Code No: 285AA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy III Year I Semester Examinations, September/October - 2025

MEDICINAL CHEMISTRY – I

Time: 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART- A

(25 Marks)

1.a) Which of the following will be the pharmacokinetic application of prodrug? [1]

A) Improvement of taste B) Improvement of odour

C) Site-specific drug delivery D) Reduce gastric irritation

b) Which of the following best describes the partition coefficient? [1]

A) The ratio of the number of moles of a substance in two phases at equilibrium

B) The ratio of the concentrations of a substance in two immiscible phases at Equilibrium.

C) The ratio of the solubility of a substance in two phases at equilibrium.

D) The ratio of the vapor pressure of a substance in two phases at equilibrium.

c) Alpha adrenergic blocker is [1]

A) Atenolol B) Salbutamol

C) Clonidine D) None of the above

d) Prazosin belongs to the class of [1]

A) Pyridyl quinazolines B) Piperazinyl quinoxaline

C) pyridyl quinoxaline D) piperazinyl quinazoline

e) The levorotatory isomer of atropine is [1]

A) Hyoscine B) Hyoscyamine

C) Tropine D) Pseudotropine

f) Which of the following is a pure muscarinic agent [1]

A) Arecoline B) Pilocarpine

C) Muscarine D) Acetyl choline

g) Barbituric acid is prepared by condensation of [1]

A) Malonic acid and urea B) Diethyl malonate with urea

C) Malonic acid with methyl urea D) Diethyl malonate with methyl urea

h) 5,5 diethyl barbituric acid is a common name of [1]

A) Pentobarbitone B) Secobarbital

C) Barbitone D) Phenytoin

i) Morphine and heroine differ from each other in respect of [1]
A) Methyl group on nitrogen B) Acetyl group at C1 & C6
C) Absence of double bond between C4 & C5 D) Absence of D ring

j) Which of the following belongs to aryl propionic acid class [1]
A) Indomethacin B) Naproxen
C) Diclofenac D) Paracetamol

k) State the significance of isomerism in biological activity. [3]

l) What are beta blockers? Explain its mechanism of action. [3]

m) Discuss the biosynthetic process of acetyl choline. [3]

n) Define the term sedative, hypnotic and tranquilizer with examples. [3]

o) Classify nonsteroidal anti-inflammatory agent with example. [3]

PART - B

(50 Marks)

2.a) Define prodrug.
b) Elaborate various types of prodrug design with suitable example.
c) State the application of prodrug design. [2+4+4]

OR

3.a) What is bioisosterism?
b) Discuss the classical and non-classical bioisosters with example.
c) Write a brief note on partition coefficient. [3+4+3]

4.a) What do you mean by adrenergic antagonist?
b) State the mode of action of adrenergic antagonists. [5+5]

OR

5.a) Write an explanatory note on adrenergic receptors.
b) Schematically represent the biosynthesis and catabolism of catecholamines. [5+5]

6.a) Discuss the SAR of cholinolytic agents.
b) List five synthetic cholinergic blocking agents.
c) What is choline esterase reactivators? [3+4+3]

OR

7.a) Write an explanatory note on cholinergic receptors.
b) Write the mode of action of solanaceous alkaloids as anticholinergic agent.
c) Outline the synthesis of dicyclomine hydrochloride. [3+4+3]

8.a) Explain the mechanism of action of anticonvulsant drugs.
b) Discuss the uses of short and long-acting barbiturates with example. [5+5]

OR

9.a) Write the SAR of phenothiazine derivatives.
b) Discuss the mechanism of action of benzodiazepines. [5+5]

10.a) What are opioid analgesics?
b) Discuss the SAR of mu receptor agonist citing example.
c) Outline the synthesis of fentanyl. [3+4+3]

OR

11.a) Discuss the SAR of 5-pyrazolone derivatives used as NSAI drugs.
b) How different stages of general anesthesia is distinguished?
c) How will you synthesize mefenamic acid? [4+3+3]

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Code No: 285AA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy III Year I Semester Examinations, March - 2025

MEDICINAL CHEMISTRY – I

Time : 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART- A (25 Marks)

1.a) Addition of non-polar group…….. partition co-efficient [1]
A) Reduce B) Improves
C) No effect on D) All of the above

b) Bioisoterism is the process of: [1]
A) Replacement of similar group B) Replacement similar valence group
C) Replacement similar mass no. group D) Addition of group having different mass no.

c) Which enzyme involved in catecholamine metabolism [1]
A) Monoamine oxidase B) Catechol-O-methyltransferase
C) Both A and B D) None of the above

d) Propylhexedrine is an analogue of [1]
A) Pseudoephedrine B) Amphetamine
C) Ephedrine D) Dobutamine

e) SAR study of acetylcholine replacement of nitrogen with sulphur or selenium, the activity. [1]
A) Decrease B) Increase
C) No Change D) None

f) Neostigmine is prepared by direct combination of dimethyl carbamoylchloride with [1]
A) Potassium m-(dimethylamino)-phenolate
B) Potassium m-(diethylamino)-phenolate
C) Potassium p-(diethylamino)-phenolate
D) Potassium p-(dipropylamino)-phenolate

g) Sedative action of barbiturates is due to substituents at C5 is due to [1]
A) High lipophilicity of groups at C5 B) Steric effect
C) metal complex formation D) Isosteric effect

h) Which of the following antipsychotic used in pre-anesthetic medication in combination with fentanyl. Identify the correct pair -both nucleus and drug. [1]
A) Haloperidol and piperidine B) Droperidol and piperazine
C) Droperidol and Indole D) Droperidol and benzimidazole

i) Which of the following I.V. general anesthetic act through NMDA blockage…. [1]
A) Etomidate B) Propofol
C) Alphaxalone D) Ketamine

j) Removal 3,4-epoxide bridge in the morphine structure results in compounds that are referred as-------
A) Benzomorphan B) Morphinan
C) Morpholine D) Mepheridine [1]

k) Explain the effect of ionization in relation to biological action. [3]

l) Write structure, IUPAC name and medical uses of Atenolol. [3]

m) Write short note on biosynthesis of acetylcholine. [3]

n) Write structure, MOA and uses of Phenytoin. [3]

o) Write a note on ketamine as a general anaesthetic. [3]

PART-B

(50 Marks)

2.a) Discuss the role of ionization and solubility in drug action.
b) Discuss the history and development of medicinal chemistry. [5+5]

OR

3.a) Explain how biological action of drug is affect by hydrogen bonding and protein binding. Give suitable examples.
b) Explain the basic concepts and application of prodrug design. [5+5]

4.a) Classify Sympathomimetic agents with suitable structure.
b) Discuss the SAR of sympathomimetic agents. [5+5]

OR

5.a) Describe the adrenergic receptors (alpha and beta) and their distribution.
b) Discuss in brief about beta adrenergic blockers with examples. [5+5]

6.a) Discuss indirect acting parasympathomimetic agents giving their structures.
b) Write the catabolism of acetylcholine. [5+5]

OR

7.a) Give name and structures of a few natural and synthetic cholinergic blocking agents. In brief discuss SAR of anticholinergic molecules.
b) Outline the synthesis of dicyclomine hydrochloride and ipratropium bromide. [5+5]

8.a) Classify the antipsychotics agents with suitable examples.
b) Discuss SAR, MOA and various examples of benzodiazepines. [5+5]

OR

9.a) Discuss SAR, mechanism of action and various examples of Anticonvulsants agents.
b) Outline the synthesis of following drugs
(i) Barbital (ii) Phenytoin [5+5]

10.a) Classify narcotic and non-narcotic analgesics giving their chemical structures.
b) Write the structure, mechanism of action of ultra short acting barbiturates with uses. [5+5]

OR

11.a) Classify the non-steroidal anti-inflammatory drugs? Give example.
b) Discuss MOA and synthesis and uses of Ibuprofen. [5+5]

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Code No: 285AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy III Year I Semester Examinations, September/October - 2025

INDUSTRIAL PHARMACY - I

Time: 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
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PART - A

(25 Marks)

1.a) Oxidation of drugs results in_____ [1]

b) The BCS class II drug has [1]

A) High solubility and high permeability B) High solubility and low permeability

C) Low solubility and high permeability D) Low solubility and low permeability

c) Breaking to two layers of tablets is called_____ [1]

d) The preservatives in liquid orals protect the drug from [1]

A) Chemical degradation B) Microbial degradation

C) Thermal degradation D) Both chemical and thermal degradation

e) What is the range of capsule sizes for human use? [1]

A) 1 – 5 B) 00 – 5

C) 000 – 4 D) 000 – 5

f) _____Humidity range need to maintain for hard gelatin capsules. [1]

g) For preparation of depot type parenterals, the choice of vehicle is [1]

A) Aqueous vehicles B) Non-aqueous vehicles

C) Co-solvent systems D) Buffered isotonic solution

h) Lyophilization process convert_____to _____ [1]

i) Which of the following is not a tamper-evident packaging? [1]

A) Plain screw-cap bottles B) Blister packs

C) Foil seals D) Film wrappers

j) Cold creams and vanishing creams are____and ____emulsions. [1]

k) Differentiate between crystalline and amorphous forms of drug substances. [3]

l) What are the purposes of tablet coating? [3]

m) Write the advantages of pellet dosage form. [3]

n) Write about any three formulation considerations for eye drops. [3]

o) Brief on glass types used for pharmaceutical packaging. [3]

PART - B

(50 Marks)

2. What is polymorphism? Discuss its significance in pharmaceutical product development and industrial implications. [10]

OR

3. How do preformulation studies affect the development and stability of liquid and parenteral dosage forms? [10]

4. Explain the common coating defects with causes and remedies. [10]

OR

5. Enumerate and explain in-process and finished product quality control tests for tablets. [10]

6. Describe the manufacturing process of soft gelatin capsules with suitable diagrams. [10]

OR

7. Describe various pelletization processes used in pharmaceutical industry. [10]

8. Describe the process of filling and sealing of ampoules, vials, and infusion fluids. [10]

OR

9. Write a note on the introduction and formulation considerations for ophthalmic preparations. [10]

10. Explain the formulation and preparation of toothpaste with functions of each ingredient. [10]

OR

11. Define pharmaceutical aerosols. Classify different types of aerosol systems with examples. [10]

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Code No: 285AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy III Year I Semester Examinations, March - 2025
INDUSTRIAL PHARMACY - I

Time : 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
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PART- A (25 Marks)

1.a) Which of the following is a key factor affecting the polymorphic stability of a drug? [1]
A) Temperature B) Particle size
C) Solubility D) pH

b) The partition coefficient (log P) of a drug helps in predicting its: [1]
A) Aqueous solubility B) Protein binding
C) Lipophilicity and membrane permeability D) Chemical stability

c) Which granulation method is preferred when heat-sensitive drugs are formulated into tablets? [1]
A) Wet granulation B) Dry granulation
C) Direct compression D) Melt granulation

d) Which of the following coating types is commonly used for sustained-release tablets? [1]
A) Sugar coating B) Film coating
C) Enteric coating D) Compression coating

e) Hard gelatin capsules are primarily made from which of the following? [1]
A) Starch B) Gelatin
C) Cellulose D) Polyvinyl alcohol

f) Which pelletization technique first creates the exudates, then breaks them down in smaller fragments which are further fragmented into smaller pieces and then gives spherical shape to these pieces by using the motion of the machine? [1]
A) Fluidized bed coating B) Dry granulation
C) Extrusion and Spheronization D) Direct compression

g) Which of the following additives is used in parenteral formulations to maintain isotonicity? [1]
A) Preservatives B) Buffers
C) Osmotic agents D) Surfactants

h) Which sterilization method is commonly used for heat-sensitive ophthalmic preparations? [1]
A) Autoclaving B) Dry heat sterilization
C) Filtration D) Gas sterilization

i) Which of the following is NOT a commonly used propellant in pharmaceutical aerosols? [1]
A) Hydrofluorocarbons B) Chlorofluorocarbons
C) Carbon dioxide D) Oxygen

j) Which of the following factors is most crucial when selecting packaging materials for light-sensitive pharmaceutical products? [1]
A) Tensile strength B) Opacity and UV resistance
C) Thermal conductivity D) Adhesion properties.

k) Describe the role of pH and pKa in drug solubility and formulation. [3]

l) Explain the importance of excipients in tablet formulation. [3]

m) Describe the in-process quality control tests for soft gelatin capsules. [3]

n) Describe the formulation considerations for ophthalmic preparations. [3]

o) Explain the role of surfactants in pharmaceutical aerosols. [3]

PART-B (50 Marks)

2.a) Discuss the significance of solubility profile in dosage form development.
b) Explain the role of hydrolysis and oxidation in drug degradation.
c) Describe the BCS classification of drugs with suitable examples. [4+3+3]

OR

3.a) Explain the impact of drug-excipient compatibility in formulation development.
b) Describe how intrinsic dissolution studies help in drug formulation.
c) How does stability testing contribute to pharmaceutical development? [4+3+3]

4.a) Describe the formulation and manufacturing process of liquid orals.
b) Explain the filling and packaging considerations for liquid orals.
c) Discuss the evaluation tests for pharmaceutical suspensions. [4+3+3]

OR

5.a) Explain the different types of tablet compression machines.
b) Discuss the factors influencing tablet dissolution rates.
c) Describe the importance of disintegration testing in tablet quality control. [4+3+3]

6.a) Explain the manufacturing process of soft gelatin capsules.
b) Describe the quality control parameters of soft gelatin capsules.
c) Discuss the stability aspects of capsule formulations. [4+3+3]

OR

7.a) Explain the formulation requirements for pelletized dosage forms.
b) Discuss the impact of particle size on pelletization.
c) Describe different coating techniques used in pellet manufacturing. [4+3+3]

8.a) Discuss the types of containers and closures used for parenteral products.
b) Explain the production and control of sterile powders.
c) Describe the sterilization techniques used in ophthalmic preparations. [4+3+3]

OR

9.a) Explain the formulation and quality control of large-volume parenterals.
b) Discuss the stability testing of parenteral products.
c) Describe the labeling and regulatory aspects of ophthalmic preparations. [4+3+3]

10.a) Explain the stability aspects of pharmaceutical packaging.
b) Discuss the role of different packaging materials in drug storage.
c) Describe the evaluation tests for flexible packaging. [4+3+3]

OR

11.a) Discuss the formulation of sunscreen products.
b) Explain the packaging and stability concerns of aerosols.
c) Describe the different types of closures used in pharmaceutical packaging. [4+3+3]

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Code No: 285AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD **R22**

B. Pharmacy III Year I Semester Examinations, September/October - 2025

Time: 3 hours **PHARMACOLOGY - II**

Max Marks: 75

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

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PART - A

(25 Marks)

1.a) Phase 0 of electrophysiology of muscle is due to [1]
A) Na channel opening
B) K channel opening
C) Cl channel opening
D) K channel closing

b) Angina can be treated with [1]
A) Diuretics
B) Digoxin
C) Nitrates
D) β-openers

c) Folic acid deficiency leads to _____ [1]
A) Iron deficiency anemia
B) Megaloblastic anemia
C) Hemolytic anemia
D) Aplastic anemia

d) _____ is a natural coagulant [1]
A) Calcium gluconate
B) Thrombin
C) Aspirin
D) Heparin

e) prostaglandin is used to maintain a patent ductus arteriosus in newborns [1]
A) PGE2 (Prostaglandin E2)
B) PGI2 (Prostacyclin)
C) PGF2α
D) Thromboxane A2

f) Colchicine, used in gout, primarily works by [1]
A) Inhibiting uric acid formation
B) Increasing uric acid excretion
C) Reducing inflammation by inhibiting neutrophil chemotaxis
D) Inhibiting xanthine oxidase

g) The primary source of parathormone is [1]
A) Thyroid gland
B) Parathyroid glands
C) Adrenal glands
D) Liver

h) The hormone decreases blood calcium levels by inhibiting osteoclast activity [1]
A) Parathormone (PTH)
B) Parathyroid hormone-related protein (PTHrP).
C) Calcitonin.
D) Vitamin D.

i) The dose that produces a response in 50% of the test subjects or tissue is called [1]
A) ED50 (Effective dose 50) B) IC50 (Inhibitory concentration 50)
C) LD50 (Lethal dose 50) D) TI (Therapeutic index)

j) The "all or none" effect is commonly observed in which type of bioassay [1]
A) Quantal bioassay B) Graded bioassay
C) Chemical titration D) Chromatographic analysis

k) Classify antianginal drugs. [3]

l) Write a note on Hematinics? [3]

m) Write short note on Bradykinin. [3]

n) Write about ACTH. [3]

o) Write note on tocolytic agents. [3]

PART - B

(50 Marks)

2. Classify the anti-hypertensive drugs. Explain in detail about ACE inhibitors. [10]

OR

3. Classify Anti-hyperlipedimic drugs and explain about HMG-CoA Reductase Inhibitors. [10]

4. Classify Diuretics and explain about the mechanism of action and side effects of loop diuretics. [10]

OR

5.a) Write a note on fibrinolytics with examples.
b) Write a short note on anti-coagulants. [5+5]

6.a) Classify Antirhuematic drugs.
b) Write short note on Leukotrienes. [5+5]

OR

7. Classify Anti-gout drugs and explain about the xanthine oxidase derivatives. [10]

8. Classify hypoglycemic drugs. Explain in detail about the sulphonyl ureas. [10]

OR

9. Enumerate thyroid hormone inhibitors and explain their mechanisms of action and therapeutic indications. [10]

10.a) Enumerate the procedure for the digitalis bioassay.
b) Write a note on Anabolic steroids. [5+5]

OR

11. Classify Bioassay and explain in detail about the graded bioassay. [10]

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Code No:285AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy III Year I Semester Examinations, March - 2025

PHARMACOLOGY - II

Time : 3 hours **Max Marks: 75**

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PART - A (25 Marks)

1.a) An antihypertensive drug causing hypertrichosis is [1]
A) Methyldopa B) Clonidine
C) Diltiazem D) Minoxidil

b) All of the following statements regarding cardiac glycosides are true EXCEPT [1]
A) They inhibit the activity of the Na+/K+-ATPase
B) They decrease intracellular concentrations of calcium in myocytes
C) They increase vagal tone
D) They have a very low therapeutic index

c) Example of High ceiling diuretic [1]
A) Triamterene B) Spironolactone
C) Bumetanide D) Amiloride

d) Which of the following drugs belongs to coumarin derivatives? [1]
A) Heparin B) Enoxaparin
C) Dalteparin D) Warfarin

e) Most of non-narcotic analgesics have: [1]
A) Anti-inflammatory effect B) Analgesic effect
C) Antipyretic effect D) All of the above

f) For which of the following conditions could aspirin be used prophylactically? [1]
A) Noncardiogenic pulmonary edema B) Peptic ulcers
C) Thromboembolism D) Metabolic acidosis

g) Indications of thyroid hormones are following, EXCEPT: [1]
A) Cretinism B) Myxoedema
C) Hashimoto's disease D) For treatment of simple obesity

h) Alpha-glucosidase inhibitors act by: [1]
A) Diminishing insulin resistance by increasing glucose uptake and metabolism in muscle and adipose tissues
B) Competitive inhibiting of intestinal alpha-ghucosidases and modulating the postprandial digestion and absorption of starch and disaccharides
C) Reducing the absorption of carbohydrate from the gut
D) Stimulating the beta islet cells of pancreas to produce insulin

i) Finasteride is a [1]

A) Androgen receptor antagonist B) Androgen receptor agonist

C) 5-α reductase inhibitor D) None of the above

j) Cohn syndrome is due to [1]

A) Increased aldosterone secretion B) Increased glucocorticoid secretion

C) Decreased aldosterone secretion D) Decreased glucocorticoid secretion

k) Give mechanism of action of cardiac glycosides. [3]

l) Write a note on high ceiling diuretics. [3]

m) Discuss local actions of NSAIDs. [3]

n) Describe adverse effects of SGLT2 inhibitors. [3]

o) Describe bioassay of insulin. [3]

PART – B (50 Marks)

2.a) Discuss mechanism of action of nitrites.

b) Comment: Beta blockers are contraindicated in asthma.

c) Classify anti-hyperlipidaemics. [3+4+3]

OR

3.a) Explain side effects of ACE inhibitors.

b) Discuss mechanism of action of class I anti-arrythmics.

c) Write a note on fibrates. [3+4+3]

4.a) Justify use of GpIIb/IIIa receptor antagonists in myocardial infarction.

b) Describe mechanism of action of osmotic diuretics.

c) Give a brief account of haemostatics. [4+3+3]

OR

5.a) Explain pharmacological actions of heparin.

b) Comment: Aspirin in low doses works as anti-platelet agent.

c) Describe mechanism of action of streptokinase and urokinase. [3+4+3]

6.a) Give mechanism of action of paracetamol.

b) Classify DMARDs.

c) Discuss triple response of histamine. [4+3+3]

OR

7.a) Give mechanism of action of colchicine.

b) Describe synthesis of prostaglandins.

c) Write a note on Substance P. [4+3+3]

8.a) Explain pharmacological actions of metformin.

b) Classify anti-thyroid agents.

c) Explain mechanism of action of glucocorticosteroids. [3+3+4]

OR

9.a) Describe somatostatin analogues for acromegali.

b) Explain role of calcitonin in regulation of calcium.

c) Discuss adverse effects of insulin. [3+4+3]

10.a) Discuss mechanism of action of leuprolide.
b) Describe bioassay of oxytocin.
c) Give a brief account of anti-adrogens. [4+3+3]

OR

11.a) Write a note on oral contraceptives.
b) Describe pharmacological actions of mineralocorticoids.
c) Give a brief account of tocolytics. [3+4+3]

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Code No: 285AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD **R22**

B. Pharmacy III Year I Semester Examinations, September/October - 2025

PHARMACOGNOSY AND PHYTOCHEMISTRY - II

Time: 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

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PART - A

(25 Marks)

1.a) Which pathway is responsible for the biosynthesis of aromatic amino acids in plants? [1]

A) Shikimic acid pathway B) Acetate pathway
C) Amino acid pathway D) Mevalonate pathway

b) Radioactive isotopes are used in biogenetic studies mainly to: [1]

A) Increase yield B) Trace metabolic pathways
C) Improve colour of drugs D) Purify phytoconstituents

c) Biological source of Reserpine is? [1]

A) Vinca rosea B) Rauwolfia serpentine
C) Digitalis purpurea D) Dioscorea species

d) The main active component in Mentha oil is: [1]

A) Citral B) Menthol
C) Quinine D) Linalool

e) Which plant is the source of Catechu? [1]

A) Acacia catechu B) Pterocarpus santalinus
C) Myrrh D) Senna

f) Benzoin is classified as: [1]

A) Glycoside B) Resin
C) Tannin D) Alkaloid

g) Quinine belongs to which class of phytoconstituents? [1]

A) Terpenoids B) Alkaloids
C) Glycosides D) Resins

h) Curcumin is obtained from: [1]

A) Curcuma longa B) Taxusbaccata
C) Artemisia annua D) Podophyllumpeltatum

i) Taxol is industrially produced from: [1]

A) Digitalis purpurea B) Taxusbrevifolia
C) Artemisia annua D) Vinca rosea

j) Which modern extraction method uses CO_2 at high pressure? [1]

A) Microwave-assisted extraction B) Supercritical fluid extraction
C) Counter-current extraction D) Ultrasound-assisted extraction

k) Explain the role of the shikimic acid pathway in the biosynthesis of secondary metabolites. [3]

l) Write the biological source, chemical constituents and uses of *Belladonna.* [3]

m) Classify tannins and write their general properties. [3]

n) Write the isolation and identification procedure for *Curcumin.* [3]

o) Discuss the industrial production and uses of *Podophyllotoxin.* [3]

PART - B

(50 Marks)

2.a) Explain the acetate pathway for biosynthesis of secondary metabolites in plants.

b) Write a note on the amino acid pathway and its products. [5+5]

OR

3.a) Describe the use of radioactive isotopes in biogenetic investigations.

b) Write the applications of metabolic pathway studies in industrial drug production. [5+5]

4.a) Describe the extraction and isolation of alkaloids from plant sources.

b) Write the source, constituents and commercial applications of *Vinca.* [5+5]

OR

5.a) Explain general method of extraction and isolation of *glycosides.*

b) Write a detailed systematic Pharmacognosy study of *Digitalis.* [5+5]

6.a) Classify Resins with suitable examples and write its properties.

b) Write the biological source, chemistry, extraction and commercial applications of Taxol. [5+5]

OR

7.a) Explain the extraction and uses of Asafoetida.

b) Write the source, constituents and applications of Bitter Almond. [5+5]

8.a) Describe the isolation, identification and application Artemicin.

b) Write the chemistry, analysis and uses of *Glycyrhetinic acid.* [5+5]

OR

9.a) Write the source, chemical nature isolation and uses of *Artemisin.*

b) Describe the analysis, identification and uses of Atropine. [5+5]

10.a) Discuss the industrial production and uses of Digoxin.

b) Describe the production and uses of *Vinblastine.* [5+5]

OR

11.a) Write in detail about production, estimation and utilization of sennosides.

b) Write the industrial process for obtaining *Podophyllotoxin.* [5+5]

---ooOoo---

Code No: 285AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HDERABAD
B. Pharmacy III Year I Semester Examinations, March - 2025
PHARMACOGNOSY AND PHYTOCHEMISTRY - II

Time : 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART- A (25 Marks)

1.a) The Shikimic Acid Pathway is absent in which of the following organisms? [1]
A) Plants B) Bacteria
C) Fungi D) Animals

b) The herbicide glyphosate inhibits which key enzyme of the Shikimic Acid Pathway? [1]
A) EPSP synthase (5-enolpyruvylshikimate-3-phosphate synthase)
B) Acetolactate synthase
C) RuBisCO
D) Phenylalanine ammonia-lyase

c) Which of the following alkaloids is NOT derived from Vinca (Catharanthus roseus)? [1]
A) Vinblastine B) Vincristine
C) Reserpine D) Vindesine

d) The biosynthesis of Vinca alkaloids follows which major pathway? [1]
A) Shikimic acid pathway B) Mevalonate pathway
C) Indole and terpenoid pathway D) Acetate pathway

e) Which of the following is NOT a therapeutic use of Benzoin? [1]
A) Antiseptic B) Analgesic
C) Expectorant D) Antipyretic

f) In which form is Benzoin most commonly used in the pharmaceutical and cosmetic industries? [1]
A) Oil B) Powder
C) Resin D) Crystal

g) Menthol is primarily used in topical formulations due to its ability to: [1]
A) Relieve muscle pain through cooling sensation B) Reduce blood pressure
C) Enhance appetite D) Increase skin hydration

h) What is the primary mechanism by which Menthol produces a cooling sensation? [1]
A) Blocking sodium channels B) Activating TRPM8 receptors
C) Inhibiting COX enzymes D) Blocking calcium channels

i) Forskolin is primarily used in the treatment of: [1]
A) Hypertension B) Asthma
C) Diabetes D) Liver disorders

j) Which of the following enzymes does Forskolin directly activate to increase intracellular cyclic AMP (cAMP) levels? [1]

A) Phosphodiesterase
B) Adenylate cyclase
C) Protein kinase C
D) Kinase A

k) How does the regulation of the acetate pathway influence the biosynthesis of fatty acids and cholesterol in living organisms? [3]

l) Compare and contrast the chemical composition of green tea, black tea, and oolong tea, highlighting key differences in their bioactive compounds. [3]

m) Explain the therapeutic uses of Asafoetida in traditional medicine, including its role as a digestive aid, anti-inflammatory agent, and potential uses in modern pharmacotherapy. [3]

n) Explain the pharmacokinetics of Quinine, including its absorption, distribution, metabolism, and excretion. Also, discuss the factors influencing its therapeutic efficacy and potential toxicities. [3]

o) Discuss the pharmacokinetics of Digoxin, including its absorption, distribution, metabolism, and excretion. Also, explain the significance of its narrow therapeutic index and the clinical monitoring required during therapy. [3]

PART-B (50 Marks)

2.a) Explain the role of feedback inhibition in the regulation of amino acid biosynthesis and provide an example of an enzyme regulated by this mechanism.

b) Compare and contrast the biosynthetic pathways of essential and non-essential amino acids, highlighting key differences in their enzymatic steps. [5+5]

OR

3.a) Discuss the advantages and limitations of using radioactive isotopes in biogenetic research compared to non-radioactive labeling techniques.

b) Explain the use of tritium in investigating nucleic acid and protein synthesis, and how it differs from other radioactive tracers. [5+5]

4.a) Discuss the role of flavonoids in tea and their mechanism of action as antioxidants in preventing oxidative stress-related diseases.

b) Explain how different processing methods influence the phytochemical content and therapeutic properties of various types of tea. [5+5]

OR

5.a) Explain the adverse effects of prolonged Liquorice consumption, focusing on its impact on electrolyte balance and the endocrine system.

b) Describe how Liquorice exhibits antiviral activity and its potential application in viral infections. [5+5]

6.a) Explain the major chemical constituents of Pterocarpus species and their pharmacological significance.

b) Describe the key chemical classes found in Pterocarpus and their role in therapeutic applications. [5+5]

OR

7.a) Identify the biological sources of Artemisia, mentioning important species and their geographical distribution.

b) Explain the therapeutic uses of Artemisia, particularly its role in malaria treatment and its mechanism of action. [5+5]

8.a) Identify the biological sources of Citral, with a focus on plants such as lemon grass (*Cymbopogon citratus*) and lemon myrtle (*Backhousia citriodora*), and discuss their distribution.

b) Explain the therapeutic uses of Citral, particularly its antimicrobial, anti-inflammatory, and antioxidant properties, and how these applications contribute to its medicinal value. [5+5]

OR

9.a) Explain the pharmacological properties of caffeine, focusing on its stimulant effects on the central nervous system, its mechanism of action, and its therapeutic uses in conditions such as headaches and fatigue.

b) Discuss the therapeutic uses of caffeine, including its role in the treatment of migraine, asthma, and its potential as a cognitive enhancer, and explain the doses at which it is most effective. [5+5]

10.a) Explain the industrial methods used for the extraction of sennosides from Senna plants and the challenges involved in large-scale production.

b) Describe the chemical structure of sennosides and explain how it contributes to their pharmacological activity as a natural laxative. [5+5]

OR

11.a) Explain the pharmacological mechanism of action of Taxol as an anti-cancer agent, and discuss its role in stabilizing microtubules and inhibiting cell division.

b) Discuss the therapeutic uses of Taxol in cancer treatment, highlighting its efficacy in treating cancers such as ovarian, breast, and lung cancer, and the challenges in its clinical application. [5+5]

--ooOoo--

Code No: 286AA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy III Year II Semester Examinations, September - 2025
MEDICINAL CHEMISTRY – II

Time: 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART - A

(25 Marks)

1.a) Which of the following enzymes is essential for the conversion of histidine to histamine? [1]
A) Histidine amylase
B) Histidine hydrolase
C) Histidine decarboxylase
C) Histidine phophorylase

b) Omeprazole is [1]
A) Gastric acid inhibitor
B) Mast cell stabilizer
C) Proton pump inhibitor
D) H_1-receptor antagonist

c) Mechanism of action of furosemide is [1]
A) Osmotic diuretic
B) inhibits $Na^+/K^+/2Cl^-$ cotransporter
C) Inhibits carbonic anhydrase
C) competitive inhibit aldosterone

d) Which of the following drug is containing 1, 3, 4 thiadiazole ring? [1]
A) Amiloride
B) Acetazolamide
C) Dichloropenamide
D) None

e) Among the following which is having coumarin nucleus? [1]
A) Menadione
B) Warfarin
C) Clopidogrel
D) All of the above

f) Sotalol is classified as a..... [1]
A) Calcium channel blocker
B) Beta-blocker and anti-arrhythmic
C) Diuretic .
D) Vasodilator

g) Aromatic ring in local anesthetics increases [1]
A) Metabolism
B) hydrophilicity
C) lipophilicity
D) None of the above

h) Repaglinide belongs to class.... [1]
A) Biguanides
B) Glitazones
C) Meglitinides
D) Glucosidase inhibitors

i) QSAR stands for.....
A) Quantitative Structure-Activity Relationship
B) Quality Structural Analysis Report
C) Quantitative Solubility Activity Relation
D) Quantum Structural Atomic Relationship

j) Docking studies are used to..... [1]
A) Analyze blood samples B) Identify molecular weight
C) Predict binding of drug to receptor D) Measure acidity

k) Give the uses of promethazine. [3]

l) Write a note on antianginal agents. Give the synthesis of Isosorbide dinitrite. [3]

m) Explain the mechanism of action of antihyperlipidemic agents. [3]

n) Outline the synthesis of procaine. [3]

o) List the applications of combinatorial chemistry. [3]

PART-B

(50 Marks)

2. What are antineoplastic agents? Classify them with examples. Discuss the mechanism of alkylating agents. Outline the synthesis of Mechlorethamine [10]

OR

3. Define and classify antihistaminic agents with suitable examples and explain the synthesis of diphenhydramine. [10]

4. Define and classify antihypertensive agents. Explain the MOA of Angiotensin Receptor Blockers. Write the synthesis of Methyl Dopa. [10]

OR

5. Define and classify diuretics with examples. Explain the mechanism of action of loop diuretics and write the synthesis of furosemide. [10]

6.a) What are antiarrythmic drugs? Write the structure and uses of procainamide HCl, phenytoin sodium, lidocaine HCl and amiodarone.

b) Define antihyperlipidemic agents. Write the structures and uses of clofibrate, lovastatin, cholesteramine and cholestipol. [5+5]

OR

7.a) Define coagulants and anticoagulants. Write the structure and uses of warfarin, menadione, acetomenadione and anisindione.

b) Explain the chemistry of cardiac glycosides used in CHF. [5+5]

8. Define and classify local anaesthetic agents with examples. Explain the SAR of local anaesthetic agents. [10]

OR

9.a) Define and classify oral hypoglycaemic agents with examples and write the synthesis of tolbutamide.

b) Outline the synthesis of dibucaine and benzocaine. [5+5]

10. Discuss the importance of molecular docking studies in rational drug design. [10]

OR

11. Write a detail on pharmacophore modelling with examples. [10]

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Code No: 286AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy III Year II Semester Examinations, September - 2025

PHARMACOLOGY - III

R22

Time : 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART- A

(25 Marks)

1.a) Which of the following is an expectorant? [1]
A) Codeine B) Guaifenesin
C) Dextromethorphan D) Diphenhydramine

b) A drug acting as an appetite suppressant is: [1]
A) Orlistat B) Sibutramine
C) Sucralfate D) Loperamide

c) Which drug is a macrolide antibiotic? [1]
A) Erythromycin B) Ciprofloxacin
C) Tetracycline D) Penicillin G

d) Which antibiotic is contraindicated in children due to teeth discoloration? [1]
A) Cephalosporins B) Tetracyclines
C) Macrolides D) Aminoglycosides

e) First-line drug for leprosy is: [1]
A) INH B) Amphotericin B
C) Acyclovir D) Dapsone

f) Which antiviral is used in treatment of herpes infections? [1]
A) Acyclovir B) Zidovudine
C) Interferon D) Oseltamivir

g) Which alkylating agent is used in cancer chemotherapy? [1]
A) Cyclophosphamide B) Vincristine
C) Methotrexate D) Dactinomycin

h) Which is an example of an immunostimulant? [1]
A) Interleukin-2 B) Cyclosporine
C) Azathioprine D) Tacrolimus

i) Which metal poisoning is treated with deferoxamine? [1]
A) Arsenic B) Lead
C) Mercury D) Iron

j) Antidote for morphine poisoning is:
A) Naloxone B) Flumazenil
C) Atropine D) Physostigmine [1]

k) Write a short note on respiratory stimulants. [3]

l) Mention mechanism of action and uses of sulfonamides. [3]

m) Write short notes on antiviral drugs used in HIV. [3]

n) Classify immunostimulants with suitable examples. [3]

o) Write management of lead poisoning. [3]

PART-B

(50 Marks)

2.a) Classify antitussives with examples. Discuss mechanism of action and therapeutic uses of expectorants.

b) Write note on antidiarrheal drugs. [7+3]

OR

3.a) Classify antiemetics. Discuss mechanism of action and uses of 5-HT_3 antagonists.

b) Write note on appetite stimulants. [7+3]

4.a) Classify cephalosporins.

b) Discuss mechanism of action, uses and adverse effects of quinolones.

c) Write note on macrolides. [3+4+3]

OR

5.a) Classify aminoglycosides. Discuss their mechanism of action and therapeutic uses.

b) Write note on cotrimoxazole. [6+4]

6.a) Classify antifungal drugs. Discuss mechanism of action and uses of amphotericin B.

b) Write note on antileprotic agents. [6+4]

OR

7.a) Classify antiamoebic drugs. Discuss uses and adverse effects of metronidazole.

b) Write note on antimalarial drug resistance. [6+4]

8.a) Classify antimetabolite anticancer drugs. Discuss mechanism of action and uses of methotrexate.

b) Write note on monoclonal antibodies in cancer therapy. [6+4]

OR

9.a) Classify immunosuppressants. Discuss mechanism of action and therapeutic uses of tacrolimus.

b) Write note on protein drugs in immunotherapy. [6+4]

10.a) Define mutagenicity and teratogenicity with examples.

b) Discuss clinical symptoms and treatment of morphine poisoning. [5+5]

OR

11.a) Define carcinogenicity and genotoxicity. Explain treatment of lead poisoning.

b) Write note on principles of poisoning management. [5+5]

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19

Code No: 286AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy III Year II Semester Examinations, September - 2025
HERBAL DRUG TECHNOLOGY

Time : 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART- A (25 Marks)

1.a) The term "herb" in herbal drug technology refers to: [1]
A) Only leaves of medicinal plants
B) Any plant or plant part used for medicinal purposes
C) Only dried plant materials
D) Only cultivated medicinal plants

b) Good Agricultural Practices (GAP) in medicinal plant cultivation primarily aims at: [1]
A) Increasing yield only
B) Ensuring quality and safety of raw materials
C) Reducing cultivation costs
D) Preventing pest attacks only

c) Nutraceuticals are defined as: [1]
A) Nutritional supplements only
B) Food products with medicinal properties
C) Synthetic vitamins
D) Herbal medicines in food form

d) Hypericum (St. John's Wort) is known to interact with: [1]
A) Only antidepressants
B) Warfarin and oral contraceptives
C) Only analgesics
D) Antacids only

e) Herbal excipients are used in pharmaceutical formulations as: [1]
A) Active ingredients only
B) Inactive ingredients that aid in formulation
C) Preservatives only
D) Flavouring agents only

f) Phytosomes are: [1]
A) Traditional herbal formulations
B) Novel drug delivery systems for herbal extracts
C) Herbal cosmetic preparations
D) Natural excipients

g) WHO guidelines for herbal drug assessment include: [1]
A) Only safety evaluation
B) Quality, safety, and efficacy evaluation
C) Only chemical analysis
D) Only toxicity studies

h) Biopiracy refers to: [1]
A) Illegal cultivation of medicinal plants
B) Unauthorized use of traditional knowledge for commercial gain
C) Smuggling of herbal drugs
D) Patent infringement only

i) Schedule T of Drugs and Cosmetics Act deals with: [1]
A) Allopathic drug manufacturing
B) Good Manufacturing Practices for herbal drugs
C) Import regulations
D) Clinical trial guidelines

j) GMP documentation in herbal drug industry includes: [1]
A) Only production records
B) Standard Operating Procedures and batch records
C) Only quality control reports
D) Only raw material specifications

k) Explain the process of selection, identification, and authentication of herbal raw materials with suitable examples. [3]

l) Write a note on the health benefits and role of Ashwagandha and Ginseng as nutraceuticals. [3]

m) Describe the formulation principles and preparation of herbal shampoos with ingredients. [3]

n) Compare the patenting aspects of Turmeric (Curcuma) and Neem case studies in traditional knowledge protection. [3]

o) Explain the infrastructural requirements for herbal drug manufacturing as per Schedule T. [3]

PART-B (50 Marks)

2.a) Define and classify herbal drugs, herbal medicines and herbal drug preparations with examples.
b) Describe the various sources of herbs and factors affecting the quality of herbal raw materials. [5+5]

OR

3.a) Discuss Good Agricultural Practices in medicinal plant cultivation including organic farming methods.
b) Explain pest management in medicinal plants with emphasis on biopesticides and bioinsecticides. [5+5]

4.a) Classify nutraceuticals and discuss their market growth, scope and types of products available.
b) Explain the health benefits and therapeutic applications of Ginger, Garlic, and Amla as health foods. [5+5]

OR

5.a) Define and classify herbal-drug and herb-food interactions with suitable examples.
b) Describe the pharmacological effects and possible interactions of Ginkgo biloba and Ginseng. [5+5]

6.a) Explain the principles and preparation of herbal cosmetic formulations including face creams and tooth pastes.
b) Describe the significance and applications of herbal excipients as binders, disintegrants and flavors. [5+5]

OR

7.a) Compare conventional herbal formulations (syrups, mixtures) with novel dosage forms like phytosomes.
b) Discuss the preparation methods and advantages of herbal perfumes and natural dyes. [5+5]

8.a) Describe WHO and ICH guidelines for assessment of herbal drugs including stability testing protocols.

b) Formulate a patent application strategy for a novel herbal formulation based on traditional knowledge. [5+5]

OR

9.a) Discuss the regulatory framework in India for herbal drugs including ASU DTAB and ASU DCC.

b) Explain the patenting aspects and biopiracy issues related to traditional knowledge with case studies. [5+5]

10.a) Describe the components and objectives of Good Manufacturing Practices (Schedule T) for herbal drugs.

b) Explain the requirements for working space, storage areas, and equipment in herbal drug manufacturing. [5+5]

OR

11.a) Discuss the health and hygiene requirements for personnel in herbal drug manufacturing facilities.

b) Describe the documentation and record keeping systems required as per GMP guidelines. [5+5]

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Code No: 286AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy III Year II Semester Examinations, September - 2025
BIOPHARMACEUTICS AND PHARMACOKINETICS

Time : 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART - A

(25 Marks)

1.a)	Mathematical expression for Vd is_____	[1]
b)	Protein binding affects Vd_____(Yes/No)	[1]
c)	Drug clearance is given as_____	[1]
d)	Cytochrome P450 induction means_____	[1]
e)	Cmax indicates_____	[1]
f)	Zero order kinetics is_____	[1]
g)	Beta half-life refers to_____	[1]
h)	Multi-compartment has____different Vd	[1]
i)	Km represents_____	[1]
j)	Change in pharmacokinetics is dependent on_____dose administered.	[1]
k)	Write about the significance of protein binding.	[3]
l)	Discuss the factors that affect urinary excretion.	[3]
m)	How is compartment model different from non-compartment model?	[3]
n)	Give reasons for different Vd in multi compartment model.	[3]
o)	How is Km and Vmax known for a drug graphically?	[3]

PART - B

(50 Marks)

2. Elaborate on the factors that affect tissue permeability of drugs. [10]

OR

3. Discuss the following w.r.t. drug absorption
   a) GI residence time
   b) Gastric emptying
   c) Gastric absorption window. [3+3+4]

4. Discuss the factors that re considered for a valid urinary excretion data. [10]

OR

5. Elaborate on the methods to determine bioavailability. [10]

6.a) What is the significance of Vd?
b) How is Vd related to drug clearance? [5+5]

OR

7. Describe one-compartment IV Bolus model and its parameters. [10]

8. What are the advantages and disadvantages of drugs given by:
a) Constant i.v. infusion
b) Multiple i.v. bolus injection. [5+5]

OR

9. Demonstrate the relationship between tissue and plasma drug concentration following two compartment open model. [10]

10. Discuss the characteristics of drugs showing non-linear kinetics. [10]

OR

11. How is bioavailability of a drug following non-linear kinetics determined? [10]

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Code No: 286AE

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy III Year II Semester Examinations, September - 2025
PHARMACEUTICAL QUALITY ASSURANCE

Time : 3 hours

Max Marks: 75

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART- A

(25 Marks)

1.a) Total Quality Management emphasizes: [1]
A) Quality control only
B) Continuous improvement and customer focus
C) Cost reduction only
D) Production speed

b) Quality by Design (QbD) approach focuses on: [1]
A) End-product testing only
B) Building quality into the product from design stage
C) Reducing manufacturing costs
D) Speeding up production

c) Environmental control in pharmaceutical manufacturing includes: [1]
A) Temperature control only
B) Humidity control only
C) Both temperature and humidity control
D) Pressure control only

d) Raw material specifications should include: [1]
A) Physical properties only
B) Chemical properties only
C) Both physical and chemical properties
D) Price information only

e) Plastic container testing includes: [1]
A) Light transmission test
B) Moisture permeability test
C) Chemical resistance test
D) All of the above

f) GLP regulations apply to: [1]
A) Clinical studies only
B) Non-clinical safety studies
C) Manufacturing processes only
D) Marketing activities only

g) Batch manufacturing record is prepared: [1]
A) Before production starts
B) During production
C) After production is complete
D) During quality testing

h) Quality review should be conducted: [1]
A) Monthly
B) Quarterly
C) Annually
D) As needed

i) Installation Qualification (IQ) verifies:
A) Equipment performance B) Proper equipment installation
C) Process capability D) Product quality [1]

j) First-In-First-Out (FIFO) principle in warehousing ensures:
A) Cost reduction B) Space optimization
C) Prevention of expiry D) Easy handling [1]

k) Explain the concept of Good Manufacturing Practices (GMP) and its significance in pharmaceutical industries. [3]

l) Describe the design requirements for sterile manufacturing areas as per cGMP. [3]

m) List the key components of Good Laboratory Practices and explain their importance. [3]

n) Define Standard Operating Procedure (SOP) and explain its role in pharmaceutical quality assurance. [3]

o) Explain the principles of validation and its types used in pharmaceutical industries. [3]

PART-B

(50 Marks)

2.a) Analyze the implementation challenges of Total Quality Management in pharmaceutical industries and suggest solutions to overcome them.

b) Evaluate the impact of ICH harmonization on global pharmaceutical quality standards. Discuss the benefits and limitations.

c) Apply the principles of Quality by Design to develop a robust pharmaceutical formulation. [4+4+2]

OR

3.a) Demonstrate the application of ISO 9000 quality management principles in pharmaceutical manufacturing operations.

b) Examine the role of NABL accreditation in ensuring the competency of pharmaceutical testing laboratories.

c) Design an environmental management system based on ISO 14000 standards for a pharmaceutical company. [4+4+2]

4.a) Evaluate the critical factors in pharmaceutical plant design and layout that ensure compliance with cGMP requirements.

b) Analyze the contamination control measures required for different pharmaceutical manufacturing areas.

c) Apply cGMP principles to establish personnel qualification and training programs. [4+4+2]

OR

5.a) Demonstrate the equipment maintenance strategies that ensure consistent product quality in pharmaceutical manufacturing.

b) Critically evaluate the utilities management (water, air, steam) requirements for pharmaceutical manufacturing facilities.

c) Examine the purchase specifications and vendor qualification process for pharmaceutical raw materials. [4+4+2]

6.a) Analyze the quality control testing requirements for different types of pharmaceutical containers and closures. Include test methods and specifications.

b) Apply GLP principles to design a comprehensive quality control testing facility for pharmaceutical products.

c) Evaluate the importance of proper documentation and record-keeping in GLP-compliant laboratories. [4+4+2]

OR

7.a) Demonstrate the protocol development process for non-clinical laboratory studies under GLP conditions.

b) Examine the organizational and personnel requirements for implementing GLP in pharmaceutical testing facilities.

c) Create a disqualification and corrective action plan for GLP non-compliance issues. [4+4+2]

8.a) Evaluate the effectiveness of complaint handling systems in pharmaceutical industries and suggest improvements.

b) Apply quality documentation principles to establish a comprehensive document control system.

c) Analyze the decision-making process for product recall and its implementation. [4+4+2]

OR

9.a) Demonstrate the development and maintenance of batch manufacturing records for pharmaceutical products.

b) Assess the role of quality audits in continuous improvement of pharmaceutical quality systems.

c) Design a waste management and disposal system for pharmaceutical manufacturing facilities. [4+4+2]

10.a) Examine the validation lifecycle approach and its application in pharmaceutical manufacturing processes.

b) Evaluate the critical aspects of analytical method validation for pharmaceutical quality control.

c) Apply calibration principles to maintain the accuracy and reliability of analytical instruments. [4+4+2]

OR

11.a) Create a comprehensive validation master plan for a multi-product pharmaceutical manufacturing facility.

b) Analyze the qualification requirements (DQ, IQ, OQ, PQ) for pharmaceutical manufacturing equipment with practical examples.

c) Critically assess the implementation of good warehousing practices in pharmaceutical supply chain management. [4+4+2]

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Code No: 286AH

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy III Year II Semester Examinations, September - 2025
SCREENING METHODS IN PHARMACOLOGY

Time: 3 hours **Max Marks: 75**

Note: The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.

- **Part-A** is compulsory question which consists of fifteen sub-questions. The first ten sub-questions are of Objective type/ Multiple Choice Questions, 2 from each unit and carry 1 mark each. The next five sub-questions are Short Answer Questions one from each unit and carry 3 marks each.
- **Part-B** consists of ten Long Answer Questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

PART - A

(25 Marks)

1.a) CPCSEA stands for – [1]
A) Committee for the Purpose of Control and Supervision of Experiments on Animals
B) Central Pharmacology Committee on Screening of Experimental Animals
C) Committee for Preclinical Screening of Experimental Animals
D) Council for Prevention of Cruelty to Small Animals

b) Which is an alternative to animal experimentation? [1]
A) In-silico models B) Use of higher primates
C) Clinical trials directly D) Use of rodents

c) LD_{50} refers to – [1]
A) Dose lethal to 50% of animals B) Safe dose in 50% population
C) Dose effective in 50% patients D) Dose effective in 90% patients

d) OECD guidelines are related to – [1]
A) Efficacy studies B) Toxicity testing
C) Screening for analgesics D) Clinical trials

e) Forced swim test is used in screening of – [1]
A) Antipyretics B) Anxiolytics
C) Antipsychotics D) Antidepressants

f) Tail suspension test is used for evaluating – [1]
A) Muscle relaxant activity B) Antidepressant activity
C) Antipyretic activity D) Antidiabetic activity

g) Streptozotocin is used to induce – [1]
A) Hypertension B) Diabetes mellitus
C) Ulcer D) Epilepsy

h) Pylorus ligation method is used in screening – [1]
A) Antiulcer drugs B) Antidiabetic drugs
C) Analgesics D) Antipsychotics

i) Hot plate test is commonly used for – [1]
A) Antipyretics B) Analgesics
C) Antidepressants D) Antihypertensives

j) Brewer's yeast is used to induce –
A) Fever B) Ulcer
C) Hypertension D) Diabetes [1]

k) Write short note on animal breeding techniques. [3]

l) Explain acute toxicity study design. [3]

m) Write a note on models used in screening antiepileptic drugs. [3]

n) List methods used in screening antihypertensive drugs. [3]

o) Write a short note on carrageenan-induced paw edema model. [3]

PART – B

(50 Marks)

2.a) Explain CPCSEA guidelines for use of animals.
b) Discuss alternatives to animal experimentation. [5+5]

OR

3.a) Discuss ethical issues in animal experiments.
b) Write notes on IAEC (Institutional Animal Ethics Committee). [5+5]

4.a) Differentiate acute and chronic toxicity studies.
b) Write notes on OECD guidelines. [5+5]

OR

5.a) Explain sub-acute toxicity testing.
b) Describe biomarkers used in toxicity studies. [5+5]

6.a) Discuss the screening for antipsychotic drugs.
b) Explain experimental models for antidepressants. [5+5]

OR

7.a) Write about animal models for screening antidepressants.
b) Mention disadvantages of animal models in CNS screening. [5+5]

8.a) Explain screening models for anti-diabetic drugs.
b) Write about experimental methods for anti-hypertensives. [5+5]

OR

9.a) Describe pylorus ligation method for anti-ulcer screening.
b) Explain induction of diabetes by alloxan and its use in screening. [5+5]

10. Explain hot plate method of analgesic screening. [10]

OR

11. Write about cotton pellet-induced granuloma method. [10]

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