BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – DMLT-2023/DMLT-2024
Course Name – Clinical Biochemistry-I
Course Code - DMLT104
(Semester I)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Pick the primary anticoagulant in a green-top Vacutainer tube?
a) Citrate b) EDTA
c) Heparin d) Naf

(ii) Select what does the lavender-top Vacutainer tube contain to preserve blood samples for hematology testing?
a) Citrate b) EDTA
c) Heparin d) Naf

(iii) Select The purpose of heparin in a Vacutainer tube is to:
a) Prevent clotting b) Preserve glucose levels
c) Facilitate coagulation studies d) Inhibit enzyme reactions

(iv) Select A water bath is commonly used in laboratories for:
a) Measuring pH levels b) Sterilizing equipment
c) Maintaining a constant temperature d) Centrifugation

(v) Identify the primary advantage of a microbalance over a standard laboratory balance?
a) Microbalances are less precise b) Microbalances are faster
c) Microbalances can measure smaller masses d) Microbalances can measure temperature

(vi) Pick which of the following substances is commonly used as a calibration standard for pH meters.
a) Saltwater b) Baking soda solution
c) Distilled water d) pH buffer solutions

(vii) Select which preservative is commonly used for preserving stool specimens for microbiological analysis?
a) Ethanol b) Formalin
c) Sodium fluoride d) Liquid paraffin

(viii) A 1 molal solution contains 1 mole of solute dissolved in ____. Choose the correct answer.

a) 1 liter of solvent
b) 1 liter of solution
c) 1 kilogram of solvent
d) 1 kilogram of solute

(ix) Name the solution with a pH less than 7.

a) Acidic
b) Basic
c) Neutral
d) Alkaline

(x) In terms of accuracy and precision, select the type of standard solution that is typically more reliable.

a) Primary standard solution
b) Secondary standard solution
c) Both are equally reliable
d) Neither is reliable

(xi) Identify the recommended method for disposing of expired or unused pharmaceuticals in healthcare facilities.

a) Flushing them down the toilet
b) Throwing them in the regular trash
c) Incinerating them on-site
d) Sending them to a licensed pharmaceutical waste disposal facility

(xii) Choose the role of trained personnel in BMW management.

a) To generate more waste
b) To oversee waste disposal in landfills
c) To ensure safe handling and disposal of biomedical waste
d) To sell recycled waste products

(xiii) In waste segregation, the term composting refer to _____. Choose the correct answer.

a) Recycling plastics
b) Decomposing organic waste into nutrient-rich soil
c) Burning waste materials
d) Sorting recyclable materials

(xiv) Write the first step in waste disposal.

a) Recycling
b) Waste segregation
c) Incineration
d) Landfill disposal

(xv) Pick which waste category includes materials like batteries, chemicals, and fluorescent bulbs that require special handling due to their potential harm to the environment and human health?

a) Non-recyclable waste
b) Hazardous waste
c) General waste
d) Organic waste

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Write the different components of blood. (3)
3. Apply your knowledge and discuss what is the pH scale, and how is it used? Explain its range and significance. (3)
4. Explain briefly the mode of action of heparin as an anticoagulant. (3)
5. Write the principle and use of pH meter. (3)
6. Evaluate the advantages and limitations of using flame photometry in the measurement of sodium and potassium ions in clinical samples. (3)

OR

6.0 moles of $MgCl_2$ is dissolved in 20.0 L of water. Evaluate the molarity of the solution. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Using real-life examples, demonstrate how to properly package and label bio-medical waste according to waste management protocols. (5)

8. Apply the knowledge of anticoagulants to select the appropriate tube for collecting blood samples for hematological analysis, and explain the rationale for your choice. (5)
9. Explain the concept of acid-base titration. Provide a step-by-step description of how you would perform a titration to determine the concentration of a hydrochloric acid (HCl) solution using a sodium hydroxide (NaOH) solution. (5)
10. Compare and contrast Preparative and Analytical centrifugation. (5)
11. Define Sterilization and classify different types of sterilization. (5)
12. Plan a protocol to prepare 500 mL of a 0.2 M sodium chloride (NaCl) solution. Describe the step-by-step procedure, including calculations, to make this solution. (5)

OR

Interpret the mathematical basis for the pH scale, which ranges from 1 to 14? Please justify how this calculation is determined. (5)

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