Appendix 1

Table 3 OPRA™ exam content areas (descriptive)

Content area	General description	Content assessed		Examples of topics (non-exhaustive)
1. Biomedical sciences	Normal and abnormal body functions including at cellular level, and the manner in which diseases and disorders affect normal body functions. It includes the causes (aetiology) of disease and disorders and the recognition of normal and abnormal body functions	1.1	Physiological processes and normal bodily function for all systems	Central nervous, digestive, cardiovascular, lymphatic, nervous, respiratory, urinary, endocrine, and reproductive systems, and their integration; blood and other body fluids.
		1.2	Pathophysiology	Alteration of normal physiological processes and genesis of disease states by genetic factors, environmental, chemical/drug causes, physical injury or infectious agents or other causes.
		1.3	Medical microbiology	Pathogenesis of infections (bacteria, viruses, fungi, and other parasites).
		1.4	Immunology	Immune responses and defence mechanisms against infectious agents. Vaccines and vaccine preventable disease.
		1.5	Disorders affecting bodily fluids	Fluid and electrolyte disorders, metabolic acid-base disorders, and blood disorders.
		1.6	Symptoms and physiological values of disease states and disorders	Signs, symptoms, of disease, diagnostic tests and laboratory investigations associated with normal and abnormal body functions, disease states, and disorders.

Content area	General description	Content assessed		Examples of topics (non-exhaustive)
2. Medicinal chemistry and biopharmaceutics	Principles of drug design and development and the factors that influence and/or determine the materials and methods used in the formulation of medicines	2.1	Physicochemical properties of drugs	Physicochemical properties of drugs of relevance to drug absorption, distribution, metabolism, and excretion (ADME).
		2.2	Formulations for the delivery of drugs	Properties of solids, solid dosage forms, solvents, solutes, aqueous and non-aqueous solutions, liquid-liquid solutions, solid-liquid solutions, gas-liquid solutions, suspensions, and emulsions.
		2.3	Drug and chemical stability	Mechanisms of degradation (hydrolysis, oxidation), zero and first-order degradation, effect of temperature and pH.
		2.4	Solubility	Factors affecting solubility, dissolution, partition, and thermodynamics of pharmaceutical solutions.
		2.5	Drug formulation	Materials and methods used in the formulation of drug delivery systems for common routes of administration, including oral, pulmonary, transdermal, parenteral, ophthalmic, nasal, rectal, and vaginal.
		2.6	Pharmaceutical microbiology	Preservation, antimicrobial agents, and sterilisation processes.

Content area	General description	Content assessed		Examples of topics (non-exhaustive)
3. Pharmacokinetics and pharmacodynamics	Factors that influence how medicines are absorbed, distributed, metabolised, and eliminated (ADME) from the body, and how pathophysiological changes impact ADME and the selection of treatment options	3.1	Drug metabolism	Chemical and biochemical basis for drug action and pathways for drug metabolism, drug absorption, disposition, biotransformation, elimination, receptor theory, signal transduction mechanisms, and molecular pharmacology.
		3.2	Principles of pharmacokinetics	Bioavailability and bioequivalence, biological half-life, elimination and clearance concepts, distribution, protein binding, steady state considerations.
		3.3	Factors affecting drug impacts	Determinants of drug onset, drug duration, and effect of factors such as disease/conditions and diet on absorption, distribution, metabolism, and excretion.
		3.4	Evaluation of pharmacokinetic data	Kinetics of drug interactions, drug concentration vs time curves and interpretation of pharmacokinetics of low-therapeutic-index drugs.
		3.5	Using pharmacokinetic data in treating patients	Use of pharmacokinetics to calculate, evaluate, and individualise drug therapy, including monitoring and adjustment of doses in renal and hepatic dysfunction, loading doses and time to reach a steady state.
		3.1	Drug metabolism	Chemical and biochemical basis for drug action and pathways for drug metabolism, drug absorption, disposition, biotransformation, elimination, receptor theory, signal transduction mechanisms, and molecular pharmacology.

Content area	General description	Content assessed		Examples of topics (non-exhaustive)
4. Pharmacology and toxicology	How medicines work in the body, how common chemicals and poisons exert their effect, recognition of toxic and adverse effects and their management	4.1	Impact of drugs on the body	Effects of drugs on organs and body systems, dose-response relationships, agonists, partial agonists, antagonists, enzyme inducers/substrates/inhibitors, genetic polymorphism, and clinical relevance.
		4.2	Receptor theory	Drug receptor interactions, agonists/antagonists, dose-response curves, desensitisation, and super sensitivity.
		4.3	Mechanisms of action of drugs	Mechanisms of action of various drug categories as they relate to organs and disease states. Including but not limited to central nervous system, cardiovascular, haemostasis and thrombosis, and cancer chemotherapy
		4.4	Adverse drug reactions	Adverse drug reactions, side effects of medicines and management, and mechanisms of drug-drug interactions.
		4.5	Drug interactions	Drug-drug interactions, drug-receptor interactions, drug-receptor binding, enzyme-substrate relationships, hydrophilic and hydrophobic interactions.
		4.6	Drug toxicity and treatment	Drug and chemical overdose and antidotes. Signs and symptoms of toxicity and mechanism of toxicity and its management.
		4.7	Factors causing changes in the pharmacology and toxicity of drugs	Modulators of drug pharmacology and toxicity such as pharmacologic factors (disposition, biotransformation, renal elimination), physiological factors (age, sex, genetics, pregnancy, etc), and pathophysiological factors (liver disease, renal dysfunction).

Content area	General description	Content assessed		Examples of topics (non-exhaustive)
5.Therapeutics and patient care	Clinical application of content areas 1-4 in patient care. It includes understanding the principles of health promotion, disease prevention, quality use of medicine, selection of medicines for special populations and provision of medicines information	5.1	Screening	Calculate common patient assessment parameters such as body mass index (BMI) and creatinine clearance.
		5.2	Dose calculations	Amount of drug, number of doses, dosing based on body weight/ body surface area/ age/or other pharmacokinetic parameters, ratio and proportion, percentage, stock solutions, dilution, and concentration, alligation, electrolyte solutions (milliequivalents/milliosmoles), reconstitution, infusion flow rates, isotonicity.
		5.3	Primary health care	Select appropriate management options for treating illness and maintaining health and identify circumstances where non-pharmacological treatment is more appropriate.
		5.4	Safe and effective use of medicines in populations requiring extended consideration	Consideration for medicine use, precautions, and contraindications in special populations: the elderly, children less than 12 years of age, during pregnancy or while breastfeeding.
		5.5	Safe and effective use of medicines	Monitoring and review of management options, including medicines use and promoting adherence to medicines.
		5.6	Harm minimisation	Knowledge about strategies for minimising misuse and abuse of medicines at the patient and community level.
		5.7	Health promotion and disease prevention	Knowledge about general approaches for health promotion and disease prevention. Measures for promoting wellness, and proper use of non-pharmacological treatment options.
		5.8	Confidentiality	Understanding general principles about maintaining confidentiality and professionalism when providing medicines information and handling patient records.