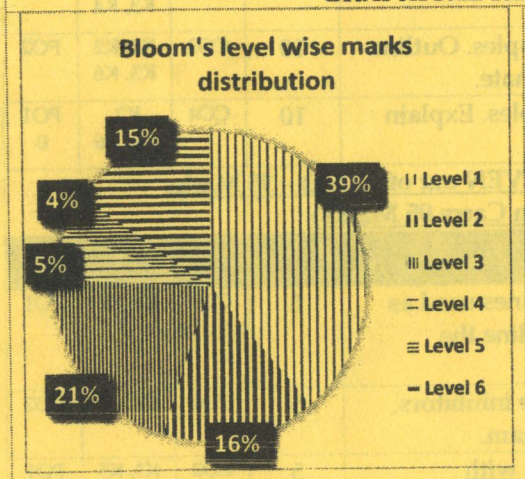
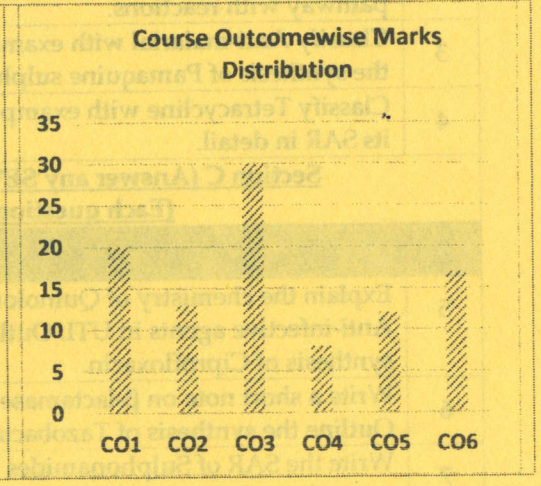
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcome	CO1	Know the correlating between pharmacology of a Infection disease and its management or cure.
	CO2	Acquire knowledge about the rational drug design techniques.
	CO3	Interpret the biological actions of any class of drugs through the study of quantitative structural activity relationship
	CO4	Acquire knowledge about the pharmacodynamics of different class of medicinal compounds.
	CO5	Acquire knowledge about the chemotherapy for infection diseases.
	CO6	Understand the chemistry of drugs with respect to their pharmacological activity.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A — ACCREDITED UNIVERSITY

[30-04-2026]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Medicinal Chemistry-III**	**Session**	**Even, 2025-2026**
Semester	**VI**	**Year**	**April, 2026**
Time: 3 Hour **Max. Marks: 75**	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • **Answer all Questions of Section A (Compulsory)** • **Answer Any *Two* out of *Three* of Section B** • **Answer Any *Seven* out of *Nine* of Section C** • **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers.**		
Knowledge Level (KL)	**K1 :** Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Iodoxuridine belongs to which category of Anti-viral drug? a) Anti-herpes b) Anti-influenza c) Anti-retrovirus d) None of these	1	CO5	K1	PO9
ii	Identify the Integrase inhibitor: a) Amantadine b) Lamivudine c) Raltegravir d) None of these	1	CO3	K1	PO1
iii	Pyrantel is: a) Anti-protozoal b) Anthelmintic c) Anti-fungal d) All of these	1	CO5	K1	PO2
iv	Nitroimidazoles include: a) Metronidazole b) Tinidazole c) Ornidazole d) None of these	1	CO2	K5	PO2
v	Metrifonate is: a) Anthelmintic b) Anti-protozoal c) Anti-fungal d) None of these	1	CO3	K1	PO1
vi	Isoniazid is represented as------in ATT. a) H b) Z c) R d) S	1	CO1	K1	PO2

vii	PAS is:- a) ATT b) Anti-fungal c) Both a and b d) None of these	1	CO4	K3	PO1
viii	DEC is: a) Anti-protozoal b) Anthelmintic c) Anti-fungal d) All of these	1	CO2	K2	PO1
ix	Choose the drug containing Imidazothiazole structure: - a) Mebendazole b) Levamisole c) INH d) Niridazole	1	CO4	K2	PO10
x	Furazolidone serves the same principal function as that of: - a) Metrifonate b) Ornidazole c) Nitrofurantoin d) Mafenide acetate	1	CO4	K2	PO1
xi	Urotropine is also called: a) Hexamine b) Hamacyin c) None of these d) All of these	1	CO3	K2	PO2
xii	Select the drug which is used as an Injectable in ATT. a) Capreomycin b) Pyrazinamide c) INH d) All of these	1	CO3	K1	PO1
xiii	Sulphamethoxazole contains which heterocyclic compound? a) Oxazole b) Isoxazole c) Both(a)&(b) d) None of these	1	CO1	K1	PO2
xiv	Sulphonamides are:- a) Anti-Bacterial b) Anti- Protozonal c) Both (a) & (b) d) None of these	1	CO3	K2	PO1
xv	Which heterocyclic compound is found in the structure of Thiabendazole? a) Imidazole b) Pyrrole c) Thiazole d) Thiophene	1	CO2	K1	PO2
xvi	The carbon atom in the straight chain of Pyrantel is------hybridized. a) sp b) sp^2 c) sp^3 d) None of these	1	CO2	K2	PO2
xvii	Identify the nitroimidazole used as Anti-protozoal drug :- a) Metronidazole b) Albendazole c) Thiabendazole d) None of these	1	CO2	K2	PO2
xviii	Amphotericin-B belongs to the category of:- a.) ATT-drug b.) Anti-fungal c.) Anthelmintic d.) All of these	1	CO1	K1	PO2
xix	Zidovudine is: a) Anti-viral b) ATT c) Both a and b d)None of these	1	CO4	K2	PO1
xx	Pyrazinamide is: a) Anti-viral b) ATT c) Both a and b d) None of these	1	CO4	K1	PO1

Section B (Answer any TWO out of THREE) – 20 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	CO	KL	PO
2	Classify Penicillin and explain its degradation pathway with reactions.	10	CO2	K1, K2 K3, K4	PO1
3	Classify Anti-malarial with examples. Outline the synthesis of Pamaquine sulphate.	10	CO3	K1, K2 K3, K6	PO2
4	Classify Tetracycline with examples. Explain its SAR in detail.	10	CO4	K2, K5, K6	PO10

Section C (Answer any SEVEN out of NINE) – 35 Marks
(Each question Carry 05 Marks)

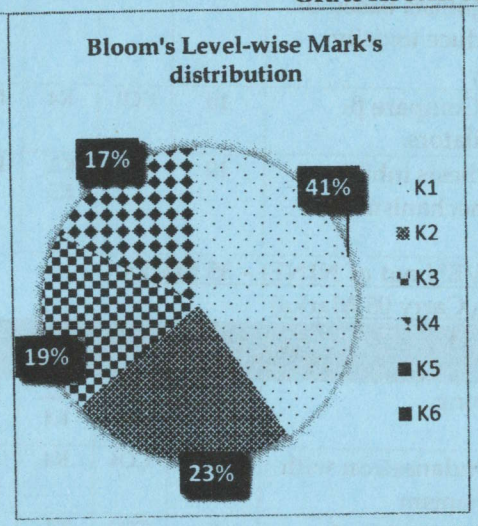
Q. No.	QUESTIONS	Marks	CO	KL	PO
5	Explain the chemistry of Quinolones used as Anti-infective agents in UTI. Outline the synthesis of Ciprofloxacin.	5	CO1	K2, K4	PO1
6	Write a short note on β-lactamase inhibitors. Outline the synthesis of Tazobactam.	5	CO1	K1, K6	PO2
7	Write the SAR of Sulphonamides with examples.	5	CO2	K3, K5	PO1
8	Classify Anti-protozoal drugs with examples. Outline the synthesis of Metronidazole.	5	CO3	K1, K6	PO2
9	Outline the synthesis of Diethylcarbamazine citrate and give examples of Benzimidazole drugs used as Anthelmintic drugs.	5	CO2	K1, K2	PO2
10	Give examples of Azoles used as Anti-fungal drugs. Outline the synthesis of Miconazole.	5	CO3	K3, K6	PO4
11	Write a short note on Monobactams. Outline the synthesis of Aztreonam.	5	CO3	K1, K3, K4	PO7
12	Give examples of first line Anti-tubercular drugs and outline the synthesis of Isoniazid.	5	CO6	K6, K2. K3	PO2
13	Explain the degradation pathway of Cephalosporins.	5	CO3	K1, K3	PO2

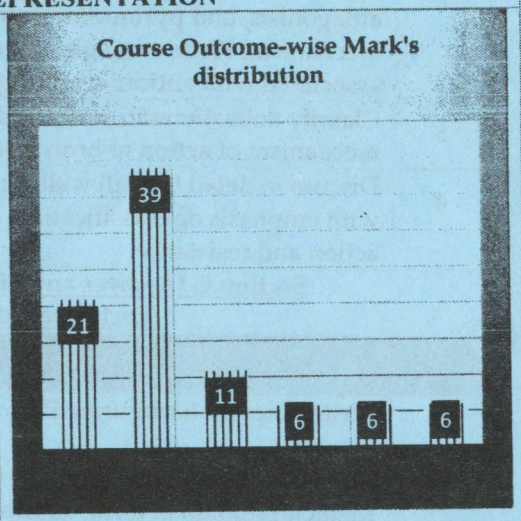
9	Write the MOA and adverse effects of Aminoglycosides.	5	CO2	K1, K2	PO2
10	Classify Anti-fungal drugs & write M.O.A of Echinocandins	5	CO2	K2	PO4
11	Describe about life cycle of HIV virus and Classify Anti-retroviral drugs.	5	CO2	K1, K3, K4	PO7
12	Classify immunosuppressant drugs and Explain the mechanism of action of calcineurin inhibitors.	5	CO3	K4	PO2
13	Define Gastroesophageal Reflux Disease (GERD). Explain pharmacological treatment for GERD.	5	CO1	K3	PO2

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Understand the mechanism of drug action and its relevance in the treatment of different diseases
	CO2	Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
	CO3	Understand the mechanism of drug action and its relevance in the immunotherapy
	CO4	Analyze correlation of pharmacology with related medical sciences.
	CO5	Understand about symptoms of several poisonings
	CO6	Understand the principles of toxicology and treatment of various poisonings

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

[04-05-2026]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Pharmacology-III**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**April, 2026**
Time: 3 Hour **Max. Marks : 75**	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any *Two* out of *Three* of Section B** • **Answer Any *Seven* out of *Nine* of Section C** • **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.**		
Knowledge Level (KL)	**K1** : Remembering	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Sulfasalazine is a combination of sulfapyridine and: a. Metronidazole b. Folic acid c. Prednisolone d. Mesalazine	1	CO1	K3	PO9
ii	Omalizumab belongs to which class of drug? a. Bronchodilator b. Mast cell stabilizer c. Anti-IgE Antibody d. Anticholinergics	1	CO1	K2	PO1
iii	Antidote used in organophosphorus poisoning: a. Naloxone b. Atropine + Pralidoxime c. Deferoxamine d. Penicillamine	1	CO5	K1	PO2
iv	Which drug is used both as anticancer and immunosuppressant? a. Methotrexate b. Penicillin c. Aspirin c. Diazepam	1	CO3	K5	PO2
v	Anti-TB agent that acts by inhibiting DNA dependent RNA Polymerase a. Pyrazinamide b. Ethambutol c. Isoniazid d. Rifampin	1	CO2	K1	PO1
vi	Why should antacids be avoided with sucralfate? a. They increase gastric irritation b. They decrease absorption of sucralfate	1	CO1	K3	PO2

	c. They prevent activation of sucralfate by increasing gastric pH d. They increase toxicity of sucralfate				
vii	Azole antifungals (e.g., Fluconazole) act by: a. Binding to DNA b. Inhibiting β-glucan synthesis c. Inhibiting ergosterol synthesis d. Blocking protein synthesis	1	CO2	K2	PO1
viii	Which of the following inhibits DNA Gyrase a. Sulfonamides b. Amphotericin B c. Gentamicin d. Ciprofloxacin	1	CO2	K1	PO1
ix	Which class inhibits 50S ribosomal subunit? a. Tetracycline b. Macrolides c. Penicillin d. Quinolones	1	CO2	K2	PO1
x	Ivermectin acts by: a. Blocking calcium channels b. Opening glutamate-gated chloride channels c. Inhibiting DNA synthesis d. Blocking ribosomes	1	CO2	K2	PO1
xi	β-lactam resistance commonly occurs due to: a. Increased absorption b. β-lactamase enzyme production c. Increased metabolism d. Increased excretion	1	CO2	K3	PO2
xii	Antidote for Arsenic poisoning a. N-acetylcysteine b. Dimercaprol c. Physostigmine d. None	1	CO5	K1	PO1
xiii	Which anticmetic has prokinetic action? a. Metoclopramide b. Ondansetron c. Promethazine d. Aprepitant	1	CO1	K1	PO2
xiv	Which of the following is used for extra-intestinal amoebiasis only a. Metronidazole b. Ornidazole c. Chloroquine d. Emetine	1	CO2	K2	PO1
xv	Acyclovir acts by: a. Inhibiting RNA polymerase b. Inhibiting viral DNA polymerase c. Inhibiting ribosomes d. Blocking cell wall	1	CO2	K1	PO2
xvi	Proton pump inhibitors act by a. Decreasing the volume of HCl in stomach b. Neutralizing the gastric HCl contents c. Through H^+/K^+ ATPase pump d. All	1	CO1	K2	PO2
xvii	Mesna is used to prevent toxicity of: a. Methotrexate b. Cyclophosphamide c. Doxorubicin d. Cisplatin	1	CO6	K2	PO2
xviii	Chronotherapy refers to: a. Surgical timing b. Drug administration according to biological rhythm c. Emergency therapy d. Gene therapy	1	CO4	K4	PO2
xix	Dextromethorphan acts by: a. Blocking histamine receptors b. Acting on cough center in CNS c. Increasing bronchial secretion d. Inhibiting DNA synthesis	1	CO1	K2	PO1
xx	Fanconi syndrome is most commonly associated with: a. High-dose intravenous therapy of steroids b. Concurrent aminoglycoside use c. Use of outdated tetracycline d. Combination with penicillin	1	CO2	K4	PO1

Section B (Answer any TWO out of THREE) – 20 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Differentiate between folate antagonists, purine antagonists, and pyrimidine antagonists based on mechanism. Write strategies to reduce toxicity associated with anticancer therapy	10	CO3	K4, K6	PO1
3	Classify antiasthmatic drugs and Compare β_2 mechanism of action of bronchodilators.	10	CO1	K4	PO2
4	Discuss in detail the cell wall synthesis inhibitors with emphasis on classification, mechanism of action and resistance.	10	CO2	K2, K5	PO1

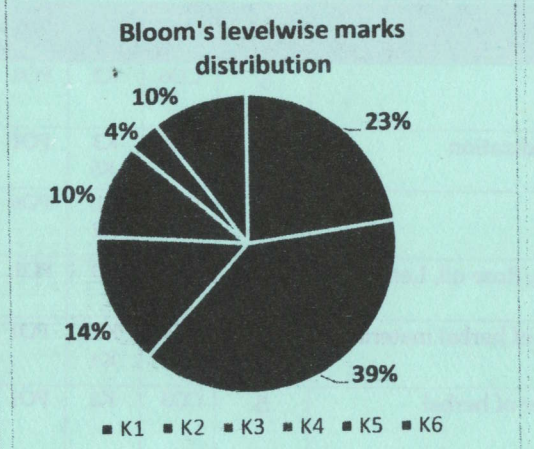
Section C (Answer any SEVEN out of NINE) – 35 Marks
(Each question Carry 05 Marks)

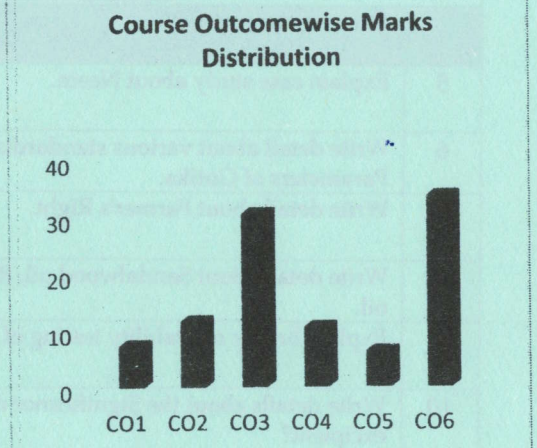
Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Write notes on Barbiturate Poisoning.	5	CO5	K2, K4	PO1
6	Classify anti-emetics. Compare Ondansetron with Metoclopramide in terms of mechanism	5	CO4	K4	PO2
7	Classify anti-diarrhoeal drugs. Write MOA of antimotility drugs.	5	CO2	K3, K5	PO1
8	Differentiate between mutagenicity and carcinogenicity.	5	CO6	K2	PO2

CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

Course Outcomes	CO1	Acquire knowledge about the recognition, collection and preservation of medicinal plants.
	CO2	Know the Indian system of medicines, herb-drug and herb-food interactions.
	CO3	Know the formulation and standardization of herbal cosmetics, other herbal formulations.
	CO4	Study the phytochemical screening of crude drugs.
	CO5	Know the WHO and ICH guidelines for evaluation of herbal drugs.
	CO6	Know the patenting aspects related to herbal drugs and about the GMP of Indian system of medicines.

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A – ACCREDITED UNIVERSITY

[06-05-2026]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	Bachelor of Pharmacy		
Subject Name	Herbal Drug Technology-Theory	Session	Even, 2025-26
Semester	VI	Year	April, 2026

Time: 3 Hour
Max. Marks : 75

- Start writing from 2nd page onwards; don't Write on the 1st Page Backside
- Answer all Questions of Section A (Compulsory)
- Answer Any *Two* out of *Three* of Section B
- Answer Any *Seven* out of *Nine* of Section C
- Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.

Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Novel dosages form includes____ A) Liposomes B) Phytosome C) Neosomes D) All of the above	1	CO3	K1	PO1
ii	Which of the following is marketed Bhasma? A) Suvarna Bhasma B) Kanakasava C) Triphala churna D) Ashokaristha	1	CO2	K1	PO1
iii	Shikakai is useful in_____ A) Herbal lotion B) Herbal Cream C) Herbal Shampoo D) Herbal mixture	1	CO3	K1	PO1
iv	Kava plant is mainly used for_____ A) Anti-Anxiety B) Headache C) Dizziness D) Insomnia	1	CO2	K1	PO1
v	Who is known as the father of Ayurveda? A) Sushruta B) Charaka C) Dhanvantari D) Patanjali	1	CO2	K1	PO1
vi	Which of the following cannot be patented? A New Drug B) Traditional Knowledge C) Machine D) Process	1	CO6	K1	PO1
vii	Pepper increases Bioavailability of many drugs due to A) piperine B) Morphine	1	CO2	K1	PO1

	C) Nicotine D) Quinine				
viii	Schedule- Z Of Drug & Cosmetic act relates to A) Clinical trial B) Veterinary Drugs C) Herbal Drugs D) Cosmetic Drugs	1	CO6	K1	PO1
ix	Which System uses "like cures like" principle A) Ayurveda B) Unani C) Homeopathy D) Siddha	1	CO2	K1	PO1
x	Storage area for herbal drug should be A) Moist & warm B) Clean, Dry C) Open place D) hot & very hot	1	CO1	K2	PO1
xi	Labeling of herbal product should contain A) product name B) Manufacturing date C) Expiry date D) All of the above	1	CO6	K1	PO1
xii	Cationic dyes are___ A) Acid dyes B) Disperse dye C) Basic dyes D) All of the above	1	CO3	K1	PO1
xiii	Aristha is a fermented preparation that Contains A) Alkaloid B) Essential oil C) Alcohol D) Tannins	1	CO2	K1	PO1
xiv	Most Commonly used natural Diluent is_____ A) Lactose B) Corn starch C) Methyl cellulose D) Talc	1	CO3	K1	PO1
xv	A Patent is granted for _____ how long years? A) 20 years B) 18 years C) 16 years D) 15 years	1	CO6	K1	PO1,
xvi	There Should be ___ sq. feet area for quality Control Selection A) 150 B) 160 C) 190 D) 200	1	CO5	K2	PO1
xvii	DCC belong to____ A) Ayurvedic System B) Unani system C) Siddha System D) All of the above	1	CO6	K1	PO1
xvii i	Proper storage of drug helps to prevent A) Growth B) Deterioation C) Identification D) Collection	1	CO1	K1	PO1
xix	GMP part 1 Include A) General requirement B) Warehousing area C) personnel D) All of the above	1	CO6	K1	PO1
xx	Patent means A) Legal protection for Invention B) Drug marketing C) Drug testing D) Drug Advertisement	1	CO6	K1	PO1

Section B (Answer any TWO out of THREE) – 20 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Describe in details about the herbs used in hair care with example.	10	CO3	K2	PO1, PO2
3	Explain in detail about the phytochemical screening of crude drugs.	10	CO4	K2, K4	PO1
4	Explain the Part-1 Component of GMP of ASU Drugs.	10	CO6	K2, K6	PO1, PO2

Section C (Answer any SEVEN out of NINE) – 35 Marks
(Each question Carry 05 Marks)

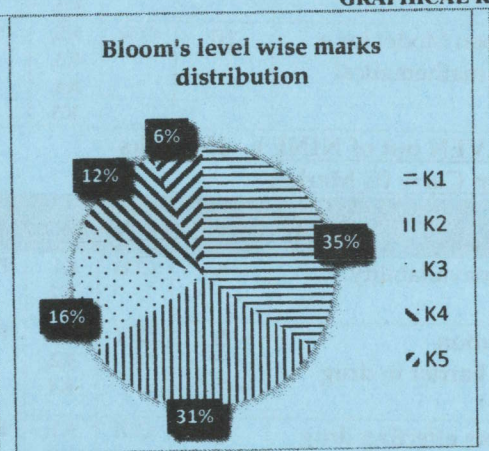
Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Explain case study about Neem.	5	CO6	K2	PO6
6	Write detail about various standardization Parameters of Gutika.	5	CO3	K3 ,K5	PO1
7	Write detail about Farmer's Right.	5	CO6	K1, K2	PO6
8	Write detail about Sandalwood oil, Rose oil, Lemon oil.	5	CO1	K1	PO1,
9	Explain briefly on stability testing of herbal material.	5	CO5	K3, K4	PO1
10	Write details about the Significance of herbal excipient?	5	CO3	K2	PO1
11	Write short note on phytosome.	5	CO3	K2, K3	PO1, PO5
12	Explain Preparation and standardization of churna..	5	CO2	K1	PO1, PO2
13	Explain the concept of trademark.	5	CO6	K2, K6	PO1, PO8

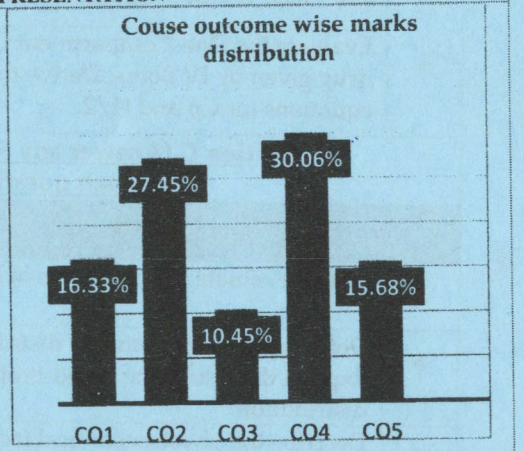
8	Explain any two levels of IVIVC (In-Vitro-In-Vivo Correlation).	5	CO5	K1, K2, K4	PO2
9	Analyse Fick's First Law in passive diffusion.	5	CO3	K1, K2, K4	PO10
10	Write a note on the compartment model and enumerate difference between Mamillary and the Caternary Model.	5	CO4	K1, K2, K3	PO1
11	Explain the various types of dissolution apparatus used according to the USP.	5	CO4	K1, K4, K5	PO2
12	Briefly evaluate the Michaelis–Menten equation.	5	CO5	K1, K2. K4 K5	PO1
13	Explain the clinical significance of loading dose and maintenance dose with suitable examples.	5	CO3	K1, K2, K3	PO1

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
	CO2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
	CO3	Understand the concepts of bioavailability and bioequivalence of drug products and their significance
	CO4	Understand various pharmacokinetic parameters, their significance & applications.
	CO5	Understand the renal excretion process of drugs and its clearance; also explain the bioavailability and IVIVC.

GRAPHICAL REPRESENTATION





JGI **ARKA JAIN University** Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

[08-05-2026]
END SEM EXAMINATION
School of Allied Health Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Biopharmaceutics and Pharmacokinetics**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**April, 2026**
Time: 3 Hour **Max. Marks: 75**	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any *Two* out of *Three* of Section B** • **Answer Any *Seven* out of *Nine* of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.		
Knowledge Level (KL)	**K1** : Remembering	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	What is driving force for passive diffusion? a) Concentration gradient only b) Electrochemical gradient only c) Charge equilibration & Concentration gradient d) Concentration & electrochemical gradient both	1	CO2	K1, K2	PO1
ii	According to the BCS classification, Class III drugs are- a) High solubility, low permeability b) Low permeability High solubility c) Low solubility, low permeability d) High solubility, high permeability	1	CO1	K1, K2	PO1
iii	What is the molecular weight of human serum? a) 50000 Daltons b) 65000 Daltons c) 60000 Daltons d) 75000 Daltons	1	CO2	K1, K2	PO1
iv	Drug-protein binding is generally- a) Irreversible b) Covalent c) Reversible d) Permanent	1	CO2	K1, K2	PO1
v	A drug that is 98% bound to albumin has its binding reduced to 96% due to a competitor. What is the percentage increase in the "free" (active) drug concentration?	1	CO2	K2, K4, K5	PO10

	a) 2% b) 4% c) 50% d) 100%				
vi	Drugs given sublingually avoid: a) Distribution b) Renal excretion c) First-pass metabolism d) Plasma binding	1	CO2	K1, K2	PO1
vii	Which factor decreases renal excretion of drugs? a) Increased renal blood flow b) Increased urine flow c) High protein binding d) Increased glomerular filtration	1	CO5	K1, K2	PO1
viii	Relative bioavailability compares: a) Oral with IV b) Two different formulations of same drug c) Drug with placebo d) Drug with metabolite	1	CO3	K1, K2	PO1
ix	If in-vitro dissolution is fast but in-vivo absorption is slow, the possible reason is: a) Poor permeability of drug b) High solubility c) High dissolution rate d) Low dose	1	CO5	K2, K3	PO2
x	Which approach best improves bioavailability of a poorly water-soluble drug with good permeability? a) Prodrug formation b) Particle size reduction c) Increasing polarity d) Reducing dose	1	CO1	K1, K2, K3	PO1
xi	In IV bolus administration, drug input is- a) Slow b) Continuous c) Instantaneous d) Delayed	1	CO4	K1, K2	PO1
xii	The formula t1/2 = 0.693/KE applies to- a) Zero-order kinetics b) First-order kinetics c) Non-linear kinetics d) Mixed order	1	CO4	K1, K2, K4	PO1
xiii	The units for Clearance (Cl) are - a) mg/L b) hr^{-1} c) mL/min d) mg/hr	1	CO4	K1, K2	PO1
xiv	Transdermal absorption depends on: a) Molecular size b) Lipid solubility c) Skin hydration d) All of the above	1	CO2	K1, K2	PO1
xv	The central compartment includes- a) Muscle & Fat b) Blood & highly perfused tissue c) Bone d) Skin	1	CO4	K1, K2	PO1
xvi	Steady state is achieved when- a) Absorption stops b) Rate of drug input = rate of elimination c) Drug is fully metabolized d) Drug binds protein	1	CO5	K1, K2, K3	PO1
xvii	Improper dosing can lead to- a) Therapeutic failure b) Toxicity c) Drug accumulation d) All of the above	1	CO4	K1, K2 ,K3	PO1
xviii	Non-linear pharmacokinetics is also known as- a) First-order kinetics b) Zero-order kinetics c) Dose-dependent kinetics d) Passive kinetics	1	CO4	K1, K2	PO1
xix	The equation used in Michaelis–Menten kinetics is: a) C = kt b) dC/dt = -kC c) Rate = (Vmax × C)/(Km + C) d) AUC = Dose/Cl	1	CO5	K1, K2	PO1
xx	Protein binding saturation leads to- a) Decreased free drug b) Increased free drug fraction c) No change d) Complete elimination	1	CO2	K1, K2, K3	PO2

Section B (Answer any TWO out of THREE) – 20 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain in detail the different mechanisms of drug absorption with diagram.	10	CO1	K1, K2, K4	PO2
3	Explain drug metabolism with emphasis on Phase I and Phase II reactions and their significance.	10	CO2	K1, K2 K3,	PO1
4	Evaluate the One-Compartment Open Model for a drug given by IV Bolus. Derive the mathematical equations for Cp and t1/2.	10	CO4	K2, K3, K4, K5	PO9

Section C (Answer any SEVEN out of NINE) – 35 Marks
(Each question Carry 05 Marks)

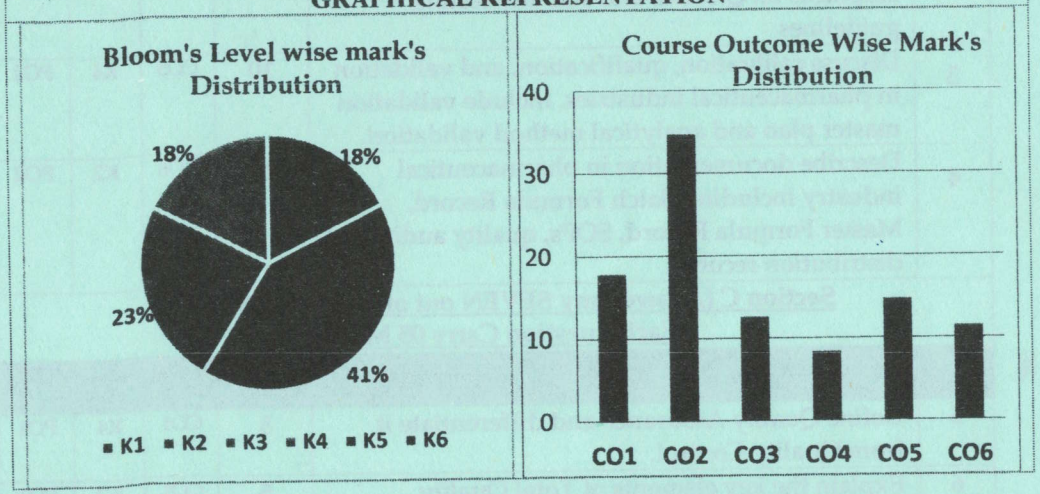
Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Briefly evaluate the objectives of bioavailability.	5	CO3	K1, K2	PO1
6	Define apparent volume of distribution. Explain the role of the blood-brain barrier in drug distribution?	5	CO2	K1, K2, K4	PO9
7	Describe the physicochemical factors affecting drug absorption.	5	CO1	K1, K2, K3	PO1

9	Discuss the benefits and elements of ISO 9000.	5	CO1	K 2	PO1
10	Discuss the Document maintenance process in pharmaceutical industry.	5	CO4	K 3	PO6
11	Describe contamination control in sterile areas.	5	CO2	K 2	PO2
12	Write a note on Good Laboratory Practices principles.	5	CO3	K 3	PO6
13	Explain types of validation with examples.	5	CO3	K 3	PO2

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Understand the importance of quality in pharmaceutical products.
	CO2	Understand the importance of Good manufacturing practices and the factors affecting the quality of pharmaceuticals.
	CO3	Understand the importance of Good laboratory practices and its documentation.
	CO4	Apply the various documentation processes.
	CO5	Analyze calibration, validation and predict the errors and analyse the root cause.
	CO6	Understand the process involved in manufacturing of pharmaceuticals in different departments

GRAPHICAL REPRESENTATION



ARKA JAIN University
Jharkhand
NAAC GRADE A ACCREDITED UNIVERSITY

[11-05-2026]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	Bachelor of Pharmacy		
Subject Name	Quality Assurance	Session	Even, 2025-26
Semester	VI	Year	April, 2026
Time: 3 Hour Max. Marks : 75	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any *Two* out of *Three* of Section B • Answer Any *Seven* out of *Nine* of Section C • Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Which of the following best defines Quality Control? a) Preventing defects b) Detecting defects in finished products c) Marketing strategy d) Cost reduction	1	CO1	K1	PO 1
ii	GMP primarily ensures: a) Product marketing b) Product safety and consistency c) Sales growth d) Patent protection	1	CO2	K1	PO2
iii	TQM focuses mainly on: a) Inspection b) Continuous improvement c) Advertising d) Packaging	1	CO1	K1	PO1
iv	ICH stands for: a) International Council for Harmonization b) Indian Council of Health c) International Chemical House d) Industrial Control Hub	1	CO2	K1	PO1
v	QbD emphasizes: a) End product testing b) Building quality into process c) Random sampling d) Marketing strategy	1	CO2	K1	PO2

vi	ISO 9000 deals with: a) Environmental management b) Quality management systems c) Drug approval d) Clinical trials	1	CO2	K1	PO1
vii	NABL accreditation is related to: a) Manufacturing b) Laboratory quality c) Marketing d) Distribution	1	CO3	K1	PO1
viii	Personnel hygiene in Pharmacy industries is important to: a) Increase profit b) Prevent contamination c) Improve packaging d) Reduce cost	1	CO2	K1	PO2
ix	Controlled environment in sterile areas is mainly for: a) Temperature control b) Contamination prevention c) Lighting d) Noise control	1	CO2	K1	PO2
x	Equipment qualification ensures: a) Proper installation and operation b) Sales growth c) Advertising d) Cost reduction	1	CO5	K2	PO2
xi	Rubber closures are tested for: a) Colour b) Extractable and leachable c) Shape d) Weight	1	CO2	K1	PO2
xii	GLP applies to: a) Manufacturing b) Non-clinical laboratory studies c) Sales d) Packaging	1	CO3	K1	PO2
xiii	Stability testing guidelines are part of: a) ICH Q-series b) ICH E-series c) ICH S-series d) ICH M-series	1	CO2	K1	PO1
xiv	Complaint handling includes: a) Ignoring issues b) Investigation and corrective action c) Marketing d) Packaging	1	CO4	K2	PO6
xv	Batch Formula Record contains: a) Marketing plan b) Manufacturing instructions c) Sales data d) Transport details	1	CO4	K1	PO1
xvi	SOP stands for: a) Standard Operating Procedure b) System Operating Plan c) Standard Output Process d) System Order Protocol	1	CO4	K1	PO1
xvii	Validation ensures: a) Equipment cleaning b) Process consistency c) Marketing d) Packaging	1	CO5	K2	PO2
xviii	Calibration is defined as: a) Adjustment of instrument b) Comparison with standard c) Cleaning d) Repair	1	CO5	K2	PO1
xix	UV spectrophotometer qualification checks: a) Weight b) Wavelength accuracy c) Volume d) Shape	1	CO5	K2	PO2
xx	Good warehousing practice ensures: a) Proper storage and handling b) Sales increase c) Advertising d) Transport	1	CO6	K1	PO1

Section B (Answer any TWO out of THREE) – 20 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain ICH guidelines in detail with special emphasis on Q-series and stability testing guidelines	10	CO2	K2	PO1
3	Discuss calibration, qualification, and validation in pharmaceutical industries. Include validation master plan and analytical method validation.	10	CO5	K4	PO2
4	Describe documentation in pharmaceutical industry including Batch Formula Record, Master Formula Record, SOPs, quality audit, and distribution records.	10	CO6	K2	PO2

Section C (Answer any SEVEN out of NINE) – 35 Marks
(Each question Carry 05 Marks)

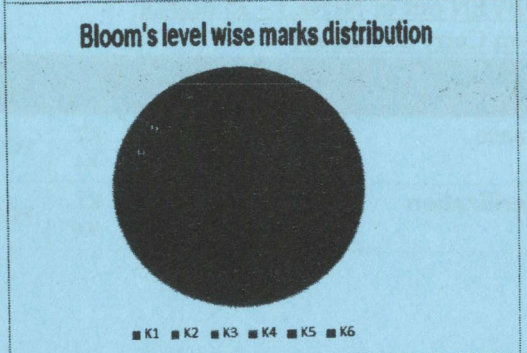
Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Define Quality Assurance and differentiate it from Quality Control.	5	CO1	K4	PO1
6	Explain the key elements of Total Quality Management.	5	CO1	K2	PO1
7	Describe the purpose and harmonization process of ICH guidelines.	5	CO2	K2	PO2
8	Write a short note on Quality by Design (QbD) and its tools.	5	CO2	K3	PO2

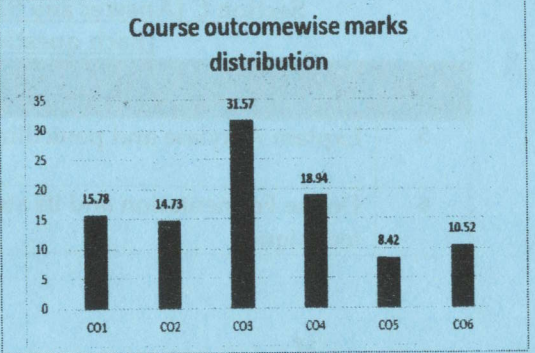
7	Define PCR along with their application.	5	CO4	K1, K2	PO1
8	Write down the collection, processing and storage of plasma substitutes	5	CO6	K1, K6	PO2
9	Discuss hybridoma technology. Write its production, purification and application	5	CO3	K1, K2	PO2
10	Write note on Storage condition and stability of official vaccines	5	CO5	K3, K6	PO4
11	Explain the microbial production of protease and penicillinase	5	CO3	K1, K3, K4	PO7
12	Discuss Cloning Vectors and its principle with the structure of electrode used in biosensor	5	CO2	K6, K2. K3,	PO2
13	Define Protein engineering and its application	5	CO3	K1, K3	PO2

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Know current applications of biotechnology in industry and to understand the importance of Immobilized enzymes in Pharmaceutical
	CO2	Understand the application of genetic engineering in relation to production of pharmaceuticals
	CO3	Learn types of immunity and general method of the preparation, storage and stability of various official vaccines
	CO4	Understand various techniques used in modern biotechnology
	CO5	Demonstrate and provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products
	CO6	Learn about various blood products/plasma substitues and their clinical importance

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

[13-05-2026]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Pharmaceutical Biotechnology**	**Session**	**Even, 2025-26**
Semester	**VI**	**Year**	**April, 2025**
Time: 3 Hour Max. Marks : 75	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • **Answer all Questions of Section A (Compulsory)** • **Answer Any *Two* out of *Three* of Section B** • **Answer Any *Seven* out of *Nine* of Section C** • **Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.**		
Knowledge Level (KL)	**K1** : Remembering	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Which is considered as the foremost step in Protein Engineering? a) Insertion of nucleotides b) Gene encoding c) A study of its three-dimensional structure d) Modification in its prosthetic group	1	CO2	K1	PO2
ii	Ligation involves the use of _____ a) Linkers b) Adapters c) Both (a) and (b) d) None of the above	1	CO2	K1	PO1
iii	_____ blotting method is used for DNA a) Western b) Southern c) Northern d) All of the above	1	CO4	K2	PO2
iv	Who invented PCR a) Kary Mullis b) Watson c) E.M.Southern d) Meselson	1	CO4	K1	PO2
v	Immunity acquired from mother to foetus is _____ a) Active immunity b) Passive immunity c)Innate immunity d) All of the above	1	CO3	K2, K1	PO1
vi	ELISA means _____ a) Enzyme linked immunosorbent assay	1	CO4	K1	PO2

	b) Enzyme linked immobilized sorbent assay c) Enzyme loving immunosorbent assay d) None of the above				
vii	_____ is prokaryotic micro-organisms a) Algae b) Fungi c)Virus d) Rickettsiae	1	CO5	K1, K3	PO1
viii	_____ is the basic function of the fermenter. a) Recovery of product b) Medium Sterilization c) Provision of optimum growth conditions d) None of the above	1	CO5	K1	PO1
ix	Dolly sheep was genetically similar to a) The mother from which nucleated fertilized egg was taken b) The mother from which nuclear DNA of udder cell was taken c) The surrogate mother d) Both surrogate mother and nuclear donor mother	1	CO2	K2,	PO10
x	In forensic science which of the following is used? a) Bacterial cloning b) DNA foot printing c) DNA fingerprinting d) DNA cloning	1	CO1	K2	PO1
xi	The class of antibodies, which can cross the placenta is a) IgD b) IgA c) IgG d) IgM	1	CO3	K1	PO2
xii	Antibodies are a) Prostoglandndins b) Steroids c) lipoprotein d) glycoprotein	1	CO3	K1, K2	PO1
xiii	A positive tuberculin test is an example of * a) Delayed type hypersensitivity b) Acute contact dermatitis c) Type I hypersensitivity d) Eczema	1	CO1	K1, K2	PO2
xiv	Which hypersensitivity reactions are T cell mediated? a) Type IV b) Type III c) Type I d) Type II	1	CO1	K1, K2	PO1
xv	B cells that produce and release large amounts of antibody are called: a) Memory cells b) Basophils c) Plasma cells d) Killer cells	1	CO3	K1, K2	PO2
xvi	Name the class of immunoglobulin which takes part in hypersensitivity reaction? a) IgG b) IgE c) IgA d) IgM	1	CO3	K2	PO2
xvii	Introduction of recombinant DNA into the bacterial cell by using current is called a) Transformation b) Electroporation c) Transformation d) Transduction	1	CO1	K2	PO2
xviii	Which of the following is the first transgenic crop? a) Flax b) Tobacco c) Plastic d) Cotton	1	CO5	K1	PO2
xix	Chain termination is a type of a) Sequencing b) Vector generation c) Antibiotic production d) Gene manipulation	1	CO2	K1	PO1
xx	Which of the following is the commonly employed adsorbents? a) Calcium carbonate b) Alumina c) Celluloses d) All of these	1	CO1	K1	PO1

Section B (Answer any TWO out of THREE) – 20 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	CO#	KL	PO
2	What is recombinant DNA technology? Write the various process involve in production of protein through r DNA technology.	10	CO1	K1, K2, K4	PO1
3	Define immunity along with its type and structure of immunoglobulin with its function.	10	CO3	K1, K2 K6	PO2
4	Classify Immuno Blotting Techniques and explain Western Blotting with their applications.	10	CO4	K2, K1	PO10

Section C (Answer any SEVEN out of NINE) – 35 Marks
(Each question Carry 05 Marks)

5	Explain Amylase and penicillinase.	5	CO2	K2, K4	PO1
6	Define Fermentation and its sterilization technique	5	CO6	K1, K6	PO2