The Council of Pharmaceutical Society of Uganda
Final Qualifying/Pre-registration examination
4th September 2025

Time: 3 hours
Index No.....

Instructions

1. Attempt **ALL** questions
2. Start each question on a **SEPARATE** page of the answer booklet
3. Write your index number **CLEARLY** on all answer sheets provided
4. Be specific and precise while answering questions
5. Answer **ALL** questions in the Answer Booklet Provided.

Question one (1)

A 65-year-old male smoker was rushed to the Mulago Hospital emergency unit with a 3-hour history of chest pain and nausea. On physical examination, he was diaphoretic and appeared ashen, his Heart rate and rhythm are regular, and no S3 or S4 sounds present, Height 158cm, Weight 78Kg, Supine BP 145/93mmHg, HR 105 beats per minute, respiratory rate 32 breaths/minute and SPO2 92%.

Investigations on admission:

12 lead ECG showed 2.5 mm ST-segment elevation in V2 and V3; Troponin I - **0.19** µg/mL *(<0.10)*; CK-MB - **1.1** ng/mL *(0.5-4.0)*; RBS **8.1** mmol/L

Further lab results:

Urea	**4.8** mmol/L *(3-7)*
Creatinine	**112** µmol/L *(50-125)*
Na+	**142** mmol/L *(135-148)*
K+	**3.8** mmol/L *(3.5-5.0)*
TC	**6.2** mmol/L *(<5.1)*
LDLC	**4.1** mmol/L *(<3.0)*
HDLC	**0.9** mmol/L *(>1.0)*
TG	**1.9** mmol/L *(<1.7)*

The working diagnosis in this patient was an acute coronary syndrome.

i. State the **three (3)** types of acute coronary syndromes **(3 marks)**
ii. What is your assessment of this patient? **(4 marks)**
iii. State **three (3)** modifiable cardiovascular disease risk factors in this patient **(3 marks)**
iv. State the **four (4)** immediate treatment goals (within 24 hours) in this patient and the treatment (s) you would recommend to achieve each of the goals. Tabulate your responses **(10 marks)**

Question two (2)

a) A 32-year-old G2 is admitted to labor and delivery unit at 30 weeks' gestation complaining of a severe headache and blurred vision. Her BP is 200/110 mmHg with 2+ proteinuria on urinalysis. Repeat BP a few hours later is 180/110 mmHg. Laboratory studies showed a normal hematocrit, platelet count, and liver transaminase levels.

i. State **three (3)** goals and their recommended treatment (s) for this patient **(3 marks)**

ii. A loading dose of 20 ml I.V 4 g Magnesium Sulphate 20% w/v is to be administered over 20 minutes period. Using a stock solution of 4 g Magnesium Sulphate 50% w/v and normal saline as a diluent, show the dilution. **(3 marks)**

iii. State **four (4)** indications of Magnesium Sulphate **(2 marks)**

b) An 86 kg adult patient is diagnosed with severe malaria and prescribed artesunate injection. The injection is available as 60 mg powder in vials. According to guidelines, artesunate should be administered at 2.4 mg/kg intravenously at 0, 12, and 24 hours, then once daily until the patient can tolerate oral medication.

i. Calculate the number of vials you will dispense for the first 24 hours for this patient? **(3 marks)**

ii. After 24 hours on treatment, a repeat blood smear shows high levels of parasitemia. Outline four (4) reasons for persistent parasitemia in this patient **(2 marks)**

c) You have been appointed a pharmacist at a hospital that wants to open an Opioid Replacement Therapy (ORT)/Opioid Substitution Therapy (OST) unit.

Note: The rest of essential medicines to run other hospital units are already provided

i. List **six (6)** critical (specialist) medicines to stock in the unit **(3 marks)**

ii. Outline **four (4)** challenges and how they can be minimized for patients treated with antipsychotic drugs **(4 marks)**

Question three (3)

Kyakatara General Hospital has been grappling with a challenge of expired drugs and in the recently concluded financial year, drugs worth 300 million Uganda shillings expired at the facility.

i. As a newly recruited pharmacist at the Hospital, outline **five (5)** strategies, you will use to reduce expiries **(5 marks)**

ii. List **four (4)** advantages of having a limited list of essential medicines and health supplies **(2 marks)**

Carefully analyze the logistics data in the table below for ceftriaxone Injection 1g Vial at Kyakatara General Hospital.

Month	Consumption data	Days out of stock	Adjustments	Comment
June 2025	369	0	-20	To Lwala HCIV
July 2025	210	5	+50	From Oyam HCIV
August 2025	145	4	+100	From Soroti Hospital

A physical count as of 31st August, 2025 documented a balance of 5 vials. Maximum stock level is 4 months and minimum stock level is 2 months.

iii. Calculate the months of stock of ceftriaxone Injection by the end of August in Kyakatara Hospital **(5 marks)**

iv. Calculate the quantities of Ceftriaxone Injection to order at the end of August **(5 marks)**

v. State **six (6)** circumstances under which a redistribution may be triggered in the Hospital **(3 marks)**

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Question four (4)

a) A pharmaceutical company, XYZ Pharmaceuticals, has developed a novel medication for treating diabetes, which they believe has the potential to revolutionize the treatment of the disease in Uganda. However, the National Drug Authority (NDA) has not approved the medication due to lack of clinical trial data. The company is eager to bring the medication to market, but they are not aware of the regulatory requirements and the potential risks of non-compliance.

As a new Pharmacist, you have been approached by XYZ Pharmaceuticals to advise them on how to navigate this situation.

i. Outline the regulatory steps the pharmacist must take to get the clinical trial approval by the NDA **(6 marks)**

ii. Outline four (4) potential risks if the medication is marketed without approval **(4 marks)**

b) KI is a consultant pharmacist of Whizee Pharmaceuticals Ltd that deals in manufacturing of both herbal medicines and conventional medicines in Uganda, within the same site. The company is licensed by the National Drug Authority and wishes to seek marketing authorization for Whizee Herbal Cough Syrup and Whizeedol (a generic brand of a paracetamol) to sell them within Uganda.

i. Define marketing authorization? **(1 mark)**

ii. What general name is given to the compilation of documents KI must submit for marketing authorization? **(1 mark)**

iii. Mention the **two (2)** forms of marketing authorization that he may seek to obtain for the two products? **(2 marks)**

iv. Outline **three (3)** similarities and **three (3)** differences in requirements for marketing authorization for herbal and conventional medicines **(6 marks)**

Question Five (5)

a) The holder of a Manufacturing Authorization must manufacture medicinal products to ensure that they are fit for their intended use, comply with the requirements of the Marketing Authorization, and do not place patients at risk due to inadequate safety, quality, or efficacy. To achieve this quality objective, Company A has hired you to comprehensively design and implement a Pharmaceutical Quality System.

i. Outline **five (5)** components of a Pharmaceutical Quality system? **(5 marks)**

ii. State the **two (2)** principles of Quality Risk Management? **(2 marks)**

iii. Define Data Integrity and its principles? **(3 marks)**

b)

i. Shelf-life determination is one of the requirements for marketing a finished pharmaceutical product. propose the stability design/protocol that the manufacturer would need to submit at the time of registration. **(5 marks)**

ii. What is the change in pH on adding 0.02 mol of sodium hydroxide to a liter of a buffer solution containing 0.5 M of sodium acetate and 0.5 M acetic acid? The pK_a value of acetic acid is 4.76 at 25°C? **(5 marks)**

Question Six (6)

The Proud Physician

David, an intern pharmacist, is performing a medication reconciliation for a 78-year-old patient newly admitted to the hospital with a complex medical history of heart failure and chronic kidney disease. During his review, David discovers a newly prescribed medication has a significant drug-drug interaction with an existing medication, posing a serious risk of dangerously high potassium levels—a condition known as hyperkalemia—which is particularly hazardous for a patient with compromised kidney function.

Concerned, David contacts the prescribing physician, a senior doctor with a reputation for being dismissive. The physician brushes off David's warning, confidently stating, "I've prescribed this combination many times, and its fine. The benefit to the patient outweighs any minimal risk." Despite the physician's curt response, David remains convinced the potential for harm is too great to ignore.

i. What is the core conflict in this scenario, and what ethical principles are at stake? **(5 marks)**

ii. What steps should David take to address the potential for patient harm, despite the physician's dismissive attitude? **(5 marks)**

iii. What is the ethical obligation of the Physician and the pharmacist in view of the inter-professional relationship? **(5 marks)**

iv. If David's intervention is ignored and the patient suffers an adverse event, who could be held ethically and legally liable? **(5 marks)**

END

Council of the Pharmaceutical Society of Uganda (PSU)

Pre-registration examination

Date: 22nd August 2024 **Time: 3 hours**

Index No..... .....

Instructions

1. Attempt **ALL** questions.
2. Begin each question on a **FRESH** page of the answer booklet provided.
3. Write your index number **CLEARLY** on each page of the answer booklet.

Question one (1)

MP, a 38-year-old, 60-kg woman with a 10-year history of type 1 diabetes was brought to emergency department by her family with complains of abdominal tenderness, nausea, and vomiting. Because she has been unable to eat, she has omitted her usual morning dose of insulin for the past 2 days. **Physical examination** reveals an ill-appearing woman who is lethargic but responsive. Her temperature is 37^{0}C. Skin turgor is poor, mucous membranes are dry, and her eyeballs are shrunken and soft. MP's lungs are clear, but respirations are deep and her breath has a fruity odor. Cardiac examination is within normal limits. In the supine position, MP's pulse rate is 115 beats/minute and her BP is 105/60 mm Hg. In the upright position, her pulse increased to 140 beats/minute, and her BP dropped to 85/40 mm Hg. There is mild, diffuse tenderness over her abdomen.

Laboratory results on admission: RBS, 25mmol/L; Sodium (Na), 148 mEq/L (normal 135-147); Potassium (K), 5.2 mEq/L (normal 3.5-5.0); Chloride (Cl), 106 mEq/L(normal 95-105); HCO3, 10 mEq/L (normal 22-28); Hemoglobin, 15.7 g/dL; White blood cell count, 15,000/μL with 3% bands (normal, 3%–5%), 70% polymorphonuclear neutrophils (normal, 54%–62%), and 27% lymphocytes (normal, 25%–33%). Serum ketones, moderate at 1:10 dilution (normal, negative).

The urinalysis showed the following: Glucose, 2+ (normal, 0); Moderate ketones (normal, 0); pH, 5.5 (normal, 4.6–8); Specific gravity, 1.029 (normal, 1.020–1.025); No white blood cells, red blood cells, bacteria, or casts.

Arterial blood gas results were as follows: pH, 7.05 (normal, 7.36–7.44); PCO2, 20 mm Hg (normal, 35–45); PO2, 120 mm Hg (normal, 90–100). A diagnosis of diabetic ketoacidosis (DKA) secondary to type I diabetes was made.

I. List **three (3)** characteristic findings suggestive of DKA **(3 marks)**

II. State **three (3)** main goals of treatment for DKA in this patient and the medicines you would recommend to achieve the goals. Tabulate your responses **(6 marks)**

III. With an example, outline **five (5)** types/formulations of insulin **(5 marks)**

IV. MP improved and was discharged on 12 units of insulin glargine every evening and 4 units of regular insulin before breakfast, lunch and supper. She was taught the "450 rule" to estimate her premeal insulin requirements and "1500 rule" to estimate her correction/sensitivity factor in cases of unusual excursions from her goal blood glucose levels. Based on this information, calculate the insulin carbohydrate ratio and sensitivity factor for this patient. **(4 marks)**

V. How would you monitor glycaemic control in this patient? **(2 marks)**

Question two (2)

(a) Carboplatin is one of the medicines included in the essential medicine list of Uganda.

I. State **four (4)** specific indications of Carboplatin **(2marks)**

II. State **three (3)** calculated patient parameters used to determine the dose of Carboplatin **(3 marks)**

III. State **four (4)** pre- and **one (1)** post-Carboplatin treatment medication highlighting the rationale for each. Tabulate your answers **(5 marks)**

(b) A patient with bed sores was prescribed tab morphine 70mg morning and 100mg at night for 21 days. He was also advised to regularly clean the bed sores with alcohol 75% v/v. The strengths of morphine tablets available are; 10mg @ UGX 200, 30mg @ UGX 300 and 60mg @ UGX 500, while alcohol is stocked in strengths of 15% v/v and 95% v/v.

I. Calculate the least number of tablets of morphine for each strength to be used and hence the total cost for this prescription **(6 marks)**

II. Calculate the volume of the different stock solutions to prepare 500ml of alcohol 75% v/v **(2 marks)**

III. Outline **four (4)** disadvantages of alcohol-based disinfectants **(2 marks)**

Question three (3)

According to the World Health Organization (WHO) estimates, 1 in 10 medicines circulating in low-income and middle-income countries (LMICs) is either substandard or falsified. Approximately 1 million people worldwide die every year from substandard and falsified medical products (SFMPs).

I. State seven (7) attributes that makes a product to be categorized as SFMPs. **(7 marks)**

II. "*There is no universal health coverage, no health security without access to quality medicines.*" Substantiate this statement by briefly explaining how SFMPs affect health security **(3 marks)**

III. Medicines and products found to be substandard and falsified in the market can trigger a recall. Explain with suitable examples the following concepts

1) Recall classification **(3 marks)**
2) Recall types **(4 marks)**
3) Recall levels **(3 marks)**

Question four (4)

I. It is estimated that 90% of the pharmaceuticals used in Uganda are imported hence requiring a robust quality assurance system for product stability and safety. Outline eight (8) actions that can be undertaken as part of the quality assurance system to ensure that pharmaceutical products imported into Uganda are stable and safe before, during and after importation **(8 marks)**

II. With an example in each case explain the following terms with respect to quality control of pharmaceuticals **(6 marks)**

1) Identity
2) Purity
3) Potency
4) Assay
5) Batch certificate
6) Certificate of pharmaceutical product

III. Explain with suitable examples the WHO AWaRe approach to use of antimicrobials **(6 marks)**

Question five (5)

a) During the process of manufacture of finished products, excipients are added for various reasons.

I. With an example, state the roles of a lubricant and a buffer in manufacture of finished products **(2 Marks)**

II. Explain the significance of **four (4)** tests done before release of IV fluid preparation **(8 marks)**

b) The Strength of Digoxin Tablet is 0.5mg and the Batch size is 2,000,000 (Two Million) Tablets. The gross weight of each Tablet is 50mg.

I. Calculate the Quantity of the Active Pharmaceutical Ingredient (API) needed to Manufacture the Batch **(1 Mark)**

II. The Batch of digoxin has to be made / blended in three stages

- The first blend is of 25mg of API in 50mg of the blended mixture
- The second blend is 4mg of API in 50mg of the blended mixture
- The third blend for compression is 0.5mg of API in 50mg blend mixture

Calculate the quantity of excipients added at each stage **(9 Marks)**

Question six (6)

I. Laws are the codification of ethics. The NDPA Act 1993, CAP 206, of the Laws of Uganda is one such a law. Accordingly, a key purpose of the "*National Drug Policy shall be to ensure that essential, safe, efficacious and cost-effective drugs are made available to the entire population of Uganda to provide satisfactory health care*". State **three (3)** principles of ethics codified by this provision. In each case explain how the ethical principle is fulfilled in that provision of the law. Tabulate your responses **(9 marks)**

II. The Pharmacy and Drugs Act 1970, CAP 280, of the Laws of Uganda imposes the duty of supplying drugs on the pharmacist but ties that duty to certain conditions. State **five (5)** conditions in that provision which compels the pharmacist to comply, according to the Act and **two (2)** conditions that allow him or her not to comply. **(6 marks)**

III. State **five (5)** principles of the Pharmacists Code of Conduct of 2014, explaining in each case how that principle protects the patient or the Public. **(5 marks)**

End

Council of the Pharmaceutical Society of Uganda (PSU)

Pre-internship examination

Date: 24th February 2023 **Time: 3 hours**

Index No.....

Instructions

1. Attempt **ALL** questions.
2. Begin each question on a **FRESH** page of the answer booklet provided.
3. Write your index number **CLEARLY** on each page of the answer booklet.

Question one (1)

A 46-year-old male known hypertensive patient for the last 5 years was brought to Mbarara Regional Referral Hospital having felt unwell for the past one month. His chief complaints were occasional fever, fatigue and muscle aches. **Examination:** BP 150/110mmHg, HR 84 Bpm, Temp 37°C, Weight 76kg, Height (62 inches/157cm/5.2 feet). **Investigations:** Urea 9.8mmol/l (range 3.0-6.5), Creatinine 125µmol/l (range 6.0-100), Potassium 4.0mmol/l (range 3.5-5.0), Total cholesterol 15mmol/l (normal <5mmol/l), Random plasma glucose level, 14mmol/l and confirmed HIV+. **Medication history:** He was taking Amlodipine 10mg O.D. He was sent to the ART clinic for initiation of ART.

a. Write a SOAP (Subjective, Objective, Assessment and Plan) note for this patient. Tabulate your responses **(14 marks)**

b. Based on your assessment and plan, state the ART regimen and **two (2)** other medicines you would recommend for this patient **(6 marks)**

Question two (2)

a) State **five (5)** dosage form modifications for oral tablets and give the purpose for each modification **(5 marks)**

b) State **five (5)** components of pharmacokinetics and for each component indicate one parameter used in pharmacokinetic studies **(5 marks)**

c) Outline **five (5)** biological factors that cause variation in drug pharmacokinetics **(5 marks)**

d) State one application of pharmacokinetics principles in each of the following: drug discovery, dosage form design, therapeutics, pharmaceutical care and toxicology **(5 marks)**

Question three (3)

a)

I. Outline **five (5)** indications of Lamotrigine **(5 marks)**

II. A patient is prescribed lamotrigine **ten (10)** days course as follows; 250mg daily for 3 days then 125mg for the remaining days. You have in stock, lamotrigine 150mg oral dispersible tablets that remain stable on dissolution in water for 24 hours. The patient is to use 100ml of drinking water for preparation of each daily dose. How many tablets will be needed for this prescription. Give instructions to the patient on daily dosing (assume complete dissolution). **(7 marks)**

b)

I. Outline **four (4)** variables used to calculate loading dose **(4 mark)**

II. A 70kg patient is prescribed an intravenous drug as follows; loading dose of 20mg bolus; followed by 0.8mg/kg infusion over 60 minutes, and finally 0.6 mg/kg over 40 minutes. Calculate the total dose administered to this patient. **(4 marks)**

Question four (4)

a) Multiple Choice Questions **(10 marks)**

The thalidomide incident opened the eyes of regulators to add strict measures in drug approvals. Answer questions I-II:

I. what was that addition?
   A. efficacy must be proven beyond doubt
   B. safety must be proven in medium to long term
   C. manufacturer must be known beyond doubt
   D. users must be documented

II. What principle of ethics was violated by this incident?
   A. benevolence
   B. non maleficence
   C. autonomy
   D. justice

As a graduate pharmacist, a client comes to you asking you to diagnose and prescribe for them. On turning them down the patient asks "what then are you"?

Using the following options as answers: 3 to 6.

   A. only pharmacists have a law
   B. only pharmacists know medicines
   C. the laws establishing the two are different
   D. the pharmacists is the supervisor of the other

Please help the patient clarify on:

III. the boundaries between a pharmacist and a medical doctor C
IV. the boundaries between a pharmacist and an intern pharmacist D
V. Why the patient cannot determine what should be done A
VI. Why the patient cannot hold primary responsibility if anything goes wrong B

Use the following choices to answer Questions VII-X

   A. moral principles that govern law making regarding patient rights
   B. ideal principles that attract severe punishment
   C. general principles that do not apply anywhere
   D. specific principles that apply every professional
   E. regulators making codes for professionals
   F. trainers making notes for students
   G. professional bodies adjudicating on the conduct of professionals
   H. trainess deciding which steps to take

VII. The cardinal principles of ethics refer to:
VIII. Professional code of ethics refers to
IX. The cardinal principles of ethics are used by:
X. Professional code of ethics are used by

b) Outline five (5) aspects of the pharmacy profession that are regulated by ethics rather than law **(10 marks)**

Question five (5)

a) Define wildcrafting **(1 mark)**
b) State two (2) disadvantages of wildcrafting **(2 marks)**
c) State two (2) ways that be used to reduce wildcrafting **(2 marks)**

d) Phytochemical variation is a major challenge in commercial production of Herbal Medicinal Products. Indicate how each of the following factors leads to phytochemical variation giving one example of the compound or class of compounds affected by the factor **(5 marks)**

I. Rainfall
II. Temperatures
III. Light radiation
IV. Mutations
V. Breeding

e) Complete the table below with most appropriate information **(10 marks)**

Compound	**Pharmaceutical/clinical use**	**Phytochemical class**	**Plant Source**	**Family of the plant source**
Quinine				
Artemisinin				
Atropine				
Diosgenin				
Digoxin				

Question six (6)

a) The table below lists some terms commonly encountered in pharmaceutical analysis (column a) and the analytical techniques (column b) commonly applied. Match each term in column (a) with the technique selected from column (b) most associated with the term. (Hint: some techniques may be used more than once or not at all). **(10 marks)**

(a) Terms	**(b) Techniques**
1. Bragg's law	A. Atomic absorption spectrophotometry
2. Chemical shift	B. Differential scanning calorimetry
3. Chromophore	C. Electrophoresis
4. Detection antibody	D. Enzyme linked immunosorbent assay (ELISA)
5. Electron-impact ionization	E. Flame photometry
6. Enantiomeric purity	F. Fluorimetry
7. Excitation/emission wavelength	G. Gas chromatography
8. Fingerprint region	H. Gravimetric analysis
9. Hausner ratio	I. High performance liquid chromatography (HPLC)
10. Hollow cathode lamp	J. Infrared (IR) spectroscopy
11. Mass-to-charge ratio	K. Mass spectrometry
12. pKa	L. Non aqueous titration
13. Retardation factor	M. Nuclear magnetic resonance (NMR) spectroscopy
14. Retention time	N. Polarimetry
15. Selective ion monitoring	O. Potentiometric titration
16. Specific rotation	P. Powder density tester
17. Spin-spin coupling	Q. Tandem mass spectrometry
18. Stokes shift	R. Thin layer chromatography (TLC)
19. Thermal excitation	S. Ultraviolet/Visible (UV/Vis) spectroscopy
20. Wave number	T. X-ray crystallography

b) State the role of the following excipients in pharmaceutical manufacture of different dosage forms **(5 marks)**

I. Glidants
II. Surfactants
III. Preservatives
IV. Disintegrants
V. Bulking agents

C) Select the most appropriate answer from the options provided **(5 marks)**

I. Borax in creams is used as
   A. Surfactant
   B. Bulking Agent
   C. Sweetener
   D. Antimicrobial

II. The following are the roles of Coating in tablets except
   A. To mask unpleasant taste
   B. To give shape to the tablet
   C. Sweetener
   D. Physical and chemical protection

III. Which test is used to determine the strength of tablets to resist shake and fall
   A. Weight variation
   B. Friability
   C. Disintegration
   D. Assay

IV. Magnesium Stearate in tablet manufacture is used as
   A. Anti-adherent
   B. Antioxidant
   C. Sweetener
   D. Preservative

V. Angle of repose of $\leq 30^{\circ}$ indicates
   A. Poor powder flow
   B. Moderate powder flow
   C. Good powder flow
   D. Excellent powder flow

End

The Council of Pharmaceutical Society of Uganda

Pre-registration examination

Date: 4th November 2021 **Time:** 3 hours

Index No.....f.....

Instructions

1. Attempt **ALL** questions
2. Start each question on a **SEPARATE** page of the answer booklet
3. Write your index number **CLEARLY** on all answer sheets provided
4. Be specific and precise while answering questions

Question one (1)

a) A 50 year old male hypertensive patient for 10 years came to KK Hospital having felt unwell for the past one month. His chief complaints were occasional fever, fatigue and muscle aches. **Examination:** BP 140/110mmHg, HR 84 Bpm, Temp 37°C, Weight 80kg Height (65 inches/165cm/5.4 feet). **Investigations:** Urea 9.8mmol/l (range 3.0-6.5), Creatinine 130µmol/l (range 6.0-100), Potassium 4.0mmol/l (range 3.5-5.0), Total cholesterol 15mmol/l (270mg/dl), Random plasma glucose level, 14mmol/l and confirmed HIV+. **Medication history:** He was taking Amlodipine 10mg O.D. He was sent to the ART clinic for initiation of ART.

I. State four (4) goals of therapy in this patient **(2 marks)**

II. Recommend a first line ART regimen for this patient. Explain your choice of the regimen **(8 marks)**

III. State other non-ART medicines you would recommend including the rationale for this patient **(3 marks)**

IV. How would you monitor ART therapy in this patient **(2 marks)**

b) A Total Parenteral Nutrition (TPN) order reads: Parenteral Nutrition: 20% dextrose, 5% amino acids and 3% lipids @ 200 ml/hour for 24 hours. How many kcals are supplied by this order? **(5 marks)**

Question two (2)

a) A newly licensed Pharmaceutical manufacturer in Uganda intends to manufacture for the first time and distribute its product on the Ugandan market. You have been hired as the Regulatory Pharmacist. Advise the company on documents to be submitted to NDA in order to get permission to manufacture the first THREE batches of a product. **(11 marks)**

b) Alexander Pharmaceuticals Ltd, a duly Licensed importer of Pharmaceuticals imported Phenobarbital sodium Injection 200mg/ml into Uganda and made a Pyschotropic returns of 575.53g drug base to NDA. Calculate the Number of ampoules imported if the drug was packed in 2ml ampoules.

Hint: $C_{12}H_{12}N_2O_3$ =232.24; Na=21.98 **(9 marks)**

Question three (3)

a) A 54-year-old female patient, an oncologist selects the drug temozolomide, an antitumor agent used in the treatment of refractory astrocytoma (brain tumor). The drug is used as part of a 28-day regimen, during which the first five days of treatment include temozolomide at a once-daily dose of 150 mg/m^2 / day. The patient's medical chart indicates that she measures 152.4 cm. in height and weighs 53.2kg. You are asked to determine the proper combination of available capsules to use in dosing the patient. The drug is available in capsules containing 5, 20, 100, and 250 mg of temozolomide.

I. Outline any **Three (3)** patient related factors you would want to verify before initiating this treatment **(3 marks)**

II. Calculate the least number of capsule(s) (of each strength), needed for this prescription? **(9 marks)**

Hint; $BSA(sqm) = \frac{\sqrt{\text{height (cm)X weight(kg)}}}{3600}$

b) JB a 22-year old man was admitted to hospital via emergency clinic after being arrested by police for causing "a disturbance". He was very agitated and suspicious of shoppers around him. He was managed as a highly agitated patient and given medicines for rapid tranquilization. Later he was maintained on an antipsychotic and a mood stabilizer. A few days later, he suffered extrapyramidal side effects (EPSE) which were managed.

I. Outline **three (3)** medicines that can be combined for rapid tranquilization treatment. **(3 marks)**

II. State **three (3)** EPSE and propose **two (2)** ways of managing them. **(5 marks)**

Question four (4)

a) An effective national pharmaceutical supply chain is dependent on utilization of knowledge in pharmaceutics, pharmacology, drug regulation, therapeutics, and pharmaco-economics. **Explain, citing an example in each case,** how the knowledge in these aspects is applied to maintain an effective national pharmaceutical supply chain. **(10marks)**

b) State **one purpose** of each of the following tools in drug management. **(5marks)**

I. Stock book
II. Stock card
III. Issu
e voucher
IV. Dispensing log
V. Requisition voucher

c) Give five (5) scenarios to explain the importance of pharmaceutical logistics management in effective health services delivery **(5 marks)**

Question five (5)

a) Fighting Antimicrobial resistance (AMR) is one of the UN's sustainable development goals. Give **THREE (3)** ways, with at least **TWO (2)** strategies each, by which manufacturers of antimicrobials in Uganda can contribute towards AMR stewardship and minimize resistance. **(10 marks)**

b) You have been hired as a quality control pharmacist for a new drug manufacturing company. Part of your immediate tasks is to set up an analytical quality control laboratory for the assay of a range of solids, semisolids, liquids and gaseous formulations. For each formulation, state the technique, sample preparation requirement and the limitation of the method. Tabulate your answer as below. **(10 marks)**

Formulation type	**Technique**	**Sample preparation**	**Limitation of method**

Question six (6)

a) For questions I-X, choose most correct answer from the options provided

I. Which law governs the pharmacy profession in Uganda?
   A. NDPA-1993
   B. PDA-1971
   C. PDA-1970
   D. All the above
   E. None of the above
   F. A&C

II. Which instrument is used to decide on an ethical complaint against a pharmacist?
   A. Cardinal principles
   B. Code of conduct
   C. Professional misconduct as per second schedule of PDA
   D. All the above
   E. None of the above
   F. B&C

III. Name the body that hears cases of professional misconduct against pharmacists.
   A. Council of PSU
   B. Ethics committee
   C. Disciplinary committee
   D. Pharmacy Board
   E. None of the above
   F. C&D

IV. Which of the following is a criminal offence for a pharmacist?
   A. Professional misconduct
   B. Ethical misconduct
   C. Absenteeism
   D. Obtaining money by False pretense
   E. All the above
   F. A & D

V. Which of the following can only be appealed in the High Court?
   A. Decisions of the ethics committee
   B. Decisions of the disciplinary committee
   C. Decisions of NDA
   D. Decisions of PSU
   E. None of the above
   F. B & C

VI. William a registered pharmacist is accused of selling a POM to a human patient without a prescription. Which of the following is not a valid defense, even if true?
   A. Was a serious Emergency
   B. Was a Minor ailment
   C. No medical officer or dental surgeon within reasonable distance
   D. Nearby dental surgeons and medical officers are also dispensing

E. Didn't know
F. D&E

VII. Betty a 16 year old girl has got pregnant during lockdown. The president has announced schools opening in January 2021. She wants to buy an abortifacient so that she can get back to school, advise her as a pharmacist
A. I can only help you with your parent's consent
B. I can only dispense on valid prescription
C. I can only sell to you without a receipt
D. It's your fundamental human right to decide for your future and I will give you the medicine
E. None of the above
F. All the above

VIII. A medical officer is consulting you on the use of a hypotensive drug you know is on recall. It's not on your stock list. What do you advise?
A. No obligation, because you neither have nor sold it to them
B. Help them return it to the supplier
C. Give them correct information as per BNF
D. Report them to NDA
E. None of the above
F. B&C

IX. A patient goes out with a drug you know was dispensed in error by a senior colleague. There's no serious side effect with the use of the drug, but also no therapeutic benefits for the condition. What would you do?
A. Call the patient to bring back the drug at the risk of the image of your pharmacy?
B. Wait for them, and correct it only if they come back?
C. Not to tell the patient even if they come to protect the trust
D. Tell them the colleague made a mistake, and advise them to always come to you
E. None of the above
F. A & D

X. You have finished your duty shift and want to handover to go enjoy yourself. Your colleague shows up drunk to take over. What do you do?
A. Let them sort it with the boss
B. Stay and work together
C. Stand in and let them go back
D. Send him back and close the place
E. None of the above
F. A&C

b) All over the world, pharmacists are regarded to be the last contacted of any healthcare professional in the hospital. Use this fact to justify why the following can amount to ethical misconduct for a pharmacist. **(10 marks)**

I. Incompetence
II. Late coming
III. Poor communication
IV. Poor relation with other health workers
V. Poor dress code

END

The Council of Pharmaceutical Society of Uganda

Pre-registration examination

29th October 2020

Time: 9:00am-12.00pm (3 hours)

Index No.....

Instructions

1. Attempt **ALL** questions
2. Answer each question on **SEPARATE** answer sheet (s) of paper
3. Write your index number **CLEARLY** on all answer sheets provided
4. Be specific and price on your recommendations while answering clinical cases.

Success

Question one (1)

A prescription order for 25,000 units of heparin in 250 ml of Dextrose 5% is to be infused at a rate of 1000 units/hr,

a) Give any 3 indications and 3 side effects of heparin **(3 marks)**
b) Calculate the rate of the infusion (in ml/hr) **(3 marks)**
c) Given that the drip dropper is calibrated to dispense 30drops per ml, calculate the I.V rate in drops per minute **(6 marks)**
d) Outline 4 reasons why correct calculation of medication infusion rates is crucial in clinical care **(4 marks)**
e) State four (4) aspects of counseling information for patients on heparin? **(4 marks)**

Question two (2)

a) Outline **Six (6)** characteristics of a pharmaceutical formulation that determine the quality of the formulation **(6 marks)**
b) Health center IVs are regarded important levels of care in the Ugandan setting because they represent the first level of health services with general outpatient and general inpatient services. You have been hired as a pharmacist at one of the health center IVs and your first assignment is to set up a comprehensive quality assurance programme for the health center.
Outline **Seven (7)** medicines management processes that you need to include in this Programme.
(14 marks)

Question three (3)

1) A patient is brought to the emergency unit and is not cooperating for administration of a laxative suppository. The attendant suggests you do it by force. You are the pharmacist on duty. State whether you will comply or not for each of the five scenarios below. Use the cardinal principles of ethics to back your answer. **(10 marks)**
    a. Attendant is a good Samaritan
    b. Patient is a minor and attendant is the mother/father
    c. Patient is an adult criminal suspect and attendant is the arresting officer
    d. Patient is an elder and attendant is the grand child
    e. Patient is claimed to be psychotic by the attendant who is the spouse
2) In this question, you have been provided with five scenarios. Use the following alternatives to answer the questions for each scenario.
    A. If only (i) and (iv) apply
    B. If only (ii) and (iii) apply
    C. If only (iii) applies
    D. If only (iv) applies
    E. If (i), (ii), (iii) and (iv) apply

    Given that, the regulation of pharmacy profession and practice is multi-faceted and the following bodies and laws apply;
    i. The Companies Act 2012
    ii. The Council of PSU under Pharmacy and Drugs Act 1970
    iii. The Pharmacy Board under Pharmacy and Drugs Act 1970
    iv. National Drug Policy and Authority Act 1993

    Identify the relevant bodies and laws involved in the following scenarios:
    1) Proprietor authorization to apply for a pharmacy license
    2) Products authorization for distribution
    3) Premises authorization to operate
    4) Professional misconduct
    5) Ethical misconduct

(10 marks)

Question four (4)

a) Company X is using only Dettol for sanitization of the manufacturing cubicles. This is being done at the beginning and end of every shift. The staff preparing and diluting the Dettol are trained and have been following the procedure outlined in the sanitization SOP. QC has observed an out of specifications for a week so far.

State any five (5) cause(s) and propose corrective and preventive actions, including ways to minimize antimicrobial resistance. **Tabulate** your responses **(10 marks)**

Cause	Corrective measures	Preventive

b) A local manufacturer has a Fluid Bed Equipment (FBE) with operating capacity of 40-90 % of full capacity for his solid dosage forms. Given full capacity of the FBE is 800L and bulk density of the granules is 0.5g/ml, which of the following batch sizes is appropriate considering single lot at granulation. Show how you arrive at your answer. **(10 marks)**
    I. Batch size 1,000,000 Tablets (350Kg)- Quantity at granulation = 211Kg
    II. Batch Size 250,000 Tablets(87.5kg)- Quantity at granulation=52.75kg

Question five (5)

a) Haruna Pharmaceuticals Ltd submitted a return to NDA of 1498.20 grams drug base of Phenobarbital Sodium injection 200mg/ml it had imported. If the drug was packed in 2ml ampoules, how many ampoules were imported?

Note: $C_{12}H_{12}N_2O_3$ = 232.24; $C_{12}H_{11}N_2NaO_3$ = 254.22 **(6marks)**

b) In Uganda, Drug regulation and use are controlled through scheduling drugs into classes. For each class, give **ONE** drug example and **TWO** Criteria used to classify the drug as such. **Tabulate** your answer **(14 marks)**

Class	Example of drug	Criteria

Question six (6)

A 70 year old male was brought to the Hospital Emergency Unit after developing right sided facial droop and dense weakness on the right side. He was very confused with slurred speech and had difficulty obeying commands. Two weeks ago, the wife reported him experiencing weakness in his right arm and appeared "vacant" while listening to radio. He is a known hypertensive patient for over 10 years and smoker. His medication on admission was Bendroflumethazide 2.5mg once daily.

Results on admission: BP: 155mmHg/95mmHg, Sodium 140mmol/L, Potassium 5.0mmol/L, Urea/BUN: 35.7mmol/L, Serum Creatinine jaffe gen 2 comp: 125µmol/L, Glucose: 12 mmol/l, Hb: 11.0, WCC: 6.0, INR 1.0. Weight: 75 Kg, Height: 170cm; =5''feet 7 inches=67 inches.

Neurological Observations: **Glasgow Coma Scale**: 9/15, Motor 5/6, verbal 2/5, eye 2/5 L>R. **Power**: Right upper limbs: 2/5, Right lower limbs: 1/5, Left Upper limbs: 5/5, Left lower limbs: 5/5.

A CT scan is carried out and shows a large area of infarction in the left cerebral hemisphere, in the distribution of the left middle cerebral artery.

A diagnosis of stroke was made.

1. What type of stroke is this patient suffering? **(2 marks)**
2. State four (4) goals of therapy in this patient **(4 marks)**
3. State the rationale for three (3) classes of medicines you would recommend for his stroke **(6 marks). Tabulate your responses**

Class	Rationale

4. What's the stage of renal failure in this patient **(4 marks)**
5. State your goal B.P and blood glucose levels in this patient and recommend a medicine each to attain your target goals **(4 marks). Tabulate your responses**

Target goal	**Medicine**

END