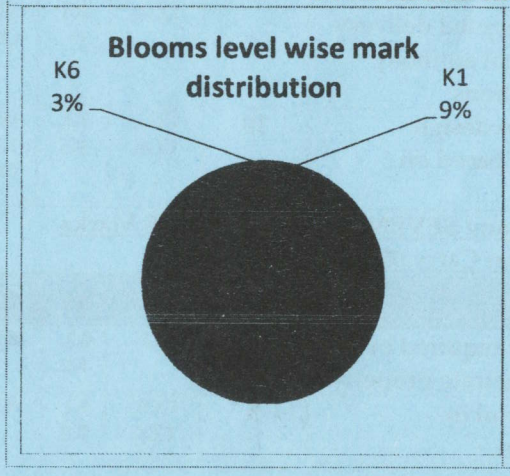
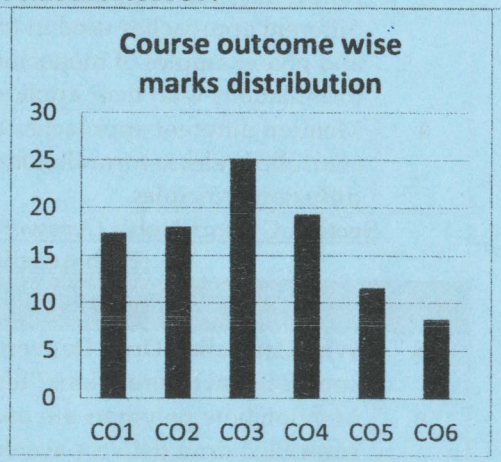
7	Write a short note on spray-drying technique of microencapsulation.	5	CO3	K2, K4	PO3, PO4
8	Discuss the drug absorption process via skin.	5	CO5	K5	PO5
9	Explain mucoadhesive systems in gastro-retentive drug delivery	5	CO3	K4, K3	PO4
10	Discuss about the formulation of inhalers.	5	CO2, CO3	K2, K4	PO3
11	Compare Ocusert and Vitrasert systems in terms of drug release and application.	5	CO3, CO4	K2, K5	PO5
12	Write about permeation enhancers, give few examples.	5	CO1, CO3	K2, K3	PO4
13	What do you mean by nebulizers, write its application?	5	CO3, CO4	K3, K6	PO4

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

Course Outcomes	CO1	Understand controlled drug delivery system and its design.
	CO2	Understand various approaches for development of microencapsulation, mucosal, implantable drug delivery systems
	CO3	Understand formulation approaches of transdermal, gastro retentive, naso-pulmonary drug delivery system and its applications
	CO4	Understand various targeted drug delivery systems and their applications
	CO5	Understand and apply the knowledge of ocular and intrauterine drug delivery systems
	CO6	Applications of polymers in formulation of novel drug delivery systems

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A
ACCREDITED UNIVERSITY

[26-11-2025]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Novel Drug Delivery System**	**Session**	**Odd,2025-26**
Semester	**VII**	**Year**	**Nov,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 LONG ANSWER** • **Answer Any SEVEN out of NINE of Section C SHORT NOTES** • **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	Hydrophilic matrix systems use polymers like: a) HPMC b) Silica c) Talc d) Titanium oxide	1	CO1	K1	PO1
ii	Dissolution-controlled systems depend on: a) Drug particle size b) Drug solubility c) Drug diffusion d) Drug dose	1	CO1	K2, K3	PO2
iii	Which polymer is most suitable for enteric coating to achieve delayed release? a) Ethyl cellulose b) Hydroxypropyl methylcellulose phthalate (HPMCP) c) Sodium alginate d) Carbopol	1	CO6	K3, K5	PO2,PO3
iv	Implantable devices offer: a) Short term release b) Rapid action c) Long-term controlled release d) No release	1	CO2	K2, K4	PO3
v	Buccal drug delivery avoids: a) Oral mucosa b) First-pass metabolism c) Sublingual space d) Drug release	1	CO2	K4, K1	PO2,PO3
vi	Which factor most significantly limits ocular bioavailability of conventional eye drops? a) Tear turnover and nasolacrimal drainage	1	CO3	K2, K6	PO3,PO4

	c) High corneal lipophilicity d) Slow blinking rate				
vii	Nebulizers convert drug into: a) Liquid b) Powder c) Aerosol mist c) Gel	1	CO3	K2, K4	PO4
viii	One of the advantage of transdermal drug delivery system is: a) High variability b) Painful c) Bypass first-pass metabolism d) Short duration	1	CO4	K1, K3	PO3,PO4
ix	Nasal sprays are preferred for: a) Topical therapy b) Systemic rapid absorption c) Prolonged retention d) Eye infections	1	CO4	K4	PO2,PO4
x	Example of passive targeting is: a) Tumor targeting via EPR b) Ligand binding c) Receptor activation d) Drug coating	1	CO2	K4, K2	PO1,PO2
xi	Nanoparticles size is in the range of: a) >10 mm b) 1–1000 nm c) 1–10 µm d) 0.1–1 mm	1	CO3	K1, K2	PO3,PO4
xii	Niosomes are: a) Lipid vesicles b) Non-ionic surfactant vesicles c) Polymer capsules d) None	1	CO4	K3, K4	PO5
xiii	Monoclonal antibodies are used for: a) Targeting specific antigens c) Solubility b) Increasing taste d) Weight gain	1	CO4	K1, K4	PO4
xiv	A key barrier to ocular delivery is: a) Cornea b) Skin c) Nose d) Blood	1	CO6	K2, K3	PO4,PO5
xv	Which of the following statement about Ocusert is TRUE? a) Delivers pilocarpine for 7 days b) Delivers drug through enzymatic degradation c) Delivers drug by osmotic pumping d) Is placed in anterior chamber of eye	1	CO5	K4, K5	PO2
xvi	IUDs are used for: a) Eye infection b) Contraception	1	CO3	K2, K3	PO5
	c) GI infection d) Skin burns				
xvii	Liposomes are used to deliver: a) Only proteins b) All types of drugs c) Mainly vitamins d) Only DNA	1	CO4	K1, K2	PO3
xviii	The stratum corneum acts as the primary barrier in transdermal drug delivery because it is: a) Rich in hydrophilic channels b) Lipophilic, keratinized structure with low water content c) Highly vascularized d) Metabolically active	1	CO5	K2, K4	PO3
xix	DMSO are used to: a) Color the drug b) Enhance permeation c) Reduce viscosity d) Improve taste	1	CO6	K1, K2	PO5
xx	Which of the following is a key feature of controlled drug delivery systems? a) Immediate release b) Sustained and controlled release c) Rapid metabolism d) High dose frequency	1	CO5	K3, K4	PO3

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Describe briefly about the introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and its applications.	10	CO1, CO5	K2, K5	PO1,PO4
3	Define targeted drug delivery. Explain the different approaches used in targeted delivery and give examples of monoclonal antibody formulations with their applications.	10	CO3, CO4	K3, K4	PO3,PO5
4	Mention different approaches to design controlled release formulations based on diffusion principles.	10	CO2, CO6	K2, K5	PO1,PO3

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

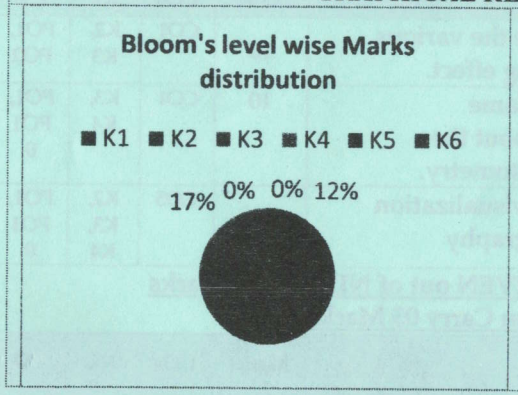
Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Why Controlled Drug Delivery required over conventional formulations? Illustrate properly.	5	CO1	K1, K2	PO2
6	Mention how polymers are useful in controlled drug delivery system.	5	CO1, CO2	K1, K2	PO3

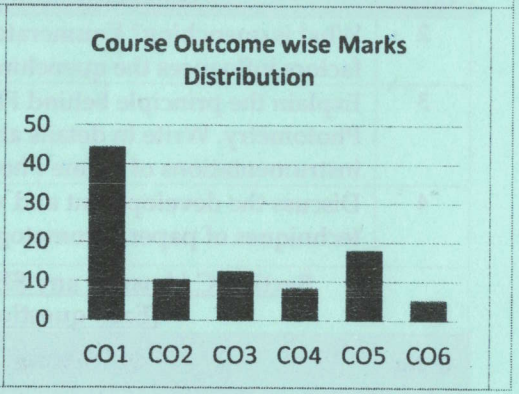
6	Discuss various molecular vibration involved in IR absorption process.	5	CO2	K1,K2	PO1, PO2
7	Enumerate the theory behind Gel electrophoresis?	5	CO6	K1,K2	PO1
8	Describe the various steps involved in affinity chromatography.	5	CO3	K2,K3	PO1
9	Differentiate between atomic absorption and atomic emission spectroscopy.	5	CO1	K2,K3 , K4	PO2
10	Explain Isocratic and Gradient Elution in HPLC.	5	CO4	K2,K3 , K4	PO1
11	Write a short note on various techniques for packing of column chromatography.	5	CO5	K2,K3	PO1, PO10
12	Derive the Beer-lambert's Law.	5	CO1	K2,K3	PO8, PO9
13	Write a note on Eddy and longitudinal diffusion.	5	CO3	K2, K3,K4	PO1

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

Course Outcomes	CO1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
	CO2	Understand the functional group determination by IR spectroscopy
	CO3	Gain knowledge on adsorption and partition chromatography
	CO4	Understand various instrumentation of GC and HPLC
	CO5	Understand various types of chromatographic techniques.
	CO6	Understand electrophoretic methods

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A
ACCREDITED UNIVERSITY

[19-11-2025]
END SEM EXAMINATION
School of Health & Allied Science

Program	**Bachelor of Pharmacy**		
Subject Name	**Instrumental Methods of Analysis**	**Session**	**Odd, 2025-26**
Semester	**VII**	**Year**	**Nov, 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 device splits the light into two path and then recombines in FTIR? a. Chopper. b. Interferometer. c. Prism. d. All the above.	1	CO2	K1, K3	PO2
ii	Which shift shows the increase in λ-max? a. Red shift b. Blue shift c. Both a and b d. None of these	1	CO1	K1, K2	PO1
iii	Which of the following types of chromatography involves the process, where the mobile phase moves through the stationary phase by the influence of gravity or capillary action? a. Column Chromatography b. High Pressure Liquid Chromatography c. Gas Chromatography d. Planar Chromatography	1	CO3	K1, K2	PO2
iv	Transition from singlet excited to a triplet state is known as: a. Fluorescence. b. Absorbance. c. Phosphorescence. d. None of the above.	1	CO1	K1, K2	PO1
v	Which of the following pump provides continuous phase flow rates? a. Reciprocating piston pumps.	1	CO4	K1, K3	PO2

	b. Syringe pumps. c. Constant pressure pumps. d. All the above.				
vi	Beer's law states that the intensity of transmitted light decreases with respect to: a. Increase in concentration c. Composition b. Decrease in Distance d. Volume	1	CO1	K1, K2	PO1
vii	Which detector detect IR radiation by potential difference? a. Thermocouple b. Bolometers c. Thermistor d. None of this	1	CO2	K1, K2	PO2
viii	Which device is used to convert polychromatic light radiation into monochromatic light radiation? a. Amplifier. b. Detector. c. Monochromator. d. Slit.	1	CO1	K1, K3	PO1
ix	Which of the following is the principle of Flame emission photometers? a. Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states b. Medium absorbs radiation and transmitted radiation is measured c. Colour and wavelength of the flame is measured d. Only wavelength of the flame is measured	1	CO1	K2, K3	PO1
x	Which is the most employed crosslinking agent and imparts strength to the polymer? a. Polyethylene glycol. b. Divinyl benzene. c. Divinyl pyridine. d. Dimethyl sulfoxide.	1	CO5	K1, K2	PO1,
xi	In HPLC, degassing can be done by: a. Vacuum filtration. b. Helium purging. c. Ultra sonication. d. All the above.	1	CO4	K1, K3	PO1,
xii	Which instrument is used to convert sample in mist or aerosol? a. Atomizer b. Hollow cathode lamps c. Nebulizer d. Detector	1	CO1	K1, K3	PO1, PO10
xiii	Which of the following is a common mulling agent? a. KCl. b. Nujol. c. NaCl. d. All of these.	1	CO2	K1, K3	PO1, PO10
xiv	Which is the important region in IR spectra? a. Finger print region b. Both a and b c. Functional group region d. None of this	1	CO2	K2, K4	PO1, PO8
xv	A compound that does not retain in the column will elute out at: a. Dead Time. b. Void Time. c. Threshold time. d. Both a and b.	1	CO3	K1, K2	PO2
xvi	Which detector are used in Fluorimetry? a. Photo voltaic cell b. PMT c. Photo tube d. All of the above	1	CO1	K1, K3	PO1
xvii	Which of the following is used to improve binding between ligand and target molecule? a. Ligand stabilizer. b. Spacer arm. c. Spacer enhancer. d. Both a and b.	1	CO5	K1, K2	PO1, PO2
xviii	How the liquid samples injected into the column in gas chromatography? a. Rotary sample valve b. Micro-syringe c. Solid injection syringes d. Gas tight syringe	1	CO4	K1, K3	PO1
xix	Which of the following technique is used for examination of solid sample in IR Spectroscopy? a. Pressed pellet technique. b. Mull technique. c. Film technique. d. All of these.	1	CO2	K1, K2	PO1
xx	Which of the following is not a type of detector used in gas chromatography? a. Argon ionisation detector b. Thermal conductivity detector c. UV visible spectrometric detector d. Electron capture detector	1	CO4	K2, K3	PO1, PO10

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	What is quenching? Enumerate the various factors influences the quenching effect.	10	CO1	K2, K3	PO1, PO2
3	Explain the principle behind Flame Photometry. Write in details about the instrumentations of Flame Photometry.	10	CO1	K3, K4	PO1, PO10
4	Discuss the development and visualization techniques of paper chromatography	10	CO5	K2, K3, K4	PO1, PO10

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 various radiation sources used in UV-Visible Spectroscopy.	5	CO1	K2, K3	PO2, PO10

7	Write a short note on spray-drying technique of microencapsulation.	5	CO3	K2, K4	PO3, PO4
8	Discuss the drug absorption process via skin.	5	CO5	K5	PO5
9	Explain mucoadhesive systems in gastro-retentive drug delivery	5	CO3	K4, K3	PO4
10	Discuss about the formulation of inhalers.	5	CO2, CO3	K2, K4	PO3
11	Compare Ocusert and Vitrasert systems in terms of drug release and application.	5	CO3, CO4	K2, K5	PO5
12	Write about permeation enhancers, give few examples.	5	CO1, CO3	K2, K3	PO4
13	What do you mean by nebulizers, write its application?	5	CO3, CO4	K3, K6	PO4

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

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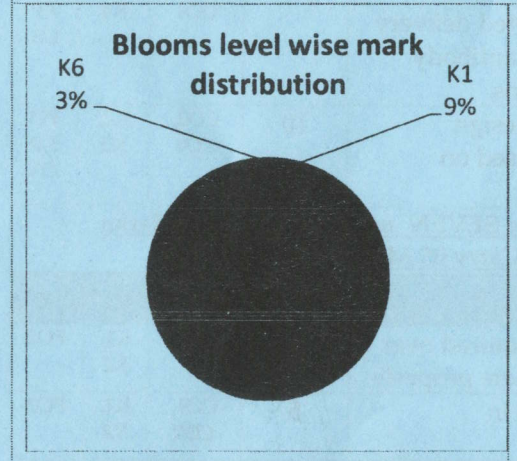
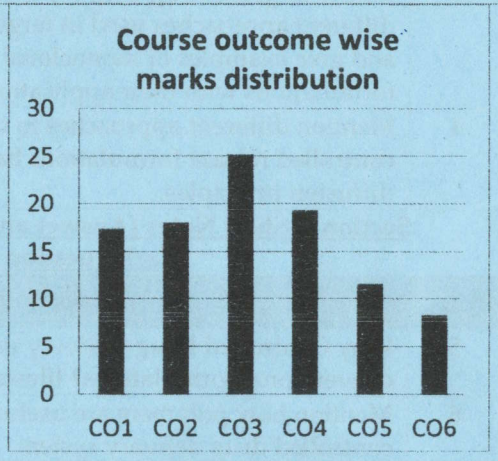
GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A
ACCREDITED UNIVERSITY

[26-11-2025]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Novel Drug Delivery System**	**Session**	**Odd,2025-26**
Semester	**VII**	**Year**	**Nov,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 LONG ANSWER** • **Answer Any SEVEN out of NINE of Section C SHORT NOTES** • **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.**		
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Section A (Each question Carry 01 Mark from Q1-i to xx) –20 Marks

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ii	Dissolution-controlled systems depend on: a) Drug particle size b) Drug solubility c) Drug diffusion d) Drug dose	1	CO1	K2, K3	PO2
iii	Which polymer is most suitable for enteric coating to achieve delayed release? a) Ethyl cellulose b) Hydroxypropyl methylcellulose phthalate (HPMCP) c) Sodium alginate d) Carbopol	1	CO6	K3, K5	PO2,PO3
iv	Implantable devices offer: a) Short term release b) Rapid action c) Long-term controlled release d) No release	1	CO2	K2, K4	PO3
v	Buccal drug delivery avoids: a) Oral mucosa b) First-pass metabolism c) Sublingual space d) Drug release	1	CO2	K4, K1	PO2,PO3
vi	Which factor most significantly limits ocular bioavailability of conventional eye drops? a) Tear turnover and nasolacrimal drainage	1	CO3	K2, K6	PO3,PO4

	c) High corneal lipophilicity d) Slow blinking rate				
vii	Nebulizers convert drug into: a) Liquid b) Powder c) Aerosol mist c) Gel	1	CO3	K2, K4	PO4
viii	One of the advantage of transdermal drug delivery system is: a) High variability b) Painful c) Bypass first-pass metabolism d) Short duration	1	CO4	K1, K3	PO3,PO4
ix	Nasal sprays are preferred for: a) Topical therapy b) Systemic rapid absorption c) Prolonged retention d) Eye infections	1	CO4	K4	PO2,PO4
x	Example of passive targeting is: a) Tumor targeting via EPR b) Ligand binding c) Receptor activation d) Drug coating	1	CO2	K4, K2	PO1,PO2
xi	Nanoparticles size is in the range of: a) >10 mm b) 1-1000 nm c) 1-10 µm d) 0.1-1 mm	1	CO3	K1, K2	PO3,PO4
xii	Niosomes are: a) Lipid vesicles b) Non-ionic surfactant vesicles c) Polymer capsules d) None	1	CO4	K3, K4	PO5
xiii	Monoclonal antibodies are used for: a) Targeting specific antigens c) Solubility b) Increasing taste d) Weight gain	1	CO4	K1, K4	PO4
xiv	A key barrier to ocular delivery is: a) Cornea b) Skin c) Nose d) Blood	1	CO6	K2, K3	PO4,PO5
xv	Which of the following statement about Ocusert is TRUE? a) Delivers pilocarpine for 7 days b) Delivers drug through enzymatic degradation c) Delivers drug by osmotic pumping d) Is placed in anterior chamber of eye	1	CO5	K4, K5	PO2
xvi	IUDs are used for: a) Eye infection b) Contraception	1	CO3	K2, K3	PO5
	c) GI infection d) Skin burns				
xvii	Liposomes are used to deliver: a) Only proteins b) All types of drugs c) Mainly vitamins d) Only DNA	1	CO4	K1, K2	PO3
xviii	The stratum corneum acts as the primary barrier in transdermal drug delivery because it is: a) Rich in hydrophilic channels b) Lipophilic, keratinized structure with low water content c) Highly vascularized d) Metabolically active	1	CO5	K2, K4	PO3
xix	DMSO are used to: a) Color the drug b) Enhance permeation c) Reduce viscosity d) Improve taste	1	CO6	K1, K2	PO5
xx	Which of the following is a key feature of controlled drug delivery systems? a) Immediate release b) Sustained and controlled release c) Rapid metabolism d) High dose frequency	1	CO5	K3, K4	PO3

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Describe briefly about the introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and its applications.	10	CO1, CO5	K2, K5	PO1,PO4
3	Define targeted drug delivery. Explain the different approaches used in targeted delivery and give examples of monoclonal antibody formulations with their applications.	10	CO3, CO4	K3, K4	PO3,PO5
4	Mention different approaches to design controlled release formulations based on diffusion principles.	10	CO2, CO6	K2, K5	PO1,PO3

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Why Controlled Drug Delivery required over conventional formulations? Illustrate properly.	5	CO1	K1, K2	PO2
6	Mention how polymers are useful in controlled drug delivery system.	5	CO1, CO2	K1, K2	PO3

6	Discuss various molecular vibration involved in IR absorption process.	5	CO2	K1,K2	PO1, PO2
7	Enumerate the theory behind Gel electrophoresis?	5	CO6	K1,K2	PO1
8	Describe the various steps involved in affinity chromatography.	5	CO3	K2,K3	PO1
9	Differentiate between atomic absorption and atomic emission spectroscopy.	5	CO1	K2,K3 , K4	PO2
10	Explain Isocratic and Gradient Elution in HPLC.	5	CO4	K2,K3 , K4	PO1
11	Write a short note on various techniques for packing of column chromatography.	5	CO5	K2,K3	PO1, PO10
12	Derive the Beer-lambert's Law.	5	CO1	K2,K3	PO8, PO9
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CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

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	CO6	Understand electrophoretic methods

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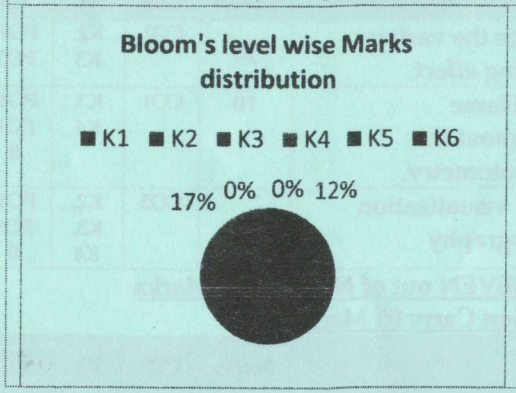

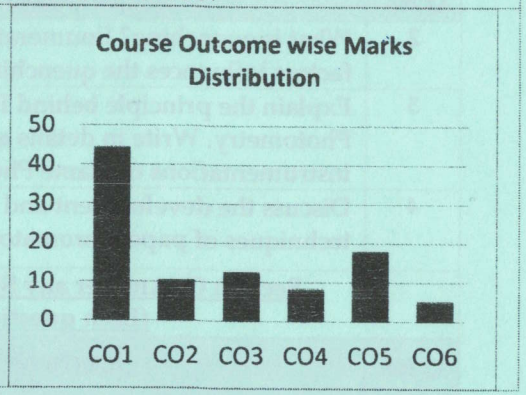

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NAAC GRADE A
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[19-11-2025]
END SEM EXAMINATION
School of Health & Allied Science

Program	**Bachelor of Pharmacy**		
Subject Name	**Instrumental Methods of Analysis**	**Session**	**Odd, 2025-26**
Semester	**VII**	**Year**	**Nov, 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.**		
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iv	Transition from singlet excited to a triplet state is known as: a. Fluorescence. b. Absorbance. c. Phosphorescence. d. None of the above.	1	CO1	K1, K2	PO1
v	Which of the following pump provides continuous phase flow rates? a. Reciprocating piston pumps.	1	CO4	K1, K3	PO2

	b. Syringe pumps. c. Constant pressure pumps. d. All the above.				
vi	Beer's law states that the intensity of transmitted light decreases with respect to: a. Increase in concentration c. Composition b. Decrease in Distance d. Volume	1	CO1	K1, K2	PO1
vii	Which detector detect IR radiation by potential difference? a. Thermocouple b. Bolometers c. Thermistor d. None of this	1	CO2	K1, K2	PO2
viii	Which device is used to convert polychromatic light radiation into monochromatic light radiation? a. Amplifier. b. Detector. c. Monochromator. d. Slit.	1	CO1	K1, K3	PO1
ix	Which of the following is the principle of Flame emission photometers? a. Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states b. Medium absorbs radiation and transmitted radiation is measured c. Colour and wavelength of the flame is measured d. Only wavelength of the flame is measured	1	CO1	K2, K3	PO1
x	Which is the most employed crosslinking agent and imparts strength to the polymer? a. Polyethylene glycol. b. Divinyl benzene. c. Divinyl pyridine. d. Dimethyl sulfoxide.	1	CO5	K1, K2	PO1,
xi	In HPLC, degassing can be done by: a. Vacuum filtration. b. Helium purging. c. Ultra sonication. d. All the above.	1	CO4	K1, K3	PO1,
xii	Which instrument is used to convert sample in mist or aerosol? a. Atomizer b. Hollow cathode lamps c. Nebulizer d. Detector	1	CO1	K1, K3	PO1, PO10
xiii	Which of the following is a common mulling agent? a. KCl. b. Nujol. c. NaCl. d. All of these.	1	CO2	K1, K3	PO1, PO10
xiv	Which is the important region in IR spectra? a. Finger print region b. Both a and b c. Functional group region d. None of this	1	CO2	K2, K4	PO1, PO8
xv	A compound that does not retain in the column will elute out at: a. Dead Time. b. Void Time. c. Threshold time. d. Both a and b.	1	CO3	K1, K2	PO2
xvi	Which detector are used in Fluorimetry? a. Photo voltaic cell b. PMT c. Photo tube d. All of the above	1	CO1	K1, K3	PO1
xvii	Which of the following is used to improve binding between ligand and target molecule? a. Ligand stabilizer. b. Spacer arm. c. Spacer enhancer. d. Both a and b.	1	CO5	K1, K2	PO1, PO2
xviii	How the liquid samples injected into the column in gas chromatography? a. Rotary sample valve b. Micro-syringe c. Solid injection syringes d. Gas tight syringe	1	CO4	K1, K3	PO1
xix	Which of the following technique is used for examination of solid sample in IR Spectroscopy? a. Pressed pellet technique. b. Mull technique. c. Film technique. d. All of these.	1	CO2	K1, K2	PO1
xx	Which of the following is not a type of detector used in gas chromatography? a. Argon ionisation detector b. Thermal conductivity detector c. UV visible spectrometric detector d. Electron capture detector	1	CO4	K2, K3	PO1, PO10

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	What is quenching? Enumerate the various factors influences the quenching effect.	10	CO1	K2, K3	PO1, PO2
3	Explain the principle behind Flame Photometry. Write in details about the instrumentations of Flame Photometry.	10	CO1	K3, K4	PO1, PO10
4	Discuss the development and visualization techniques of paper chromatography	10	CO5	K2, K3, K4	PO1, PO10

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

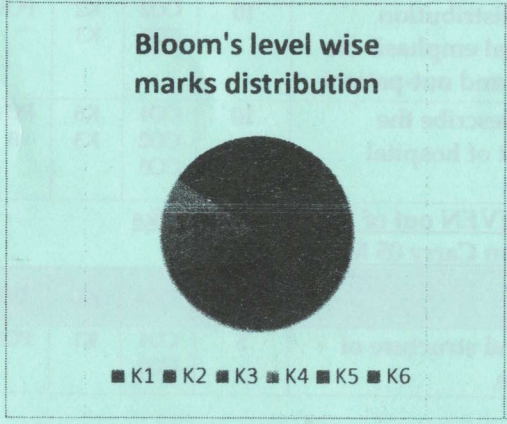
Q. No.	QUESTIONS	Marks	COs	KL	PO
5	Write notes on various radiation sources used in UV-Visible Spectroscopy.	5	CO1	K2, K3	PO2, PO10

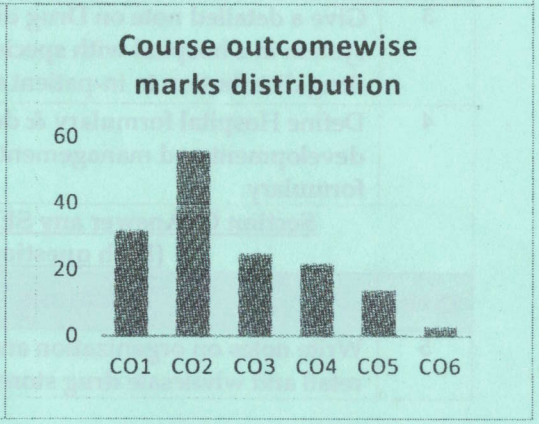
6	Define Therapeutic drug monitoring and write notes on role of pharmacist intervention in TDM.	5	CO2	K3 K4	PO10
7	Define and classify ADRs.	5	CO3	K2	PO2
8	Discuss rational use of common Over the counter drugs.	5	CO5	K1 K2	PO2
9	Brief the function and responsibilities of clinical pharmacist	5	CO2	K1 K2	PO9
10	Briefly discuss dispensing of drugs to ambulatory patients.	5	CO2	K1 K2	PO9
11	Write short notes on VED & EOQ analysis	5	CO4 CO5	K4 K5	PO9
12	Write short notes on Budget preparation	5	CO4	K6	PO10
13	Write down the importance of communication skills for a pharmacist.	5	CO1 CO3	K1 K4	PO10

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

Course Outcomes	CO1	Understand the organization and functions of hospital, hospital pharmacy and community pharmacy
	CO2	Understand drug distribution system, different committee and program in hospital.
	CO3	Analyze the drug and therapy related problems with the concept of Rational drug therapy to provide patient-centred care to diverse patients using the best available evidence and monitor drug therapy.
	CO4	Apply the preparation and implementation of budget and concepts of clinical pharmacy
	CO5	Apply knowledge of drug store management and inventory control.
	CO6	Analyze the interpretation of clinical laboratory data and utilisation of information services

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A ACCREDITED UNIVERSITY

[24-11-2025]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	Bachelor of Pharmacy		
Subject Name	Pharmacy Practice	Session	Odd, 2025-26
Semester	VII	Year	Nov, 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	_____ is not an OTC Drug among the following A. Salicylates B. Melatonin C. Look alike and act alike drugs D. None of above	1	CO5 CO2	K1 K2	PO2
ii	The Hospital formulary consists of list of _____in hospital. A. Instruments B. Drugs C. Staff D. Patients	1	CO2 CO5	K1 K2	PO2
iii	The word "Hospital" originated from _____ Latin word A. Asclepieia B. Hospitale C. Hospice D. None of the above	1	CO1	K1	PO2
iv	Presence of ketone bodies in urine indicates - A. Kidney disfunction B. Nephrosis C. Hypoglycaemia D. Mushroom poisoning	1	CO6	K4	PO2
v	For 200 beds hospital number of pharmacist required are---------- A. 8 B. 10 C. 15 D. 5	1	CO1	K1	PO2
vi	_____is the heart of the patient counseling session A. Preparing for the session. B. Opening the session.	1	CO3	K4 K5	PO9

	C. Counselling content. D. Closing the session.				
vii	The following are the principles of inventory control except- A. Demand Forecasting B. Accuracy C. Warehouse flow D. Overstocking	1	CO5 CO2	K3	PO9
viii	The count of haemoglobin _____ in anaemia and leukemia. A. Increases than normal range B. Remains constant C. Decreases than normal range D. None of the above	1	CO6	K4 K5	PO2
ix	Which of the following is not an objective of budget preparation? A. Monitor of hospital financial activities B. Analysis of deviation C. Development of standard D. Allowing over expenditure	1	CO4	K6	PO2
x	The ward pharmacy is controlled by- A. Satellite Pharmacy B. Medical officer C. Nurses D. Pharmacist	1	CO2	K1	PO10
xi	Which of the following reaction is called Augmented adverse drug reactions? A. Genetically determined effects. B.. Rebound effect on discontinuation C. Idiosyncracy D. Allergic reactions &anaphylaxis.	1	CO3	K1 K2	PO9
xii	The benefit of patient counselling is_____ A. Serving patients and their well being B. Improves patient compliance C. Formation of trusting relationship with patients D. All of the above	1	CO3	K4 K5	PO2
xiii	Internal teaching program involved in training of _____in hospital A. Student Nurses B. Cardiologist C. Physician D. Administrator	1	CO3	K2	PO2
xiv	Increase Number of RBC in urine is called A. Haematuria B. Oligouria C. Polyuria D. Pyuria	1	CO6	K1 K2	PO2
xv	The numerical method is also known as A. Coding system method C. Block system B. Sequence system method D. Decimal system	1	CO5	K1	PO2
xvi	TDM is very essential for those drugs with A. Wide Therapeutic index B. Narrow Therapeutic index C. Large Therapeutic index D. Small Therapeutic index	1	CO3	K4	PO9
xvii	Buffer stock' is the level of stock : A. At which the ordering process should start B. Half of the actual stock b. At which the ordering C. Minimum stock level below which actual stock should not fall D. Maximum stock in inventory	1	CO5	K1 K2	PO10
xviii	The time period between placing an order its receipt in stock is known as A. Lead time B. Carrying time C. Shortage time D. Over time	1	CO4	K1 K2	PO9
xix	Satellite pharmacy is located at A. Only one in a hospital B. For two floor one pharmacy C. Each floor D. Depends on hospital type	1	CO2	K1 K2	PO10
xx	Purpose of PTC A. Advisory B. Educational C. Both A & B D. Only A	1	CO2	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	Write in details about Hospital Pharmacy along with organization structure, location, layout of ideal pharmacy, staff requirement and responsibilities of hospital pharmacist.	10	CO1 CO2	K1 K2	PO9
3	Give a detailed note on Drug distribution system in a hospital with special emphasis on drug distribution to in-patient and out-patient	10	CO2 CO1	K2 K3	PO9
4	Define Hospital formulary & describe the development and management of hospital formulary.	10	CO1 CO2 CO3	K6 K3	PO10

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 organization and structure of retail and wholesale drug store.	5	CO1 CO2	K1	PO2

6	Define Therapeutic drug monitoring and write notes on role of pharmacist intervention in TDM.	5	CO2	K3 K4	PO10
7	Define and classify ADRs.	5	CO3	K2	PO2
8	Discuss rational use of common Over the counter drugs.	5	CO5	K1 K2	PO2
9	Brief the function and responsibilities of clinical pharmacist	5	CO2	K1 K2	PO9
10	Briefly discuss dispensing of drugs to ambulatory patients.	5	CO2	K1 K2	PO9
11	Write short notes on VED & EOQ analysis	5	CO4 CO5	K4 K5	PO9
12	Write short notes on Budget preparation	5	CO4	K6	PO10
13	Write down the importance of communication skills for a pharmacist.	5	CO1 CO3	K1 K4	PO10

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

Course Outcomes	CO1	Understand the organization and functions of hospital, hospital pharmacy and community pharmacy
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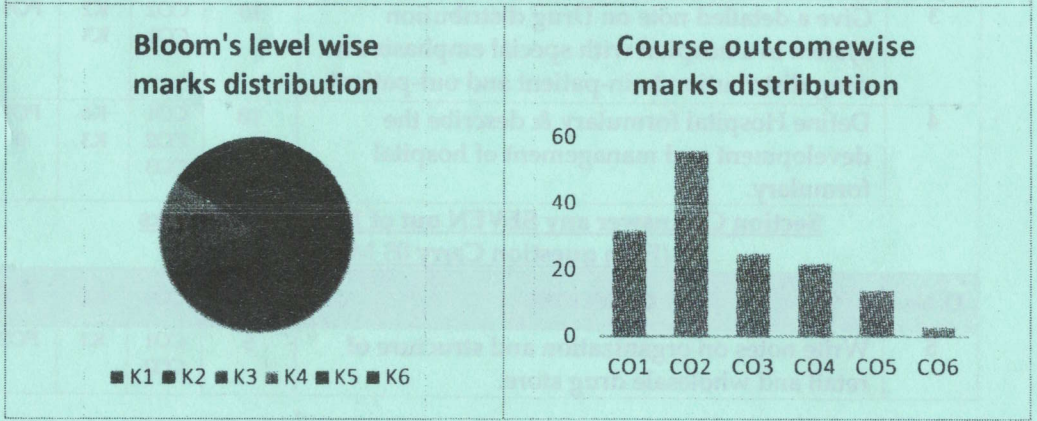
	CO4	Apply the preparation and implementation of budget and concepts of clinical pharmacy
	CO5	Apply knowledge of drug store management and inventory control.
	CO6	Analyze the interpretation of clinical laboratory data and utilisation of information services

GRAPHICAL REPRESENTATION



ARKA JAIN University
Jharkhand
NAAC GRADE A ACCREDITED UNIVERSITY

[24-11-2025]
END SEM EXAMINATION
School of Health & Allied Sciences

Program	**Bachelor of Pharmacy**		
Subject Name	**Pharmacy Practice**	**Session**	**Odd, 2025-26**
Semester	**VII**	**Year**	**Nov, 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
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Section A (Each question Carry 01 Mark from Q1-i to xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	_____ is not an OTC Drug among the following A. Salicylates B. Melatonin C. Look alike and act alike drugs D. None of above	1	CO5 CO2	K1 K2	PO2
ii	The Hospital formulary consists of list of _____in hospital. A. Instruments B. Drugs C. Staff D. Patients	1	CO2 CO5	K1 K2	PO2
iii	The word "Hospital" originated from _____ Latin word A. Asclepieia B. Hospitale C. Hospice D. None of the above	1	CO1	K1	PO2
iv	Presence of ketone bodies in urine indicates - A. Kidney disfunction B. Nephrosis C. Hypoglycaemia D. Mushroom poisoning	1	CO6	K4	PO2
v	For 200 beds hospital number of pharmacist required are---------- A. 8 B. 10 C. 15 D. 5	1	CO1	K1	PO2
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xiii	Internal teaching program involved in training of _____in hospital A. Student Nurses B. Cardiologist C. Physician D. Administrator	1	CO3	K2	PO2
xiv	Increase Number of RBC in urine is called A. Haematuria B. Oligouria C. Polyuria D. Pyuria	1	CO6	K1 K2	PO2
xv	The numerical method is also known as A. Coding system method C. Block system B. Sequence system method D. Decimal system	1	CO5	K1	PO2
xvi	TDM is very essential for those drugs with A. Wide Therapeutic index B. Narrow Therapeutic index C. Large Therapeutic index D. Small Therapeutic index	1	CO3	K4	PO9
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xix	Satellite pharmacy is located at A. Only one in a hospital B. For two floor one pharmacy C. Each floor D. Depends on hospital type	1	CO2	K1 K2	PO10
xx	Purpose of PTC A. Advisory B. Educational C. Both A & B D. Only A	1	CO2	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	Write in details about Hospital Pharmacy along with organization structure, location, layout of ideal pharmacy, staff requirement and responsibilities of hospital pharmacist.	10	CO1 CO2	K1 K2	PO9
3	Give a detailed note on Drug distribution system in a hospital with special emphasis on drug distribution to in-patient and out-patient	10	CO2 CO1	K2 K3	PO9
4	Define Hospital formulary & describe the development and management of hospital formulary.	10	CO1 CO2 CO3	K6 K3	PO10

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 organization and structure of retail and wholesale drug store.	5	CO1 CO2	K1	PO2

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			[21-11-2025] END SEM EXAMINATION School of Health & Allied Sciences
Program	**Bachelor of Pharmacy**		
Subject Name	**Industrial Pharmacy II**	**Session**	**Odd, 2025-26**
Semester	**VII**	**Year**	**Nov, 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**.		
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	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	Who is the head of the Central Drugs Standard Control Organization (CDSCO)? a) Health Secretary of India b) Drugs Controller General of India (DCGI) c) Chief Minister of States d) WHO Director General	1	CO6	K1, K2	PO1
ii	Which Act governs the Indian drug regulatory system? a) Pharmacy Act, 1948 b) Drugs and Cosmetics Act, 1940 c) Narcotic Drugs Act, 1985 d) Indian Medical Council Act, 1956	1	CO3	K1, K2	PO2
iii	Which authority is responsible for the approval of new drugs in India? a) State Licensing Authorities (SLAs) b) Pharmacy Council of India (PCI) c) Central Drugs Standard Control Organization (CDSCO) d) Indian Council of Medical Research (ICMR)	1	CO6	K3, K5	PO1, PO2
iv	Which of the following authority grants licenses to local chemist shops in India? a) CDSCO	1	CO6	K3	PO1, PO2

	b) DCGI c) SLA d) Central Government				
v	SUPAC guidelines are applicable to which type of dosage forms? a) Oral solid dosage forms b) Parenteral dosage forms c) Ophthalmic dosage forms d) Inhalation dosage forms	1	CO1	K3, K4	PO2
vi	Why are In-process controls (IPC) primarily used in pharmaceutical manufacturing? a) Measure the shelf-life of a product b) Perform random quality checks after production ends c) Monitor and control quality during the manufacturing process d) Adjust marketing strategies	1	CO2	K2	PO1
vii	What is the main purpose of a pilot plant in the pharmaceutical industry? a) Commercial production b) Pre-clinical testing c) Scale-up and process optimization d) Marketing approva	1	CO1	K1, K2	PO1 PO
viii	Raw material requirements in pilot plants must follow which standards? a) Cost only b) GMP standards c) FDA approval only d) Random selection	1	CO1	K1, K3	PO1 PO
ix	CDSCO works under which ministry of the Government of India? a) Ministry of Finance b) Ministry of Health and Family Welfare c) Ministry of Education d) Ministry of Commerce	1	CO6	K1, K2	PO
x	In pharmaceutical regulation, NDA stands for what? a) New Drug Application b) National Drug Authority c) New Drug Approval d) None	1	CO3	K3, K4	PC
xi	What does Six Sigma mainly focus on in pharmaceutical manufacturing? a) Cost reduction b) Defect reduction and process improvement c) Rapid production	1	CO5	K3	PC
	d) Marketing				
xii	Which of the following is usually the first document signed in the technology transfer process? a) Licensing Agreement b) Memorandum of Understanding (MoU) c) Confidentiality Agreement (NDA) d) Legal Contract	1	CO4	K1, K2	PO1
xiii	ISO 9000 is related to which of the following? a) Environmental safety b) Quality management systems c) Laboratory testing d) Financial auditing	1	CO4	K1, K2	PO1, PO2
xiv	Which organization helps Indian small businesses to import and export technology? a) BCIL b) NRDC c) TIFAC d) TBSE	1	CO2	K4, K3	PO1, PO2
xv	Which TT agency acts as a link between research institutions and industries? a) NRDC b) BCIL c) TBSE d) All of the above	1	CO2	K1, K2	PO2
xvi	What is the primary purpose of a Certificate of Pharmaceutical Product (COPP)? a) To certify the patent status of a drug b) To confirm the quality, safety, and efficacy of a drug for export c) To provide marketing strategies for pharmaceuticals d) To approve the clinical trial of a drug	1	CO4	K1	PO2
xvii	Which international body developed the COPP format? a) USFDA b) WHO c) CDSCO d) EMA	1	CO5	K2, K3	PO1
xviii	What is the first step in new drug approval procedures in India? a) post-marketing surveillance b) Submission of Investigational New Drug (IND) application c) NDA filing d) GMP inspection	1	CO3	K2, K3	PO1
xix	Which of the following documents ensures sensitive information is not disclosed to third	1	CO2	K1, K2	PO2

	parties? a) MoU b) Licensing Agreement c) NDA d) Patent Filing				
xx	Who issues COPP in India? a) Pharmacy Council of India b) CDSCO & State Licensing Authority c) Indian Council of Medical Research d) Ministry of Finance	1	CO4	K1, K2	PO1

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Define technology transfer (TT). Explain WHO guidelines for TT including technology transfer protocol and documentation.	10	CO2	K1	PO1
3	Write a detailed note on pilot plant scale-up techniques for liquid orals with relevant documentation.	10	CO1	K3, K4	PO2
4	Explain Quality by Design (QbD) concept in pharmaceutical quality management with examples.	10	CO5	K4, 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	Mention personnel requirements for a pilot plant scale-up.	5	CO1	K3	PO1
6	Write short notes on SUPAC documentation.	5	CO1	K2	PO2
7	Differentiate between NDA and IND applications.	5	CO4	K4	PO
8	What is the role of ISO 9000 and ISO 14000 in pharma quality management?	5	CO5	K5	PO
9	Mention the four TT agencies in India and their roles.	5	CO2	K2	PO
10	Write a note on Investigator's Brochure (IB).	5	CO3	K2	PO
11	Shortly write about the responsibilities of CDSCO.	5	CO3	K3	PO
12	Describe the process of transfer from R&D to production, with emphasis on process and packaging.	5	CO2	K3	PO
13	Shortly write about the various steps involved Clinical research.	5	CO4	K3	PO

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

Course Outcomes	CO1	Know the process of pilot plant and scale up of pharmaceutical dosage forms
	CO2	Understand the process of technology transfer from lab scale to commercial batch.
	CO3	Know different laws and acts that regulate pharmaceutical industry
	CO4	Understand the approval process and regulatory requirements for drug products
	CO5	Understand the quality management systems and its certifications
	CO6	Understand the Indian Regulatory requirements and approval procedures for New Drugs

GRAPHICAL REPRESENTATION