

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF
SCIENCE IN NURSING

NURS 256: CLINICAL CHEMISTRY

STREAMS: BSc. NURSING (Y2S2)

TIME: 2 HOURS

DAY/DATE: MONDAY 14/04/2025

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS

- Answer ALL questions in section A and B and only ONE question in section C.
- Do not write on the Question paper.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 marks)

1. Which of the following is NOT a reason for ordering clinical chemistry tests?
 - a. Disease diagnosis
 - b. Monitoring the effect of treatment
 - c. Treating the disease directly
 - d. Conducting research on drug responses
2. What type of error occurs when a sample is mislabeled before reaching the lab?
 - a. Pre-analytical error
 - b. Analytical error
 - c. Post-analytical error
 - d. Sampling error
3. Haemolysis in a blood sample is most likely to falsely elevate levels of which electrolyte?
 - a. Sodium
 - b. Potassium
 - c. Calcium
 - d. Chloride

4. What is the main component responsible for blood clotting that should be avoided in plasma samples?
 - a. Calcium
 - b. Potassium
 - c. Sodium
 - d. Magnesium
5. Which of the following factors affect the variability of clinical chemistry test results?
 - a. Patient age
 - b. Lab equipment used
 - c. Drug history
 - d. All of the above
6. What preservative is commonly used for glucose stability in blood samples?
 - a. Sodium citrate
 - b. Sodium fluoride
 - c. Heparin
 - d. EDTA
7. Abnormal fat and amino acid metabolism can lead to a condition called
 - a. Ketoacidosis
 - b. Lactic acidosis
 - c. Metabolic alkalosis
 - d. Respiratory acidosis
8. Which one of the following lipoproteins has the highest percentage of cholesterol.
 - a. HDL
 - b. VLDL
 - c. LDL
 - d. Chylomicrons
9. Creatine clearance is better used for-----and needs a substance that is-----
 - a. Glomerular filtration and endogenous
 - b. Glomerular filtration and exogenous
 - c. Glomerulonephritis and has a limiting filtration
 - d. Minor renal impairment and reabsorbed by renal tubules

10. Which tumor marker is commonly elevated in patients with liver cancer and can also be used in the diagnosis of certain germ cell tumors?
- a) CA-125
 - b) AFP (Alpha-Fetoprotein)
 - c) PSA (Prostate-Specific Antigen)
 - d) CEA (Carcinoembryonic Antigen)
11. Which of the following markers is used for the differential diagnosis of obstructive jaundice
- a. Lactate dehydrogenase
 - b. Creatinine kinase
 - c. Carbonic anhydrase
 - d. 5'nucleotidase
12. Which of the following is an important consideration when conducting a 24-hour urine collection?
- a. Only the urine collected in the morning is needed, and the rest of the day's urine can be discarded.
 - b. The collection container should be kept in a warm place to prevent the growth of bacteria.
 - c. The patient should drink a normal amount of fluids and avoid caffeine or alcohol during the collection period.
 - d. It is not necessary to record the exact times of urination during the collection period.
13. Which of the following statements about biochemical reference ranges is TRUE?
- a. Reference ranges are universal and do not vary between different populations or laboratories.
 - b. Reference ranges are determined based on the results of a large, diverse group of healthy individuals.
 - c. Reference ranges should be adjusted based on the patient's age, sex, and other individual factors.
 - d. Reference ranges are typically based on a single measurement and do not account for variations in individual laboratory techniques.

14. Which of the following conditions is characterized by an increased anion gap metabolic acidosis?
- Chronic respiratory alkalosis
 - Diabetic ketoacidosis
 - Hyperventilation
 - Renal tubular acidosis
15. Which organ is primarily responsible for regulating the body's water and electrolyte balance?
- Lungs
 - Liver
 - Kidneys
 - Heart
16. What happens to the body's water content in cases of overhydration?
- Decrease in plasma volume
 - Cellular dehydration
 - Cellular edema
 - Hyponatremia
17. Which buffer system is the most important in regulating blood pH?
- Phosphate buffer system
 - Protein buffer system
 - Bicarbonate buffer system
 - Hemoglobin buffer system
18. What is the typical consequence of prolonged vomiting in terms of electrolyte balance?
- Increased chloride and sodium levels
 - Decreased chloride and sodium levels
 - Decreased potassium levels only
 - Increased potassium levels only
19. Which of the following enzymes is more liver-specific?
- Aspartate aminotransferase (AST)
 - Alanine transaminase (ALT)
 - Lactate dehydrogenase (LDH)
 - Creatine kinase (CK)

20. Which cardiac marker is the most sensitive and specific for myocardial infarction?
- a. CK-MB
 - b. Troponin I
 - c. Amylase
 - d. ALT

SECTION B: SHORT ANSWER QUESTIONS (30 marks)

1. Describe five types of post analytical errors that can occur in the clinical chemistry laboratory. (5 marks)
2. Describe the distribution of total body water. (5 marks)
3. Briefly discuss the common cardiac markers and their clinical significance. (5 marks)
4. Outline the differences between hypertonic expansion and isotonic expansion. (5 marks)
5. Hemolysis is a source of unreliable clinical chemistry results, list down five precautions that can be taken to avoid hemolysis. (5 marks)
6. Describe the criteria for specimen rejection in the clinical chemistry laboratory ((5 marks)

SECTION C: LONG ANSWER QUESTIONS (20 marks)

1. A 48-year-old female presents with fatigue, nausea, and mild right upper quadrant pain. Her liver function tests show elevated ALT (150 U/L) and AST (200 U/L), with normal ALP and bilirubin levels.
 - a) Based on the liver function test results, what do the elevated ALT and AST levels suggest about the patient's liver condition? (5 marks)
 - b) What additional tests or investigations would you recommend to confirm the diagnosis and determine the underlying cause of her liver condition? (5 marks)
 - c) Discuss the characteristics of physiological jaundice and how its management approach. [10 marks]
2. A 45-year-old woman presents with excessive thirst, frequent urination, and unexplained weight loss over the past 3 months. Her fasting blood glucose is 18mmol/l, and her HbA1c is 9.2%.
 - i. What is the most likely diagnosis? (2 marks)
 - ii. Describe oral glucose tolerance test and outline its protocol. (8 marks)
 - iii. Discuss the pathogenesis and management of diabetic ketoacidosis [10 marks]