MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS 2024/2025

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN NURSING

NND 3113- MEDICAL BIOCHEMISTRY I

DATE: JANUARY 2025   **TIME: 3 HOURS**

INSTRUCTIONS: *All questions are compulsory*

Ensure that all your answers are properly numbered

Part 1 Multiple Choice Questions (MCQs): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark.

Part 11: Short Answer Questions-Answer questions following each other on the answer booklet

Part 111: Long Answer Questions-Answer the questions on the answer booklet.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. A nucleoside consists of

    a.   Nitrogenous base

    b.   Purine or pyrimidine base + sugar

    c.   Purine or pyrimidine base + phosphorous

    d.   Purine + pyrimidine base + sugar +phosphorous

2. which of the following is not water soluble vitamin

    a.   Biotin

    b.   Pyridoxal

c. Vitamin C

d. Tocopherol

3. A purine nucleotide is

   a. AMP

   b. UMP

   c. CMP

   d. TMP

4. A pyrimidine nucleotide is

   a. GMP

   b. AMI?

   c. CMP

   d. IMP

5. The purity of an isolated protein can be tested by employing various methods.

   a. Solubility curve

   b. Molecular weight

   c. Ultra Centrifugation

   d. Immuno Reactivity

6. More than one break in the line or in saturation curve indicates the following quality

of protein.

   a. Non homogenity

   b. Purity

   c. Homogeneity

   d. None of these

7. A sharp moving boundary is obtained between the pure solvent and solute containing layer in

   a. Chromatography

   b. Immuno Reactivity

   c. Ultra Centrifugation

   d. Solubility curve

8. An example of a hydroxy fatty acid is

   a. Ricinoleic acid

   b. Crotonic acid

   c. Butyric acid

   d. Oleic acid

9. An example of a saturated fatty acid is

    a. Palmitic acid

    b. Oleic acid

    c. Linoleic acid

    d. Erucic acid

10. The polysaccharide used in assessing the glomerular filtration rate (GFR) is

    a. Glycogen

    b. Agar

    c. Inulin

    d. Hyaluronic acid

11. The constituent unit of inulin is

    a. Glucose

    b. Fructose Mannose

    c. Galactose

12. Thepolysaccharide found in the exoskeleton of invertebrates is

    a. Pectin

    b. Chitin

    c. Cellulose

    d. Chondroitin sulphate

13. Which of the following is a heteroglycan?

    a. Dextrins

    b. Agar

    c. Inulin

    d. Chitin

14. The glycosaminoglycan which does not contain uronic acid is

    a. Dermatan sulphate

    b. Chondroitin sulphate

    c. Keratan sulphate

    d. Heparan sulphate

15. The following enzymes requires selenium

    a. Glutathione Peroxidic

    b. Kinase

    c. Mutase

d. Isomerase

16. Keratan sulphate is found in abundance in

    a. Heart muscle

    b. Liver

    c. Adrenal cortex

    d. Cornea

17. The principal cation in extracellular fluid is

    a. Sodium

    b. Potassium

    c. Calcium

    d. Magnesium

18. The normal concentration of sodium (in mg/100 ml) of human plasma is

    a. 100

    b. 200

    c. 250

    d. 330

19. A decrease in serum sodium may occur in

    a. Adrenocortical insufficiency

    b. Hypoparathyroidism

    c. Hyperparathyroidism

    d. Thyrotoxicosis

20. Repeating units of hyaluronic acid are

    a. N-acetyl glucosamine and D-glucuronic acid

    b. N-acetyl galactosamine and D-glucuronic acid

    c. N-acetyl glucosamine and galactose

    d. N-acetyl galactosamine and L- iduronic acid

SECTION B: SHORT ANSWER QUESTIONS (40 MARKS)

1. Draw the structures of glucose and its isomer   (6marks)

2. Explain the three major buffers in biological systems   (6marks)

3. Illustrate Structures of the two pyrimidines bases in a nucleotide   (4marks)

4. Calculate $[H^+]$, $[OH^-]$ and pH of 0.01M ethanoic acid, given Ka = 1.76 x 1 0 $^{-5}$ (6marks)

5. Illustrate the general formula for the naturally occurring amino acids   (5marks)

6. outline the significance of Heparin (3marks)

7. Outline the clinical significance of Lactate Dehydrogenase (LDH) (6marks)

8. Explain the clinical application of denaturation of proteins (4marks)

SECTION C: LONG ANSWER QUESTIONS (40 MARKS)

1. a. Explain the clinical application of enzyme inhibitors (10marks)

   b. Explain sources, functions and deficiency of copper and selenium in body (10marks)

2. a. Explain the different types of second messengers (10marks)

   b. Derive the Michaelis-Menten Equation (10marks)