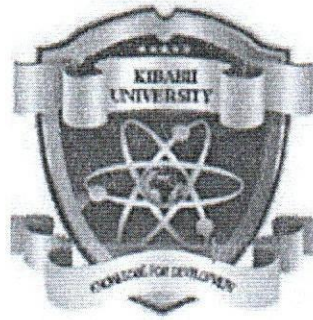


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(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2021/2022

ACADEMIC YEAR

FIRST YEAR FIRST TRIMESTER

MAIN EXAMINATION

**FOR BACHELOR OF SCIENCE IN NURSING
DEGREE**

COURSE CODE: NUR 112

COURSE TITLE: MEDICAL BIOCHEMISTRY 1

DATE: 26/01/2022

TIME: 09:00AM

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

This paper consists of 8 printed pages. Please Turn Over
KIBU observes ZERO tolerance to examination cheating



SECTION A: MULTIPLE CHOICE QUESTIONS

50 Marks

INSTRUCTION: Answer ALL questions

- Which of the following is true with regard to solubility of amino acids
 - Mostly soluble in water and insoluble in organic solvents
 - They are only water soluble
 - They are only soluble in organic solvents
 - Mostly soluble in organic solvents and insoluble in water
- From which of the following are amino acids generally synthesized?
 - Fatty acids
 - α -ketoglutaric acid
 - Mineral Salts
 - Volatile acids
- The following Amino acids have aromatic side chains
 - tryptophan, asparagine, tyrosine
 - tryptophan, threonine, tyrosine
 - phenylalanine, tryptophan, serine
 - phenylalanine, tryptophan, tyrosine
- One of the following is a true statement
 - Tryptophan and tyrosine are significantly more polar than phenylalanine
 - Leucine is commonly used as an ingredient in the buffers of SDS page
 - Aspartate is an essential amino acid
 - Lysine is a non-essential amino acid
- One of the following is an essential amino acid
 - Cysteine
 - Asparagine
 - Glutamine
 - Phenylalanine
- Which of the following is an example of imino acid?
 - Alanine
 - Glycine
 - Proline
 - Serine
- Which of the following is true of an amino acid that yields acetoacetyl CoA during the catabolism of its carbon skeleton?
 - It's glucogenic in nature
 - It's ketogenic in nature
 - It's an essential amino acid
 - It can be either glucogenic or ketogenic in nature
- One of the following is the first amino acid in a polypeptide chain?
 - Serine
 - Valine
 - Alanine
 - Methionine
- Which of the following are positively charged basic amino acids?
 - Lysine and arginine
 - Lysine and asparagine

- C. Glutamine and arginine
 - D. Lysine and glutamine
10. The 21st amino acid is
- A. Hydroxy lysine
 - B. Hydroxyproline
 - C. Selenocysteine
 - D. Citrulline
11. During the formation of a peptide bond, which of the following takes place?
- A. Hydroxyl group is lost from its carboxyl group of one amino acid and a hydrogen atom is lost from its amino group of another amino acid
 - B. Hydrogen atom is lost from its carboxyl group of one amino acid and a hydroxyl group is lost from its amino group of another amino acid
 - C. Hydroxyl group is lost from its carboxyl group of one amino acid and a hydroxyl group is lost from its amino group of another amino acid
 - D. Hydrogen atom is lost from its carboxyl group of one amino acid and a hydrogen atom is lost from its amino group of another amino acid
12. A tripeptide has _____
- A. 3 amino acids and 1 peptide bond
 - B. 3 amino acids and 2 peptide bonds
 - C. 3 amino acids and 3 peptide bonds
 - D. 3 amino acids and 4 peptide bonds
13. Which of the following is not a classified form of conjugated proteins?
- A. Lipoproteins
 - B. Glycoproteins
 - C. Metalloproteins
 - D. Complete proteins
14. Which of the following event is responsible to specify the three-dimensional shape of a protein?
- A. The protein's peptide bond
 - B. The protein's amino acid sequence
 - C. The protein's interaction with other polypeptides
 - D. The protein's interaction with molecular chaperons
15. One of the following is not a factor responsible for the denaturation of proteins
- A. pH change
 - B. Organic solvents
 - C. Heat
 - D. Charge
16. A Coenzyme is:
- A. Often a metal
 - B. Always a protein
 - C. Often a vitamin
 - D. Always an inorganic compound
17. Which of the Following is Produced between a Combination of Apoenzyme and Coenzyme:
- A. Holoenzyme
 - B. Enzyme substrate complex
 - C. Prosthetic group

- D. Enzyme product complex
18. Blocking of Enzyme Action by Blocking its Active Site is Called as:
- A. Allosteric inhibition
 - B. Feedback inhibition
 - C. Competitive inhibition
 - D. Non-competitive inhibition
19. An Enzyme Catalysing Rearrangement of Atomic Grouping without Altering Molecular Weight or Number of Atom is referred to as:
- A. Ligase
 - B. Isomerase
 - C. Oxidoreductase
 - D. Hydrolase
20. Enzyme Complex Involved in Alcoholic Fermentation is:
- A. Zymase
 - B. Invertase
 - C. Lipase
 - D. Amylase
21. Enzymes are Basically Made Up of:
- A. Fats
 - B. Proteins
 - C. Nucleic acids
 - D. Vitamins
22. Enzymes are Polymers of:
- A. Hexose sugar
 - B. Amino acids
 - C. Fatty acids
 - D. Inorganic phosphate
23. Which Among the Following is the Nature of Enzyme:
- A. Lipid
 - B. Vitamin
 - C. Carbohydrate
 - D. Protein
24. One of the following Statements about Enzymes is True:
- A. Enzymes accelerate reactions by lowering activation energy
 - B. Enzymes are proteins whose three-dimensional form is key to their function
 - C. Enzymes do not alter the overall change in free energy for a reaction
 - D. All of these
25. Koshland Proposed Which enzyme Model:
- A. Fluid mosaic model
 - B. Induced fit model
 - C. Lock and key model
 - D. Reflective index model
26. In Human Body Optimum Temperature for Enzymatic Activities is about :
- A. 37 degree celsius
 - B. 25 degree celsius
 - C. 20 degree celsius

- D. 15 degree celsius
27. The Enzyme Minus its Coenzyme Known as:
- A. Apoenzyme
 - B. Metalloenzyme
 - C. Isoenzyme
 - D. All of these
28. One of the following is not an Attribute of Enzymes:
- A. Specific in nature
 - B. Protein in chemistry
 - C. Consumed in reaction
 - D. Increased rate of reaction
29. Beta-oxidation of fatty acids commonly occurs in which of the following organelles?
- A. Peroxisome, Mitochondria and Endoplasmic Reticulum
 - B. Peroxisome and Mitochondria
 - C. Only Mitochondria
 - D. Only Peroxisome
30. Unsaturated Fats are Usually Derived from which of the following sources?
- A. Plant Species
 - B. Human beings
 - C. Aquatic animals
 - D. None of the Above
31. The general formula of carbohydrates is
- A. $(CH_2O)_n$
 - B. $(C_4H_2O)_n$
 - C. $(C_6H_2O)_n$
 - D. $(C_2H_2O)_nCOOH$
32. Carbohydrates are:
- A. Polyhydroxy aldehydes and phenols
 - B. Polyhydroxy aldehydes and ketones
 - C. Polyhydroxy ketones and phenols
 - D. Polyhydroxy phenols and alcohols
33. Glycogen in humans is stored in
- A. Liver and spleen
 - B. Liver and muscles
 - C. Liver and bile
 - D. Liver and adipose
34. Smallest carbohydrates are trioses. Which of the following is a triose?
- A. Glucose
 - B. Ribulose

- C. Ribose
 - D. Glyceraldehyde
35. In polysaccharides, monosaccharides are joined by
- A. Peptide bond
 - B. Glucose bond
 - C. Glycosidic bond
 - D. Covalent bond
36. Lactose is a disaccharide consisting of:
- A. Glucose and fructose
 - B. Glucose and galactose
 - C. Glucose and sucrose
 - D. Glucose and ribose
37. Which base is not found in RNA?
- A. Adenine
 - B. Cytosine
 - C. Thymine
 - D. Uracil
38. Analysis of a sample of DNA found that 20% of the bases were adenine. What percentage of the bases would be pyrimidines?
- A. 20%
 - B. 30%
 - C. 60%
 - D. 50%
39. Which of the following options, A – D, are the pyrimidine bases found in DNA?
- A. Uracil and thymine
 - B. Thymine and cytosine
 - C. Adenine and thymine
 - D. Cytosine and uracil
40. Thymine comprised 36% of the nitrogen bases present in a sample of double stranded DNA. What was the percentage of guanine in the sample?
- A. 14%
 - B. 28%
 - C. 36%
 - D. 64%

	Pyrimidines	Purines
A	adenine and thymine	cytosine and guanine
B	adenine and cytosine	thymine and guanine

C	uracil and thymine	adenine and guanine
D	cytosine and uracil	thymine and cytosine

41. Three of the bases found in nucleic acids are pyrimidines and two are purines. Which of the following is correct?
42. Which nucleic acid, A – D, could contain the triplet of bases ACT?
- DNA
 - mRNA
 - rRNA
 - tRNA
43. The cause of short-term or acute vitamin A poisoning is due to
- Eating the liver of Mule deer
 - Eating the liver of Buffalo
 - Eating the liver of Ostrich
 - Eating the liver of Polar bear
44. Which of the following is the most essential nutrient for a woman during her initial stages of pregnancy to prevent birth defects?
- Thiamin
 - Folic acid
 - Vitamin C
 - Vitamin E
45. Which of the following food sources has the highest levels of vitamin C?
- Parsley
 - Broccoli
 - Black currants
 - Orange juice
46. Which of the following vitamin helps in blood clotting?
- Vitamin A
 - Vitamin C
 - Vitamin D
 - Vitamin K
47. One of the following is the leading cause of blindness in children worldwide?
- Glaucoma
 - Cataracts
 - Colour blindness
 - Vitamin A deficiency
48. Which of the following vitamin deficiency causes Beriberi?
- Vitamin B1
 - Vitamin B2
 - Vitamin B6
 - Vitamin B12
49. Who is most likely to develop scurvy due to vitamin C deficiency?
- A pregnant woman
 - A malnourished child
 - A long-time alcoholic

- D. A person with the eating disorder anorexia nervosa
50. Which of the following vitamin functions as both, hormone and visual pigment?
- A. Thiamine
 - B. Retinal
 - C. Riboflavin
 - D. Folic acid

SECTION B: SHORT ANSWER QUESTIONS (SAQS) 30 Marks

INSTRUCTION: Answer ALL questions

1. Draw two dipeptides formed from each pair of the following amino acids (5 Marks)
 - A). Tyrosine and Lysine
 - B). Threonine and glutamine
 - C). Alanine and Histidine
2. Describe the types of interactions that hold the tertiary structure together? (5 Marks)
3. Describe the following models (5 Marks)
 - A). Fischer's Lock and Key substrate-enzyme interaction model
 - B). Koshland's Induced fit substrate-enzyme interaction model
4. Describe pentoses and explain their roles in DNA and RNA molecules (5 Marks)
5. With relevant examples describe the classification of lipids (5 Marks)
6. With suitable illustrations, describe the structure of pyrimidines (5 Marks)

SECTION C: LONG ANSWER QUESTIONS (LAQS)

20 Marks

INSTRUCTION: Answer any ONE question

1. With relevant examples, describe enzyme nomenclature and classification. (20 Marks)
2. Discuss the structure of disaccharides illustrating how glycosidic bonds are utilized in linking the various monosaccharides that constitute them. (20 Marks)