

Candidate number.....



**COLLEGE OF HEALTH, AGRICULTURE AND NATURAL
SCIENCES**

DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES

NSLS103: CLINICAL PATHOLOGY

END OF SEMESTER FINAL EXAMINATIONS

APRIL 2023

LECTURER: MRS R. CHIRIMO

DURATION: 3 HOURS

INSTRUCTIONS

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1. Write your candidate number on the space provided on top of each page
 2. Answer **all** questions in sections A on the question paper.
 3. Answer **all** questions in section B on separate answer sheets provided.
 4. Answer any **3** questions in section C on separate answer sheets provided
 5. Mark allocation for each question is indicated at the end of the question
 6. Credit will be given for logical, systematic and neat presentations in sections B and C
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SECTION A [40 Marks]

- **Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions**
- **Each correct response is allocated half mark**

1. The following processes take place in the liver:

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|---|---|-----|--------------------------------------|
| T | F | (a) | amino acid synthesis and degradation |
| T | F | (b) | formation of coagulation factors |
| T | F | (c) | endocrine regulation |
| T | F | (d) | red cell production |
| T | F | (e) | Formation and secretion of bile |

2. Which of the following statement is/are true regarding plasma calcium?

- | | | | |
|---|---|-----|---|
| T | F | (a) | Approximately 50% of the plasma calcium is present in the ionized form |
| T | F | (b) | Approximately 90% of the plasma calcium is bound to proteins |
| T | F | (c) | Approximately 10% of the plasma calcium is complexed with anions |
| T | F | (d) | A negative balance may be found in children due to bone growth |
| T | F | (e) | A negative balance may occur when gastrointestinal and urinary losses exceed intake and retention |

3. The following statements is/are true about PTH regulation of Calcium

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|---|---|-----|--|
| T | F | (a) | Secretion of PTH is inversely related to plasma calcium concentration |
| T | F | (b) | At plasma calcium concentration above 5.5 mmol/L, PTH secretion is maximally inhibited |
| T | F | (c) | PTH acts to reduce the degradation of bone in the process releasing calcium |
| T | F | (d) | increased PTH stimulates the kidney to increase secretion of 1,25(OH) ₂ D, which activates gut to increase calcium absorption |

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T F (e) PTH stimulates calcium reabsorption in the distal tubule

4. The following interfere(s) with the laboratory to measurement of calcium:

T F (a) heparin
T F (b) EDTA
T F (c) Haemolysis
T F (d) lipaemia
T F (e) proteins

5. Which of the following is/are true about blood buffer systems

T F (a) The respiratory and urinary systems are physiological buffer systems
T F (b) The body has both physiological and chemical buffers
T F (c) the phosphate buffer system has less buffering effect than an equal amount of bicarbonate buffer.
T F (d) Haemoglobin acts as a buffer by transporting H^+ from the tissues to the lungs
T F (e) A buffer system consists of a strong acid and its conjugate base

6. A renal tubule can secrete

T F a) H^+
T F b) HCO_3^-
T F c) K^+
T F d) Ca^{2+}
T F e) glucose

7. In blood gas analysis :

T F (a) Actual HCO_3^- is calculated using the measured pH and pCO_2
T F (b) pCO_2 is measured with a CO_2 electrode.
T F (c) pH is calculated using the measured H^+ ions

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- T F (d) O₂ is measured by an O₂ electrode
T F (e) K⁺ are measured using a K⁺ electrode

8. The following hormones are produced by the kidneys:

- T F a) Renin
T F b) Erythropoietin
T F c) Prostaglandin
T F d) Antidiuretic hormone
T F (e) parathyroid hormone

9. A urine dipstick detects the following

- T F a) Leucocytes
T F b) Blood
T F c) Urine casts
T F d) Nitrite

10. In metabolic acidosis there is :

- T F a) decrease in the blood pH caused by a decrease in the bicarbonate concentration.
T F b) decrease in the bicarbonate concentration due to accumulation of hydrogen
T F c) there is an increase in the bicarbonate concentration
T F d) there is always an increase in the pCO₂
T F e) there is a decrease in H ion concentration

11. The following are laboratory methods used for the measurement of urea

- T F a) Jaffe chemical method
T F b) Diacetyl monoxime method
T F c) Fearon chemical method
T F d) Enzymatic method using uricase
T F e) Jendrassik–Grof Method

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12. The following statements are true of electrolyte distribution throughout the body:

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|---|---|----|---|
| T | F | a) | Sodium is the major cation in the extracellular space |
| T | F | b) | chloride is the most abundant cation in the extracellular space |
| T | F | c) | potassium is the most abundant cation in the extracellular space |
| T | F | d) | magnesium is more abundant than sodium in the extracellular space |
| T | F | e) | bicarbonate is in equimolar amounts in both the intracellular and extracellular space |

13. The following is/are true of unconjugated bilirubin:

- | | | | |
|---|---|-----|---|
| T | F | (a) | It is found in very high amounts in urine |
| T | F | (b) | It is water soluble and easily excreted by the kidney |
| T | F | (c) | Normal circulating plasma levels should be greater than 3 $\mu\text{mol/l}$ |
| T | F | (d) | gives the stool the characteristic dark brown color |
| T | F | (e) | At high concentrations it deposits in cell membranes causing kernicterus. |

14. The following are used to assess renal function:

- | | | | |
|---|---|----|------------------------------------|
| T | F | a) | serum α -1 antitrypsin test |
| T | F | b) | serum total protein |
| T | F | c) | serum calcium |
| T | F | d) | serum creatinine |
| T | F | e) | serum urea test |

15. The following statements are true concerning liver function tests:

- | | | | |
|---|---|-----|---|
| T | F | (a) | Cellular damage can be tested sensitively by enzymatic tests |
| T | F | (b) | Alkaline phosphatase is specific to the liver and is used only to assess liver function |

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|---|---|-----|--|
| T | F | (c) | Serum levels of Gamma glutamyl transpeptidase (GGT) are increased by cholestasis |
| T | F | (d) | Alkaline phosphatase is induced when biliary drainage is impaired. |
| T | F | (e) | Gamma glutamyl transpeptidase (GGT) is markedly raised in alcoholic cirrhosis. |

16. The following will interfere with the measurement of potassium

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|---|---|-----|--------------------------|
| T | F | (a) | lipaemia |
| T | F | (b) | haemolysis |
| T | F | (c) | EDTA |
| T | F | (d) | old sample |
| T | F | (e) | freshly collected sample |

17. The following statements are true of urinalysis:

- | | | | |
|---|---|-----|---|
| T | F | (a) | Alkaline urine in a patient with UTI suggests the presence of a urea-splitting organism |
| T | F | (b) | the presence of nitrites may indicate Gram-negative bacteria |
| T | F | (c) | normal urine will have proteins in small amounts |
| T | F | (d) | glucose is normally found in urine |
| T | F | (e) | specific gravity measures the ability of the kidney to concentrate or dilute the urine |

18. The following laboratory processes are done on a CSF sample

- | | | | |
|---|---|-----|------------------------------|
| T | F | a) | ZN staining |
| T | F | b) | Urea and protein measurement |
| T | F | c) | WBC and RBC counts |
| T | F | (d) | Geimsa staining |
| T | F | (e) | gram staining |

19. A transudate has the following properties:

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| T | F | a) | usually cloudy in appearance |
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|---|---|-----|--|
| T | F | b) | has a total protein less than 30g/l |
| T | F | c) | low red blood cell count |
| T | F | d) | usually due to a systemic disorder |
| T | F | (e) | has a lower specific gravity than an exudate |

SECTION B [20 Marks]

Answer ALL questions on separate answer sheets

1. Write short notes on the sample for blood gas analysis.
2. State the factors contributing to neonatal jaundice and the bilirubin findings in the laboratory.
3. Write short notes on the use of creatinine as a renal function test.
4. Write about the factors that may contribute to hypernatremia and the laboratory findings.

SECTION C [75 Marks]

Answer any THREE questions on separate answer sheets

1. Discuss the biochemical tests used to assess the functions of the liver.
2. Outline the laboratory processing of fluids.
3. Write a detailed account on the role and regulation of electrolytes in the body.
4. Discuss the methods that are used to measure calcium in the laboratory.
5. Outline the processes in urine formation.