B.Voc (NEP) 1st Semester (FYUGP) Exam., 2024

MEDICAL LAB AND MOLECULAR DIAGNOSTIC TECHNOLOGY/MEDICAL LABORATORY TECHNICIAN

Paper : MHS0100204

(Introduction to Biomolecules, Instrumentation and Reagents)

Full Marks : 45

Time : 2 hours

The figures in the margin indicate full marks for the questions

1. Fill in the blanks : 1×5=5

(a) A cuvette for UV range is made of _____.

(b) Monosaccharides are classified based on the number of _____ atoms.

(c) _____ bond is responsible for the primary structure of proteins.

(d) Centrifugal force is measured in _____.

(e) The Svedberg unit is related to _____.

2. Answer any *five* from the following questions : 2×5=10

(a) Differentiate between phospholipids and glycolipids.

(b) Describe the structure of a nucleotide.

(c) What is the purpose of a water bath in a laboratory?

(d) Define 'molar' in solution preparation.

(e) Differentiate between aldoses and ketoses.

(f) Explain the role of a volumetric flask.

(g) Describe the acid-base properties of amino acids.

(h) List the main steps for cleaning laboratory glassware.

(i) Describe the function of tRNA.

(j) Define peptide bond formation.

3. Answer any *four* from the following questions : 5×4=20

(a) Describe the biochemical reactions of monosaccharides.

(b) Explain the principle and parts of a spectrophotometer.

(c) Describe the properties and biological roles of cholesterol.

(d) Describe the optical properties of amino acids.

(e) Explain how to prepare a standard solution of sodium hydroxide.

(f) Outline the types of centrifuges and their uses.

(g) Discuss the categories of biomedical waste.

(h) Calculate the molarity if 50 g of glucose ($C_6H_{12}O_6$) is dissolved in 500 ml of solution. (Molar mass of glucose = 180 g/mol)

4. Answer any *one* from the following questions : 10

(a) Discuss in detail the methods and significance of biomedical waste disposal.

(b) The following stock solutions are available to make a protein extraction buffer. 100% Nonidet P-40, 1 M Tris-Cl and 0·5 M EDTA. What quantity of the original stocks will be needed to make 250 ml of buffer with the following final concentrations : 0·5% Nonidet, 150 mM Tris-Cl and 10 mM EDTA?

(c) Describe the different structures of proteins and their importance in biological function. 7+3=10

(d) Describe the classification, properties and biological roles of lipids. 4+3+3=10

(e) Describe in detail the structure of DNA and the significance of its helical form. 7+3=10

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