Code No: 6803AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, September/October-2025
MODERN PHARMACEUTICS –I
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Discuss the significance of particle size analysis in preformulation studies for tablets, capsules and suspensions. [5]

b) Write about the mechanism of superdisintegrant action. Give two examples of superdisintegrants. [5]

c) Give the differences between capsules and microcapsules and mention the advantages of microcapsules. [5]

d) Write the significance of hard gelatin capsule size and how it is fixed and calibrated? [5]

e) What is the need for optimization techniques in formulation development and they are gaining significance in recent times? Give one example. [5]

PART - B **(50 Marks)**

2. Write about the following:
a) Reports of preformulation
b) Significance of flow properties and their determination. [5+5]

OR

3. Discuss the significance of polymorphs, solid state properties and solubility in preformulation studies. [10]

4. Write about types of diluents and disintegrants with suitable examples and mention their advantages. [10]

OR

5. Explain the approaches for preparation of co-processed excipients. Add a note on their superiority over conventional excipients. [10]

6. Write about coating materials used in aqueous film coating and explain the process. [10]

OR

7. Explain the formulation development and manufacture of powder dosage forms for internal use. [10]

8. Write about types of gelatin suitable for hard gelatin capsule shell manufacture. Explain the methods for preparation of hard gelatin capsule shells. [10]

OR

9. Enumerate the formulation additives for soft gelatin capsules. [10]

10. Explain the significance of factorial designs and contour diagrams in formulation development. [10]

OR

11. Write about the following:
a) Box Behnken design
b) Mixture design. [5+5]

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Code No: 6803AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, March/April - 2025
MODERN PHARMACEUTICS –I
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Give the principle of laser diffraction method and write its applications. [5]

b) What are diluents and give their types? Discuss their role in the formulation development with suitable examples. [5]

c) Briefly describe the steps in the manufacture of powder dosage forms for internal use. [5]

d) Explain the physical stability testing of capsules. [5]

e) Give the differences between factorial and fractional factorial designs and their applications. [5]

PART - B **(50 Marks)**

2. Explain the preformulation stability studies protocol for solid dosage forms as per ICH guidelines. [10]

OR

3. What is the need for carrying of drug-excipient compatibility studies? Explain the methods for the same. [10]

4. How functional properties of excipients are evaluated? Explain. [10]

OR

5. What are co-processed excipients and explain methods for their preparation? Mention their advantages compared to common excipients. [10]

6. Mention the names of methods and their relative advantages for microcapsules preparation. Explain coacervation-phase separation method with suitable example. [10]

OR

7. Mention the significance of in process quality control tests and write about in process quality control tests for tablets with their limits of acceptance. [10]

8. Write about formulation additives used in the manufacture of hard gelatin capsule. [10]

OR

9. Explain the process of soft gelatin capsule manufacture by rotary die process. [10]

10. What are the advantages of optimization in formulation development and explain the optimization parameters useful in the development. [10]

OR

11. Write about the following:
a) Placket Burman method
b) Simplex methods. [5+5]

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Code No: 6803AA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, September/October-2025
APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Discuss the role of animal models in bioavailability studies. [5]
b) What is hepatic clearance? What are the factors affecting hepatic clearance of a drug? [5]
c) Explain Zero order and First order absorption Models. [5]
d) What is the difference between linear and non-linear pharmacokinetics? [5]
e) State the principles of Chronopharmacokinetics. [5]

PART - B (50 Marks)

2. Derive an equation to calculate K_a and K_E by using method of residual. [10]

OR

3. Explain AUC. What is its significance? How will you measure it? [10]

4. Derive the disposition equation of a drug following one compartment open model IV bolus administration. [10]

OR

5. Derive expressions for the calculation of $C_{ss,min}$, $C_{ss,max}$ and dosing interval in case of multiple dosing of a drug. [10]

6.a) Mathematically, show that Michaelis-Mention kinetics may describe a zero-order and/or a first-order process.
b) Theophylline was administered to a patient at dosing rates of 600 mg/day and 1.2g/day and the respective steady state concentration were found to be 9.8 mg/L and 28.6mg/L. Find V_{max} and K_m. Determine the dosing rate to achieve a C_{ss} of 15mg/L. [5+5]

OR

7.a) Half-life of oxacillin is 0.5 hours and 30% available dose is excreted unchanged in urine while the rest undergoes biotransformation.
i) What is the constant for biotransformation?
ii) Find out $t_{1/2}$ if renal function is decreased by 50%.

b) What is the equilibrium plasma level of digitoxin when 0.5 mg is administered each day? Assume that 55% of the dose is absorbed. V_d is 175 litres, $t_{1/2}$ is 1.6 days. [5+5]

8.a) What is meant by non-liner pharmacokinetics? What causes non-linear pharmacokinetic behavior of drugs?

b) Write short note on Caternary model and mammillary model. [5+5]

OR

9. Write a note on altered pharmacokinetic in the hepatic failure patients. [10]

10. What do you mean by pharmacokinetic drug interaction and what is it's significance in combination therapy? [10]

OR

11.a) State the reasons for Chronopharmacokinetics.

b) Explain the chronopharmacokinetics of antibiotics giving suitable examples. [4+6]

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Code No: 6803AA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, March/April - 2025
APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Write a note on Flip-Flop model. [5]
b) What is renal clearance? Discuss the factors affecting renal clearance. [5]
c) Discuss various types of compartment models. [5]
d) What are the characteristics of drugs with relevant graphs that show non-linear pharmacokinetics? [5]
e) A drug solution has a half-life of 21 days. Assuming that the drug undergoes first-order kinetics, how long will it take for the potency to drop to 90% of the initial potency? [5]

PART - B (50 Marks)

2. How can you develop in vitro in vivo correlation in case of solid dosage form? [10]

OR

3.a) Discuss the regulatory requirements for conduction of bioequivalence study.
b) Write the Neat protocol for bioequivalence study. [5+5]

4. Derive expression for the calculation of C_{ss} in one compartment open model IV Infusion. [10]

OR

5. Derive the disposition equation of a drug following one compartment open model IV bolus administration. [10]

6. How would you use Wagner-Nelson method for calculating absorption rate constant? What are the advantages of this method? [10]

OR

7.a) Derive the first order kinetic equation and determine the biological half-life.

b) The biological half-life for the first order of photolysis of Cefotaxime solution containing 150 mg drug is 50 mins.

i) How long will it take for the drug to decompose to 20% of its original amount?

ii) If 1 ml aliquot taken after 90 mins of exposure to light was formed to contain 0.43 mg of Cefotaxime, what was the original volume of the solution? [5+5]

8.a) Why clinical results of sustain release oral dosage forms are not up to expectations?

b) What are the cases of non-linearity in pharmacokinetic behavior? [6+4]

OR

9.a) Define altered pharmacokinetics.

b) Give possible reasons for altered pharmacokinetics in pediatrics. [3+7]

10. What is elimination? Discuss in brief about the pathways of drug metabolism with suitable examples. [10]

OR

11.a) Explain TES.

b) State the importance of chronopharmacokinetics study using the example of NSAIDs. [2+8]

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Code No: 6803AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, September/October-2025
ADVANCED PHYSICAL PHARMACEUTICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART – A

(25 Marks)

1.a) Write the application of polymers in pharmaceutical dosage forms. [5]
b) Discuss about the Heckel plot in tablet compression. [5]
c) What is photodecomposition and how to stabilize pharmaceutical dosage forms against photodegradation? [5]
d) Discuss the rheological properties of dispersion systems. [5]
e) Give a short note on solubilization by the use of surfactant. [5]

PART – B

(50 Marks)

2. Discuss the properties and characterization of polymers used in controlled drug delivery systems. [10]

OR

3. What are mucoadhesive drug delivery systems and add a note on polymers used in mucoadhesive systems. [10]

4. Define compression and consolidation. Explain the process involved in tablet compression. [10]

OR

5. Explain the following:
a) Distribution of forces in compaction.
b) Force volume relationship. [5+5]

6. Enumerate various factors influencing the stability of pharmaceutical dosage forms. [10]

OR

7.a) How do you evaluate the physical stability of pharmaceutical products?
b) Discuss the importance and strategy of stability testing of dosage form. [5+5]

8. Explain the advantages, disadvantages, instrumentation and applications of Differential Scanning Calorimetry with a neat labeled diagram. [10]

OR

9. Write a note on following:
   a) Creep measurement
   b) Origin of X-rays and their applications. [5+5]

10. Explain the influencing of complexation and drug derivatization in improving the solubility. [10]

OR

11. Discuss various dissolution equipments and their working for studying drug release from pharmaceutical dosage forms. [10]

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Code No: 6803AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, March/April - 2025
ADVANCED PHYSICAL PHARMACEUTICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Describe in detail characterization of polymers. [5]
b) Explain about distribution of forces during tablet compression with diagrams and equations. [5]
c) Describe accelerated stability testing of solution and solid dosage forms. [5]
d) Explain drug excipient compatibility studies with examples using DSC. [5]
e) Describe drug derivatization and solid-state manipulation with examples. [5]

PART - B (50 Marks)

2. Discuss in detail about the mechanism of biodegradation of polymers. Add a note on their applications. [10]

OR

3. Classify different types of polymers. Mention the properties of different types of biodegradable polymers. [10]

4. What is compaction profile? Explain the phases of compaction profile with a suitable example. Write the applications of force displacement curves of tablet compression. [10]

OR

5. Write the Heckel equation and draw the Heckel plots for determination of Porosity of tablet during compression process. [10]

6. Explain the photo degradation and it's testing procedure. Add a note on Solid state decomposition. [10]

OR

7. Write in detail about the first order and zero order kinetics. Mention the expression for half-life and shelf life. [10]

8. Explain the instrumentation and application of DSC. Write in detail about Oscillatory testing and Creep measurement. [10]

OR

9. Discuss the principle and instrumentation of X-ray diffraction. Add a note on interpretations. [10]

10. Explain the concept Solubility and solubilization of non-electrolytes. Add a note on Surfactants and Complexation with examples. [10]

OR

11. Write the mechanism of drug release in reservoir type of drug delivery systems. Give a note on dissolution equipment. [10]

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Code No: 6803AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, March - 2024
ADVANCED PHYSICAL PHARMACEUTICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Enlist the various applications of polymers in pharmaceutical formulations. [5]
b) Enumerate in detail the effect of friction in compaction process. [5]
c) Explain in brief about complex order reactions. [5]
d) Discuss the rheological properties of semi-solids. [5]
e) Discuss the importance of surfactants in enhancing the solubility of drug. [5]

PART - B

(50 Marks)

2.a) Discuss in brief the various methods involved in characterization of a polymer.
b) Explain the concept of transdermal systems. Enumerate in brief the role of polymers in transdermal systems. [5+5]

OR

3. Explain in detail the concept of Hydrodynamically balanced system and write the applications of polymers in Hydrodynamically balanced systems. [10]

4. Discuss in detail about compacrion profiles. Write a note on various energies involved in compaction process. [10]

OR

5.a) Write a note on Heckel plots.
b) Explain in brief about various compression pressure-QA parameters. [5+5]

6.a) Explain in brief about photodecomposition with examples. Explain its preventive measures.
b) Write a note on method of accelerated stability testing in dosage forms. [5+5]

OR

7.a) Discuss the various methods of stabilization of drug products against hydrolysis and oxidation reactions.
b) Explain the solid-state decomposition with examples. [5+5]

8.a) Explain in detail the principle, instrumentation and thermal transitions of X Ray Diffraction.

b) Write a note on interpretation of DSC thermograms. [5+5]

OR

9. With the help of neat labelled diagram, explain the principle and working of Creepe measurements. [10]

10.a) Explain the concept of sink conditions in dissolution.

b) Explain in brief about Peppas model. Enumerate its significance in drug release study. [5+5]

OR

11. Explain in detail the various mechanism of drug release during drug diffusion studies. [10]

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Code No: 6803AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, August/September - 2023
ADVANCED PHYSICAL PHARMACEUTICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Define 'polymer' and write about classification of polymers. [5]
b) Write a brief note on 'compression and consolidation'. [5]
c) Define 'stability'. Enlist factors influencing stability and add notes on any two factors. [5]
d) Explain 'creep' and its measurement. [5]
e) Define 'solubilization'. Enlist different methods. Write about use of surfactants. [5]

PART - B

(50 Marks)

2. Give an account on 'bio degradable polymers and their uses'. Explain the mechanism of biodegradation. Write notes on preparation of polymer solutions. [10]

OR

3. Enlist different polymer characteristics and explain them. Write notes on 'phase separation'. [10]

4. Write about the 'compression and consolidation' under high load, distribution of forces in compaction and effect of friction. [10]

OR

5. Draw a typical 'compression profile' and explain. Explain different types of heckel plots. [10]

6. Explain 'order of reaction'. Write about the zero order, first order and second order reactions with examples. [10]

OR

7. Write notes on 'photodecomposition' and solid state decomposition with examples. Add notes on methods of stabilization. [10]

8. Write a detailed note on characterization of any API and its interaction with any excipient by using DSC. [10]

OR

9. Write about the principle, advantages and disadvantages of using XRD spectra in characterization of API. [10]

10. Explain 'solubility and solubilization' of non-electrolytes. Write about the solubilization by co-solvents, complexation and drug derivatization. [10]

OR

11. Explain 'dissolution' and its importance. Enlist different types of dissolution apparatus. Write notes on USP-II and USP-III dissolution apparatus and their usage. [10]

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Code No: 6803AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, March/April - 2025
DRUG REGULATORY AFFAIRS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Describe the process of clinical trials approval in India under Schedule Y. [5]
b) How do Quality Assurance and Quality Control contribute to in-built product quality? [5]
c) Explain the key regulatory agencies governing drug product design, manufacture, and distribution in the USA and Brazil. [5]
d) Describe the requirements for retention samples and their role in quality assurance. [5]
e) Outline the major steps involved in product filing and responding to regulatory deficiencies in drug submissions. [5]

PART - B

(50 Marks)

2.a) Explain the specific requirements and conditions for loan license.
b) Explain the specific requirements and conditions for contract license. [5+5]

OR

3. Discuss the process of obtaining various drug-related licenses in India, including test licenses, import licenses, and manufacturing licenses for drugs and APIs. [10]

4.a) What are the key elements of HVAC systems in pharmaceutical manufacturing facilities?
b) Describe the importance of effluent treatment systems in pharmaceutical manufacturing. [5+5]

OR

5. Discuss the ICH Q8-Q10 guidelines, emphasizing their role in pharmaceutical quality systems. [10]

6.a) What are the major quality control and drug analysis regulations applicable to pharmaceuticals in developed countries?
b) Compare the regulatory requirements for pharmaceutical manufacturing in the USA and Brazil. [5+5]

OR

7. Explain the Hatch-Waxman Act in detail, covering its impact on patent protection, generic drug approval, and market exclusivity. [10]

8.a) What are the essential distribution record-keeping requirements for pharmaceuticals?
b) Explain the safety and quality regulations for herbal products in India. [5+5]

OR

9. Discuss the documentation requirements and regulatory guidelines for handling complaints and product recalls in the pharmaceutical industry. [10]

10.a) What is the role of the USFDA in drug regulation and approval?
b) Explain the function of the EMA in regulating pharmaceutical products. [5+5]

OR

11. Explain the final approval procedure for a drug, including preparation, review, and submission of a Drug Master File to different global regulatory authorities. [10]

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R22

Code No: 6803AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy I Semester Examinations, March/April – 2025

PHARMACEUTICAL VALIDATION

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) What is qualification and mention the user requirement specification for it. [5]

b) Write in brief the qualification of pH meter. [5]

c) Describe the qualification of tap density tester and hardness tester. [5]

d) Explain the role of HPLC and MS in cleaning validation of pharmaceutical manufacturing apparatus. [5]

e) Discuss about general planning and design of validation studies. [5]

PART - B

(50 Marks)

2. Elaborate on various aspects of validation master plan. Add a note on streamlining of validation processes. [10]

OR

3.a) Discuss in brief of qualification of manufacturing equipment.

b) Write a note on installation qualification. [6+4]

4. Discuss the procedure involved in the qualification of FTIR. [10]

OR

5. Explain the qualification of volumetric flask, pipette, measuring cylinder, and beakers. [10]

6. How will you perform validation of the water system and pure steam? [10]

OR

7. Discuss briefly the procedure involved in the qualification of HVAC system. [10]

8. Discuss various aspects of validation of analytical method used in cleaning. [10]

OR

9. Explain the general procedure involved in cleaning facilities for the manufacturing of parenteral. [10]

10. Discuss various aspects of precision and linearity parameters as per ICH guidelines for the assessment of active pharmaceutical ingredients. [10]

OR

11. Explain the procedure for the validation of manufacturing facilities meant for solid orals. [10]

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Code No: 6603AH

R19

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, September/October - 2025
STABILITY OF DRUGS AND DOSAGE FORMS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Give the mechanisms of oxidation pathway. [5]
b) Explain the kinetics of solid state decomposition. [5]
c) Give the principle of SPE and mention its applications in the extraction of biologicals. [5]
d) Mention the requirements of stabilizers for cosmetics as per Indian Standard Specifications. [5]
e) How the absence of lead is tested in lipsticks? [5]

PART - B

(50 Marks)

2. Write about photolytic reactions of pharmaceutical interest and explain the methods for their prevention. [10]

OR

3. Explain the methods for prevention of hydrolysis and acyl transfers with suitable examples. [10]

4. What are the problems of physical stability of nano carriers and discuss methods for their stabilization against physical degradation. [10]

OR

5. Explain the methods for studying drug-excipient interactions in physical state. [10]

6. Write about methods for quantitative determination of preservatives and stabilizers pharmaceutical formulation. [10]

OR

7. Explain the method of LLE for biological samples and mention its advantages. [10]

8. Write about maximum authorized concentration of different classes of chemicals in cosmetics as per BIS norms. [10]

OR

9. Explain the BIS standards for skin care products. [10]

10. Explain the quality control tests for baby products. [10]

OR

11. Explain methods for compatibility testing of containers. [10]

Code No:6803AH

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy I Semester Examinations, March - 2024

STABILITY OF DRUGS AND DOSAGE FORMS

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Explain the Acyl transfer reaction with an example. [5]

b) Write about Microbial decomposition of Pharmaceutical dosage forms. [5]

c) Write about the factors affecting extraction of drugs from biological fluids. [5]

d) Write about BIS requirements of a Mouth wash. [5]

e) Write about ICH guidelines for Accelerated Stability testing of dosage forms. [5]

PART - B **(50 Marks)**

2. Explain about the hydrolytic decomposition of the Pharmaceutical product with examples and protection against hydrolysis. [10]

OR

3. Write about the oxidative pathways of pharmaceutical interest with examples. [10]

4. Write about drug – excipient and drug – drug interactions in solid dosage forms. [10]

OR

5. Explain about physical stability testing of Nano particles. [10]

6. Write about the selection of biological sample for drug analysis. [10]

OR

7. Explain about spectroscopic determination of Propyl gallate. [10]

8. Write about BIS standards related to the coloring agents used in cosmetics. [10]

OR

9. Write about BIS specifications in detail about Hair dyes. [10]

10. Write about BIS specifications in detail for Shampoos. [10]

OR

11. Write about skin and eye irritation Assessment of cosmetic products. [10]

Code No: 6803AH

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, September - 2024
STABILITY OF DRUGS AND DOSAGE FORMS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Write about the kinetics of photolysis. [5]
b) Explain the method for testing the microbial decomposition of disperse systems. [5]
c) Write about identification tests used for preservatives. [5]
d) Briefly explain the test for heavy metals in cosmetics. [5]
e) Explain the consistency test for lipsticks. [5]

PART - B (50 Marks)

2. Write about stages of oxidation pathway. Discuss the approaches for preventing the oxidative pathway and methods for protection against oxidation. [10]

OR

3. Explain the mechanism of hydrolysis in pharmaceutical products and discuss methods for its prevention. [10]

4. What are the physical stability problems of novel drug carriers and explain the methods for physical stability evaluation. [10]

OR

5. Giving examples for solid state decomposition explain the kinetics of solid state decomposition. [10]

6. Explain the methods for quantitative determination of antioxidants. [10]

OR

7. Write about factors effecting extraction of drugs from biological samples and explain the application of SPE for the same with suitable example. [10]

8. Give the testing of baby cosmetics as per Indian Standard Specifications. [10]

OR

9. Explain the safety tests for cosmetics as per Indian Standard Specifications. [10]

10. Explain the toxicity testing of cosmetics. [10]

OR

11. Explain the compatibility testing of containers and closures for cosmetics. [10]

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Code No: 6803AH

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, August/September - 2023
STABILITY OF DRUGS AND DOSAGE FORMS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Give the mechanisms of photolysis. [5]
b) What are the stability problems of nano particles and how to prevent them? [5]
c) Give the principle of LLE and mention its applications. [5]
d) Mention the requirements of colorants for cosmetics as per Indian Standard Specifications. [5]
e) How tooth pastes are tested for chlorate levels? [5]

PART – B

(50 Marks)

2. Explain the pathways and kinetics oxidation. How pharmaceuticals are protected from oxidation. Explain. [10]

OR

3. What are the problems of hydrolysis in the stability of pharmaceutical products? Explain methods for stabilization of pharmaceutical products against hydrolysis with suitable examples. [10]

4. Explain the physical stability testing protocol for disperse systems. [10]

OR

5. Give examples for solid state decomposition of drugs and explain methods for studying the solid state decomposition. [10]

6. Enumerate the factors influencing the extraction of biologicals. Name the methods suitable and mention their relative merits. [10]

OR

7. Give the characteristics for membranes used for filtration. Explain the process of membrane filtration. [10]

8. Explain the BIS standards for dental products. [10]

OR

9. Write about BIS requirements for preservatives and antioxidants. [10]

10. Explain the cGMP guidelines for cosmetics. [10]

OR

11. Explain methods for compatibility testing of closures. [10]

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R22

Code No: 6803AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, September/October-2025
RESEARCH METHODOLOGY AND IPR
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Explain the various characteristics of a good research problem. [5]
b) Define plagiarism and explain why it is considered a serious academic offense. [5]
c) Discuss on various criteria for technical writing. [5]
d) Describe the term Trade and Copyright with suitable. [5]
e) Explain the administration of patent system. [5]

PART - B **(50 Marks)**

2. Describe the various sources of research problem and examine the role of necessary instruments in data analytics. [10]

OR

3. Explain various approaches of investigation for solving a research problem with suitable example. [10]

4. How can technology like plagiarism detection software be used effectively to prevent plagiarism, while also considering its limitations? [10]

OR

5. Describe the ethical issues related to data sharing in research, including the importance of data privacy, informed consent regarding data usage and potential risks of misuse. [10]

6. Explain the methodology in formatting a research proposal and elements of a research proposal. [10]

OR

7. Describe the key aspects in the assessment of research proposal by a review committee. [10]

8. Describe the procedure for grants of patents with suitable examples. [10]

OR

9. Describe briefly on the exclusive rights of a patentee, add a note on patent infringement. [10]

10. Explain various new developments in IPR and role of AI in research and IPR. [10]

OR

11. Discuss on IPR of biological systems and computer software. [10]

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Code No: 6803AJ

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, March/April - 2025
RESEARCH METHODOLOGY AND IPR
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Explain how data analysis and interpretation find solutions for research problems. [5]
b) Describe the importance of ethics in research. [5]
c) Describe the scope of technical writing. [5]
d) Describe the term Trade and Copyright with suitable. [5]
e) Write scope of Patent Rights. [5]

PART - B **(50 Marks)**

2. Explain errors in selecting a research problem. [10]

OR

3. Discuss on the Scope and objectives of research problem. [10]

4. Discuss the different types of plagiarism, providing examples for each category (e.g., direct plagiarism, accidental plagiarism, self-plagiarism. [10]

OR

5. Explain the various aspects of effective literature review. [10]

6. Describe the key aspects in developing a research proposal. [10]

OR

7. Describe the methodology on report writing. [10]

8. Explain PCT in brief. [10]

OR

9. Explain the procedure involved in granting international patent. [10]

10. Discuss IPR and IITs in detail. [10]

OR

11. Explain the Licensing and transfer of technology. [10]

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Code No: 6803AJ

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy I Semester Examinations, August/September - 2023
RESEARCH METHODOLOGY AND IPR
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) List out the importance of research problem. [5]
b) Write a note on the importance of literature review. [5]
c) Write a detailed note on the duty of review committee. [5]
d) Write a note on patenting under PCT. [5]
e) Write a detailed note on the scope of Patent Rights. [5]

PART - B

(50 Marks)

2. Write a note on the following:
a) Analysis and interpretation of data
b) Sources of research problem. [5+5]

OR

3. Write a detailed note the scope, objective and errors in selecting research problem. [10]

4. What do you mean by Plagiarism? Write a note on its importance and how to avoid Plagiarism. [10]

OR

5. Write a note on the following:
a) Effective literature studies approaches
b) Ethics in research [5+5]

6. Summarize in detail the format of writing a research proposal. [10]

OR

7. List out the stepwise procedure in paper developing a research proposal. [10]

8. Explain in detail the process of patenting and its development procedure. [10]

OR

9. Write a note on the following:
a) International cooperation on Intellectual Property
b) Patent designs. [7+3]

10. Write a note on the following:
a) Licensing and transfer of technology
b) Patent information and databases. [5+5]

OR

11. Summarize in detail the IPR of Biological Systems and its importance. [10]

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Code No: 6803AJ

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy I Semester Examinations, March - 2024

RESEARCH METHODOLOGY AND IPR

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) What is research and how the problem of research in pharmacy will be identified? [5]

b) Discuss the role of Chemical Abstracts in literature survey. [5]

c) Give the basic outline for format of research proposal. [5]

d) What is PCT and mention its significance. [5]

e) Write about geographical indications and give two examples. [5]

PART - B (50 Marks)

2. Give the criteria and characteristics for a good research problem. Discuss the solutions for avoiding errors while selecting the research problem with suitable example. [10]

OR

3. Explain the approaches for collection of data for research problem. [10]

4. What different abstracting services are suitable for literature search in pharmacy? Explain them. [10]

OR

5. How to analyze the literature search for originating the research problem? Discuss. [10]

6. Explain the approaches for effective technical writing. [10]

OR

7. Explain the methods for preparation of successful presentation of research proposal before the review committee. [10]

8. Explain the procedure for grant of patent as per Indian Patents Act. [10]

OR

9. Write about patentable and non-patentable inventions with suitable examples. [10]

10. Write about the following:
a) Licensing and transfer of technology
b) IPR of biological systems. [5+5]

OR

11. Explain the administration of patent system in India. How it is different from international scenario? [10]

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Code No: 6803AV

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, September - 2025
MODERN PHARMACEUTICS – II
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Write briefly about SUPAC guidelines for scale up. [5]
b) Write a note on advances in production techniques for parenteral dosages form. [5]
c) Mention the requirements for aerosol containers. [5]
d) Name the ingredients and their use required for sun screen lotions. [5]
e) Write about culture media with their specific incubation conditions for Gram negative organisms. [5]

PART - B

(50 Marks)

2. Explain the steps in the technology transfer from R&D plant to pilot scale for tablets with suitable example. [10]

OR

3. Define scale up technique. Explain the critical variables to be monitored in the size reduction and blending during scale up. [10]

4. Describe different advanced filling machines and sterilizers used in the formulation of parenteral dosages form. [10]

OR

5. Discuss in detail about formulation additives involved in the development of parenteral dosages form. [10]

6. What are aerosols? Write about types of systems used in formulations of aerosols. [10]

OR

7. Write about manufacture and quality control aspects of metered dose inhaler. [10]

8. Briefly explain role of nutraceuticals in cancer prevention and cardio vascular disorders. [10]

OR

9. Describe the method of manufacturing, labeling and Q.C. of anti-ageing products. [10]

10. Write in detail about air handling systems for parenteral products. [10]

OR

11. Discuss about microbiological testing of water and air. [10]

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R22

Code No: 6803AV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, March - 2025
MODERN PHARMACEUTICS - II
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Define Scale up. Give its significance in pharmaceutical manufacturing. [5]
b) Define parenteral dosage form. Discuss the process of dry heat sterilization. [5]
c) Enumerate the concept of selection of container for aerosol formulations. [5]
d) Discuss the quality control test for fairness cream. [5]
e) Write a note on microbial environmental monitoring. [5]

PART - B **(50 Marks)**

2.a) Write a note on technology transfer from R&D to pilot plant.
b) Discuss the scale-up process for coating of tablets. [5+5]

OR

3.a) Write a note on equipment selection for formulation of suspension.
b) Discuss the pilot scale considerations for layout design. [5+5]

4. Write a detailed note on product layout for parenteral preparations. [10]

OR

5.a) Discuss in detail about machines used for filling the parenterals.
b) Write a note on filtration and gaseous method of sterilization. [5+5]

6. Enumerate in detail the advances in propellants for aerosol formulations. [10]

OR

7. Discuss in detail the concept and significance of metered dose inhaler designers. [10]

8.a) Write a note on formulation approaches and quality control for anti-ageing Products.
b) Discuss in brief the role of nutraceuticals in cancer prevention. [5+5]

OR

9.a) Discuss the general and specific properties of glucosamine.
b) Write a note on method of manufacturing and labeling of sun screen lotion. [5+5]

10.a) Discuss the protocol for microbiological testing of water.
b) Enumerate in detail about theoretical evaluation of aseptic operations. [5+5]

OR

11.a) Define air handling systems. Describe the concept of Air Handling Unit (AHU).
b) Discuss in brief the various strategies involved in contamination control process. [5+5]

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Code No:6803AV

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, September - 2024
MODERN PHARMACEUTICS - II
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) What is coating? Explain the scale-up of the coating process. [5]
b) Write a note on non aqueous solvents used in parenteral dosage forms. [5]
c) Discuss about ozone friendly propellents used aerosols. [5]
d) Explain the formulation approaches of anti-ageing products. [5]
e) Outline the contamination control and incubation conditions in the aseptic process. [5]

PART - B (50 Marks)

2. Describe the steps involved in pilot plant considerations for semisolids. [10]

OR

3. Write a note on the scale-up process of compression and liquid-liquid mixing. [10]

4. What is sterilization? Elucidate the agents used in gaseous sterilization. [10]

OR

5. Discuss the product layout for the production of parenterals. [10]

6. Give a note on quality control testing of pharmaceutical aerosols. [10]

OR

7. Discuss the principle of drug deposition, formulation and evaluation of dry powder inhalers. [10]

8. Write the formulation, preparation method and quality control of fairness creams. [10]

OR

9. Describe the manufacture, general and specific properties of glucosamine. [10]

10. What is an aseptic condition? Discuss the characterization of the aseptic process. [10]

OR

11.a) Explain the microbiological testing of air.

b) Describe the microbial environment monitoring in the aseptic process. [5+5]

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Code No: 6803AV

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy II Semester Examinations, March - 2024

MODERN PHARMACEUTICS - II

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Write about Technology transfer from Pilot plant to Pilot scale. [5]

b) Write about product layout of Parenteral dosage form. [5]

c) Write about manufacturing method of Aerosols. [5]

d) Write briefly the role of nutraceuticals in Cancer prevention with the examples. [5]

e) Explain about microbial environmental monitoring during aseptic processing. [5]

PART - B (50 Marks)

2. Explain about design and layout of Pilot plant Scale up study including personnel required and equipment selection for tablets. [10]

OR

3. Explain about Scale up of Capsules regarding various unit operations like size reduction, mixing , blending and granulation. [10]

4. Explain about various ingredients including advanced materials used in Parenteral dosage forms. [10]

OR

5. Explain about liquid filling machines for Parenterals include advancement in the liquid filling machines. [10]

6. Explain about metered dose inhaler designs. [10]

OR

7. Write about quality control tests of Aerosols. [10]

8. Write about preparation, labelling and Quality control of Sunscreen lotions. [10]

OR

9. Explain the source, manufacture and analysis of glucosamine. [10]

10. Write about the microbiological testing of water. [10]

OR

11. Explain about AHUS and humidity control in Aseptic Processing operation. [10]

Code No: 6803AV

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, August/September - 2023
MODERN PHARMACEUTICS – II
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Define and explain the importance of scale up technique. [5]
b) Give the principle and advantages of moist heat and radiation sterilization. [5]
c) Give the properties required for propellants in aerosol. [5]
d) Explain the role of nutraceuticals in cancer prevention. [5]
e) Describe the principle of humidity control. [5]

PART - B

(50 Marks)

2. Define pilot plant. Write down the general consideration of steps in pilot plant for a thermolabile drug. [10]

OR

3. Describe the scale up process involved in tablet coating. [10]

4. Enumerate the sterilizers used for parenteral products. [10]

OR

5. Explain the production techniques for parenteral products. [10]

6. Discuss the formulation aspects in aerosols formulation. [10]

OR

7. Explain the quality control tests for aerosols with limits of acceptance criteria. [10]

8. Discuss the formulation approaches and method of manufacturing of fairness cream. [10]

OR

9. Explain the manufacture and analysis of glucosamine and cartinine. [10]

10. Define aseptic technique. Discuss the theoretical evaluation of aseptic operations. [10]

OR

11. Discuss the various environmental monitoring methods. [10]

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R22

Code No: 6803AW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy II Semester Examinations, September - 2025

ADVANCED DRUG DELIVERY SYSTEMS

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Outline the key factors influencing the pharmacodynamics of controlled drug delivery systems. [5]

b) Discuss the fabrication and evaluation of implantable therapeutic systems. [5]

c) Discuss the molecular biology approaches used in targeting drugs to specific sites in the body. [5]

d) Discuss the role of microspheres in controlled drug delivery. What are the methods used to evaluate their performance? [5]

e) Discuss the use of nanoparticles in overcoming the blood-brain barrier for drug delivery. [5]

PART - B **(50 Marks)**

2.a) Explain the pharmacodynamic basis of controlled drug delivery systems.

b) Compare and contrast controlled drug delivery systems with conventional drug delivery. [5+5]

OR

3. Describe the steps involved in the design and fabrication of controlled release oral drug delivery systems. What are the key evaluation parameters? [10]

4.a) Outline the design considerations for vaccine delivery systems.

b) Discuss the challenges associated with the biocompatibility of implantable systems. [5+5]

OR

5. Describe the mechanism of drug release in transdermal delivery systems. How are these systems evaluated for their effectiveness? [10]

6.a) Describe the mechanism of drug delivery using bioadhesive systems.

b) What are the advantages and limitations of using bioadhesive systems for drug delivery? [5+5]

7. Discuss the strategies involved in nasal drug delivery. How does nasal drug delivery differ from other systemic delivery routes? [10]

OR

8.a) Describe the preparation and application of liposomes in drug delivery.
b) What are the key factors affecting the stability and drug release of liposomes? [5+5]

OR

9. Discuss the design, fabrication, and evaluation of microspheres as a drug delivery system. What are the key challenges associated with microspheres? [10]

OR

10.a) Explain the physiological challenges associated with drug delivery to the lungs.
b) Discuss the strategies used to overcome these challenges in pulmonary drug delivery systems. [5+5]

OR

11. Describe the methods used for targeting drugs to the brain. What are the major problems encountered in brain-targeted drug delivery? [10]

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19AN

Code No: 6803AX

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, March - 2025
INDUSTRIAL PHARMACY
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Explain 'Milling'. Write about structure and operation of 'Roller mill'. [5]
b) Explain 'qualification of equipment'. Add notes on IQ and its importance. [5]
c) Write a note on Good manufacturing practices. [5]
d) Define 'effluent' and write about effluent analysis by taking an example. [5]
e) Explain 'validation'. Add notes on retrospective validation. [5]

PART - B

(50 Marks)

2. Write about granulation, both wet and dry methods by taking suitable examples. Add notes on the instrumentation used for granulation. [10]

OR

3. Write about the theory of drying, construction and operation of a granule dryer. [10]

4. Describe in detail the large scale production of tablets. [10]

OR

5. Describe the procedure involved in production of ophthalmic products and sterile products manufacture. [10]

6. Explain 'sales force casting'. Describe the methodologies used for sales forecasting. Add notes on 'cost control' with an example. [10]

OR

7. Explain 'Total Quality Management'. Write notes on the key features of TQM and give some example companies, which follow TQM. [10]

8. Explain 'treatment of effluent'. Write a detailed account on the analysis and treatment of any effluent, form pharma industry. [10]

OR

9. Write note on the following:
a) Solid pollution and its prevention
b) Water pollution and its prevention. [5+5]

10. Write about the following:
a) Prospective validation of an emulsion manufacture.
b) Concurrent validation of a syrup manufacture. [5+5]

OR

11. Give an account on validation of capsule manufacture with a suitable example. [10]

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R22

Code No: 6803AX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy II Semester Examinations, March - 2024

INDUSTRIAL PHARMACY

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a)	Write a note on the theory of filtration. Add notes on filter media and filter aid.	[5]
b)	Write a note on pharmaceutical packaging materials for tablets. Give examples.	[5]
c)	Briefly write about 'Total quality management'.	[5]
d)	Write a note on preventive measures of water pollution.	[5]
e)	Describe importance of validation and its regulatory basis.	[5]

PART - B

(50 Marks)

2. Write about construction and operation of any two instruments used for milling operations. [10]

OR

3. Describe the principle, construction and operation of fluidized bed dryer. Add notes on the applications. [10]

4. Describe about the material of construction, and structure and operation of a multipunch rotary tablet press. [10]

OR

5. Describe about the material of construction, structure and operation of a capsule machine. [10]

6. Write notes on
   a) Inventory management and control
   b) Production and planning control. [5+5]

OR

7. Write notes on
   a) Material Management
   b) Industrial and personal relationship. [5+5]

8. Explain 'Effluent'. Write a detailed note on Effluent analysis and the methods used by taking example. [10]

OR

9. Write about air pollution and its preventive measures. [10]

10. Explain 'validation'. Describe in detail about the process validation types of a sterile injection manufacture. [10]

OR

11. Give a detailed account on the 'validation' process of tablet manufacture. [10]

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Code No: 6803AX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

R22

M. Pharmacy II Semester Examinations, August/September - 2023

INDUSTRIAL PHARMACY

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Write a note on the construction, principle and operation of a ball mill. [5]

b) Write a note on the composition, characters and uses of carbon steel and stainless steel. [5]

c) Give an account on the concept of 'total quality management' and its importance in pharma industry. [5]

d) Enlist different air pollutants and methods for controlling air pollution. Write about the 'cyclone separator. [5]

e) Write about process revalidation significance. [5]

PART - B

(50 Marks)

2. Write about the theory of 'fluidized bed dryer'. Add notes on the construction, operation and application in pharma industry. [10]

OR

3. Explain theory of 'filtation sterilization'. Write about the construction and operation of a membrane filtration unit for manufacture of parenterals. [10]

4. Describe the large scale manufacture of sterile injections for an heat sensitive and heat stable drug, using appropriate drugs, vehicles, excipients and equipment. [10]

OR

5. Write a detailed account on the needed equipment and maintenance in a GMP tablet facility. Add notes on consequence if non GMP equipment is used. [10]

6. Define 'GMP' and 'cGMP'. Enlist advantages, objectives and policies of GMP. Add notes on its role in getting regulatory approvals. [10]

OR

7. Discuss about Total Quality Management (TQM). [10]

8. Define pollution. Write about the water pollution and its pollutants. Add notes on the preventive steps. [10]

OR

9. Write about the air pollution. Enlist the causative pollutants and write about the steps to prevent. [10]

10. Explain 'validation' and its importance. Describe the validation of a capsule manufacturing process. [10]

OR

11. Explain 'process validation'. Write about concurrent, retrospective and prospective validation. Give suitable examples and provide information on the relevant conditions for such validation. [10]

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R22

Code No: 6803AY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, September - 2025
HERBAL COSMETICS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Define herbal cosmetics and classify them based on their applications. [5]
b) Outline the general principles of quality control in herbal cosmetics. [5]
c) Describe the general method of preparation for creams used in herbal cosmetics. [5]
d) Explain the physiology and chemistry of the skin in relation to cosmetic formulation development. [5]
e) Explain the role of Aloe Vera in skincare and haircare formulations. [5]

PART - B

(50 Marks)

2.a) Outline the key regulatory provisions related to the licensing of herbal cosmetics manufacturing.
b) What are the GMP requirements for the production of herbal cosmetics? [5+5]

OR

3. Discuss the challenges and opportunities in the herbal cosmetics industry, considering economic and regulatory aspects. [10]

4. Discuss the different processes used in the manufacture of herbal cosmetics, including mixing, compaction, molding, and emulsification. [10]

OR

5.a) List commonly used preservatives in herbal cosmetics and explain their role.
b) What are the functions of surfactants in herbal cosmetic formulations? [5+5]

6.a) Outline the pharmacological evaluation methods used for lipsticks.
b) What are the key pharmaceutical evaluation procedures for herbal lotions? [5+5]

OR

7. Discuss five formulations each of lipsticks and face packs, analyzing their herbal components and pharmacological effects. [10]

8. Provide a detail study of five formulations of herbal creams and lotions, including their composition and claimed benefits of herbal ingredients. [10]

OR

9.a) Outline the steps involved in the preparation of a herbal hair oil.

b) Explain how the safety of hair dyes is assessed before they are approved for market release. [5+5]

10.a) Discuss the cosmetic benefits and active components of Almond oil.

b) How is Neem used in cosmetics, and what are its key bioactive compounds? [5+5]

OR

11. Provide a detail account of Citrus aurantium peels, Liquorice, and Olive oil, including their sources, active principles, and cosmetic applications. [10]

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Code No: 6803BA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, September - 2025
NANO BASED DRUG DELIVERY SYSTEMS
(Pharmaceutics)

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

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

- **Part - A** is compulsory and consists of 5 questions, of 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Briefly describe the two marketed nanoproducts. [5]
b) Explain the principle of self-assembled structures and compare niosomes and aquasomes. [5]
c) How do nanomaterials help in the early detection and treatment of diseases? [5]
d) What should be the characteristics of a nanosystem for targeted drug delivery? [5]
e) What are the different techniques used to analyze drug release from nanoparticle-based delivery systems? Describe any one in detail. [5]

PART - B (50 Marks)

2. Who coined the term Nanotechnology and briefly explain the statement "There is plenty of room at the bottom". [10]

OR

3.a) Briefly explain the nanomaterial on the basis of its composition.
b) What are the different types of polymers used to prepare a nanosystem? [5+5]

4.a) Give the composition and importance of Critical Micelle Concentration (CMC) in the development of micelles.
b) How does varying the lipid composition in liposomes affect their stability and drug encapsulation efficiency? [5+5]

OR

5. Describe the methods employed in the synthesis of gold nanoparticles; also discuss their applications. [10]

6. Discuss the advantages of using nanotechnology products for In-vitro diagnostics and therapeutics. [10]

OR

7. Describe the concept of targeted nanomaterials for diagnostic purposes. How do nanoparticles specifically target certain cells or tissues for enhanced diagnostic imaging? [10]

8. Discuss the key design considerations for nanomaterials used in localized drug delivery, focusing on controlled release mechanisms and tissue penetration. [10]

OR

9. Critically assess the challenges and limitations of localized drug delivery systems in treating diseases like osteoarthritis or ocular conditions. [10]

10. Give the principle and techniques used for size separation. [10]

OR

11. How does the Polydispersity Index (PDI) relate to the uniformity of nanoparticles, and what is its significance in terms of their stability and quality control? [10]

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R22

Code No: 6803BA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, March - 2025
NANO BASED DRUG DELIVERY SYSTEMS
(Pharmaceutics)

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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A (25 Marks)

1.a) Give the unique properties and classification of nanomaterials. [5]
b) How do the size, charge, and hydrophobicity of block copolymers influence the self-assembly in micelle formation? [5]
c) Write a note on diagnostic tools. [5]
d) Explain the role of nanomaterials in pulmonary and nasal drug delivery systems. [5]
e) How is the stability of nanoparticles evaluated? [5]

PART - B (50 Marks)

2. Who propounded the term Nanotechnology. Briefly discuss the evolution of nanotechnology in the pharmaceutical industry, focusing on key milestones and advancements that have shaped its application in drug delivery systems. [10]

OR

3. Describe the science behind the Enhanced Permeability and Retention (EPR) effect in nanotechnology-based drug delivery, and critically assess its effectiveness in tumor targeting along with its clinical limitations. [10]

4.a) Discuss the application of aquasomes in delivering hydrophilic molecules such as proteins, peptides, and vaccines.
b) Describe the method for synthesizing polymeric nanoparticles and the factors influencing particle size and drug encapsulation efficiency. [5+5]

OR

5.a) Write a note on Niosomes and nanoemulsions.
b) Evaluate the advantages and potential limitations of transferosomes over traditional transdermal drug delivery systems. [5+5]

6.a) Explain how quantum dots are utilized in molecular imaging and discuss their advantages over traditional fluorescent dyes in diagnostic applications.

b) Describe the role of gold nanoparticles in *in vitro* diagnostic assays. [5+5]

OR

7. Explain the use of nanoparticle-based biosensors in detecting disease biomarkers. Explain how the sensitivity of biosensors is improved using nanomaterials. [10]

8. Discuss the difficulties in optimizing nanomaterial formulations for nasal delivery to ensure both effective absorption and safety. How can it be used for delivery to brain. [10]

OR

9. Evaluate the challenges in achieving selective tumor targeting with nanomaterials, considering the tumor microenvironment and heterogeneity. Also explain active and passive targeting to cancers. [10]

10.a) How do nanotechnology-based drug delivery systems achieve controlled release, and what factors impact release of active from these systems?

b) Explain the principles behind Dynamic Light Scattering (DLS) and its role in determining the size and PDI of nanoparticles. How do variations in the refractive index affect the results? [5+5]

OR

11.a) Evaluate the importance of stability in nanoparticle formulations for drug delivery, and how do environmental factors like temperature and pH impact nanoparticle integrity over time?

b) Describe the key methods for analyzing drug encapsulation efficiency in nanoparticles. [5+5]

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Code No: 6803BA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, August/September - 2023
NANO BASED DRUG DELIVERY SYSTEMS
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Write definition and history of nanotechnology. [5]
b) Enumerate all methods of synthesis of nanoparticles and explain one method. [5]
c) Write one method where nanoparticles are used for diagnosis. Explain their importance. [5]
d) Explain nano materials use for respiratory drug delivery system. [5]
e) Write PDI importance and how that in determined. How can rectify? [5]

PART - B

(50 Marks)

2. Write in detail unique properties and their importance for nano materials. [10]

OR

3. List out five nano based material formulation and write science behind them. [10]

4. Write different methods of synthesis of gold and magnetic nanoparticles. [10]

OR

5. Write different methods of synthesis of liposomes. [10]

6. Write different targeted nano materials for brain diagnosis and treatment. [10]

OR

7. Write different targeted nano materials for lungs diagnosis and cancer diagnosis. [10]

8. Write the design and drug delivery to cancer therapy. [10]

OR

9. Write the design and drug delivery to congestive heart failure. [10]

10. Write the characterization of nano materials by size and size reduction. [10]

OR

11. Write different methods used for study of drug release of nano materials. [10]

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R22

Code No: 6803BB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Pharmacy II Semester Examinations, March - 2025

NUTRACEUTICALS

(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Define nutraceuticals and classify them with examples. [5]
b) Write the medicinal benefits of resveratrol. [5]
c) Describe the damaging effects of free radicals on nucleic acids. [5]
d) Explain the role of free radicals in the pathology of diabetes mellitus. [5]
e) What is HACCP? Discuss its role in food safety. [5]

PART - B **(50 Marks)**

2.a) Discuss the role of nutraceuticals in the prevention and treatment of obesity and cancer.
b) Explain the health benefits of garlic and ginseng as functional foods. [5+5]

OR

3.a) Elaborate on the sources, marker compounds, and chemical nature of flaxseeds and Spirulina.
b) Write a detailed account of the medicinal uses of soya bean. [5+5]

4.a) Explain the occurrence and health benefits of carotenoids like α-carotene and lutein.
b) Describe the characteristic features and applications of flavonoids such as rutin and catechins. [5+5]

OR

5.a) Write about the role of probiotics and prebiotics as nutraceuticals.
b) Explain the health benefits and chemical nature of phytoestrogens like isoflavones and lignans. [5+5]

6.a) Discuss the methods used for measuring free radicals, including lipid peroxidation products.
b) Explain the damaging effects of free radicals on proteins and carbohydrates. [5+5]

OR

7.a) Describe the production and reactive nature of free radicals in cells.
b) Describe the strategies for measuring free radical production. [5+5]

8.a) Discuss the role of endogenous antioxidants like catalase and superoxide dismutase.
b) Write a note on synthetic antioxidants such as Butylated Hydroxytoluene (BHT). [5+5]

OR

9.a) Explain the free radical theory of aging.
b) Discuss the involvement of free radicals in muscle and kidney damage. [5+5]

10.a) Elaborate on food adulteration and its impact on consumer safety.
b) Explain the importance of label claims and dietary supplement claims in the nutraceutical industry. [5+5]

OR

11.a) Discuss the FDA regulations on food safety.
b) Write a note on AGMARK and its significance. [5+5]

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R22

Code No: 6803BC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy II Semester Examinations, September - 2025
CLINICAL RESEARCH AND PHARMACOVIGILANCE
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a) Summarize the ethical guidelines for biomedical research involving human participants. [5]
b) Explain the key differences between cohort and case-control studies. [5]
c) Discuss the importance of a Clinical Study Report in a clinical trial. [5]
d) Describe the WHO international drug monitoring program. [5]
e) Explain the guidelines for ADR reporting to regulatory authorities. [5]

PART - B **(50 Marks)**

2. Describe the structure and content of an informed consent document. [10]

OR

3. Discuss the role of ICMR guidelines in clinical trials conducted in India. [10]

4. Explain the roles and responsibilities of a study coordinator in clinical trials. [10]

OR

5. Compare and contrast experimental study designs with observational study designs. [10]

6. Discuss the preparation of a clinical trial protocol with its key components. [10]

OR

7. Describe the terminologies and assessment methods for ADR severity and seriousness. [10]

8. Explain the process of establishing pharmacovigilance centers in hospitals. [10]

OR

9. Discuss the international regulatory terminologies of adverse drug reactions. [10]

10. Outline the tools used in pharmacovigilance, such as VigiFlow and Argus. [10]

OR

11. Explain the concept of targeted clinical investigations in vaccine safety surveillance. [10]

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R22

Code No: 6803BE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy III Semester Examinations, March - 2025
SCALE UP AND TECHNOLOGY TRANSFER
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A **(25 Marks)**

1.a)	Define pilot and scale up technology.	[5]
b)	Write a note on the general procedure of validation.	[5]
c)	Discuss about the four Stages of Equipment Qualification.	[5]
d)	What is prospective validation and give one example.	[5]
e)	What are the different types of industrial hazards?	[5]

PART - B **(50 Marks)**

2.a) Explain the procedure of scale up from pilot scale to large scale? Give suitable examples.
b) Write a note on the basic requirements for design, facility selection for semisolid preparations. [7+3]

OR

3.a) Describe the scaling up process for liquid orals. Give its importance.
b) Discuss the challenges encountered during the transfer of technology. [6+4]

4. What is vendor qualification? Briefly discuss the parameters that should be taken into consideration for the qualification of vendors. [10]

OR

5. Explain about the protocol and documentation of validation. [10]

6.a) Write a short note on the OQ for double cone blender.
b) Write a short note on the qualification of membrane filter. [5+5]

OR

7.a) Write note on IQ, OQ, PQ of fluidized bed dryer.
b) How do you do qualification of liquid filling machine? [7+3]

8.a) How are the mixing, granulation and drying processes validated?
b) Explain the importance of process validation with suitable examples. [6+4]

OR

9.a) Describe process validation of tablet coating.
b) Write a note on environmental control. [5+5]

10.a) Define pollution. Enlist different types of pollution.
b) Explain the reasons and preventive measures for electrical hazards in the pharmaceutical industry. [6+4]

OR

11.a) Give an account of the pharmaceutical hazard monitoring and prevention systems.
b) Write a note on industrial safety and hazards. [5+5]

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Code No: 6803BF

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Pharmacy III Semester Examinations, September - 2025
PRODUCTION AREA DESIGN AND PACKAGING DEVELOPMENT
(Pharmaceutics)

Time: 3hours **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 and consists of 5 questions, one from each unit and carrying 5 marks each.
- **Part - B** consists of 10 questions carrying 10 marks each. There will be two questions from each unit and only one should be answered.

PART - A

(25 Marks)

1.a) Explain the design considerations for manufacturing solid dosage forms in a pharmaceutical plant. [5]

b) Outline the role of HVAC systems in maintaining a controlled clean room environment. [5]

c) Compare the advantages and disadvantages of glass and metal as packaging materials. [5]

d) Define pharmaceutical stability and explain its importance in drug development. [5]

e) What are the different methods used for the inspection of injectable products? [5]

PART - B

(50 Marks)

2.a) Describe the importance of purified water, potable water, and water for injection in pharmaceutical manufacturing.

b) What is the role of Air Handling Units (AHUs) in maintaining relative humidity and temperature control in pharmaceutical plants? [5+5]

OR

3. Discuss the significance of general utilities (e.g., water systems, air handling units) in pharmaceutical manufacturing and their role in ensuring compliance with Good Manufacturing Practices (GMP). [10]

4. Describe the documentation and record-keeping requirements in GMP, including specifications, testing procedures, master formulae, and packaging instructions. [10]

OR

5.a) What are the essential elements of batch processing records in pharmaceutical manufacturing?

b) Discuss the importance of SOPs in GMP compliance. [5+5]

6. Describe different types of packaging systems used in pharmaceuticals. [10]

OR

7. Explain the process of package development and the role of design research in pharmaceutical packaging. [10]

8.a) Describe the purpose and working of climatic cabinets in pharmaceutical stability testing.
b) What are the different pharmaceutical stability testing conditions specified by ICH guidelines? [5+5]

OR

9. Provide an overview of pharmaceutical product stability review, highlighting factors affecting stability and methods used for stability assessment. [10]

10.a) Explain the importance of packaging in the pharmaceutical industry.
b) Describe the types of packaging used for solid and semisolid pharmaceuticals. [5+5]

OR

11.a) List and explain different components used in pharmaceutical packaging.
b) What are the key considerations for packaging sterile pharmaceutical products? [5+5]

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