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University Examinations 2024/2025

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCES

HML 3316: PRINCIPLES OF CLINICAL CHEMISTRY

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

INSTRUCTIONS:
Answer ***All*** *questions*
Ensure that all your answers are properly numbered
Part I multiple Choice Questions (MCQ): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark
Part II: Short Answer Questions – Answer questions following each other on the answer booklet
Part III: Long Answer Questions – Answer each question on the answer booklet

SECTION A: MULTIPLE CHOICE QUESTIONS (20 marks)

1. Specific gravity in urine is high in patients with diabetes mellitus due to the presence of
   a. Protein
   b. Blood
   c. Glucose
   d. All of the above
2. Non-conjugated bilirubin
   a. Is water soluble
   b. Is alcohol soluble
   c. Is protein bound

d. Is detectable in urine

3. Fist clenching tends to increase the following analyte
   a. Blood glucose
   b. Potassium
   c. Alanine aminotransferase
   d. Total cholesterol
4. Which of the following is a test for detecting bence jones protein
   a. Flame photometry
   b. Ion selective electrode
   c. Brandshaw test
   d. Jaffers reaction test
5. Which of the following increases Specific gravity in urine in patients with diabetes mellitus
   a. Protein
   b. Blood
   c. Glucose
   d. All of the above
6. In hepatic jaundice, direct bilirubin in plasma is
   a. Low
   b. Normal
   c. High
   d. None of the above
7. The body responds to the oversupply of glucose by
   a. Getting rid of the excess through urine
   b. Storing the excess in the liver and the muscles in form of glycogen
   c. Storing the excess in the liver and the muscles in form of glucose
   d. All of the above
8. All of the following are true about Insulin except
   a. Enhances glucose entry into the cells

b. It is a protein hormone
c. It stimulates fat cells to form fats from fatty acids and glycerol
d. It is produced by alpha cells of the pancreatic islets

9. Polyuria is
    a. Decreased urine output
    b. Increased urine output
    c. Complete suppression of urine output
    d. None of the above
10. In a quantitative analytical technique
    a. Results reflect the presence or absence of a metabolite
    b. Serum cannot be used as specimen
    c. Reagents are impregnated on wafer thin plastic pad
    d. Results reflect actual concentration of the analyte
11. Chemical examination of urine is performed to detect the following
    a. Glucose
    b. Urea
    c. Bence jones protein
    d. All of the above
12. Random urine specimen can be corrected at what time of the day
    a. In the morning
    b. In the afternoon
    c. At any time of the day
    d. At night
13. The difference between plasma and serum is that plasma
    a. Has more water
    b. Has less water
    c. Contains fibrinogen
    d. Doesn't contain fibrinogen

14. The following is not a characteristic of a quality reagent kit
    a. Expiring date
    b. Chemical formula
    c. Friendly package
    d. Storage conditions
15. In the metabolism of glucose, insulin and glucagon have a common characteristic, which is;
    a. Acts on the same body cells
    b. Promote glycogenesis
    c. Promote glycogenolysis
    d. Have the same effect in the control of blood sugar
16. Standard solutions are made from
    a. Master standard
    b. Analar reagents
    c. Reference materials
    d. Common salts
17. Haematuria is
    a. Presence of pus cells in urine
    b. Presence of free haemoglobin in urine
    c. Presence of protein in urine
    d. Presence of blood in urine
18. In electrophoresis the anion always migrate
    a. Towards the anode
    b. Towards the cathode
    c. It does not migrate
    d. It can go either way
19. Polyuria, excessive thirst and lethargy could be signs and symptoms of
    a. Diabetes mellitus
    b. Shock

c. Myocardial infarction

d. Kidney damage

20. Haemoglobinuria is

a. Presence of red blood cells in urine

b. Presence of pus cells in urine

c. Presence of free haemoglobin in urine

d. Presence of protein in urine

SECTION B: SHORT ANSWER ALL QUESTIONS (40 MARKS)

1. State the use of spectrophotometer and transfer pipette in clinical chemistry laboratory (5 marks)
2. Compare and contrast qualitative and quantitative analysis (5 marks)
3. Outline five specimens analyzed in clinical chemistry laboratory (5 marks)
4. Describe how you would perform an oral glucose tolerance test on a 10 year old patient (5 marks)
5. Briefly describe five disorders related to the liver (5 marks)
6. In continuous flow auto analyzer there is introduction of air bubbles into the sample streams at strategic points. Explain the importance of these air bubbles (5 marks)
7. Briefly describe how the body responds to oversupply and short supply of glucose (5 marks)
8. Briefly describe five causes of pre-hepatic jaundice (5 marks)

SECTION C: LONG ANSWER TWO QUESTIONS (40 MARKS)

1. With an aid of a well labeled diagram, describe the components of a spectrophotometer (20 marks)
2. Discuss quality assurance in clinical chemistry laboratory (20 marks)
3. Discuss urinalysis under the following headings (20 marks)
   a) Principle
   b) Physical examination
   c) Chemical examination
   d) Microscopic examination