
 - c) Glucocerebroside
 - d) Sphingomyelin
40. The most potent Vitamin D metabolite is
- a) 25-Hydroxycholecalciferol

- b) 1, 25-Dihydroxycholecalciferol
 - c) 24, 25-Dihydroxycholecalciferol
 - d) 7-Dehydrocholesterol
41. The most abundant bio-molecule on earth
- a) Nucleic Acids
 - b) Proteins
 - c) Lipids
 - d) Carbohydrates
42. The major functions carbohydrates include
- a) Structural framework
 - b) Storage
 - c) Both A and B
 - d) None of the above
43. Structural polysaccharides include
- a) Cellulose, hemillulose and chitin
 - b) Cellulose, starch and chitin
 - c) Cellulose, starch and glycogen
 - d) Cellulose, glycogen and chitin
44. Which of the following is a reducing sugar
- a) Glucose
 - b) Dihydroxyacetone
 - c) Erythulose
 - d) None of these
45. Oligosaccharides linked to proteins are called
- a) Glycoproteins
 - b) Glycolipids
 - c) Galactosides
 - d) Ganglioside
46. Sucrose is a:
- a) Monosaccharides
 - b) Disaccharides
 - c) Polysaccharide
 - d) Triose
47. Which of the following bonds are broken during DNA replication?
- a) Hydrogen bonds between bases
 - b) Phosphodiester bonds
 - c) Covalent bonds between bases
 - d) Ionic bonds between bases and phosphate groups
48. How many base pairs are there in one full turn of the DNA double helix?
- a) 4
 - b) 10
 - c) 16

d) 64

49. Which technique was used to determine the double-helical structure of DNA?

- a) Electrophoresis
- b) Chromatography
- c) Centrifugation
- d) X-ray crystallography

50. Analysis of a molecule of DNA found it to contain 200 adenine bases, 20% of the total number of bases in the strand. How many phosphate groups did it contain?

- a) 200
- b) 400
- c) 800
- d) 1000

SECTION B: ANSWER ALL QUESTIONS (30 MARKS)

1. Explain the biological roles of Calcium (5mks)
2. State the functions of lipids in the human body (5mks)
3. Differentiate between Competitive and non-competitive inhibitor (5mks)
4. Using Glucose, describe the various isomers of Monosaccharides (5mks)
5. Classify proteins on the basis of their conformation (5mks)
6. Describe the induced fit model (5mks)

SECTION C: LONG ANSWER QUESTIONS (LAQS)

20 Marks

INSTRUCTION: Answer any ONE question

Q1. Discuss the α -helix structure of Proteins (20mks)

Q2. Discuss the functions of

- i) Carbohydrates (5mks)
- ii) Proteins (5mks)
- iii) Nucleic acids (5mks)
- iv) Vitamins and minerals (5mks)