



Study Guide

3rd Year MBBS

Pharmacology

& Therapeutics

2022-2023

**CMH Lahore
Medical College &
Institute of
Dentistry**

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Introduction to Study Guide

This study guide is designed for the subject of Pharmacology and Therapeutics, taught to 3rd year MBBS students.

It gives an overview of intended course outcomes and objectives in relation to the course content. The academic year is split into three modules of 12, 12 and 11 weeks each, interspersed with monthly assessment tests, three modular exams and pre-professional exams.

The teaching techniques aim to impart knowledge related to disease management through the use of different drugs along with their mechanism of action, side effects and interactions. Horizontal integration, across the year, is done for better conceptual understanding while vertical integration is implemented to promote clinically relevant understanding.

This study guide has been carefully designed, keeping in view PMDC and NUMS curriculum, and tailored to efficiently fulfill student's needs. Students feedback has been seeded and incorporated at all stages during study guide development. Curriculum is a living dynamic entity. Our aim is to improve it by every passing day.

Mission Statement

The University will endeavor to improve existing knowledge, and practices in the fields of medical and allied life sciences; both pure and applied, including fields of biomedical engineering and technologies, veterinary, biogenetic, social and behavioral sciences through innovative and creative approaches in order to offer best possible services to the society and humanity at large.

Vision Statement

The vision of National University of Medical Sciences is to improve the quality of life through education, research, innovation, and healthcare, thereby, contributing to endeavors to make Pakistan and this world better place to live in.

Rationale of Curriculum

The curriculum is designed in accordance with local and international standards. It is focused to prepare students for the international licensing exams and training abroad as well as empowering them to treat local patients with safety and efficiency. It is implemented in the form of class tests, modular exams tutorials, seminars and surprise tests to keep the students motivated and assess their performance throughout the year. Conventional lectures are delivered by all members of faculty to equip students with the basic knowledge of drugs for subsequent use in clinical practice. At the conclusion of each topic/chapter small group tutorials/open discussion session are conducted to encourage self-directed learning, enhance problem solving abilities and develop presentation and communication skills. This also provides for students' evaluation on a continuous basis.

Introduction to Curricular Framework

The curriculum comprises of lectures, small group discussions, tutorials, assignments and laboratory based practical work.

Lectures

Lectures are delivered by the members of the teaching staff of the department, covering in detail, all the topics given in the study guide. Advanced audiovisual aids like overhead projectors, are routinely utilized.

Small Group Discussions and Tutorials

Small Group Discussions and tutorials on recently taught topics are conducted on the conclusion of each topic. Whole of the class is divided into multiple small groups for this purpose. The students are also given the opportunity to enhance their presentation skills by presenting topics in tutorials which are planned to be held from time to time.

Assignments

Assignments are designed to impart in students, the skill of retrieving useful information from diverse resources available nowadays. Use of electronic media and scientific journals is promoted and appreciated.

Students are allocated assignment topics individually as well as in small groups. The students are evaluated for their assignments. Emphasis to recent advances is also ensured in routine assignments given to students.

Lab-based Practical Work

The syllabus of practical work has been designed to teach the students, the basic research techniques, and to impart the practical knowledge frequently needed in clinical settings. Students are instructed about the materials, methods and relevant theoretical aspects of an experiment by the instructors under supervision of senior faculty members; subsequently the students carry out the practical and laboratory work in the department laboratory.

Resources

- Teaching resources
- Supporting staff
- Infrastructure resources

Teaching Resources

Sr.No	Name	Designation	Qualification
1	Prof. Dr. Rabiea Bilal	Professor & HOD	MBBS,M.Phil, Ph.D
2	Dr. Sehrish Zaffar	Associate Professor	MBBS, M.Phil, Ph.D Scholar
3	Dr. Usman Aslam	Assistant Professor	MBBS, M.Phil
4	Dr. Ayela Eman Zia	Assistant Professor	MBBS, M.Phil
5	Dr. Sidra Ikram	Demonstrator	MBBS
6	Dr. Sidra Zahid	Demonstrator	MBBS
7	Dr. Ayra Pervaiz	Demonstrator	MBBS
8	Dr. Abeerah Idrees	Demonstrator	MBBS
9	Dr. Maham Dilshad	Demonstrator	MBBS
10	Dr. Menahil Mukhtar	Demonstrator	MBBS
11	Dr. Saif-ur-Rehman	Pharmacist	Pharm-D, M.Phil
12	Dr. Zoia Sehar	Pharmacist	Pharm-D
13	Dr. Minahil Abid	Pharmacist	Pharm-D

Supporting Staff

Sr.No	Name	Designation
1	Bilal Ashraf	Lab Technician
2	Jahangir Masih	Office Orderly
3	Muhammad Adnan	Lab Assistant
4	Muhammad Akbar	Store Keeper/Computer operator

Infrastructure Resources

Sr. #.	Infrastructure Resources	Quantity
1	Lecture Halls	1
2	Pharmacology Laboratory	1
3	Tutorial Rooms	5
4	Small Group Discussion Rooms	5
5	Faculty Rooms	6
6	Conference Room	1

Personnel involved in teaching and facilitation

Lectures & tutorials conducted by:

Prof. Dr. Rabiea Bilal (Professor of Pharmacology), Dr. Waqar Ahmed Siddiqui (Associate Professor of Pharmacology), Dr. Sehrish Zaffar (Associate Professor of Pharmacology), Dr Usman Aslam (Assistant Professor of Pharmacology), Dr Ayela Eman Zia (Assistant Professor of Pharmacology).

Practical demonstrations & tutorial conducted by:

Dr. Sidra Ikram, Dr. Sidra Zahid, Dr. Abeerah Idrees, Dr. Ayra Pervaiz, Dr. Maham Dilshad, Dr. Menahil Mukhtar, Dr. Ammar, Dr. Saif-ur-Rehman, Dr. Ayesha Eijaz, Dr. Abdul Mateen, Dr. Zoia Sehar, Dr Minahil Abid.

Support staff: Personal assistants, lab assistants, store keeper, lecture hall attendant, computer operator

DEPARTMENTAL LIBRARY **PHARMACOLOGY DEPARTMENT**

Subject:	Reference	Text books
Pharmacology	KATZUNG & TREVORS basic and clinical pharmacology	Pharmacology by Dale
“	Goodman and Gilman’s (The Pharmacology basics of Therapeutics)	Current Medical diagnosis and treatment
“	Desk reference of clinical pharmacology	Essential of medical Pharmacology by Tripathy
“	-	Disease of liver and biliary treat
“	-	Clinical gynaecology, endocrinology and infertility
“	-	British National formulary 2018
“	-	An Atlas of pediatric dermatology
“	-	Oxford Handbook of Clinical Medicine
“	-	Bertram G.Katzung pharmacology review
“	-	K.D Tripathi pharmacology
“	-	Lippincott’s illustrated review pharmacology
“	-	MCQ practice on pharmacology
“	-	Smart study series pharmacology
“	-	Kumar and Clark clinical medicine volume I
“	-	Kumar and clark clinical medicine Volume II
“	-	

“	-	Oxford handbook of clinical medicine
“	-	Prep. Manual for undergraduates
“	-	Netter’s illustrated pharmacology
“	-	Pharmacguide
“	-	Essentials of medical pharmacology
“	-	Rapid review of pharmacology(K.D Tripathy)
“	-	Brody’s human pharmacology
“	-	Physiology
“	-	Pharmacology and therapeutics
“	-	Classification and doses
“	-	Kaplan notes of pharmacology
“	-	Pharmacology secrets
“	-	Brody’s Human Pharmacology
“	-	NAPLEX
“	-	Review of Pharmacology

TECHNICAL EQUIPMENT PHARMACOLOGY DEPARTMENT

Sr.No	Nomenclature	Quantity
1.	Power Lab (Purchased)	1
2.	Electronic Micro weighing balance	2
3.	Torch	11
4.	Balance	20
5.	Weight box	20
6.	Spatulas	40
7.	Ointment box	134
8.	Scissor 6"	12
9.	Scissor 8"	3
10.	Funnel	18
11.	Beaker 250 ml	45
12.	Graduated cylinders	47
13.	Graduated cylinders 10 ml	80
14.	Bottle white 8 oz	91
15.	Bottle brown	55
16.	Surgical instrument trolley	2
17.	Reservoir bottle 2.5 L	5
18.	Reservoir bottle 5 L	12
19.	Test tube rack	6
20.	Forceps	20
21.	Scissors	12
22.	Probe	26
23.	Stop watch	10
24.	Sphygmomanometers	13
25.	Iron stands with clamp	40
26.	Weight box	5
27.	Thermometer	8
28.	Beakers 50 ml	55
29.	Beaker 1000 ml	50
30.	Graduated cylinder 1000 ml	1
31.	Volumetric flask	23
32.	Conical flask with jet	14
33.	Analytic balance	2
34.	Kymograph	27
35.	Organ bath	10
36.	Oxygen gas regulator	8
37.	Animal boards	10
38.	Dissection trays	10
39.	Glass canola	55
40.	Reagent bottle 100 ml	25
41.	Reagent bottle 250 ml	25
42.	Reagent bottles 1000 ml	

43.	Bottles 2 oz	38
44.	Bottles 8 oz	48
45.	Artery forceps	11
46.	Digital balance	1
47.	Beaker 1000 ml	5
48.	Pipettes 1 ml	45
49.	Pipettes 2 ml	24
50.	Pipettes 10 ml	10
51.	Plastic cane	4
52.	Petri dishes	53
53.	Tissue bath	8
54.	Knife	2
55.	Pestle mortar	16
56.	T. Joint	10
57.	Oxygen tube catcher	10
58.	Tyrode tube catcher	10
59.	Distillation plant	1
60.	Paper folder	22
61.	Pinch cork	20
62.	Water bath digital	1
63.	Stethoscope	9
64.	Pill tiles	24
65.	Measuring glass 2 oz	24
66.	Measuring glass 10 ml	24
67.	Measuring glass 250 ml	24
68.	Glass rod	50
69.	Gas cylinders	10
70.	Glass box	18
71.	Revolving stools	25
72.	Frog heart clip	200
73.	Curve needle	24
74.	Refrigerator	1
75.	Fire extinguisher	3
76.	Over head projector	1
77.	Multimedia projector	4
78.	Projection screen	4

LIST OF CHEMICALS PHARMACOLOGY DEPARTMENT

Sr.No	Nomenclature	Quantity
1.	Aspirin	2 kg
2.	Caffeine	1.174 kg
3.	Paracetamol	2.375 lg
4.	Thread	3.5 got
5.	Wax	1.5 pack
6.	Cotton	3
7.	Sulphur powder	1.430 kg
8.	Vaseline	9 kg
9.	Spirit ammonia aromatica	1.260 ltr
10.	Tincture Card Co	1800 ml
11.	Chloroform	Nil
12.	Sodium bicarbonate	6.420 kg
13.	Potassium permanganate	270 gm
14.	Sodium chloride	5.120 kg
15.	Dextrose	5 kg
16.	Kymograph papers	1000
17.	Plasticine	750 gm
18.	Barium chloride	Nil
19.	Potassium chloride	1.945 kg
20.	Calcium chloride	780 gm
21.	Drip sets	22
22.	Kymograph pen	30
23.	Atropine	89 gm
24.	Syringes 3 ml	15
25.	Syringes 5 ml	23
26.	Acetylcholine	100 hm
27.	Sodium dihydrogen phosphate	1.301 kg
28.	Magnesium chloride	985 gm
29.	Oxalic acid	800 gm
30.	Lignocaine injection	22
31.	Rubber tube	100 y
32.	Polythene bags	200 gm
33.	Methylated spirit	600 ml
34.	Graph papers	420
35.	Castor oil	5 ltr
36.	Bismuth carbonate	270 gm
37.	Gum acacia	810 gm
38.	Gum tregacanth	1 k
39.	Pulv create aromatic	1 kg
40.	Turpentine oil	4 ltr
41.	Camphor	1.150 kg
42.	Soft soap	

43.	Spirit chloroform	1350 ml
44.	Ammonium bicarbonate	3.760 kh
45.	Tincture ipecac	1190 ml
46.	Extract of liquorices	1900 ml
47.	Sodium citrate	2 kg
48.	Hydrochloric acid	1.700 ml
49.	Hard soap	1.750 gm
50.	Surgical gloves	Nil
51.	Face mask	100
52.	Syrup zingibarus	900 ml

TEACHING AND LEARNING STRATEGIES

Multiple educational methods have been incorporated into the curriculum. These include interactive lectures, group discussions, practical work, assessments and self-directed study.

i. Methods for achieving cognitive objectives:

- Interactive lectures using audio visual aids on power point presentation
- Group discussions in form of large group and small group
- Self-study and reading from learning resources

ii. Methods for achieving psychomotor objectives:

- Diagnosis and treatment planning
- Experimental pharmacology and hands-on practical work

iii. Methods for achieving affective objectives

- Interaction with peers, group members, teachers and support staff
- Group discussions (small and large)
- Oral presentations by students

LEARNING METHODOLOGIES

The following teaching / learning methods are used to promote better understanding:

- Interactive Lectures
- Small Group Discussions and Tutorials
- Laboratory based practical work
- E- Learning
- Self- Directed Study

Lectures

Lectures are delivered by the members of the teaching staff of the department, covering in detail, all the topics given in the study guide. Advanced audiovisual aids like overhead projectors, are routinely utilized.

Small Group Discussions and Tutorials

Small Group Discussions and tutorials on recently taught topics are conducted on the conclusion of each topic. Whole of the class is divided into multiple small groups for this purpose. The students are also given the opportunity to enhance their presentation skills by presenting topics in tutorials which are planned to be held from time to time.

Lab-based Practical Work

The syllabus of practical work has been designed to teach the students, the basic research techniques, and to impart the practical knowledge frequently needed in clinical settings. Students are instructed about the materials, methods and relevant theoretical aspects of an experiment by the instructors under supervision of senior faculty members; subsequently the students carry out the practical and laboratory work in the department laboratory.

Self-Directed Study

Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource center, teachers and resource persons within and outside the college.

E- Learning

E-Learning is a strategy by which learning occurs through the utilization of electronic media, typically the Internet. It is incorporated in the form of online resources, video lectures and LMS portal.

			Adrenaline.,Nor adrenaline, Dopamine & Dobutamine •Non Catecholamines: Ephedrine, Amphetamines α/β 2 receptor agonists etc •Adrenergic Blockers: Alpha-receptor Blockers, Beta receptor Blockers		
			•Central Sympathoplegics •Skeletal Muscle Relaxants •Drug treatment of glaucoma		
3	Drugs acting on CVS	Relate the pathophysiology of heart and vessels to its treatment modalities	•Revisiting physiology of CVS •Cardiotonic drugs: Management of cardiotoxicity of cardiac glycosides •Antihypertensive drugs •Drug Treatment of IHD •Anti arrhythmic drugs	C3	20
4	Blood	Justify the management plan of anemia, coagulation disorders and dyslipidemias by correlating it to the patho-physiological basis of disease	•Haematinics •Anticoagulants •Thrombolytic •Anti-platelets •Anti Hyperlipidemics	C3	15
5	Diuretics	•Recollect the anatomical physiological basis of renal system. •Differentiate therapeutic application of different diuretics	Thiazide, loop,K sparing, osmotic , Carbonic Anhydrase inhibitors	C3 C3	15
Total					100%
End Block Assessment		End block assessment is to be taken by the concerned institute itself. Proposed Assessment tools: MCQs & SAQs/SEQs			

List of Practicals

Note: The practicals can be shifted from one Block to other Block depending upon the convenience of the HOD of any Institute.

Self-Directed Learning Hours: Monday to Thursday 3:00 to 5:00 pm

Every Friday 1:00 pm to 3:00 pm

PHARMACOLOGY - BLOCK I

CODE: Y3B1

Duration: 12 weeks

By the end of Block I, the students will be able to:

S No	Theme	%
1	Justify the advantages and disadvantages of different routes of administration	10
2	Perform and interpret the effects of cardiac specific drugs on frog's heart.	15
3	Evaluate the effect of drugs on blood vessels of frogs.	15
4	Interpret and report the effects of CNS stimulants/depressants n frog	15
5	Interpret and report the effects of drugs in rabbit's eye	15
6	Interpret and report the effects of drugs on isolated rabbit's ileum	30
Total		100

PHARMACOLOGY - BLOCK II

CODE: Y3B2

Duration: 12 weeks

S No	Theme/Block	Learning Outcomes By the end of Block I, the students will be able to:	Course Content	Level	% Weight age
1	Central Nervous System	<ul style="list-style-type: none"> • Correlate the patho-physiology of psychiatric illnesses to their management • Differentiate between different pharmacological agents (LA, GA, opioids, NSAIDs) used in the pain management • Justify the use of antiparkinson drugs correlating it to the underlying pathophysiology of the disease • Analyze the effects of anti-epileptic drugs in relation to neuro-excitatory illnesses • Strategize the management of migraine in accordance with the underlying disease mechanism • Correlate the effects of substances of abuse (alcohol, opioids, heroin) on body to its plan for aversion therapy • Critique on the pharmacological effects of sedative /hypnotics 	<ul style="list-style-type: none"> • Central Neurotransmission • Gen Anesthetics • Local Anesthetics (LA) • Aliphatic Alcohols • Sedatives/ Anxiolytics & Hypnotics • Anti-epilepsy drugs • Antipsychotic drugs • Anti-depressants • Drugs used in Parkinsonism • Drug treatment of Migraine • Non Narcotic Analgesics <ul style="list-style-type: none"> a. Non-steroidal Anti-inflammatory drugs (NSAIDs) b. Drugs used in gout. c. DMARDs/ Biological Agents • Opioids • Drug Dependence 	C3 C3 C3 C3 C3	50
2	Chemotherapy-I	<ul style="list-style-type: none"> • Justify the treatment modalities for various microbes (bacteria, viruses) according to mode of action, resistance patterns and regional current practices • Appraise the principles of cancer chemotherapy in relation to its current therapeutic modalities 	Introduction & General Principles of Chemotherapy <ul style="list-style-type: none"> • Mechanism of Resistance • Penicillins • Cephalosporin • Sulfonamides • Macrolides • Tetracyclines • Chloramphenicol • Aminoglycosides • Quinolones • Anti- tuberculosis drugs 	C3 C3	50

			<ul style="list-style-type: none"> Misc Drugs: Clindamycin, Fusidic acids, vancomycin, Nitrofurantoin, Linezolid 	
Total				100%
End Block Assessment	End block assessment is to be taken by the concerned institute itself. Proposed Assessment tools: MCQs & SAQs/SEQs			

List of Practicals

Note: The practicals can be shifted from one Block to other Block depending upon the convenience of the HOD of any Institute

Self-Directed Learning Hours: Every Friday 1:00 pm to 3:00 pm

PHARMACOLOGY - BLOCK II		
CODE: Y3B2		
Duration: 12 weeks		
By the end of Block II, the students will be able to:		
S No	Learning Outcomes	%
1	Interpret the dose response curve	30
2	Calculate different concentrations of drugs or solutions.	30
3	Justify the selection of priority drugs for certain indications and prescribe medicine accordingly -I	40
Total		100

PHARMACOLOGY - BLOCK III

CODE: Y3B3

Duration: 12 weeks

S No	Theme/Block	Learning Outcomes By the end of Block I, the students will be able to:	Course Content	Level	% Weightage
1	Chemotherapy-II	Justify the treatment modalities for various microbes (helminths, parasites) according to mode of action, resistance patterns and regional current practices-II	<ul style="list-style-type: none"> • Anti fungal drugs • Anti viral drugs • Anti Malarial • Anti Amoebics • Anthelmintics 	C3	30
2	Endocrinology	<ul style="list-style-type: none"> • Correlate the pathophysiological basis of pituitary, thyroid and adrenal hormones with their therapeutics. • Correlate types of diabetes mellitus to their different treatment modalities • Justify the clinical use of sex hormones in relation to reproductive physiology • Correlate the patho-physiological basis of osteoporosis to its pharmacological management. 	<ul style="list-style-type: none"> • Antidiabetic drugs • Thyroid/Anti-thyroid drugs • Adrenal Hormones • Sex Hormones: Estrogens & Progestins, Anabolic steroids • Drug used in treatment of Infertility • Hormonal contraceptives • Oxytocic drugs & Uterine Relaxants • Drug treatment of osteoporosis 	<p>C3</p> <p>C3</p> <p>C3</p> <p>C3</p>	43
3	Respiratory System	Develop and justify the management plan of obstructive pulmonary disorders (Asthma, COPD).	<ul style="list-style-type: none"> • Expectorants & Antitussives • Drugs used in Bronchial Asthma • Antihistamines (H₁ antagonists) • Prostaglandins 	C3	10
4	Drugs acting on GIT	Develop and justify the management plan of common disorders of gastrointestinal tract (peptic ulcer, vomiting, constipation, gastropathies, diarrhea).	<ul style="list-style-type: none"> • Anti emetics • Antidiarrhoeals • Purgatives/laxatives Drugs used in Peptic Ulcer 	C3	15

5	Miscellaneous Topics	Outline the essential pharmacological principles of toxicology.	<ul style="list-style-type: none"> • Heavy Metal Poisoning & Antidotes (Chelating Agents) • Drug – Drug interactions 	C1	02
Total					100%
	End Block Assessment		End block assessment is to be taken by the concerned institute itself. Proposed Assessment tools: MCQs & SAQs/SEQs		

List of Practicals

Note: The practicals can be shifted from one Block to other Block depending upon the convenience of the HOD of any Institute

Self-Directed Learning Hours: Every Friday 1:00 pm to 3:00 pm

PHARMACOLOGY - BLOCK III

CODE: Y3B3

Duration: 12 weeks

By the end of Block III, the students will be able to:

S No	Learning Outcomes	%
1	Justify the selection of priority drugs for certain indications and prescribe medicine accordingly -II	50
2	Analyze the given quantitative data in a statistically significant manner.	50
Total		100

LIST OF PRACTICALS 3RD YEAR MBBS
(PHARMACY/EXPERIMENTAL PHARMACOLOGY)

PHARMACOLOGY BLOCK I

1. INTRODUCTION TO PHARMACOLOGY PRACTICALS:

- Weights and measures
- Definitions and conversions (metric system, imperial system)
- Identification of apparatus
- Routes of drug administration
- Dosage form of drugs

2. PHARMACY:-

- Carminative mixture
- Sulphur ointment
- KMnO₄ solution
- ORS
- Saline expectorant
- APC Powder
- Castor oil emulsion
- Bismuth chalk suspension

3. DOSE CALCULATIONS:-

- Young's formula:
$$\text{Age} / \text{age} + 12 \times \text{adult dose}$$
- Dilling's formula:
$$\text{Age} / 20 \times \text{adult dose}$$
- Clark's formula:
$$\text{Infant dose} = \text{weight in pounds} / 150 \times \text{adult dose}$$
- Calculation of half life, clearance and volume of distribution
- Calculation of loading dose and maintenance dose

Assessment done through OSPE test as a part of 1st Module Exam

PHARMACOLOGY BLOCK II

1. PRESCRIPTION WRITING:-

- Tuberculosis, bacillary dysentery, amoebic dysentery, asariasis, tapeworm infection, ac.streptococcal infection, pharyngitis, iron deficiency anemia, malaria, cerebral malaria, typhoid fever,
- bronchial asthma, migraine, scabies, ccf, hypertension, watery diarrhea, allergic rhinitis

2. BIostatISTICS:-

- SEM/SD
- Frequency table
- T-test
- Normal distribution curve

PHARMACOLOGY BLOCK III

1. EXPERIMENTAL PHARMACOLOGY:-

- a. Effect of known and unknown drugs on frog heart
- b. Effect of drugs on frog rectusabdoninus muscle
- c. Effect of drugs on rabbit eye
- d. Study the effect of different concentrations of ACH on rabbit ileum and
 - i. Make dose response curve
 - ii. Study drug antagonism on rabbit's ileum

2. P-DRUGS:-

- HTN with bronchial asthma, iron deficiency, allergic rhinitis, enteric fever, peptic ulcer, bacillary dysentery, amoebic dysentery, tonic clonic epilepsy, parkinsonism, malaria, streptococcal pharyngitis, UTI, acute gout, ankylostomiasis, vaginal candidiasis, bronchial asthma

LIST OF TUTORIALS

1. Pharmacokinetics
2. Pharmacodynamics
3. Sympathomimetics
4. Sympatholytics
5. Parasympathomimetics
6. Parasympatholytics
7. Anticoagulants
8. Anti hyperlipidemics
9. Diuretics
10. HTN
11. CCF, Angina
12. Sedative hypnotics
13. Local anesthetics
14. Anti epileptics
15. Antipsychotics
16. Opioids & Antiparkinson
17. General anesthetic
18. Antidepressants
19. Cell wall synthesis inhibitors
20. Cephalosporins
21. Tetracyclines, macrolides, chloramphenicol

REFERENCE BOOKS

1. Basic and Clinical Pharmacology (Bertram G.Katzung)
2. Pharmacology (Lippincott Illustrated Review)
3. A manual of Experimental Pharmacology and Pharmacy by Prof.Dr.Shabbir Ali Bhatti

OTHER LEARNING RESOURCES

1. Practicals
2. PowerLab
3. Skills Lab
4. Videos of experimental pharmacology practicals

PHARMACOLOGY

Marks of theory paper = 120
 Time Allowed = 03 hrs
 Internal Assessment (20%) = 30
Total Marks (MCQs:40%+SEQs:40%+IA:20%) = 150
 Pass Marks = 75

Paper-1: (*Marks of MCQ component shall be rationalized to 40% weightage out of 150)
 80 x MCQs (1 mark each) (80 Marks) Time =80 min

Paper-2:

9x SEQs (7x6 Marks & 2x9 Marks) (60 Marks) Time = 100 min
 *If a candidate obtains 70 marks in MCQs it will be rationalized as: $(70/80 \times 60 = 52.50)$

Modules	TOPIC	Number of MCQs (80)		9 x SEQs (7x6 Marks, 2x9Marks)
		Recall: 25	Application: 55	
General pharmacology	Branches/division of Pharmacology, Sources & active principles of drugs	1		SEQ 6 marks
	Routes of administration of drugs	1		
	Pharmacokinetics		1	
	Pharmacodynamics		1	
	Factors modifying actions & doses of drugs	1		
Drugs acting on Autonomic Nervous System(ANS)	Parasympathomimetics Drugs	1		SEQ 6 marks
	Anti Cholinesterases, Myasthenia gravis		1	
	Organophosphate poisoning & Oximes		1	
	Cholinergic blockers		1	
	Catecholamines		1	
	Non Catecholamines	1		
	Adrenergic Blockers		1	
	Central Sympathoplegics	1		
	Skeletal Muscle Relaxants		1	
	Drug treatment of glaucoma		1	
Drugs acting on Central Nervous System (CNS)	Central Neurotransmission	1		SEQ 9 marks
	Gen Anesthetics		1	
	Local Anesthetics (LA)		1	
	Aliphatic Alcohols	1		
	Sedatives/ Anxiolytics & Hypnotics		1	
	Anti-epilepsy drugs		1	

	Antipsychotic drugs		1	
	Anti-depressants		1	
	Drugs used in Parkinsonism		1	
	Drug treatment of Migraine	1		
	Non Narcotic Analgesics			
	a) Non-steroidal Anti- inflammatory drugs (NSAIDs)	1		
	b) Drugs used in gout.		1	
	c) DMARDs/ Biological Agents		1	
	Opioids		1	
	Drug Dependence	1		
Drugs acting on Cardiovascular System (CVS)	Cardiotonic drugs	1		SEQ 6 marks
	Antihypertensive drugs	1		
	Drug Treatment of IHD	1		
	Anti arrhythmic drugs	1		
Diuretics	Thiazide		1	-
	Loop/ K sparing		2	
	Osmotic		1	
	Carbonic Anhydrase inhibitors		1	
Blood	Haematinics		1	SEQ 6 marks
	Anticoagulants		1	
	Thrombolytic		1	
	Anti-platelets		1	
	Anti Hyperlipidemics		1	
Chemotherapy	Introduction & General Principles of Chemotherapy	1		SEQ 9 marks
	Mechanism of Resistance	1		
	Penicillins		1	
	Cephalosporin		1	
	Sulfonamides	1		
	Macrolides		1	
	Tetracyclines		1	
	Chloramphenicol	1		
	Aminoglycosides		1	
	Quinolones		1	
	Anti- tuberculosis drugs		1	
	Misc Drugs: Clindamycin, Fusidic acids, vancomycin, Nitrofurantoin, Linezolid	1		

	Anti fungal drugs		1	
	Anti viral drugs		1	
	Anti Malarial		1	
	Anti Amoebics		1	
	Anthelmintics	1		
Endocrinology	Antidiabetic drugs		1	SEQ 6 marks
	Thyroid/Anti-thyroid drugs		1	
	Adrenal Hormones		1	
	Drug treatment of osteoporosis	1		
Reproductive System	Sex Hormones		1	-
	Drug used in treatment of Infertility		1	
	Hormonal contraceptives		1	
	Oxytocic drugs & Uterine Relaxants		1	
Respiration	Expectorants & Antitussives		1	SEQ 6 marks
	Drugs used in Bronchial Asthma		1	
	Antihistamines (H ₁ antagonists)		1	
	Prostaglandins	1		
Gastrointestinal System (GIT)	Anti emetics		1	SEQ 6 marks
	Antidiarrhoeals	1		
	Purgatives/laxatives		1	
	Drugs used in Peptic Ulcer		1	
Misc	Autacoids	1		-
	Heavy Metal Poisoning & Antidotes		1	
	Drug – Drug interactions		1	
TOTAL		80 (80 Marks)		09 (60 Marks)

Pre-Annual Annual Professional Exam: Practical (2022)

Practical = 120
 Internal Assessment = 30
 Total marks = 150
 Pass Marks = 75

Gen Viva Voce		Practical		Gen Viva + Practical	Internal Evaluation	Total
Int Examiner	Ext Examiner	OSCE/Practical	Note book	120	30	150
30	30	55	5			

* Lab work: 03 Practical (Observed) (Pharmacodynamics) of 10 marks each = 30 Marks
 05 Unobserved stations of 05 marks each = 25 Marks

INTERNAL ASSESSMENT - THEORY	
INTERNAL ASSESSMENT WEIGHTING: 20%	
Exam s	Weighting s
Attendance in Lectures: a. >90% = 30% b. 89-80% = 20% c. 79-70% = 10%	10%
End of Block/ clinical rotation (theory) Examination	45%
Continuous assessment (average score of all tests attempted after every learning session during the academic year)	20%
Pre-Annual Exam	25%
Total	100%
INTERNAL ASSESSMENT STRUCTURE - PRACTICAL	
INTERNAL ASSESSMENT WEIGHTING: 20%	
Exam s	Weighting s
Attendance in Practicals: a. >90% = 30% b. 89-80% = 20% c. 79-70% = 10%	10%
*End of Block/ clinical rotation (OSCE) Examination	45%
*Continuous assessment of practical/ clinical skills and attitude	20%
Pre-Annual Exam	25%
Total	100%

Sample MCQ and SEQ

MCQ:

Experimental evaluation of the pharmacokinetics of a drug under development leads to the finding that it “undergoes significant first-pass hepatic metabolism.” Which of the following administration routes was most likely used to reach this conclusion?

- a. Intramuscular
- b. Intravenous
- c. **Oral**
- d. Sublingual

SEQ:

A patient diagnosed with pheochromocytoma is in presurgical management phase. He is prescribed phenoxybenzamine, an irreversible pharmacological antagonist of alpha blocker.

- a. Write down one advantage and one disadvantage of using an irreversible antagonist as a drug in clinical practice. (1 + 1)
- b. Explain the effect of irreversible antagonist on;
 - i. Efficacy of agonist (1)
 - ii. Potency of agonist (1)
 - iii. Position of the agonist curve along the dose response axis (1)

Key:

(a)

Advantage:

Long lasting and uninterrupted effect, desirable in conditions like pheochromocytoma to antagonize sudden, unpredictable release of catecholamines.

Disadvantage:

Effect cannot be reversed. Overdose/toxicity cannot be overcome by increasing agonist concentration.

(b)

Efficacy: Decreased because the receptor is permanently inactivated either by direct occupation or allosteric modulation.

Potency: No effect, unless spare receptors are present. In case of spare receptors, potency decreased until all spare receptors are occupied

Position of curve: Downward shift along y-axis (response axis), no change on x-axis (dose axis), assuming no spare receptors are present