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Barasat, Kolkata -700125**Term End Examination 2025-2026**
Programme – DMLT-2023/DMLT-2024/DMLT-2025
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) Naf (sodium fluoride) Vacutainer tubes are mainly used for:
- | | |
|------------------------|------------------------|
| a) Hematology testing | b) Glucose testing |
| c) Coagulation studies | d) Electrolyte testing |
- (ii) Explain what should you do if you accidentally spill a corrosive chemical on your skin in the laboratory?
- | | |
|---|---|
| a) Rinse with water for at least 15 minutes | b) Apply a neutralizing agent immediately |
| c) Wait for it to evaporate | d) Ignore it and continue working |
- (iii) Select what should be done with used needles and syringes in a laboratory setting?
- | | |
|--|-----------------------------------|
| a) Dispose of them in regular trash bins | b) Reuse them after sterilization |
| c) Place them in a sharps container | d) Incinerate them immediately |
- (iv) Identify the type of waste that is categorized as Infectious Waste in BMW management.
- | | |
|--------------------|--------------------|
| a) Used syringes | b) Paper towels |
| c) Plastic bottles | d) Cardboard boxes |
- (v) Explain the purpose of segregating biomedical waste into different categories.
- | | |
|---|----------------------------|
| a) To reduce waste generation | b) To facilitate recycling |
| c) To ensure proper handling and disposal | d) To save storage space |
- (vi) Choose the solution having highest ionic strength.
- | | |
|-----------|-------------------------|
| a) M NaCl | b) M glucose |
| c) M HCl | d) M CH ₃ OH |
- (vii) Give an example of a conjugate acid-base pair.
- | | |
|---|--|
| a) HCl and NaCl | b) H ₂ SO ₄ and H ₂ O |
| c) NH ₃ and NH ₄ ⁺ | d) NaOH and NaCl |
- (viii) Explain how does a buffer solution resist changes in pH when an acid is added.
- | | |
|--------------------------------|---|
| a) It consumes the added acid. | b) It donates protons (H ⁺ ions) to neutralize the added acid. |
|--------------------------------|---|

- c) It accepts hydroxide ions (OH⁻) to neutralize the added acid. d) It forms a precipitate with the added acid.
- (ix) Reflectance fluorometry is a method used to measure the: _____. Pick the correct answer.
- a) Absorption of light by a sample
b) Emission of light by a sample
c) Reflection of light by a sample
d) Transmission of light through a sample
- (x) Identify the purpose of semi-auto analyzer.
- a) Fully automated sample analysis
b) Manual sample analysis
c) Visual sample analysis
d) Non-destructive sample analysis
- (xi) The Nernst equation relates the potential of an ion-selective electrode to the concentration of the ion of interest. Name the factor that is included in the Nernst equation?
- a) Temperature (T)
b) Pressure (P)
c) Mass (M)
d) Color (C)
- (xii) A sodium-selective electrode is primarily used for measuring the concentration of: _____. Choose the correct answer.
- a) Sodium ions (Na⁺)
b) Potassium ions (K⁺)
c) Hydrogen ions (H⁺)
d) Carbon dioxide (CO₂)
- (xiii) Secondary standard solutions are prepared from: _____. Select the correct answer.
- a) Primary standards
b) Standard reference materials
c) Analytical reagents
d) Titrants
- (xiv) Standard solutions are commonly used in laboratory instruments for calibration and quality control. Name the instrument that is often calibrated using standard solutions.
- a) Microscope
b) Centrifuge
c) Spectrophotometer
d) Magnetic stirrer
- (xv) Select the preferred method of disposing of hazardous waste.
- a) Landfill disposal
b) Recycling
c) Incineration
d) Composting

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Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain the importance of calibration for laboratory balances. (3)
3. Explain how does centrifuge work to separate substances in a sample. (3)
4. Discuss the concept of "Molarity" (M) with an example. Calculate the molarity of a solution containing 0.025 moles of NaOH dissolved in 250 ml of water. (3)
5. Demonstrate the Laboratory Hazards and Safety procedures. (3)
6. How many grams of NaCl must be added to 2.00mL of water to make a 85.5M solution? (1000 mL = 1 L). (3)

OR

- 10.0g of NaCl is dissolved in 5.0L of water. What is the molarity of the solution? (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the potential consequences of non-compliance with bio-medical waste management regulations for healthcare facilities and research laboratories. (5)
8. Apply your knowledge of anticoagulants to explain the specific uses and advantages of EDTA, citrate, and heparin in different clinical contexts and their respective mode of action. (5)
9. Discuss how temperature affects the solubility of gases in liquids and provide a practical application where this phenomenon is important. (5)
10. Define colligative properties of solutions and provide three examples of colligative properties. (5)

11. Justify the importance of Beer-Lambert's law in colorimeter. (5)
12. Analyze and explain the principles behind ion selective electrodes (ISEs). (5)

OR

Compare and contrast the different categories of biomedical waste. Provide examples for each category to illustrate your points. (5)

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