National Pharmacy Council
Rwanda

GUIDELINES FOR THE PRE-REGISTRATION EXAMINATION

Kigali, September 2020

National Pharmacy Council
Rwanda

FORWARD

The Mission of the Council is to ensure that the rules, honor and dignity of the pharmacy profession are complied with and ensure the protection of public health. In addition, the Council ensures compliance with the principles of morality, integrity and dedication that one essential to the practice of the pharmacy profession and ensure that all its members comply with their professional requirements and the laws and regulations governing pharmacists.

The attainment of the mission and its objectives requires critical mass of well trained and ethical pharmacy professionals.

We believe the detailed information of this document will guide both Examiners and Candidates while they are preparing for the assessment respectively.

The development and review of these guidelines have been a big achievement for the National Pharmacy council in the implementation of assessing the competencies acquired by Pharmacists during training. All NPC organs and stakeholders are therefore urged to embrace these guidelines for Pre-registration Examination for pharmacists and support its implementation.

Dr. Hahirwa Innocent
Chairperson,
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National Pharmacy Council
Rwanda

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- The Education and Research Committee of the NPC Board
- University of Rwanda (UR)
- High Education Council (HEC)
- Rwanda Food and Drugs Authority (FDA)
- Rwanda Medical and Dental Council (RMDC)

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EXECUTIVE SUMMARY

These reviewed guidelines outline the prerequisite for registration of pharmacists in Rwanda. These guidelines list the basic academic requirements to be met by candidates before application. The documentation requirements are also listed herein.

The examination for pharmacist graduate has been split into two parts; written and oral examinations. In addition, the assessment structure and style are also detailed in this document.

Upon successful completion of both parts of the examination, the applicant will qualify to apply for registration as a pharmacist in Rwanda.

LIST OF ABBREVIATION

CNS:	Central Nervous System
CPD:	Continuous Professional Development
GIT:	Gastro-Intestinal Tract
GMP:	Good Manufacturing Practices
I.D:	Identification Card
MQC:	Multiple Choice Questions
NPC:	National Pharmacy Council
SI:	International System of Units

DEFINITION OF TERMS

Assessment:	The measurement of an applicant's competencies and fitness to practice as Pharmacist in Rwanda.
Certified Document:	A document that has been certified as true copy of the original by the issuing institution or any other legal authority.
Bureau	The Bureau of the National Council Board
Council:	National Pharmacy Council.
Entry Pharmacist:	Any pharmacy professional with less than 1 year of experience.
Equivalence:	A degree that has essentially similar entry requirements, content and duration.
Evaluation:	The scrutiny of an applicant's testimonials to determine if they meet the National Pharmacy Council eligibility criteria for assessment as a pharmacist.
Examiner:	A person appointed by the board to set, administer and mark NPC Pre-registration Examination.
Indexing:	Issue of identifying number by NPC to students undertaking Bachelor of pharmacy training in approved institutions.
Internship:	A one year structured training program carried out under the supervision of the NPC approved preceptor, during which a graduate has an opportunity to consolidate his/her knowledge and skills to enable him/her to be a competent Pharmacist in Rwanda.
Professional(s):	Pharmacist(s)
Registration:	The entry into the Register of pharmacists of a person who has been certified as fit to practice as a pharmacist in Rwanda.
The Board:	The Board of National Pharmacy Council.
The Bureau:	The Bureau of the Board.

National Pharmacy Council
Rwanda

I. INTRODUCTION

The National Pharmacy Council (NPC) is an independent statutory regulatory body organization accountable for the regulation of pharmacists and pharmacy technicians in Rwanda. It has been established since 2013 by the Law No 45/2012 of 14/01/2013 relating to the organization, functioning and competence of the Council of pharmacists. The main function of the Council is to ensure that the rules, honor and dignity of the pharmacy profession are complied with and ensure the protection of public health.

NPC is mandated by the law to participate in determining standards for pharmacy education at the university level in Rwanda and provide institutions of higher learning advice with respect to pharmacy academic programs. NPC has also the responsibility to set up regulations on the minimum knowledge and skills required for all pharmacy professionals in their respective categories.

In pursuance of its mandate, the Council has set up a knowledge assessment system to evaluate the knowledge and skills of those seeking to register with the Council and ensure that they satisfy the requirements to practice the pharmacy profession in Rwanda. The Education, research and CPD committee is responsible for conducting the assessment and monitoring its conduct. Informed by the NPC Internal rules, the Pre-registration Examination guidelines were established in 2015 to determine modalities for conducting the assessment.

The first Pre-registration Examination was conducted in September 2015 and since then seven hundred seventy-three (773) pharmacy graduates have been assessed through sixteen sessions (16) with an average pass rate of fifty five percent (55%). Throughout the execution process of Pre-registration Examination, it has been realized that the current Pre-registration Examination guidelines have some gaps and do not have enough details to guide both the examiner and graduates during the assessment.

Many changes have been seen in the regulatory, training and practice environment since 2015; Moreover, regional harmonization and mutual recognition initiatives are underway and pharmacy professionals seeking to be registered in Rwanda shall be ready to compete at international level.

In this regard, the NPC reviewed and updated the Pre-registration examination guidelines to establish modalities for pre-registration examination for pharmacists in Rwanda.

II. PURPOSE OF THE GUIDELINES

These guidelines establish modalities for pre-registration examination for pharmacist in Rwanda.

III. ELIGIBILITY AND REQUIREMENTS

III.1. Eligibility for pre-registration examination for Rwandans

The following are eligibility criteria for Rwandan Nationals:

i. Must hold a bachelor's degree in pharmacy
ii. Must have completed a one-year professional internship in Rwandan settings.
iii. Must meet minimum entry requirements set by the National Pharmacy Council prior to admission to a pharmacy training program.

III.2. Eligibility for pre-registration examination for Non-Rwandan nationals

The following are eligibility criteria for non-Rwandan:

i. Must hold a bachelor's degree in pharmacy.
ii. Must have completed a one-year professional internship in Rwandan settings.
iii. Must hold a proof of registration in their countries.
iv. Must provide a Good Standing certificate or its equivalent issued by their respective pharmacists regulatory body.

III.3. Waiver for pre-registration examination

Professionals who are eligible to apply for registration without going through the Pre-registration Examination are:

i. Professionals who graduated in and before 2014 in Rwanda.
ii. Professionals recommended by the Minister in charge of Health to practice pharmacy for a specified period of time.
iii. Rwandan professionals who were in practice before 2014 in Rwanda and who graduated abroad and were identified by Board to have a valid reason of not sitting the Pre-registration Examination.
iv. Rwandan professionals who were in practice before 2014 abroad after presentation of proof of registration and license from countries in which they have been practicing.

III.4. Required documents for pre-registration examination

III.4.1. Required Documents for Rwandans

Every Rwandan candidate who wishes to sit for the Pre-registration Examination must submit an application to NPC containing the following documents:

i. An application letter addressed to the NPC chairperson;
ii. A' level certificate;
iii. A copy of pharmacy degree from a recognized university;
iv. Proof of payment of application fees;
v. Copy of the ID or passport bio-data page;
vi. Proof of professional internship.

III.4.2. Required Documents for Non- Rwandans

Non-Rwandan nationals must also submit in addition to the above the following documents:

i. Proof of registration in their home country pharmacy councils;
ii. A valid certificate of good standing issued directly to NPC by their respective pharmacy council
iii. Proof of English or French Proficiency from recognized institution, if the applicant has pursued his/her Pharmacy Training Program in any other language from either English or French.

III.4.3. Document Status:

i. If documents are in a language other than English, French or Kinyarwanda, they must be translated and certified by an official translator or relevant authority.
ii. Presentation of any fraudulent document is a criminal offence. This shall attract prosecution and barring from sitting any Pre-registration Examination for life.

IV. APPLICATION PROCESS AND CALENDAR

IV.1. Call for Application

The Council secretariat shall disseminate the call for application one month prior to the Examination through the council's website www.pharmacycouncil.rw.

The Council secretariat will start receiving applications to the Examination the next working day from the dissemination of Pre- registration Examination calendar. The Call for application expires five working days prior to the Examination date.

The applicant submits the hard copy of required documents at the National Pharmacy Council office. In special circumstances soft copies might be submitted via email.

IV.2. 5.2 Calendar

The pre-registration Examination is conducted twice a year. The first session is conducted in February of each year and the second one in September of each year.

Under special conditions, the Council can organize a special Pre-registration Examination.

V. ORGANIZATION AND IMPLEMENTATION OF THE PRE-REGISTRATION

V.1. EXAMINERS

In collaboration with the Council secretariat, the Research and Education Committee is in charge of preparing the Examination. The composition and competency of the Research and Education committee are determined by the internal rules and regulations.

When deemed necessary, the Bureau can also appoint expert(s) in various fields to reinforce the Research and Education Committee on the organization and implementation of the Pre-registration Examination.

The NPC can also assign and or collaborate with other approved institutions to organize for the Pre-registration Examination.

V.2. EXAMINATION STRUCTURE AND STYLE

The Pre-registration Examination is conducted in two types of examinations: the written examination and the interview. Only applicants who pass the written examination will be allowed to sit for the oral examination. The National Pharmacy Council shall announce proclaim time, and venue at least two working days prior to any of these examinations.

V.3. WRITTEN EXAMINATION

V.3.1. Description of the Written Examination

The field of pharmacy is broad. Questions are based on the issues that are relevant to practice in Rwanda. Questions aim to evaluate knowledge, skills and competences in the following areas: Pharmacology and Toxicology, Applied Therapeutics, Pharmacy practice, Pharmaceutics, Supply chains Management, Pharmacy laws and regulations in the Pharmacy.

The written examination consists of *one hundred (100)* ***multiple choice questions (MQCs). The candidates are required to*** *select the best answer from the responses listed.*

- The International System of units (**SI**) will be used to describe drug level and laboratory values.
- Acronyms will be written in accordance with SI and other health care publications and will be those an entry Pharmacist should recognize.
- Drug name will be referred to by its generic name or common name. In those instances where a specific trade name is used, its generic or common name will also be given.
- Negative words, such as **NOT**, **NEVER**, and **EXCEPT** are capitalized and written in boldface, in order to draw candidate's attention to the kind of response expected.

- The exam may contain some questions that require scientific calculations. Candidates shall secure their own scientific calculator prior to entering the examination room.
- The candidates are not permitted to bring in whatever printed materials, or electronic reference.

V.3.2. Assessed areas in Written Examination

V.3.2.1. Pharmacology and Toxicology (15%)

i. Basic principles of Pharmacology:

Pharmacokinetics and pharmacodynamics.

The candidate should be able to explain:

- Fundamental principles of pharmacokinetics (Absorption, Distributions, Metabolism, Elimination of drugs), and pharmacodynamics (Drugs-receptor interactions).
- The process by which new drugs are discovered, developed, tested and finally approved by the competent entities for use in the clinic.

ii. Basic principles of Toxicology:

Toxico-kinetics and toxico-dynamics.

The candidate should be able to explain:

- Fundamental principles of Toxico-kinetics: Absorption; Distribution Biotransformation, Excretion.
- Second exposure
- The Dose-Response Analysis

iii. Clinical Pharmacology:

The candidate through Disease Pathogenesis and Treatment should be able to explain the mechanism of action of drugs acting on the following system:

- Central Nervous System
- Cardio vascular System
- Hematological System
- Gastro-intestinal system
- Respiratory system
- Hormonal System
- Chemotherapy (Anti-cancers, antimicrobials, antivirals, and Immuno-pharmacology)
- Anti- Inflammatory Drugs
- Miscellaneous (Mineral, Vitamins, Agent used in Diagnosis and Radio-therapy).

iv. Clinical Toxicology:

The candidate should be able to explain the major principles for detection, management and prevention of common toxicants (drugs and other chemicals).

V.3.2.2. Applied Therapeutics (30%)

i. Assessment of the patients therapeutic needs

The candidate should be able to explain:
Medication therapy management in pharmacy practice such as drug profile (indication, dose, contra-indication, frequency, major side effects, precautions, interactions, off label, storage and drug reconciliation)

ii. Interpretation of clinical laboratory results:

The candidate should be able to:

- Identify and recommend relevant key laboratory tests
- Interpret clinical laboratory results

iii. Most common disorders and their management:

The candidate should be able to demonstrate knowledge and management on**:**
Cardio-Vascular disorders, pulmonary disorders, G.I.T disorders, renal disorders, endocrine disorders, infectious disease, psychiatric disorders, hematopoietic disorders, neoplastic disorders, Nutrition issue.

V.3.2.3. Pharmacy practice (15%)

i. Pharmaceutical Care:

The candidate should be able to demonstrate knowledge on:

- Patient assessment skills
- The drug related problems.
- The care plan and follow-up evaluation.
- The pharmacotherapy patient case presentation.
- The ethical consideration in clinical pharmacy practice.

ii. Good Pharmacy Practice:

The candidate should be able to demonstrate knowledge on:

- Prepare, obtain, store, secure, distribute, administer, dispense and dispose of medical products.
- Provide effective medication therapy management.
- Maintain and improve professional performance.

- Contribute to improve effectiveness of the health-care system and public health.

iii. Pharmacovigilance:

The candidate should be able to demonstrate knowledge on:

- The purpose of pharmacovigilance,
- The adverse drug events/ reactions,
- Basic concepts on causality assessment
- The medication errors,
- Pharmacovigilance reporting tools and system.

V.3.2.4. Pharmaceutics (15%)

i. Scientific principles of dosage form design:

- **Dissolution and solubility:** The candidate should be able to demonstrate an understanding of the general principles relating to the formulation process of a pharmaceutical form which are essential component of their dissolution; understands their physical and pharmaceutical properties which may affect their storage conditions; be able to give clear instructions to the patient of how to facilitate the dissolution of solid medications either by using the proper accompaniment (such as water, liquid solution such as milk and juice..,) while swallowing the medication or conducting a proper dissolution of the medication which need to be dissolved before swallowing. The candidate also should be able to understand the procedure for aseptic preparation of sterile solutions and their storage conditions. She/ he should also be able to detect sings of poor quality such as precipitation, crystallization, and leakage of a solution and the cause of this poor quality.

- **Properties of solution**: The candidate should be able to identify different types and pharmaceutical properties of solutions. The active ingredient of the solution and relevant additives such as sugar content, colorant, conservatives etc. Through a visual inspection be able to detect sings of poor quality such as precipitation, color change, unusual smell, crystallization, and leakage of a solution and the Understands the storage conditions of a solution.
- **Rheology, surface and interfacial phenomena:** The candidate should be able to understand different types of safe surfactants. Different types of defect such as creaming, caking.
- **Disperse systems, Kinetics and product stability**: The candidate should be able to explain how and when the uniform distribution of a disperse system is reached(e.g. intensity and frequency of shaking); be able to educate the effective administration of the disperse medications to the end user, as well as their storage condition

ii. Particle size and Powder technology:

Candidate should be able:

- To differentiate the methods to characterize, measure, and compare distributions of powders.
- To recognize and quantify the forces between particles for a variety of situations. (Understand the particle size distribution versus route of drug administration.
- To describe the various unit operations used to process powders and particles, e.g., mixing (be able to conduct a mixing validation), agglomeration, filtration (understanding the powder formation process).

iii. Biopharmaceutical principles of drug delivery:

- **The fundamentals and principles of drug delivery**: The candidate should be able to understand the common drug delivery systems and their proper usage, difference between drug delivery systems such as delayed release system, sustained release system, rapid release system, conventional drug release system, and their practical examples as well as the applications of these fundamentals to building of modified drug delivery systems.
- **The various technologies in optimizing drug delivery**: The candidate should be able understand the technology used to develop modified drug such as patches, implants, depots medicines, targeted drug delivery, smart drug delivery system.
- **Strategies used in drug delivery:** The candidate should be able to understand the strategies and considerations in the design of different drug delivery systems help in optimizing drug delivery to the body from different routes of administration. Strategies such physical modification, chemical modification, drug delivery carriers are used to serve for this purpose.

iv. Dosage form design and manufacture:

The candidate should be able to:

- Describe and critically analyses principles and procedures underlying drug development and pharmaceutical preparations.
- Discuss the rationale behind the design of specific dosage forms (i.e. fixed dosage combination)
- Special considerations for every single dosage form design and manufacture

v. Safety and quality control of pharmaceutical products:

The candidate should be able to demonstrate understanding in:

- Good Manufacturing Practices and principles of Quality Assurance: The candidate should be familiar with GMPs including but not limited to plant design, efficient calibration of machines, cleaning, labelling of products, cross contamination, etc.

- Evaluation of starting materials and finished products.
- Bioequivalence and bioavailability testing: the candidate should be able to explain the principle of bioequivalence and bioavailability.
- Factors to be controlled in the measurement of antimicrobial activity.
- Antibiotic assays.
- Minimum inhibitory concentration determinations.
- Preservative efficacy tests.
- Disinfectant evaluation.
- Microbiological quality of pharmaceutical materials for Non-sterile products and Sterile Products.

V.3.2.5. Supply chain management (15%)

i. Health commodities Selection and forecasting:

The candidate should understand:

- The purpose of product selection for health commodities supply chain management.
- The process of making predictions of the future based on past and present data, most commonly by analyzing the trends.

The candidate should be able:

- Collect data on morbidity and health products consumption for quantification and supply planning.
- Organize, analyze and adjust data in accordance with the program/institution or area of target.
- Build forecasting consumptions for each selected product
- Reconcile forecasts to produce final estimates.

ii. Quantification and supply planning:

The candidate should be able**:**

- To describe the purpose of Quantification and supply planning.
- To build supply planning consumptions.
- To calculate total commodity requirements and costs basing on priorities, required maximum stock, lead time, safety stock and stock on hand.
- To develop supply plan and compare costs to available funding.
- To explain the Monitoring national pipeline, procurement methods and good practices, key elements for elaboration of a bid for pharmaceuticals, factors influencing price and total costs.

iii. Managing inventory:

The candidate should be able**:**

- The Purpose of assessing stock status and usage, orders management, and tools for data calculation.
- The Average monthly consumption, months of stock on hand, use of months of stock to assess stock situation at any level.
- Develop a comprehensive inventory management system to supply required products continuously, minimize the risk of under or over stocking of products, maintain systematic records of inventory, reduce losses, damages and minimize the cost associated with inventory.
- Understand and use inventory management techniques: ABC analysis, Just In Time Method, Material Requirements Planning (MRP) Method, Economic Order Quantity (EOQ) Model, Minimum Safety Stocks, VEN Analysis, Fast, Slow & Non-moving (FSN) Method.
- Understand when and how to use Forced Ordering Max/Min System, maximum level and Emergency Order Point.

iv. Storing health commodities and transportation:

The candidate should demonstrated knowledge on:

- The purpose and importance of good storage practices.
- The storage conditions (humidity, sunlight, required temperature) and adequate management of pharmaceuticals stores.
- The major steps in reception of products (visual inspection, etc.) and storage capacity management.
- The key methods (Incoterms) used in importation/exportation of pharmaceutical products: EXW, FCA, CPT, CIP, DAP, DPU, DDP, FAS, FOB, CFR, and CIF.

V.3.2.6. Pharmacy laws and regulations in the Pharmacy area. (10%)

i. Pharmacy regulations and Ethics:

- The candidate should demonstrate knowledge in managing actual and potential illegal, unethical, or unprofessional actions or situations in practice.
- The candidate should demonstrate knowledge in the law and regulation governing the pharmacy sector in Rwanda.

ii. Code of ethics for pharmacy profession:

The Candidate is expected to demonstrate knowledge in the principles of professional codes of ethics in the decision-making process

- The Confidential information,
- Uphold ethical principles.
- Apply principles of professionalism.
- The distraught Parent, Confused and Angry patient

V.3.3. Duration of the written examination

The written examination lasts for three hours (180 min) maximum.

V.3.4. Regulations and Conducts for applicant during the Written Examination

Only applicant who meets the eligibility criteria will be allowed to sit for preregistration exam.

V.3.4.1. Verification of applicant

The applicant shall convey the following documents:

i. For Rwandans: national I.D or Valid passport and his or her verification card issued by National Pharmacy council prior the assessment, the cards includes name and applicants code to be transcript on the examination paper.
ii. For Non- Rwandan: Valid passport and his or her verification card issued by National Pharmacy council prior the assessment, the card includes name and applicants code to be transcript on the examination paper.

N.B: Only examination code is written to the examination paper as applicant's identification.

V.3.4.2. Conduct in the examination room

- The applicants shall avail themselves to the venue of the examination at the set date and time.
- Applicant shall sign onto the attendance list as sign- in and sign - out.
- No applicant will be allowed into the exam room thirty minutes (30min) after the assessment has started.
- No candidate shall leave the examination room before 30 min after the examination has started.
- Candidates shall sit as directed by the invigilators.
- Silence and order shall be maintained throughout the examination session.
- Mobile phones and any other electronic gadgets shall not be allowed into the examination room. Only scientific calculators will be allowed.
- Any unauthorized written, reading or other materials including bags shall not be allowed in the examination room.
- Candidates shall start writing or opening the question paper only when allowed by the invigilators.
- Eating and smoking are prohibited in the examination room, only drinking water is allowed.
- Drunkenness and disarrangement are forbidden in the examination room.
- All examination materials shall be left in the examination room.

- Sharing of stationery, calculators and other items between candidates is prohibited.

V.3.5. Missing to sit for scheduled pre-registration examination

- Any candidate who misses all or part of examinations shall be deemed not to have completed assessment for registration as a Pharmacist.
- A candidate who misses a written examination shall be required to apply afresh upon payment of the prescribed fee.

V.3.5.1. Cheating during the Preregistration assessment

Cheating in examination is a serious offence punishable by direct expulsion from the examination room. Cheating includes but not limited to:

i. Copying;
ii. Being in possession of unauthorized material/literature;
iii. Making reference to unauthorized material;
iv. Glancing at other candidates' papers;
v. Communicating with other candidates;
vi. Browsing the internet;
vii. Writing on his/her body parts or attire;
viii. Attempting to acquire access information outside the examination room.

V.3.5.2. Consequences of Misconduct

Any candidate who contravenes any of the above rules shall be liable to disqualification from the examination. Furthermore, the candidate will be barred from sitting the Pre-registration examination for the next 2 years.

V.3.5.3. Appeal for the results of Written Examination

Applicants can appeal the results of pre-registration examination.

The appeal letter is addressed to the chair of the board, who is in charge of addressing this matter with the appropriate person(s). Appeal is addressed in writing an email or hard copy within a maximum of 5 calendar days after publication of written examination results.

V.4. ORAL EXAMINATION

V.4.1. Description of the Oral Examination

The oral examination is an assessment of practical competencies required of candidates to demonstrate knowledge and skills to situations that may be encountered in practice. In addition the candidate should demonstrate the ability to effectively communicate in a way that other health care professionals and patients can understand. A candidate must hold a current pass in the written examination conducted by the Council. A pass in the written examination is valid for 12 months from the date of passing that examination.

The oral examination is conducted at least 10 working days after the publication of the written examination results.

The oral examination shall be composed of 2 stations. The first station shall assess the candidate's understanding of Medication knowledge and pharmaceutical care. The second station will assess the candidate's knowledge on legal and ethical practice and Supply chain Management.

Each station shall be comprised of at least three (3) examiners with background and working experience in different areas of pharmacy practice. The Board may also appoint an observer to be present for the duration of the oral examination. The observer does not play a role in the assessment of the candidate. The observer oversees the examination and shall report any misconduct.

For each station there should be an audio visual IT facilities for record purposes.

V.4.2. Expectation for Oral Examination

In the assessment of each practical situation presented to the candidate, consideration is given to the following:

i. Has the patient been dealt with in a way that will minimize any potential risk to which he or she may be exposed to?
ii. Has the patient's therapy been optimized? (e.g. Has the patient been supplied with sufficient advice and information to ensure that he or she knows how to take or use the medication and manage their health condition effectively?)
iii. Has the patient been caused any harm by an action, including an omission, or by a decision of the candidate?
iv. Has the candidate demonstrated their ability to practice legally and professionally?
v. Has the candidate demonstrate ability in logistics and pharmaceutical products management?

In order to demonstrate competency, candidates in the oral are therefore expected to:

i. Respond appropriately and safely, using sound judgment when presented with a variety of practice situations. These situations may include, but are not limited to:
   - Demonstrating patient history-taking skills that would assist in decision-making processes when recommending safe and effective treatment options for a patient;
   - Considering prescriptions presented, including reviewing the patient's medication history and seeking further information from the prescriber, patient or agent (which may be presented as community practice and/or hospital-based situations);
   - Responding to drug-information queries;
   - Responding to over-the-counter (OTC) requests for advice, possibly associated with concurrent prescription therapy.

ii. Demonstrate a sound knowledge of the laws that govern pharmacy practice and apply it appropriately to practice situations;

iii. Demonstrate a sound knowledge of professional ethics and responsibility, and the ability to use professional discretion appropriately, and respond to practice situations using communication appropriate to the circumstances.

V.4.3. Assessed areas in Oral exam

The examination consists of a range questions and practice-based scenarios designed to test a range of competencies. As registration in Rwanda does not limit where a pharmacist may practice, candidates must have the competencies required to practice in community, hospital, Supply chain and regulatory contexts. The oral examination consists of the following three area of assessment:

V.4.3.1. Medication knowledge and pharmaceutical care (10 min)

The candidate is expected to:

- demonstrate reasonable skills of drug class, indications for use, dosage range, frequency and best time for administration (where relevant), patient counselling points, Interactions and contra-indications, medication errors, side effects and patient monitoring.
- demonstrate reasonable skills of OTC treatments, lifestyle modifications, or referral to another health care practitioner.

At some stage, a candidate is given a prescription and the patient dispensary medication history. He/she then is expected to elicit other relevant information through appropriate patient history-taking. This area is conducted in role play (e.g. with the patient/agent and prescriber/s).

V.4.3.2. Legal and Ethical Practice (5 mins)

The candidate is expected to explain the potential relevant legal and/or ethical issues and recommend final actions to be taken to produce a legal and satisfactory outcome for the patient/client or situation described.

The candidate is presented with a scenario e.g. suspected forged prescription, oral instructions from a prescriber, a dispensing error etc., and is expected to explain the potential relevant legal and/or ethical issues and recommend final actions to be taken to produce a legal and satisfactory outcome for the patient/client or situation described. In addition, the candidate may be asked how this situation could possibly be prevented again.

V.4.3.3. Supply chain Management: (5min)

The candidate is expected to show the use of logistic management information system, health commodities selection, quantification and procuring of health commodities, storing health commodities, and managing inventory.

V.4.4. Duration of the Oral Examination (Practice)

The oral examination lasts for **20** min maximum per each interviewee.

V.4.5. Regulations and Conducts for applicant during the Oral Examination

At the examination venue, candidates will be asked to wait at a designated point until they are called to be accompanied to an examination room.

In the examination room, the three examiners will introduce themselves to the candidate and conduct the assessment. The examiners will provide instructions and once the examination is underway, make notes based on the candidate's response to examination material and monitor time. Candidates should also keep track of the time allocated for each question to ensure they allow sufficient time to cover each question adequately. As each area of the examination is introduced, a question sheet will be provided to the candidate for two minutes to view so they are clear on what is required. Once an area of the examination has been concluded, it will not be revisited.

After completing the examination, each candidate is accompanied by the invigilator to the exit and may not discuss their experiences with any other candidate who has not yet taken the examination. A breach of this examination rule may result in disqualification of **both** candidates.

V.4.5.1. Conduct in the examination room

i. The applicants shall avail themselves to the venue of the examination at the set date and time.
ii. Applicant shall sign onto the attendance list as sign- in and sign- out.
iii. No applicant will be allowed into the exam room fifteen minutes (15 min) after assessment has started
iv. Candidates shall sit as directed by the invigilators.
v. Mobile phones and any other electronic gadgets shall not be allowed into the examination room.
vi. Any unauthorized written, reading or other materials including bags shall not be allowed in the examination room.

V.4.5.2. Consequences of cheating during oral examination

Any candidate who is found guilty of cheating shall be liable to disqualification from the examination. Furthermore, the candidate will be interdicted from sitting the Pre-registration examination for the next 2 years.

V.5. MARKING PRINCIPLES

V.5.1. Marking Written Examination

All assessment processes, including marking, and moderation, will be conducted anonymously unless the nature of the assessment makes this impossible.

All assessments will be marked by two markers, neither of whom will know the identity of the candidate. The marker should use a pen (not a pencil) which writes in red ink. The checker should use a pen which writes in green ink.

The last stage is data entry: two data entry officer must ensure that all the additions are correct and that all the totals have been correctly written into the data base.

Finally, the database projected to the panel for review and double-check the soft results versus the hard results for each candidate following numeric orders of candidate's codes.

V.5.2. Marking Oral Examination

The examiners will make notes based on the candidate's response to examination material.

V.5.3. Passing Mark

The pass mark for both the written examination and the interview is fixed at 60%.

An applicant who passes the written exam but fails the interview is eligible to sit for only one additional interview exam, consideration given to the marks of the written exam.

A candidate who fails to pass the additional interview session will be required to sit again for the written exam.

VI. APPROVAL AND VALIDATION OF THE PRE-REGISTRATION EXAMINATION RESULTS

The Bureau approves the publication of results submitted by the Research and Education Committee who also communicate the results of the Pre-registration Examination to the NPC bureau. The NPC Secretariat shall disseminate the approved results through the Council's website www.pharmacycouncil.rw.

National Pharmacy Council
Rwanda

ANNEX I: SUGGESTED REFERENCES

It is the candidate's responsibility to utilize suitable reference materials and other resources in preparation for the Pre-registration Examination. It is important to identify personal learning needs in accordance with the Pre- registration guideline.
The following list of references and resources may be helpful in preparing to take the pre-registration examination. It covers a wide range/variety of topics and is **NOT** intended to serve as a study guide for the exam. Candidates are expected to self-assess their learning needs and seek out references/resources from this list that will address their specific knowledge gaps.

TEXTBOOK

Assed Area	Textbook	Authority	Publisher
Pharmacology and Toxicology	Basic and Clinical Pharmacology, 10th Edition and Above	Bertram G. Katzung	McGraw- Hill
	Lippincott Illustrated Reviews: Pharmacology 6th Edition	Karen Whalen	Philadelphia, Pa. : Wolters Kluwer
	Clinical Toxicology: Principles and Mechanisms 2nd Edition	Frank A. Barile	
	Critical care Toxicology. Diagnosis and management of Critically poisoned Patient, 2nd Edition, by Publisher:	Jeffrey Brent (Senior Editor), Keith Burkhart, Paul Dargan, Benjamin Hatten, Bruno Megarbane, Robert Palmer, Julian White (Editors).	Springer (2005)
Applied Therapeutics	Basic Skills in interpreting Laboratory Data	Lee	American Society of health-system Pharmacists
	Clinical pharmacy and therapeutics	Walker R. & Edwards C.(2003)	Churchill Livingstone
	Pharmacotherapy: Principle & Practice	Chisholm-burns et al	McGraw- Hill
Pharmacy Practice	The Science & Practice of Pharmacy	ed. by Allen	The Pharmaceutical Press
	Pharmaceutical care practice: the patient centered approach to management	Cipolle et al	McGraw- Hill

Assed Area	Textbook	Authority	Publisher
	medication management		
Pharmaceutics	Fast track Pharmaceutics: Drug delivery and targeting, second edition	Yvonne Perrie, Thomas Rades	Pharmaceutical Press, 2012
	Pharmaceutics, Basic Principles and Application to Pharmacy Practice	ALKHA K. DASH	Elservier, 2014
	Pharmaceutics: The Science of Dosage Design	M. E. Aulton	Harcourt Publishers
Supply chain management	The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities	USAID | DELIVER PROJECT	Task Order 1. 2011
	Supply Chain Logistics Management	Bowersox, D., Closs, D. and Cooper	McGraw-Hill/Irwin

1. Internet Resources

The website listed in the table below provide information on Rwanda pharmaceutical legislation and other topics that are useful to practice Pharmacy Profession.

Organization	Website URL	Topic/Links of Interest
National Pharmacy Council	www.pharmacycouncil.rw	• Law on the art of healing of 1999
		• Law on the pharmaceutical art of 1999.
		• Law N°45/2012 of 14/01/2013 on organization, functioning and competence of the Council of Pharmacists
		• Code of ethics for pharmacy profession in Rwanda
	www.rwandafda.gov.rw	• Law N°003/2018 of 09/02/2018 establishing Rwanda Food Drug Authority and determining its Mission, Organization and Function

Organization	Website URL	Topic/Links of Interest
Rwanda Food and Drug Authority		• Regulation Governing control of import export of pharmaceutical products medical devices
		• Regulations governing licensing to manufacture pharmaceutical products or to operate as wholesale or retailer seller of pharmaceutical products.
		• Ministerial Order N° 001/MoH/2019 of 04/03/2019 establishing the list of Narcotic Drugs
		• Safety and vigilance Guidelines
		• Post Marketing Surveillance Guidelines

National Pharmacy Council
Rwanda

ANNEX II: QUESTIONNAIRE SAMPLE

NATIONAL PHARMACY COUNCIL PRE-REGISTRATION EXAMINATION FOR PHARMACISTS

Duration: **180 Minutes**

Instructions:

i. Answer on the questionnaire
ii. Circle only one correct answer
iii. Each correct answer carries 1 mark
iv. Use of other electronic devices is prohibited *except* calculators
v. Write your examination code on every page

Questions: /100 Marks

1. The following terms are commonly used in pharmaceutical supply chain:
   a. Labelling
   b. Compounding
   c. Packaging material
   d. Inventory
   e. (a) & (c)
2. Which of the following is not a storage guideline for pharmaceutical products?
   a. Regularly clean and disinfect storage area
   b. Store supplies in a dry, well-lit, and well-ventilated area, out of direct sunlight
   c. Ensure availability, accessibility and usability awareness by personnel, of the fire safety equipment
   d. Ensure cold chain requiring products are stored in the specific area
   e. Separate and dispose of damaged or expired products at the end of the month
3. What does the storage statement "Protect from light" mean?
   a. Keep out of direct sunlight
   b. Always keep the product in the outer packaging material
   c. Inform the patient to always keep the product in the outer packaging material after each dose
   d. All of the above
   e. None of the above
4. Select the option that is not an application of quantification
   a. To estimate storage space need
   b. To inform manufacturers on future demand of commodities for manufacturing decisions and preparation

c. To facilitate coordination with donors' procurement agents, health facilities and other stakeholders
d. To guide development of standard treatment guidelines
e. To plan, mobilize and secure financial resources

5. Which of the following is NOT a type of data for forecasting?
   a. Demographic and population data
   b. Morbidity data
   c. Service statistics data
   d. Consumption data
6. Which of these is not a data requirement for consumption method of forecasting?
   a. List of health commodities with full specifications
   b. Reliable records of consumption/issue
   c. Estimation of period out of stock
   d. Dosage information
   e. None of the above
7. Which of the following defines "lead time" in logistics?
   a. Shipping to receipt period
   b. Planning period
   c. Ordering to receipt period
   d. Ordering period
8. Which of the following elements influence commodity security?
   a. Context
   b. Commitment
   c. Capacity
   d. Clients
   e. All of the above
9. The purpose of a logistics system is to ensure the following but not:
   a. Right quantity of the Right health product
   b. Right place at the Right time
   c. Right cost in the Right condition
   d. Right route of administration
10. Which of the following activities is not part of a logistics cycle?
    a. Advising a patient on drug use
    b. Product selection
    c. Quantification & procurement
    d. Inventory management
11. The process of completing the stock card includes the following:
    a. To record the supplies received
    b. To record the supplies issued
    c. To record changes in stock balances
    d. All of the above
    e. None of the above
12. A given product Stock on Hand is 690, its Average Monthly Consumption is 300, the following is the products' Months of Stock:

a. 1.5
b. 2.4
c. 3
d. 2.03
e. 2.3

13. Key elements of a system design include the following:
    a. Data which are needed for commodity management
    b. Records and reports needed for commodity management
    c. LMIS
    d. The unit of measure that should be used (tablet, piece, bottle, etc.)
    e. Consumption data recording tools
14. To determine space requirements, you need to consider the following but not:
    a. Total stored pallet equivalents, by commodity, based on a peak month
    b. stored pallet orientation
    c. required space for receiving, inspection, and quarantine
    d. required space for offices
15. The eligibility criteria for getting import/export permit of health commodities in Rwanda include the following:
    a. Being a Rwandan citizen
    b. Being a wholesaler
    c. A tourist or visitor in the country or any other person for justified reasons
    d. Researchers conducting clinical trials in the country with/without ethical clearance certificate
16. Which statement is TRUE for getting health commodities import license?
    a. For narcotic, psychotropic and other controlled substances, an official import certificate is required
    b. The consignment is inspected for compliance with claimed specifications but no need of taking samples for quality control tests
    c. Sub standards or non-registered products shall be re-exported or incinerated. The cost related to this exercise shall be paid by the regulator
    d. All supporting documents shall be in English and French
17. How to determine order quantities using any max-min system:
    a. Max stock quantity-stock on hand = order quantity
    b. Max stock level ≥ min stock level + review period stock level
    c. Max stock level = lead time stock level + safety stock level
    d. Max stock level = lead time stock level + safety stock level + review period stock level
18. Key terms in inventory control include the following but not:
    a. max-min inventory control system
    b. max stock level/min quantity
    c. min stock level/min quantity
    d. review period/review period stock

19. Drug donations must:
    a. Be based on prior expression of interest from the recipient
    b. Be based on pull system
    c. Be based on baseline assessment by the donor
    d. Be based on the seasonality of the diseases
20. The label on each pharmaceutical product container must contain the following EXCEPT:
    a. International Non-Proprietary Name
    b. Batch Number
    c. All inactive ingredients (excipients)
    d. The Marketing Authorization Holder
21. The law establishing Rwanda FDA regulates the following EXCEPT:
    a. Human and veterinary drugs;
    b. Human and animal vaccines and other biological products used in clinical as drugs;
    c. Poisonous substances;
    d. Unprocessed food
22. One of the following is NOT a responsibility of the National Pharmacy Council:
    a. To establish internal rules and regulations and general principles relating to morality, honor, confidentiality, dignity and devotion essential to the practice of pharmacy profession and which constitute the Code of pharmacy ethics.
    b. To serve as an interlocutor with public and private organs with regard to all matters relating to the pharmacy
    c. To formulate regulations and guidelines for regulating the manufacture, import and export, distribution, sale and use of regulated products;
    d. To collaborate with all other organs involved in the practice of the medical profession.
    a. Import and export of health products
23. One of the following is NOT among competences of the National Pharmacy Council
    a. to grant and revoke the authorization to practice the pharmacy profession
    b. to provide institutions of higher learning advice with respect to pharmacy academic programs
    c. to take disciplinary measures against pharmacists
    d. to monitor vigilance and safety of products
24. A pharmacy professional must:
    a. always provide a client with any information regarding his/her treatment
    b. exercise professional autonomy, objectivity and independence and avoid any situation of conflict of interest
    c. All the above

d. None of the above

25. In the following situation disclosing confidential information relating to clients acquired in the course of pharmacy is UNETHICAL:
    a. Sharing identification information and patient treatment in colleagues' pharmacists on social media
    b. It is required by a legally authorized official or by any other person with powers of attorney
    c. the information is released to any person who legally represents the patient
    d. Whenever the patient/client gives his/her consent
26. Belonging to a profession brings a range of benefits but also attracts a range of obligations. Which of the following is NOT an obligation associated with being a professional?
    a. To act in the best interests of the patients
    b. To apply a high degree of skill and knowledge to their work
    c. To be objective and non-judgmental
    d. To use specialized information and operate under a monopoly
27. Which of the following is NOT a benefit of having a business perspective in the practice of pharmacy?
    a. A business focus ensures that resources are used effectively.
    b. A business perspective helps the pharmacy remain competitive and capable of adapting to change.
    c. A business focus ensures a continuity of purpose and organization.
    d. All of the above
28. Which element of the management process is the most critical?
    a. Planning.
    b. Organizing.
    c. Staffing.
    d. Controlling
29. Which financial statement could be used to determine the total value of prescription drug sales for a pharmacy during the course of a year?
    a. Balance sheet
    b. Statement of investments
    c. Statement of changes in financial position
    d. Income statement
    e. Statement of equity
30. Which of the following responsibilities can be appropriately delegated to a non-pharmacist manager of a community pharmacy?
    a. Purchasing narcotic drugs
    b. Selecting clinical decision software for the dispensary computer
    c. Coordinating staff scheduling
    d. Supervising pharmacy technicians
31. A patient visits your Pharmacy for advice. She is claiming for having a large amount of wax in ear which she thinks might be a sign for an infectious disease. What advice would you provide?

a. Refer her to a general practitioner since a bacterial infection may be suspected
b. Give her an ibuprofen and amoxicillin for seven days
c. Doing nothing since ear wax is normal in healthy people
d. None of above

32. Mrs. Mukeshimana is taking diclofenac for rheumatoid arthritis. She visits her General Practitioner (GP) with a severe gastrointestinal infection. Her GP suspects shigellosis and asks you which antibiotic would be suitable for her to take. Which of the following would NOT be suitable?
    a. Azithromycin
    b. Amoxicillin
    c. Ciprofloxacin
    d. Trimethoprim
33. Common types of irrational medicines use involve, EXCEPT:
    a. The use of too many medicines per patient (polypharmacy)
    b. The usage of antimicrobials for non-bacterial infections
    c. Appropriate self-medication, often with over the counter (OTC) medicines
    d. Failure to prescribe in accordance with clinical guidelines
34. Mr. Joseph, 92 years old man has been complaining he is suffering from constipation for the past few months, and would like to know if any of his medications might be the cause. Which of the following regular medications is least likely to be causing this?
    a. Ranitidine
    b. Tramadol
    c. Ondansetron
    d. Ferrous sulphate
35. Augmentin syrup is dosed at 100mg/12.5mg per ml. One bottle of Augmentin syrup contains 224 doses (1 dose = 1kg) and after reconstitution the whole bottle contains 60ml. A Medical Practitioner has prescribed the following to a 20 kg child: R/ Augmentin syrup 60ml dose/kg *3/7days; The total dosage for 7 days should be:
    a. 1 bottle
    b. 2 bottles
    c. 3 bottles
    d. None of above
36. Good dispensing practice involves the following steps among others, EXCEPT
    a. Interviewing the patient to establish the exact nature of the disease.
    b. Interpreting the prescription in terms of the dose, the patient and the requirements of a prescription.
    c. Calculating and measuring out the required quantity of drug to be dispensed.
    d. Recording details of the dispensed prescription to ensure affordability among other reasons.

37. In establishing a professional relationship with a patient, which of the following principles is the LEAST compatible with the philosophy of pharmaceutical care?
    a. Autonomy
    b. Nonmaleficence
    c. Confidentiality
    d. Paternalism
    e. Veracity
38. One statement is NOT considered as a health promotion activity by a community Pharmacist
    a. Educating the community on the rational use of antimicrobial medicines
    b. Educating the community on the safe disposal of leftover medications
    c. Checking the medical history of a patient to understand well the etiology of his medical condition
    d. Following up a diabetic patient with uncontrolled blood sugar and provision of advice on proper lifestyle
39. Choose the correct statement regarding the therapeutic equivalence between a new brand medicine and its generic brand
    a. A generic brand medicine and its new brand are not therapeutically equivalent but they can be substitutes
    b. A new brand medicine is of high quality due to high quality ingredients used in its formulation which make difference in its efficacy compared to a generic brand
    c. Generic brands are mostly manufactured in developing countries with cheaper and sometimes low technology which make them of low efficacy compared to new brands medicines
    d. A new brand medicine is therapeutically equivalent to its generic brand
40. Which of the following emulsion phenomena is usually reversible?
    a. Breaking.
    b. Coalescent
    c. Cracking
    d. Creaming
41. An emulsion must have the following components, EXCEPT
    a. continuous phase
    b. dispersion medium
    c. emulsifying agent
    d. surfactant
42. Which of the following statement is true?
    a. In an o/w/o emulsion, water is the external phase
    b. In an o/w emulsion, water is the internal phase
    c. In an o/w/o emulsion, oil is the external phase
    d. In a w/o emulsion, oil is the internal phase
43. What is the drawback of parental controlled release systems?
    a. Injecting is a difficulty

b. The drug cannot be easily removed once administered
c. Can get easily precipitated in the injection site
d. Rapid onset but fast excretion

44. Which one of the following should not be a characteristic of the vehicles or polymers which are used for parenteral formulations?
a. Sterile
b. Consists of pyrogen
c. Non irritating
d. Biodegradable

45. With aqueous solutions, the drug releases can be controlled. Which of the following is not the right method of controlling?
a. Increasing the viscosity
b. By forming complexes with macromolecules
c. Reducing the solubility of the parent drug
d. Increasing the pH to make it highly basic

46. Release of water-soluble drugs can be retarded by presenting it as _____ suspension
a. Oil
b. Water
c. Colloidal
d. Freezing

47. Larger particle size leads to _____ dissolution
a. Slower
b. Faster
c. Moderate
d. Normal

48. Oral controlled release drugs release the drug only inside the intestine.
a. True
b. False

49. Which is the disadvantage for implants?
a. More effective
b. More prolonged action
c. Significantly small dose
d. Need of microsurgery

50. The disadvantages of using a topical formulation are (Only one statement is correct)
a. An increased dose of medication is applied where it is needed
b. There are reduced side effects and toxicity to other organs compared to systemic medications.
c. At times, the regimen can be complicated, especially if several different formulations have been prescribed

d. The product may be designed to be moisturizing or to maximize the penetration of an active ingredient

51. In a patient on pulmonary TB treatment intensive phase, red urine is due to?
    a. Isoniazid
    b. Rifampicin
    c. Pyrazinamide
    d. Ethambutol
52. Which of the following lab parameters is more critical during patient treatment monitoring?
    a. Glucose 15mmol/l
    b. pH 7.25 acidosis.
    c. Potassium 1.5 mmol/l
    d. Sodium 150 mmol/l
53. While taking a patient's history during pharmaceutical care, biodata step includes the following key points except:
    a. History of present illness
    b. Date of history taking
    c. Patient's residence
    d. Age
54. Which position is occupied by the pharmacist in drug and therapeutic committee (DTC) at the hospital in Rwanda?
    a. Deputy chairperson
    b. Secretary
    c. Chairperson
    d. Member
55. The following drugs are considered to be lifesaving except:
    a. Hydralazine IV
    b. Clindamycin IV
    c. Hydrocortisone IV
    d. Sodium bicarbonate IV
56. The commonly known adverse effects attributed to morphine are the following except:
    a. Constipation
    b. Extrapyramidal effects
    c. Respiratory depression
    d. Vomiting
57. Parameters used to determine estimated glomerular filtration rate (eGFR) in chronic kidney disease (CKD) patients are the following except:
    a. Patient's weight
    b. Patient's age
    c. Patient's height
    d. Patient's creatinine level
58. Which one of the following is NOT involved in the presentation of seasonal allergic rhinitis?

a. Leukotrienes
b. Prostaglandins
c. Neutrophils
d. Mast cells

59. The Human papilloma virus vaccine (Gardasil):
    a. May be administered to female from 9 years onwards
    b. Eliminate the need for routine cervical screening
    c. Is a bivalent vaccine
    d. Requires the administration of 5 doses for a complete dose
60. Treatments for asthma in Pregnancy include the following except:
    a. Drugs for asthma should preferably be administered by inhalation to minimise exposure of the fetus
    b. Inhaled drugs, theophylline, and prednisolone can be taken as normal during pregnancy and breastfeeding
    c. prednisolone is the preferred corticosteroid for oral administration since very little of the drug reaches the fetus
    d. An intravenous beta2 agonist, aminophylline, or magnesium sulphate can not be used during pregnancy
61. In treatment of diabetes mellitus, Sulfonylureas characteristics include the following except
    a. Act mainly by augmenting insulin secretion and consequently are effective only when some residual pancreatic beta-cell activity is present
    b. Considered for patients who are not overweight, or in whom metformin is contra-indicated or not tolerated
    c. Glibenclamide, a short-acting sulfonylurea, is associated with a greater risk of hypoglycemia
    d. Glibenclamide, should be avoided in the elderly, and shorter-acting alternatives, such as gliclazide or tolbutamide, should be used instead
62. In the current guidelines of HIV treatment by WHO, the preferred first line regimen among childbearing patient includes:
    a. TDF/3TC/EFV
    b. TDF/3TC/DTG
    c. AZT/3TC/NVP
    d. AZT/3TC/EFV
63. WHO previously recommended efavirenz 600mg but it now supports the lower dose of 400mg which has benefits in terms of side-effects and cost; the highlighted side effect liked to 600mg was:
    a. Lipodystrophy
    b. Neural tube defect
    c. Hepatotoxicity
    d. Nephrotoxicity
64. During pulmonary TB treatment, optic neuritis is commonly due to one of the following drugs:
    a. Pyrazinamide

b. Prednisolone
c. Ethambutol
d. Isoniazid

65. Drug induced liver injury is linked mainly with elevation of liver function parameters especially:
    a. GGT
    b. AST
    c. ALT
    d. Albumin
66. All the following types of viruses causing hepatitis are RNA viruses EXCEPT one that is DNA virus:
    a. HAV
    b. HBV
    c. HCV
    d. HDV
67. Among all of hepatitis viruses only two cause chronic infection:
    a. HAV & HCV
    b. HBV & HDV
    c. HCV & HBV
    d. HEV & HDV
68. The current pharmacological management of HBV in Rwanda uses ……. as first line
    a. PEG-IFN (Pegylated Interferon).
    b. TDF
    c. AZT/3TC
    d. Entecavir
69. Current local standards of care for patients infected with HCV genotype -1 includes use of oral Direct Acting Antivirus (DAA) with the following combination of HCV polymerase inhibitors:
    a. Ledipasvir/Sofosbuvir
    b. Sofosbuvir/Velpatasvir
    c. Daclatasvir/Sofosbuvir
    d. Elbasvir/Grazoprevir
70. A Fluoroquinolone that has shown a greater activity against pneumococci is:
    a. Ciprofloxacin
    b. Levofloxacin
    c. Moxifloxacin
    d. Norfloxacin
71. Cephalosporin 3rd generation antibiotics (e.g. Ceftriaxone), have shown efficacy in management of bacterial meningitis and the treatment dose for adult patients is the following:
    a. 2g BD
    b. 1g TDS
    c. 2g TDS

d. 2g OD

72. The common systemic antifungal used in the management of cryptococcal meningitis is the following:
    a. IV Miconazole
    b. Oral Fluconazole
    c. IV Amphotericin B
    d. IV Acyclovir
73. A person was brought by police from the bus/tax stand at Nyabugogo. He is talking irrelevant. He is having dry mouth with hot skin, dilated pupils, staggering. The most probable diagnosis is:
    a. Alcohol intoxication
    b. Carbamates poisoning
    c. Organophosphorus poisoning
    d. Datura poisoning
74. Which of the following is NOT an initiating event in carcinogenesis?
    a. DNA strand breakage
    b. mutation of proto-oncogenes
    c. oxidative damage of DNA
    d. mitogenesis
75. With regard to paracetamol overdose (OD) which is false?
    a. children are relatively resistant to toxicity because the cP450 system is under developed
    b. in "at risk" patients the threshold level for N- acetylcysteine should be halved
    c. acute alcohol coingestion in a person that does not usually drink is reason to lower the treatment threshold for paracetamol OD
    d. if a patient presents at 8-24 hours after OD, N- acetylcysteine should be commenced pending the results
76. Which of the following is most useful in the treatment of hyperprolactinemia?
    a. Bromocriptine
    b. Cimetidine
    c. Ergotamine
    d. Ketanserin
77. The drugs employed for anti H pylori therapy include the following EXCEPT:
    a. Ciprofloxacin
    b. Clarithromycin
    c. Tinidazole
    d. Amoxicillin
78. Gout:
    a. May be due to excessive production of uric acid
    b. May be due to increased renal elimination of uric acid
    c. Results in the deposition of crystals of xanthine in the joints
    d. Is characterised by excessive calcium deposited in the joints

79. Anti-D immunoglobulin:
    a. is a vaccination for tetanus
    b. should be administered preferably within 72 h of a sensitising episode
    c. is intended to protect the mother from haemolytic disease
    d. cannot be used for prophylaxis
80. How many millilitres of a 1 in 500 v/v solution are required to produce 2 L of a 1 in 1000 v/v solution?
    a. 100
    b. 200
    c. 500
    d. 1000
81. All the following drugs affect renin – angiotensin system EXCEPT:
    a. Hydralazine
    b. Valsartan
    c. Losartan
    d. Perindopril
82. After ---------- 100% of a dose of drug is eliminated
    a. 3 half-lives
    b. 4 half-lives
    c. 5 half-lives
    d. 6 half-lives
83. The ratio TD1 / ED99 is called
    a. margin of safety
    b. therapeutic index
    c. potency ratio
    d. efficacy ratio

84. The the recommended first-line antidote for cyanide poisoning is:
    a. sodium thiosulphate
    b. sodium nitrite
    c. cobalt EDTA
    d. Hydroxocobalamin
85. All of the following are true of first-order kinetics except -------
    a. steady state concentration is proportional to rate of intake
    b. rate of intake will not change time to steady state
    c. half-life is inversely proportional to clearance
    d. a change in half-life will not change time to steady state

86. All of the following are components of the central compartment except ---- ------
    a. Liver
    b. Lungs
    c. Bone
    d. Kidney

87. The use of charcoal to prevent the absorption of diazepam is an example of ---------
    a. dispositional antagonism
    b. chemical antagonism
    c. receptor antagonism
    d. functional antagonism
88. All of the following are considered phase I biotransformation reactions except ----
    a. Hydrolysis
    b. Conjugation
    c. Reduction
    d. Oxidation
89. Terfenadine and ketoconazole are examples of ----------
    a. enzyme inducers
    b. perpetrator and inhibitor
    c. victim drug and perpetrator
    d. drugs with limited biotransformation
90. A classic example of a drug inducing its own metabolism is –
    a. Warfarin
    b. Lovastatin
    c. Carbamazepine
    d. Theophylline
91. the hepatic clearance of a drug with a high hepatic extraction ratio is largely dependent on ------
    a. drug protein binding
    b. hepatic blood flow
    c. drug-metabolizing enzyme activity
    d. intestinal blood flow
92. Which of the following cardiovascular agents is classified chemically as a glycoside?
    a. Nifedipine
    b. Digoxin
    c. Flecainide
    d. Cholestyramine
93. When compared to unfractionated heparin, low molecular weight heparins have
    a. Preferential binding affinity to factor Xa relative to Iia (thrombin)
    b. Shorter half-lives
    c. Dose – dependent renal clearance
    d. Less side effects
94. All of the following are treatment options for toxic alcohol poisoning except
    a. Fomepizole
    b. Riboflavin
    c. Thiamine

d. Folic acid

95. All of the following factors may increase the risk of nephrotoxicity from gentamicin therapy except:
    a. age over 70 years
    b. prolonged courses of gentamicin therapy
    c. concurrent amphotericin B therapy
    d. trough gentamicin levels below 2 mg/ml
96. Indapamide is a ……. diuretic
    a. osmotic
    b. loop diuretic
    c. thiazide
    d. potassium sparing
97. The following vitamins are fat soluble EXCEPT:
    a. vitamin A
    b. vitamin C
    c. vitamin D
    d. vitamin K
98. An antacid would be desirable in the treatment of peptic ulcer.
    a. Which raises gastric pH to 4.0
    b. Which raises gastric pH to 7.0
    c. Which increases gastric motility and hastens gastric emptying
    d. (d) Both (b) and (c)
99. Cimetidine potentiates the action of propranol, theophylline, warfarin and phenytoin because:
    a. It causes deficiency of G - 6–PD
    b. It blocks the H2 – histaminergic receptors
    c. It is an inhibitor of microsomal P–450
    d. None of the above
100. The duration of action of a drug is dependent of its
    a. Plasma and tissue binding
    b. Metabolism
    c. Tubular filtration and secretion
    d. All the above

**********END**********