

NATIONAL UNIVERSITY OF LESOTHO
FACULTY OF HEALTH SCIENCES
BACHELOR OF PHARMACY (HONOURS)

PHA4304 - CLINICAL PHARMACY I

FINAL EXAMINATION

JANUARY 2024

TOTAL MARKS: 100 MARKS

DURATION: 3 HOURS

This examination paper consists of two sections, Section A (40 marks) and Section B (60 marks).

INSTRUCTIONS

- Answer all questions.
 - Start each question on a new page.
 - Formula for calculations are in page 4
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SECTION A

40 MARKS

BIOCHEMICAL TESTS

Question 1

[16 marks]

- a. Describe any one use of each of the biochemical/physical parameters below in monitoring therapy [1 mark] and state the target therapeutic value/range of each parameter on the treatment [1 mark].
- I. HbA_{1c} [2 marks]
 - II. Cystatin C [2 marks]
 - III. BMI [2 marks]
 - IV. AST [2 marks]
 - V. aPTT [2 marks]
- b. Discuss how the following factors can affect the interpretation of biochemical test results [2 marks] and give an example of a test to support your answer [1 mark]:
- I. Age [3 marks]
 - II. Gender [3 marks]

ELECTROLYTES

Question 2

[15 marks]

The following drugs/disease condition cause serum potassium disturbances. For each drug/disease condition, name the associated potassium disturbance [1 mark] and discuss the mechanism by which the imbalance is induced [2 marks].

- a. Hydrochlorothiazide 25mg tablet [3 marks]
- b. Metabolic acidosis [3 marks]
- c. Lisinopril 20mg tablet [3 marks]
- d. Total parenteral nutrition [3 marks]
- e. Salbutamol 4mg tablet [3 marks]

KIDNEY FUNCTION

Question 3

[9 marks]

Discuss the pathophysiology of CKD-associated complications below and provide at least one pharmacological intervention

- a. Hyperphosphatemia [3 marks]
- b. Anaemia [3 marks]
- c. Hypocalcaemia [3 marks]

CALCULATIONS**Question 1****[20 marks]**

Mrs KD is a 50 years old female and was admitted with a history of fatigue and severe headache x 1/7. She is a known HTN and DM defaulter.

P/complains: she complains of excessive thirst and urination.

P/E: height 150 cm, weight 66.5 kg; BP 159/91 mmHg, HR 72 bpm

Labs results: FBG 7,9 mmol/l [5.6 -6.9 mmol/l]; BUN 6.4 mmol/l (2.8 - 6.4 mmol/l), serum creatinine 1.58 mg/dl [0.6-1.2mg/dl] or 140 μ mol/l [50 - 110 μ mol/l], Hb 12.0 g/dl [12-14g/dl], Ca^{2+} 2.0 [2.20 - 2.60 mmol/l] and patient's serum albumin = 3 g/dL.

- a. Use Cockraft-Gault formula, MDRD and CKD-EPI to estimate the glomerular filtration rate (eGFR) of Mrs KD [6 marks]
- b. Explain why MDRD and Cockraft-Gault formula are less accurate compared to CKD-EPI [2 marks]
- c. Calculate Mrs KD corrected calcium concentration. [2 marks]
- d. Base on the above information;
 - I. Provide a provisional diagnosis for Mrs KD [1 mark]
 - II. Provide justification for your provisional diagnosis above [3 marks]
 - III. Provide pharmacological interventions (based on Lesotho STG 2022) for the condition/s diagnosed above and rational for the regimens selected [6 marks]

ACID-BASE DISORDERS**Question 2****[10 marks]**

B is a 67-year-old retired miner who presents to hospital as an emergency with acute shortness of breath, fatigue, confusion and a productive cough sputum (whitish). Mr B is an ex-smoker who used to smokes 20 cigarettes per day and just stop smoking last month.

His past medical history is unknown. On examination: blood pressure (BP) 130/75 mmHg, temperature 37.5 °C, pulse 98 bpm, respiratory rate 28 breaths/min.

Lab results; chest X-ray- no consolidation seen.

Arterial blood gases Arterial blood gases: pH 7.30 (7.35-7.45); pO_2 74mmHg (90-100mmHg); pCO_2 51 mmHg (35-45 mmHg)

U & E; Na^+ 135 mmol/l (135-145 mmol/l); Cl^- 99 mmol/l (92-103 mmol/l) electrolytes;; HCO_3^- 24 mmol/l (22-26 mmol/l)

- a. Base on the information above;
 - I. What is the diagnosis of the acid-base disorder above? [1 mark]
 - II. provide the rational for your diagnosis above [3 marks]
- b. Describe the pathophysiology of the signs/symptoms of the acid-base disorder above [3 marks]
- c. Provide pharmacological interventions (based on Lesotho STG 2022) [3 marks]

LIVER FUNCTION

Question 3

[10 marks]

Pt: Mr. MDR (60-year-old) an ex-miner and ex-alcoholic, presenting with a complaint of yellowish itchy skins and eyes for a month in the hospital.

M/H: Mr.MDR, started category I anti-TB treatment (Rifampicin/Isoniazid/Pyrazinamide/Ethambutol) + pyridoxine 25 mg p.o od for a month ago

P/E: nutritional status average, jaundice (++) , no ascites,

Labs: ALT 130 U/l (3 - 58) U/l, AST 126 U/L (12-58) U/L

- a. Provide an interpretation of Mr. MDR's presenting signs and symptoms. [4 marks]
- b. Using **DILIN** (Drug-Induced –Liver Injury Network) grading scale predict the prognosis (severity) of Mr. MDR liver function. [1 mark]
- c. Base on the above information;
 - I. Explain if any changes, should be made to Mr. MDR 's anti-TB treatment at this point and justify your answer [3 marks]
 - II. Discuss additional interventions necessary to treat Mr. MDR 's presenting symptoms. [2 marks]

DM, HTN AND NUTRITIONAL SUPPORT

Question 4

[10 marks]

Pt: Mrs. TR is a 44 years' female who visited your pharmacy complaining of confusion, dizziness and excessive thirst for (1/52)

M/H: Known diabetes mellitus and HTN patient on Tx

P/E: height 160 cm, weight 69.8 kg; BP 160/101 mmHg, HR 92 bpm

- a. Provide a detailed analysis of Mrs. TR health status. [4 marks]
- b. On the basis of the analysis above, develop a nutrition plan for Mrs. TR. [6 marks]

HAEMATOLOGY

Question 5

[10 marks]

Pt: JRR, 56-year-old male with a history of diarrhoea and weight loss (> 1 month), and inability to walk (x 2/7) admitted for further investigations.

M/H: no chronic conditions

P/E: nutritional status: wasting (+++); dehydration (++); BP 105/60 mmHg, HR 104 bpm, RR 28/minutes

Labs: FBG 5.6 mmol/l [5.6-6.9];

U & E Na⁺ 130 mmol/l [135-145], K⁺ 3.6 mmol/l [3.5-5.5], eGFR 90 mmol/l;

FBC: Hb 6.5 g/dl (14 – 18)

:MCV 72 pg/cell (80 - 100)

:MCH 28 pg/cell (27 - 33)

: PLT 80 x10³/µl (130 - 400 x 10³/ µl)

- a. Provide a detailed interpretation of JRR's haematological findings. [4 marks]
- b. Develop a clinical management plan for JRR that addresses his
- I. electrolyte disturbances [2 marks]
 - II. haematological disturbances [2 marks]
 - III. nutritional needs. [2 marks]

FORMULAS

Cockcroft-Gault (male) = $((140 - \text{Age (years)}) \times \text{weight (kg)}) / (\text{scr (mg/dl)} \times 72)$

eGRF (female) = 0.85 eGFR (male)

CKD-EPI, Female = $144 \times [\text{scr (umol/l)} / 61.9]^{-1.209} \times (0.993)^{\text{Age}}$

MDRD, Female = $175 \times (\text{scr (umol/l)} / 88.4)^{-1.154} \times \text{age (years)}^{-0.203} \times 0.742$

Adjustment formula:

Corrected $[\text{Ca}^{2+}]$ mmol/l = serum $[\text{Ca}^{2+}]$ mmol/l + $0.02(40 - [\text{Pt's albumin}] \text{ g/l})$