Code No: 283AA

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, September/October - 2025
PHARMACEUTICAL ORGANIC CHEMISTRY – II

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

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PART – A

(25 Marks)

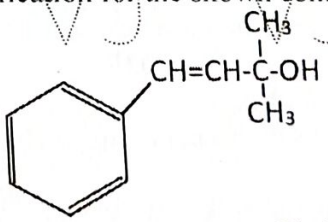
1.a) What is the formula of m-Dinitro benzene? [1]

A) (1,3)-Dinitrobenzene
B) (1,2)-Dinitrobenzene
C) (1,4)-Dinitrobenzene
D) (1,5)-Dinitrobenzene

b) ArH + ____ ——-> $ArNO_2 + H_2O$. [1]

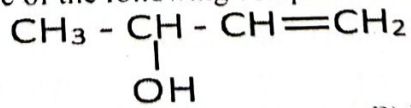
A) HNO
B) HNO_2
C) HNO_3
D) H_2NO

c) Choose the most suitable classification for the shown compound? [1]



A) Secondary alcohol
B) Allylic alcohol
C) Dihydric alcohol
D) Benzylic alcohol

d) What is the correct name of the following compound? [1]



A) But-3-enol
B) But-3-en-2-ol
C) But-1-en-3-ol
D) But-2-en-3-ol

e) Which of the following compounds is ethoxyethane? [1]

A) CH_3OCH_3
B) $CH_3OC_2H_5$
C) $C_2H_5OC_2H_5$
D) $C_2H_5OC_3H_7$

f) What is the IUPAC name of CH_3-O-CH_2-CH_2-OCH_3? [1]

A) 1,2-Dimethoxyethane
B) 1,3-Dimethoxybutane
C) 2,3-Dimethoxyethane
D) 1,4-Dimethoxypropane

g) Which among these is the simplest example for polycyclic arenes? [1]

A) Benzacephenanthrylene
B) Naphthalene
C) Pyrene
D) Dibenz-anthracene

h) Diazonium salts are primarily used for the preparation of_____substituted aromatic compounds. [1]

A) alkyl B)halogen

C) amino D) COOH

i) Cycloalkanes are associated with the general formula called _____ [1]

A) C_nH_{2n+2} B) $C_nH_{2(n+2)}$

C) C_nH_{2n+1-r} D) $C_nH_{2(n+1-r)}$

j) Identify the incorrect statement regarding cycloalkanes. [1]

A) These have sp3 hybridized carbons

B) These have tetrahedral bond angles

C) Stability of the cycloalkanes varies directly with their respective size

D) These undergo nucleophilic substitution reactions.

k) Write a short on type of bonding in benzene. [3]

l) What are Phenols? How will you differentiate phenols from alcohols. [3]

m) Write a note on cleavage of ether by acids. [3]

n) Explain the type of Polynuclear hydrocarbon. [3]

o) Write about the relative stability of Cycloalkane. [3]

PART-B

(50 Marks)

2.a) Write the mechanism of reactions of Benzene with various electrophile.

b) Write a note on orientation of second substituent in mono substitutes Benzene. [5+5]

OR

3.a) Discuss the orbital picture of Benzene and write a note about it.

b) Define Huckel, rule and explain it with example. [5+5]

4.a) Write about the basicity of Amines.

b) Explain effect of substituents on the acidic character of phenols. [5+5]

OR

5.a) Explain the preparation of phenol.

b) Explain chemical reactions of aromatic carboxylic acids. [5+5]

6.a) How is diethyl ether prepared in the Laboratory.

b) Write a note on Williamson's synthesis of ether. [5+5]

OR

7.a) How Nitrobenzene has been prepared by diazonium salt.

b) Discuss reactivity and reduction of nitrobenzene. [5+5]

8.a) Discuss three different methods of synthesis of Anthracene.

b) How can be Anthracene converted to anthraquinone and alizarine. [5+5]

OR

9.a) Write any five reactions of naphthalene.

b) Write any three methods for synthesis of Diphenyl methane. [5+5]

10.a) Write a note on Bayer's strain theory.

b) Describe about Coulson and Moffitt's modification. [5+5]

OR

11.a) Explain any four reactions of Cyclopropane.

b) Explain any four reactions of Cyclobutane. [5+5]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
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PART- A

(25 Marks)

1.a) The reagent used in bromination of benzene to give bromo benzene. [1]
A) $Br_2/FeCl_3$ B) $Cl_2/ SnCl_4$
C) $Cl_2/ AlCl_3$ D) $Cl_2/ FeCl_3$

b) Halogenation of benzene is an example of reaction. [1]
A) Electrophilic addition reaction B) Electrophilic substitution reaction
C) Nucleophilic substitution reaction D) Nucleophilic addition reaction

c) Give an example for electron releasing groups [1]
A) $-NH_2$, -OH, R, OR B) –COOH, -CHO, $-NO_2$
C) –COOH, $-NO_2$ D) all halogens

d) Br_2 reagent is used for the determination of compounds. [1]
A) Phenol B) Alcohols
C) Aniline D) Aldehydes

e) _____reaction can be used with nitrous acid to differentiate primary, secondary and tertiary nitro alkanes. [1]
A) F-C alkylation B) Sulfonation
C) Halogenation D) Nitration

f) Nitration of higher nitroalkanes gives _____. [1]
A) single nitroalkane B) mixture of nitro alkanes
C) mixture of isomeric nitro alkanes D) none of the above

g) Naphthalene undergoes substitution reactions at _____ position preferably. [1]
A) 1^{st} position B) 2^{nd} position
C) 5^{th} position D) 7^{th} position

h) Naphthalene ring is present in which medicinal agent? [1]
A) Diphenhydramine HCl B) Aspirin
C) Paracetamol D) Propronalol

i) The stability of lower cycloalkanes was proposed by _____. [1]
A) Williamson's theory B) Huckel's theory
C) Bayer's theory D) Sachse Mohr's theory

j) Theory of strain less rings is also called as _____ [1]
A) Sachse Mohr's theory B) Baeyer's theory
C) Coulson moffit's theory D) Mohr's theory

k) What is Huckel's rule? Explain with few examples. [3]
l) Write any two important preparations methods for Phenols. [3]
m) Explain Nef reaction with mechanism. [3]
n) Explain Haworth synthesis of Anthracene. [3]
o) What is Baeyer strain theory? Give its limitations. [3]

PART-B (50 Marks)

2. Explain the derivation of structure of benzene by analytical and synthetic evidences. [10]

OR

3. What are the characteristic reactions of benzene? Explain in detail along with the mechanism for a) Friedel Crafts acylation b) Friedel crafts alkylation. [10]

4.a) Explain the acidity constant of phenols. Write the effect of substituent on acidity.
b) Write the qualitative tests of phenols. [5+5]

OR

5.a) Write the acidity constant of aromatic acid. Give the effect of substituent on acidity.
b) Write the synthetic uses of alkyl diazonium salts. [5+5]

6.a) Write any two preparations and important reactions of nitro compounds.
b) Explain the halogenations reactions of various nitro alkanes with nitrous acid. [5+5]

OR

7.a) Explain the reactivity and reduction of nitrobenzene in different media.
b) What is Henry reaction? Explain. [5+5]

8.a) What are polynuclear hydrocarbons. Write examples. Give the synthesis and important reactions and uses of Naphthalene.
b) Explain the electrophilic substitution reactions of Phenanthrene in detail. [5+5]

OR

9.a) Write about isolated polynuclear hydro carbons. Explain the synthesis and uses of them (any two).
b) Explain the electrophilic substitution reactions of diphenyl methane. Give the medicinal uses and drugs containing their structure. [5+5]

10.a) Write the various conformations of cyclohexane. Explain the stable structure.
b) What are the limitations of Bayer strain theory? [5+5]

OR

11.a) What is carbon moffit's medication. Explain.
b) Write the important reactions of cyclopropane and cyclohexane. [5+5]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
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PHARMACEUTICAL ORGANIC CHEMISTRY – III

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PART- A (25 Marks)

1.a) Two compounds have the same composition and also have the same atoms attached to the same atoms, although with different orientations in space. These compounds are: [1]
A) Identical B) Position isomers
C) Structural isomers D) Stereoisomers

b) 2-Butanol is optically active because it contains [1]
A) An asymmetric carbon B) A plane of symmetry
C) A hydroxyl group D) A Centre of symmetry

c) Alkenes show geometrical isomerism due to [1]
A) Asymmetry B) Rotation around a single bond
C) Resonance D) Restricted rotation around a double bond

d) Which of the following compounds will show geometrical isomerism? [1]
A) CH_2=$CHCl_2$ B) ClCH=CHBr
C) CH_2-CH_2Cl D) Cl_2C=CBr_2

e) Pyrantel is used to treat a number of parasitic worm infections. It is derivatives of …… ? [1]
A) Pyrrole B) Aminobenzene
C) Thiophene D) Furan

f) Furan reacts with ammonia in the presence of alumina at 400°C to give [1]
A) Pyridine B) Furfural
C) Pyrrole D) Furoic acid

g) Which of the following is/are examples(s) of condensed heterocyclic compounds? [1]
A) Indole B) Isoquinoline
C) Both (A) & (B) D) Azepine

h) Pyridine is more basic then pyrrole due to [1]
A) Availability of lone pair electrons in sp3 orbital
B) Availability of lone pair electrons in sp2 orbital
C) Availability of lone pair electrons in p orbital
D) None.

i) In Clemmensen Reduction carbonyl compound is treated with.....
A) Zinc amalgam + HCl B) Sodium amalgam + HCl
C) Zinc amalgam + Nitric acid D) Sodium amalgam + Nitric acid [1]

j) What is the final product obtained in Birch reduction
A) Conjugated cyclohexadienes B) Unconjugated cyclohexadienes
C) Unconjugated cyclopentadienes D) All of the above. [1]

k) Differentiate between diastereomers and enantiomers. [3]

l) Distinguish between E and Z isomers with examples. [3]

m) Explain the reactivity and aromaticity of pyrrole in detail. [3]

n) Discuss the structure and pharmaceutical use of Oxazole in detail. [3]

o) Discuss the Claisen-Schmidt condensation reaction. [3]

PART-B

(50 Marks)

2.a) What is racemic modification? Enlist different methods of resolution of racemic modification and explain any one method in detail

b) Explain the reactions of chiral molecule. [7+3]

OR

3.a) Discuss the sequence rule in detail to assign configuration.

b) Explain partial and absolute asymmetric synthesis. [5+5]

4.a) What is configuration? Explain with suitable examples.

b) Write in brief about Atropisomerism. [5+5]

OR

5.a) Define conformation. What are the different conformations of cyclohexane? Which one is more stable? Why.

b) Write a short note on Geometric Isomerism. [7+3]

6.a) Give the general method of preparation and chemical reaction of pyrrole.

b) Why Furan has high boiling point than Pyrrole explain it. [5+5]

OR

7.a) Discuss nomenclature and classification of thiophene in details.

b) Why Furan is aromatic in nature although it containing two lone pair electron explain in detail. [5+5]

8.a) Give the synthesis, reaction and medical use of quinoline.

b) Give synthesis and medicinal uses of Pyrimidine. [5+5]

OR

9.a) Give the synthesis, reaction and medical use of Acridine.

b) Why pyridine undergoes electrophilic substitution at β-position? [5+5]

10.a) Give reaction involved in Wolff kishner reduction.

b) Write note on Pinocol-Pinocolone rearrangement. [5+5]

OR

11.a) Explain Oppenauer-oxidation and Dakin reaction.

b) Write short note on Beckmann rearrangement. [5+5]

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PART- A

(25 Marks)

1.a) Friedal crafts acylation is useful for the preparation of [1]
A) Salicylic acid B) Aromatic aldehydes
C) Aniline D) Aromatic ketones

b) Friedel-Crafts reaction between benzene and n-propyl chloride results in formation of [1]
A) Isopropyl benzene B) Propyl benzene
C) cresol D) Toluene

c) Which of the following is a 3° amine? [1]
A) Triphenyl amine B) Diphenyl amine
C) Aniline D) Nitrobenzene

d) Cresols are called as [1]
A) Methylphenols B) Dihydroxy benzene
C) Methylamines D) Aminophen

e) Aromatic nitro compounds do not undergo which type of reaction [1]
A) Friedel-Crafts reaction B) nucleophilic substitution
C) electrophilic substitution D) reduction reaction

f) Compounds in which an oxygen atom is bonded to two organic groups are called as [1]
A) esters B) nitro compounds
C) ethers D) alcohol

g) Benzophenone on Clemmensen reduction gives [1]
A) Triphenylmethane B) Naphthalene
C) Anthracene D) Diphenylmethane

h) Anthraquinone when distilled with zinc dust forms [1]
A) Diphenylmethane B) Anthracene
C) Triphenylmethane D) None

i) Banana or bend bonds are present in [1]
A) cyclohexane B) Cyclopropane
C) cyclopentane D) cyclobutane

j) Which of the following cycloalkanes has the least ring strain? [1]
A) cyclopentane B) cyclobutane
C) cyclohexane D) Cyclopropane

k) Explain the aromaticity of benzene [3]
l) Summarize on the acidity of Phenols [3]
m) Outline Henry Reaction [3]
n) Outline the preparations of Diphenyl methane [3]
o) Outline two chemical properties of cycloalkanes. [3]

PART - B

(50 Marks)

2.a) Explain the reaction and mechanism involved in the Friedel crafts acylation.
b) Write short note on Huckel's rule. [5+5]

OR

3. Explain the orientation of mono substituted benzene compounds towards electrophilic substitution reaction. [10]

4.a) List any three qualitative tests for Phenols.
b) Discuss the effect of substituent on acidity of Aromatic acids. [5+5]

OR

5.a) Brief on the important reactions of benzoic acid.
b) Write short note on the effect of substituents on basicity of Amines. [5+5]

6.a) Write any three preparation and reactions of nitro compounds.
b) Write note on the halogenation using nitrous acid. [5+5]

OR

7.a) List any five synthesis of Ethers.
b) List any five reactions of Ethers. [5+5]

8.a) Elaborate on the Structure and medicinal uses of Phenanthrene
b) Outline the derivatives of Triphenyl methane. [5+5]

OR

9.a) Write the structure of Naphthalene
b) Explain the Haworth synthesis for Naphthalene. [5+5]

10.a) Explain Sachse Mohr's theory with examples.
b) Discuss the stabilities of cyclo alkanes. [5+5]

OR

11.a) Write the reactions of cyclobutane.
b) Write short note on the angle strain in cycloalkanes. [5+5]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, September/October - 2025
PHYSICAL PHARMACEUTICS - I

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

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PART- A (25 Marks)

1.a) Latent heat of fusion is the amount of heat required to: [1]
A) Change solid to liquid at constant temperature
B) Change liquid to vapour at constant temperature
C) Increase liquid temperature by 1°C
D) Break bonds in a solid

b) Vapour pressure of a liquid depends on: [1]
A) Volume of liquid
B) Temperature only
C) Temperature and intermolecular forces
D) Pressure only

c) Which law governs the distribution of a solute between two immiscible solvents? [1]
A) Raoult's law
B) Henry's law
C) Nernst distribution law
D) Fick's law

d) Solubility of a gas in liquid generally: [1]
A) Increases with temperature
B) Decreases with temperature
C) Is independent of temperature
D) Increases indefinitely with pressure

e) Which parameter is defined as the ratio of void volume to total volume of a powder? [1]
A) Density
B) Porosity
C) Bulkiness
D) Specific surface

f) Specific surface of particles can be determined by: [1]
A) Sedimentation method
B) BET adsorption method
C) Coulter counter
D) Sieving method

g) A complex formed due to coordination between a metal ion and ligand is called as: [1]
A) Metal–chelates
B) Inclusion complex
C) Adsorption complex
D) Polymer complex

h) Which plasma protein is primarily responsible for binding acidic drugs? [1]
A) Globulin
B) α1-acid glycoprotein
C) Albumin
D) Lipoprotein

i) The pH of a solution is defined as [1]
A) $\log [H^+]$
B) $-\log [H^+]$
C) $\log [OH^-]$
D) $-\log [OH^-]$

j) What is the pH of a buffer prepared by mixing 0.1 M acetic acid (pKa = 4.76) and 0.1M sodium acetate? [1]

A) 4.76 B) 5.0
C) 7.0 D) 4.0

k) Write a short note on sublimation with pharmaceutical applications. [3]
l) Define solubility expression and give two types with examples. [3]
m) Write short notes on porosity and its types. [3]
n) Classify complexes and give one example of each. [3]
o) Write a short note on Sorensen's pH scale. [3]

(50 Marks)

PART-B

2.a) Explain eutectic mixtures. Give one pharmaceutical example. [5+5]
b) Explain the concept of dipole moment and its application in drug design.

OR

3. Write detailed notes on:
(a) Glassy state
(b) Liquid crystals
(c) Aerosols and inhalers in pharmaceuticals. [3+3+4]

4. Explain dissolution and drug release processes. Discuss the factors affecting dissolution rate with pharmaceutical relevance. [10]

OR

5.a) Describe the factors influencing solubility of drugs (quantitative approach). [5+5]
b) Discuss the limitations and applications of the distribution law.

6.a) Explain different methods for determining particle size (*any two*). [5+5]
b) Explain the significance of surface area in pharmaceutical powders.

OR

7. Discuss methods for determining surface area of powders. Add notes on permeability and adsorption methods with applications. [10]

8.a) Explain the methods of analysis of complexes. [5+5]
b) Write a short note on applications of drug-complexation in pharmacy.

OR

9. Describe methods of studying protein binding and discuss the effect of protein binding on pharmacokinetics and pharmacodynamics of drugs. [10]

10.a) Explain the applications of buffers in biological and pharmaceutical systems. [5+5]
b) Discuss colligative properties and their role in determination of isotonicity.

OR

11. Explain isotonic solutions in detail. Discuss various methods used for adjusting isotonicity with pharmaceutical examples. [10]

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Code No: 284AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year II Semester Examinations, September - 2024
PHYSICAL PHARMACEUTICS - 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) Photolytic degradation of pharmaceutical products is prevented by: [1]
A) Using opaque packaging
B) Decreasing the temperature
C) Reducing the ionic strength
D) Increasing the solvent polarity

b) The units of the rate constant for a second-order reaction are: [1]
A) mol L^{-1} B) L mol^{-1} s^{-1}
C) s^{-1} D) mol L^{-1} s^{-1}

c) Thixotropy is a property where: [1]
A) Viscosity increases with time at a constant shear rate
B) Viscosity decreases with time at a constant shear rate
C) Shear rate increases linearly with shear stress
D) Viscosity remains constant regardless of shear rate

d) The Heckel equation is used to describe: [1]
A) Elastic deformation
B) Plastic deformation of powders during compaction
C) Stress-strain behavior of metals
D) Thixotropic behavior of liquids

e) The theory of emulsification that relies on the reduction of interfacial tension is: [1]
A) Plastic film theory B) Micellar theory
C) Interfacial film theory D) Surface tension theory

f) Microemulsions are characterized by; [1]
A) Large droplet sizes B) Thermodynamic stability
C) Instability in varying temperatures D) Difficulties in formation

g) Which method is commonly used for the measurement of surface tension? [1]
A) Centrifugation method B) Capillary rise method
C) Polarimetry D) Chromatography

h) What is the role of surface active agents in pharmaceutical formulations? [1]
A) They reduce particle size
B) They stabilize emulsions and suspensions
C) They increase particle solubility
D) They prevent hydrolysis reactions

i) The process of peptization involves: [1]
A) Breaking down of colloidal particles
B) Coagulation of colloidal particles
C) Dispersion of a precipitate into colloidal particles
D) Sedimentation of colloidal particles

j) Coacervation is primarily associated with: [1]
A) Formation of a single colloidal phase
B) Aggregation of colloidal particles into a denser phase
C) Separation of colloids by centrifugation
D) Peptization of particles in a suspension

k) What is the significance of accelerated stability testing in pharmaceuticals? [3]

l) Differentiate between Newtonian and non-Newtonian fluids. [3]

m) Describe the process of sedimentation in suspensions and factors affecting it. [3]

n) What is the spreading coefficient, and how is it calculated? [3]

o) What is the Tyndall effect, and how is it used to distinguish colloidal systems? [3]

PART-B (50 Marks)

2.a) How do reaction orders influence the stability of pharmaceutical products
b) What role does dielectric constant play in the degradation of pharmaceutical products?
c) Explain the importance of pH in the stabilization of pharmaceutical agents against hydrolysis. [3+3+4]

OR

3.a) Discuss the mechanism of photolytic degradation in pharmaceuticals and how it can be prevented.
b) Provide a step-by-step description of how accelerated stability testing is performed.
c) Illustrate with examples how pharmaceutical agents are stabilized against oxidation and hydrolysis. [3+3+4]

4.a) Explain kinematic viscosity and how it differs from dynamic viscosity.
b) What is the significance of the elastic modulus in the deformation of solids?
c) Describe the principle of a rotational viscometer and its application in measuring viscosity. [3+3+4]

OR

5.a) What is plastic deformation, and how does it affect the mechanical properties of materials?
b) Explain the concept of pseudoplastic flow and its importance in pharmaceutical formulations.
c) Explain the effect of temperature on non-Newtonian fluids, particularly in terms of viscosity changes. [3+3+4]

6.a) Discuss the theories of emulsification and how they contribute to emulsion stability.
b) Describe the formulation strategies for stable pharmaceutical suspensions
c) How does temperature affect the stability of emulsions and suspensions? [4+3+3]

OR

7.a) What is the significance of zeta potential in the formulation of stable suspensions?
b) What are the key features of microemulsions that differentiate them from regular emulsions?
c) How does the dielectric constant of a solvent affect the stability of a suspension? [3+4+3]

8.a) Discuss the methods used for measuring surface and interfacial tensions.
b) Explain the importance of adsorption at solid interfaces in the development of pharmaceutical dosage forms.
c) What is the relationship between surface free energy and surface tension? [3+4+3]

OR

9.a) Explain the process of adsorption at liquid interfaces and its importance in pharmaceutical formulations.
b) How does temperature affect surface tension in liquids?
c) What is the Critical Micelle Concentration (CMC), and why is it important? [4+3+3]

10.a) Explain the importance of Brownian motion in colloidal dispersions.
b) Explain the phenomenon of peptization and its importance in colloidal chemistry.
c) What are the main methods used for the characterization of colloidal particles. [3+4+3]

OR

11.a) Discuss the role of zeta potential in the stability of colloidal systems.
b) What is the difference between optical and kinetic properties of colloids?
c) Describe the process of aggregation in colloidal systems and its impact on stability. [3+3+4]

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Code No: 283AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year I Semester Examinations, March - 2024

PHYSICAL PHARMACEUTICS - 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) Amorphous solids have [1]

A) Regular structure B) Linear structure

C) Irregular structure D) Dendritic structure

b) Dielectric constant of water is [1]

A) 72 B) 78.5

C) 68 D) 100

c) The phenomenon of increasing the solubility of drug in a solvent by the addition of another solvent is [1]

A) Co-solubilization B) Micellarsolubilization

C) Co-solvency D) Hydrotrophy

d) Azeotropic mixtures are also called as [1]

A) Constant boiling mixtures B) Constant evaporating mixtures

C) Constant melting mixtures D) Constant drying mixtures

e) Capillary rise method is used to determine [1]

A) Surface tension B) Viscosity

C) Kraft point D) HLB value

f) Nature of the drug which mostly bind to the human serum albumin is [1]

A) Acidic B) Basic

C) Anionic D) Non-ionic

g) Ligand in coordinated complexes [1]

A) Accepts a pair of electrons B) Accepts 1 electron and share it

C) Donates a pair of eleetrons D) Donates a pair of electrons and share

h) The pH is calculated mathematically as the [1]

A) Negative log of the hydroxy ion (OH-) concentration

B) Log of the hydroxy ion (OH-) concentration Boiling

C) Negative log of the hydrogen ion (H+) concentration

D) Log of the hydrogen ion (H+) concentration

i) Tonicity of a solution is determined by which of these methods? [1]
A) Colorimetric B) Cryoscopic
C) electrometric D) Osmosis

j) Microemulsions is NOT considered as true emulsions because [1]
A) internal phase is not spherical B) Emulsifier is not used
C) Immiscible phase is absent D) Appearance is transparent

k) Describe glassy state and liquid crystals. [3]

l) Write about ideal solubility parameters. [3]

m) What is density? How does it affect the flow properties? [3]

n) Define complexation. List different types of complexations. [3]

o) Write in brief about buffers and buffer capacity. [3]

PART - B

2. Explain the following with suitable examples and applications. **(50 Marks)**
(a) Eutectic mixtures
(b) Determination and applications of dissociation constant. [5+5]

OR

3.a) What is optical rotation? Add a note on its determination and applications.
b) Differentiate between amorphous and crystalline forms. [6+4]

4.a) Enumerate various solubility expressions as per IP.
b) Explain distribution of solutes between immiscible solvents and write its application in extraction. [3+7]

OR

5.a) What is Distribution law? Write is applications and limitations.
b) Describe the factors influencing the solubility of drugs. [5+5]

6. Explain the various derived properties of powders. [10]

OR

7.a) Describe the methods for determining surface area.
b) What is porosity? How does it affect the stability of the powder? [6+4]

8.a) What are metal complexes? Explain any one type with examples.
b) Write a note on solubility method of analysis in complexation. [6+4]

OR

9. Describe the methods to determine the complexation. [10]

10.a) Define pH. Explain Sorenson's pH scale.
b) Describe the methods used to measure tonicity. [5+5]

OR

11.a) Explain the reason for adjusting pH of a dosage form.
b) Write about sodium chloride equivalent method of adjustment of tonicity. [5+5]

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Code No: 283AC

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

PHARMACEUTICAL MICROBIOLOGY

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) The growth of bacteria in liquid culture medium is indicated by the presence of: [1]
A) Turbidity
B) Deposit
C) Surface pellicle
D) All of the above

b) Optimum growth temperature is greater than 45°C is [1]
A) Mesophiles
B) Thermophiles
C) Psychrophiles
D) None of these

c) Endospores can be stained with [1]
A) Safranine
B) Crystal violet
C) Methylene blue
D) Malachite green

d) The percentage of alcohol used in Gram- staining is [1]
A) 75%
B) 90%
C) 60%
D) 25%

e) Factors on which disinfectivity of a disinfectant depends [1]
A) Concentration of the substance
B) Time of action
C) pH of the medium and temperature suitable for the chemical
D) All of the above

f) Bacteria are more sensitive to antibiotics at which phase of growth curve? [1]
A) Decline phase
B) Stationary phase
C) Lag phase
D) Log phase

g) Biological Oxygen Demand (BOD) is a measure of: [1]
A) Industrial wastes poured into water bodies
B) Extent to which water is polluted with organic compounds
C) Amount of carbon monoxide inseparably combined with haemoglobin
D) Amount of oxygen needed by green plants during night.

h) The principle in microbiological assays is [1]
A) At certain range the concentration of growth factor will bear a linear relationship to the amount of nutrients added
B) Concentration of growth factor have a linear relationship with the growth of the organism
C) Both At certain range the concentration of growth factor will bear a linear relationship to the amount of nutrients added and Concentration of growth factor have a linear relationship with the growth of the organism
D) None of the above

i) During conjunction the genetic material will be transferred through [1]
A) Cell wall
B) Medium
C) Pili
D) Capsule

j) The method in which the cells are dehydrated and frozen is called [1]
A) Pasteurization
B) Dessication
C) Disinfection
D) Lypophilization.

k) Explain the phases of a bacterial growth curve. [3]

l) What are sterility indicators? Name any two types. [3]

m) What are the criteria for sterility testing of injectable products? [3]

n) What is the purpose of a microbiological assay? [3]

o) List three factors affecting microbial spoilage of pharmaceutical products. [3]

PART - B

(50 Marks)

2.a) Explain the ultra-structure of a bacterial cell with a labeled diagram.
b) Explain the cultivation techniques for anaerobic bacteria. [5+5]

OR

3.a) Compare and contrast batch culture and continuous culture techniques.
b) How does bacterial morphology help in classification? Provide examples. [5+5]

4.a) Explain the principle, procedure, and applications of Gram staining.
b) Discuss the challenges in sterilizing heat-sensitive materials. [5+5]

OR

5.a) Compare autoclaving and dry heat sterilization in terms of merits and demerits.
b) Explain the importance of sterilization in the pharmaceutical industry. [5+5]

6.a) How do antiseptics differ from antibiotics?
b) Discuss the evaluation methods for bactericidal and bacteriostatic agents. [5+5]

OR

7.a) How are viruses cultivated in the laboratory?
b) Explain the factors affecting the efficacy of disinfectants. [5+5]

8.a) Explain the importance of aseptic techniques in pharmaceutical production.
b) Discuss the role of environmental monitoring in sterile manufacturing. [5+5]

OR

9.a) What are the regulatory requirements for cleanroom classification?
b) Explain the steps involved in assessing the antimicrobial activity of a new substance. [5+5]

10.a) Discuss the sources and types of microbial contaminants in pharmaceuticals.

b) What are the regulatory considerations for cell culture-based pharmaceuticals? [5+5]

11.a) Explain the role of cell culture in monoclonal antibody production.

OR

b) Explain the preservation methods for pharmaceutical products using antimicrobial agents. [5+5]

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Code No: 283AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

R22

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

Time : 3 hours **PHARMACEUTICAL MICROBIOLOGY**

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) A……phase of growth curve bacterial multiplications maximum [1]
A) Lag phase B) Log phase
C) Death phase D) Phase of senescence

b) A bacterial culture is diluted by mixing 10ul of culture to 990ul of water. What is the dilution factor of bacterial culture? [1]
A) 10-1 B) 10-2
C) 10-99 D) 10-3

c) Teichoic acid is present in the following except [1]
A) Steptococci B) Staphylococci
C) Mycobacterium D) E.Coli

d) ……method can be preferred for sterilisation of medical devices [1]
A) Ethylene Oxide B) Autoclace
C) CO_2 D) Chromic acid

e) ……is a component of Fungal cell wall [1]
A) Lignin B) Starch
C) Glycogen D) Chitin

f) Capsid structure in virus is [1]
A) Outer protein structure B) Nucelic acid structure
C) Phage structure D) RNA

g) ……light is used for sterilisation of laminar air flow before use (UV) [1]

h) ……is a vitamin B complex except [1]
A) Tocopherol B) Thiamine
C) Pyridoxine D) Niacin

i) ……used for maintenance of pH in cell culture media (CO_2) [1]

j) The main purpose of preservatives used in pharma products is to [1]
A) maintain API composition B) To inhibit microbial growth
C) For stability D) To maintain humidity

k) Give a labelled diagram of a bacterial cell. [3]
l) List out few equipments used in pharma industry for sterilization. [3]
m) Define the abbreviations IP, BP and USP in pharma industry. [3]
n) Give the diagrammatic representation of biosafety cabinet. [3]
o) Explain the role of carbon dioxide in Cell culture lab. [3]

PART- B **(50 Marks)**

2.a) Write about the general criteria followed for the selection of media to grow bacteria.
b) Write about various phases of monoauxic growth curve of bacteria. [5+5]

OR

3.a) Give a note on the principle of working of electron microscope. Draw a labelled diagram of the instrumentation.
b) Write the essential differences in the cell structure of an eukaryote and prokaryote. [5+5]

4.a) Write about gram staining and acid fast staining techniques for identification of bacteria.
b) What are the procedures as per Indian pharmacopoeia to the pharma products for sterility testing? [5+5]

OR

5.a) Write about various types of indicators used in pharma industry for sterility testing.
b) What are various biochemical tests employed for identification of bacteria. [5+5]

6.a) Write about the general classification of fungi.
b) Explain the essential differences in the mode of action of bacteriocidal and bacteriostatic agents. [5+5]

OR

7.a) Write about replication of viruses.
b) What are disinfectants? Write about various physical and chemical disinfectants along with their mode of action. [5+5]

8.a) Explain about vertical and horizontal laminar air flow cabinets.
b) What is microbiological Assay? Explain their applications. [5+5]

OR

9.a) Explain the microbial assay procedure for estimation of vitamins.
b) Write about the different sources of contamination in an aseptic area and the measures to prevent it. [5+5]

10.a) Explain the source of spoilage in pharma products. Explain the evaluation of microbial stability of formulations.
b) Explain the general procedures used for the growth of cell lines in the laboratory. [5+5]

OR

11.a) What are various methods used for the evaluation of microbial contamination.
b) Explain how animals cell lines are tools in pharma research and industry. [5+5]

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Code No: 283AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year I Semester Examinations, March - 2024

PHARMACEUTICAL MICROBIOLOGY

R22

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

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PART- A

(25 Marks)

1.a) The main feature of a prokaryotic organism is ---- [1]
(A) Absence of nuclear envelope (B) Absence of nuclear material
(C) Absence of protein synthesis (D) Absence of locomotion

b) The source of electrons in the electron microscope is ----- [1]
(A) Lead and Mercury (B) Lead
(C) Mercury (D) Tungsten

c) ---is a substance that prevents the growth of microorganisms without killing them. [1]
(A) Antibiotic (B) Preservatives
(C) Germicide (D) Bactericide

d) The counter stain safranin used in the Gram-staining technique colours the bacterial cells. [1]
(A) Green (B) Blue
(C) Pink (D) Red

e) Lytic cycle involves intracellular multiplication of ---. [1]
(A) Bacteria (B) Virus
(C) Phages (D) Fungi

f) The test used for the evaluation of disinfectant --- [1]
(A) Test for sterility (B) Phenol coefficient method
(C) IMViC (D)Antimicrobial assay

g) The air filtered from the laminar airflow is claimed to be free from the microbial contamination of---- [1]
(A) 50% (B) 75%
(C) 100% (D) 99.97%

h) Microbiological assay of vitamins can be performed by---- [1]
(A) Both Titrimetric and turbidimetric methods (B) Only titrimetric method
(C) Only turbidimetric method (D) Agar plate method.

i) Raw materials are more prone to microbial contamination except from. [1]
(A) Natural origin (B) Vegetative origin
(C) Animal origin (D) Synthetic origin

j) After more than ----subculturing, there is an alteration in cell division characteristics and cell culture becomes transformed cell culture? [1]

(A) 50 (B) 80
(C) 100 (D) 200

k) Compare and contrast prokaryotes and eukaryotes. [3]
l) Describe sterility indicator. [3]
m) Write about antiseptics and their evaluation. [3]
n) What is a HEPA filter and mention its pharmaceutical applications? [3]
o) Discuss the types of spoilage. [3]

PART-B

(50 Marks)

2.a) Describe the nutritional requirements for bacteria.
b) Explain the bacterial growth curve. [6+4]

OR

3. Elaborate isolation and preservation methods for pure cultures. [10]

4. Write the principle, procedure, merits, demerits and applications of the physical method of sterilization. [10]

OR

5.a) Write about biochemical tests (*any two*) for the identification of bacteria.
b) How the efficiency of sterilization methods is evaluated? Explain. [5+5]

6. Describe the morphology, reproduction and techniques for the cultivation of fungi. [10]

OR

7.a) Explain the evaluation of bactericidal and bacteriostatic.
b) Discuss various factors influencing disinfection. [6+4]

8. Elaborate different sources of contamination in an aseptic area and the methods used for their prevention. [10]

OR

9.a) Write the principles of different microbiological assay
b) Describe different methods for standardization of vitamins. [5+5]

10.a) Give an account of the types of microbial contaminants.
b) Write the general procedure for cell culture. [5+5]

OR

11.a) How can one assess the microbial contamination and spoilage?
b) Discuss established and transformed cell cultures. [5+5]

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Code No: 283AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, September/October - 2025
PHARMACEUTICAL ENGINEERING

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 of the following is not a type of flow meter [1]
A) Orifice meter B) Pitot tube
C) Potentiometer D) Rota meter

b) The mode of motion in size separation [1]
A) Agitation B) Brushing
C) Centrifugal force D) All of the above

c) Ball mill is used for [1]
A) Attrition B) Very fine grinding
C) Coarse grinding D) Both Attrition and Coarse grinding

d) Which crystallizer is suitable for continuous operation [1]
A) Agitated batch crystallizer B) Sweson walker
C) Krystal crystallizer D) All of the above

e) The Baffles are used to [1]
A) Increase the path of the fluid
B) Improve heat transfer
C) Increase the velocity of the liquids outside the tubes
D) All the above

f) Which of the following is a heat exchanger [1]
A) Tray dryer B) Jacketed Kettle
C) Ball mill D) Elutriation tank

g) The enzymes, vitamins, glycoside and alkaloids are extracted by [1]
A) Steam distillation B) Distillation under reduced pressure
C) Flash distillation D) Vaccum distillation

h) Which of the following dryer is used for coating of granules [1]
A) Tray dryer B) Drum dryer
C) Fluidized bed dryer D) Spray dryer

i) Which of the following is not a filter aid [1]
A) Cellulose B) Perlite
C) Cotton D) None

j) Filter aids are added to the liquid
A) To increase the porosity
B) To increase cake permeability
C) Both To increase the porosity and to increase cake permeability [1]
D) None

k) Write the types of manometers? [3]
l) Give the principle involved in Turbines? [3]
m) Describe Fourier's law? [3]
n) Explain the preparation of purified water? [3]
o) What are the applications of centrifugation? [3]

PART - B

(50 Marks)

2.a) Discuss a note on Bernoulli's theorem.
b) Differentiate between Ball mill and Hammer Mill. [5+5]

OR

3.a) Write the construction, working and uses of Sieve Shaker.
b) Explain the factors affecting Size Reduction. [5+5]

4.a) Write the principle, construction, working and uses of twin shell blender.
b) Give a note on theory of crystallization. [5+5]

OR

5.a) Describe a note on caking.
b) Outline the principle, uses, merits and demerits of Double cone blender. [5+5]

6.a) Define evaporation. Write the objectives and applications of Evaporation.
b) What are the merits and demerits of Steam jacketed kettle and forced circulation evaporator? [5+5]

OR

7.a) Discuss a note on Heat transfer mechanisms.
b) Write the principle, construction, working, merits and demerits of multiple effect evaporator. [5+5]

8.a) Explain the types of distillation.
b) Write the measurements and applications of Equilibrium Moisture Content. [5+5]

OR

9.a) Give a note on molecular distillation.
b) Write the principle, construction, working and uses of Tray dryer. [5+5]

10.a) Explain the factors influencing filtration.
b) Discuss a note on perforated basket centrifuge. [5+5]

OR

11.a) Describe the theories of filtration.
b) What are the merits and demerits of Super centrifuge and semi continuous centrifuge? [5+5]

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Code No: 283AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, March - 2025
PHARMACEUTICAL ENGINEERING

Time : 3 hours

Max Marks: 75

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PART- A

(25 Marks)

1.a) Which of the following represents turbulent flow? [1]
A) Reynolds number < 2100
B) Reynolds number > 4000
C) Reynolds number = 2300
D) Reynolds number < 1000

b) Which mill operates on impact and attrition principle? [1]
A) Ball mill
B) Fluid energy mill
C) Edge runner mill
D) End runner mill

c) Which mixer is best suited for mixing viscous semi-solid materials? [1]
A) Double cone blender
B) Ribbon blender
C) Sigma blade mixer
D) Twin shell blender

d) The formation of a solid bridge between crystals leading to caking is primarily due to: [1]
A) Temperature fluctuations
B) Moisture absorption
C) Particle size variation
D) Crystal shape

e) In multiple effect evaporators, the economy is defined as: [1]
A) Amount of steam used per unit of product
B) Kg of water evaporated per kg of steam used
C) Heat transfer coefficient
D) Rate of evaporation

f) Which type of evaporator is most suitable for heat-sensitive materials? [1]
A) Climbing film evaporator
B) Steam jacketed kettle
C) Forced circulation evaporator
D) Long tube evaporator

g) In which phase of the drying process is the rate of moisture removal constant? [1]
A) Initial adjustment period
B) Constant rate period
C) Falling rate period
D) Static phase

h) Which type of dryer is most suitable for heat-sensitive materials? [1]
A) Tray dryer
B) Drum dryer
C) Freeze dryer
D) Spray dryer

i) HEPA filters are capable of removing particles of size: [1]
A) > 5 microns
B) > 0.3 microns
C) > 1 micron
D) > 10 microns

j) Which filter aid provides the most porous filter cake? [1]
A) Diatomaceous earth
B) Carbon black
C) Asbestos
D) Cellulose

Code No:283AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, September - 2024
PHARMACEUTICAL ENGINEERING

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) For laminar flow, the Reynolds number is typically: [1]
A) Less than 2000 B) Between 2000 and 4000
C) Between 4000 and 6000 D) Greater than 4000

b) The significance of Reynolds number in fluid mechanics is primarily to: [1]
A) Predict the energy loss in a fluid flow B) Determine the type of flow
C) Measure the pressure drop in a fluid D) Calculate the fluid velocity

c) The hammer mill works on the principle of: [1]
A) Impact B) Compression
C) Cutting D) Shear

d) The main objective of size separation is to: [1]
A) Increase particle size B) Ensure uniform particle size distribution
C) Reduce the surface area D) Decrease particle size

e) The primary objective of evaporation is to: [1]
A) Increase the volume of the solution B) Decrease the concentration of the solution
C) Increase the concentration of the solution D) Decrease the viscosity of the solution

f) A steam jacketed kettle is primarily used for: [1]
A) Cooling of liquids B) Concentrating solutions
C) Drying powders D) Sterilizing instruments

g) Equilibrium Moisture Content (EMC) is defined as: [1]
A) The total amount of water in a material
B) The amount of moisture content when the material is saturated
C) The moisture content where the material neither gains nor loses moisture to the environment
D) The moisture content after drying

h) A tray dryer operates on the principle of: [1]
A) Convection B) Conduction
C) Radiation D) Sublimation

i) Filter leaf operates on the principle of: [1]
A) Centrifugal force B) Pressure-driven filtration
C) Gravity sedimentation D) Vacuum filtration

j) Membrane filters are best suited for: [1]
A) Filtration of gases only B) Sterilization and fine particle removal
C) Filtration of large particles D) Low-temperature applications

k) State Bernoulli's theorem. [3]

l) What are the main differences in the mechanisms of solid and liquid mixing? [3]

m) Name two common applications of evaporation in industry. [3]

n) What is the purpose of flash distillation? [3]

o) How does a plate and frame filter operate? [3]

PART-B

(50 Marks)

2. Define manometers and discuss about U-tube manometer, inclined manometer, and differential manometer. [10]

OR

3.a) Define size reduction and its importance in various industries.
b) Describe the principle, construction, and working of Hammer Mill. [5+5]

4.a) Explain factors affecting mixing efficiency including mixing speed, mixing time, viscosity, particle size.
b) Discuss the Principles, Construction, working of double cone blender. [5+5]

OR

5. Explain the construction and working mechanism of Krystal crystallizer. [10]

6. Define Evaporation. Discuss about climbing film evaporator. [10]

OR

7.a) Write notes on mechanism of heat transfer.
b) Discuss about different Sources of heat. [5+5]

8. Write about the principle, construction, working and application of Freeze dryer. [10]

OR

9. Draw the diagram, principle, working and its applications of steam distillation. [10]

10.a) Explain briefly about mechanism of Filtration.
b) Briefly explain in detail about drum filter. [5+5]

OR

11. Explain the construction, working, uses, merits and demerits of Perforated basket centrifuge. [10]

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Code No: 283AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year I Semester Examinations, March - 2024
PHARMACEUTICAL ENGINEERING

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

Note: The end semester examinations will be conducted for 75 marks consisting of two partsviz. 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) Size separation is NOT based on one of the following properties. [1]
A)Particle density B) Particle Shape
C) Particle size D) Particle texture

b) Which one of the screens is attached to the size reduction equipment? [1]
A) Bar screens B) Cloth Sieves
C) Herringbone screens D) Woven wire screens

c) Mixing must be done at a lower speed for semisolids, as some of them may exhibit one of the following rheological behaviour. [1]
A) Dilatant flow B) Plastic flow
C) Pseudoplastic flow D)Thixotropy

d) In which type of mixer, the trough is stationary? [1]
A) Barrel mixer B) Double cone blender
C) Ribbon mixer D) Zigzag mixer

e) In the heat interchanger, finned tubes are used for one of the following purposes. [1]
A) Increasing the surface area B) Introducing steam
C) Introducing the cold fluid D) Reducing the size of apparatus.

f) Which is the factor that does not influence the rate of evaporation. [1]
A) Difference in vapour pressure B) Melting points of solids
C) The surface area of the evaporator D) The viscosity of the solution

g) Absolute alcohol is prepared by one of the following methods. [1]
A) Azeotropic distillation B) Simple distillation
C) Steam distillation D) Vacuum distillation

h) Raoult's law is applicable to one of the following types of distillation processes. [1]
A) Flash distillation B) Fractional distillation
C) Molecular distillation D) Simple distillation

i) If the amount of materials to be processed is huge and a low centrifugal effect is enough, then one of the following is economical to use. [1]
A) Large centrifuge operating at high speed B) Large centrifuge operating at low speed
C) Small centrifuge operating at high speed D) Small centrifuge operating at low speed

j) The centrifugal effect counteracts one of the following forces. [1]

A) Brownian forces B) Cohesive forces

C) Electrostatic forces D) Gravitational forces.

k) Write types of manometer. [3]

l) Difference between solid and liquid mixing. [3]

m) Write the mechanism of heat transfer. [3]

n) Write the objectives of distillation. [3]

o) Discuss applications of centrifugation. [3]

PART-B

(50 Marks)

2.a) Write the Factors affecting size reduction.

b) Write a note on Pitot tube. [5+5]

OR

3.a) Discuss in detail Ball Mill.

b) Discuss in detail Air separator. [5+5]

4.a) Discuss Krystal crystallizer.

b) Discuss in construction and working of ribbon blender. [5+5]

OR

5.a) Write in detail construction and working of Planetarymixers.

b) Discuss factors affecting caking and prevention of caking. [5+5]

6.a) Explain Heat exchangers.

b) Explain horizontal tube evaporator. [5+5]

OR

7.a) Write in detail construction and working of steam jacketed kettles.

b) Explain in detail heat transfer by conduction, convection and radiation. [5+5]

8.a) Write a note on steam distillation.

b) Write in detail construction and working of Freeze dryer. [5+5]

OR

9.a) Write in detail construction and working of drum dryer.

b) Write a note on water for injection BP by distillation. [5+5]

10.a) Explain in detail about Meta filter and Cartridge filter.

b) Write a note on HEPA filters. [5+5]

OR

11.a) Write in detail construction and working of Frame filter.

b) Discuss working, uses, merits and demerits of perforated basket centrifuge. [5+5]

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Code No: 284AA

R22

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

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) What is possible number of optical isomers for a compound having n disimilar asymmetric carbon atoms? [1]
A) n^1 B) 2^n
C) n+1 D) n+2

b) A meso compound is ------- [1]
A) An achiral molecule contains chiral carbons
B) Contains plane & centre of symmetry
C) Optically inactive
D) All the above

c) Convertion of D- form of optically active compound into its L-form is known as [1]
A) Resolution B) Racemization
C) Walden invertion D) all the above

d) Bayers strain theory explains the relative stability of [1]
A) n-butane. B) ethane
C) Cyclobutane D) all the above

e) Thiophene undergoes ----- reactions [1]
A) Nucleophilic addition reactions B) electrophilic substitution reactions
C) Nucleophilic substitution reactions D) both B & C

f) The order of aromaticity is as follows [1]
A) Prrole>furan> thiophene B) thiophene> pyrrole > furan
C) furan>prrole>thiophene D) prrole>thiophene>furan.

g) Indole undergoes -----reactions [1]
A) Nucleophilic addition reactions B) electrophilic substitution reactions
C) Nucleophilic substitution reactions D) both A & C

h) Acridine undergoes nucleophilic substitution at ------position [1]
A) 2^{nd} position B) 4^{th} position
C) 9^{th} position D) 5^{th} position

i) Dakin reaction is an example of -------reaction [1]
A) Reduction B) rearrangement reaction
C) Oxidation D) Both A& B

j) Catalyst used in birch reduction [1]
A) liquid ammonia & alkali metals B) liquid ammonia and alkaline metals
C) zinc/ conHcl D) tin/con Hcl

k) Explain the following with examples. [3]
i) chiral and achiral molecules ii) optical isomers.

l) What is geometric isomerism? Explain syn and anti-nomenclature with examples. [3]

m) Write any two methods of synthesis for thiophene. [3]

n) Write electrophilic substitution reactions of pyrazole. [3]

o) What is Wolf kishner reduction? Explain. [3]

PART- B

(50 Marks)

2.a) Explain RS system of nomenclature of optical isomerism.
b) What is resolution? Write the methods of resolution of enantiomeric mixtures. [5+5]

OR

3.a) Explain the reactions of chiral molecules.
b) What is asymmetric synthesis? Explain in detail. [5+5]

4.a) Explain cis, trans, E and Z system of nomenclature with examples.
b) Explain the conformational isomerism in n-butane. [5+5]

OR

5.a) Explain the methods of determination of configuration of geometrical isomers.
b) Write in detail about stereo specific and stereo selective reactions with examples. [5+5]

6.a) Write any three methods and uses of furan.
b) Explain the electrophilic substitution reactions of pyrrole. [5+5]

OR

7.a) Explain the aromaticity and reactivity of thiophene.
b) Explain the oxidation and reduction reactions of pyrrole. [5+5]

8.a) Write any three important methods of synthesis of quinoline.
b) Explain the electrophilic substitution reactions of isoquinoline. [5+5]

OR

9.a) Explain the oxidation and reduction reactions of acridine.
b) Write any three synthesis methods of pyrimidines and important drugs containing this ring. [5+5]

10.a) Explain oppenauer oxidation with mechanism and applications (any two).
b) Explain pinacol- pincalone rearrangement with its mechanism and applications. [5+5]

OR

11.a) What is Birch reduction? Explain its mechanism and applications.
b) What is claisen-schimdt rearrangement? Give its mechanism along with any two applications. [5+5]

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Code No: 284AB

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year II Semester Examinations, September - 2025
PHYSICAL PHARMACEUTICS - 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 methods is commonly used for predicting the shelf life of pharmaceutical dosage forms? [1]
A) Freeze-thaw testing
B) Solubility profiling
C) Accelerated stability testing
D) Bioavailability studies

b) In a first-order reaction, the unit of the rate constant is: [1]
A) $mol \cdot L^{-1} \cdot s^{-1}$
B) s^{-1}
C) $mol^{2} \cdot L^{-2} \cdot s^{-1}$
D) $L \cdot mol^{-1} \cdot s^{-1}$

c) The SI unit of kinematic viscosity is: [1]
A) Pascal-second
B) Poise
C) Stokes
D) Newton per meter

d) Which type of non-Newtonian flow is shown by ketchup? [1]
A) Newtonian
B) Plastic
C) Dilatant
D) Pseudoplastic

e) Which law governs the rate of settling of particles in a suspension? [1]
A) Arrhenius law
B) Raoult's law
C) Henry's law
D) Stokes' law

f) Which of the following best describes a microemulsion? [1]
A) Thermodynamically stable and transparent system
B) Thermodynamically unstable but kinetically stable
C) Heterogeneous coarse dispersion
D) System showing creaming only

g) Which method is commonly used to measure surface tension? [1]
A) Viscometry
B) Stokes' method
C) Drop weight method
D) Phase contrast microscopy

h) Which type of adsorption is characterized by multilayer formation? [1]
A) Langmuir adsorption
B) Physisorption
C) Chemisorption
D) Monolayer adsorption

i) Which phenomenon is responsible for the scattering of light by colloidal particles? [1]
A) Peptization
B) Coacervation
C) Brownian motion
D) Tyndall effect

j) Which electrolyte is most effective in causing coagulation of colloids? [1]
A) Monovalent ion B) Divalent ion
C) Trivalent ion D) Zwitterion ion

k) Differentiate between zero-order and first-order reaction kinetics with respect to concentration dependence and graphical representation. [3]

l) Differentiate between elastic deformation and plastic deformation of solids with one example each. [3]

m) What are flocculated and deflocculated suspensions? [3]

n) Write a short note on the surface free energy of liquids. [3]

o) Write the differentiate between lyophilic and lyophobic colloids with one example each. [3]

PART - B

(50 Marks)

2.a) Explain the effect of temperature and solvent on the stability of pharmaceutical products. Support your answer with the Arrhenius equation.

b) Describe the methods used to determine the order of a reaction in drug stability studies. Provide one simple numerical example. [5+5]

OR

3.a) Write short notes on photolytic degradation of drugs. How can it be prevented in pharmaceutical dosage forms?

b) Discuss the stabilization strategies of medicinal agents against hydrolysis and oxidation reactions with suitable examples. [5+5]

4. Describe the types of non-Newtonian flow. Give pharmaceutical examples. [10]

OR

5.a) Explain the law of flow for Newtonian systems. How does temperature affect viscosity in such systems?

b) What is thixotropy? Discuss its significance in pharmaceutical formulations. [5+5]

6. Discuss the physical stability problems of emulsions and the methods used to prevent them. [10]

OR

7.a) Explain the formulation considerations of pharmaceutical suspensions.

b) Discuss the different theories of emulsification with suitable examples. [5+5]

8. Discuss the role of surface active agents in pharmaceutical systems. Explain types, properties and applications. [10]

OR

9.a) Explain the HLB scale. How is it applied in the formulation of emulsions?

b) Write a note on adsorption at solid interfaces and its importance in drug formulation. [5+5]

10.a) Classify colloidal dispersions. Give a comparative account of their general characteristics.

b) Discuss the electrical properties of colloids with reference to the zeta potential and electrophoresis. [5+5]

OR

11.a) Discuss the process of coacervation and peptization. Explain their mechanisms and pharmaceutical importance.

b) Mention the significance of Brownian motion in colloidal stability. [7+3]

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Code No: 284AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year II Semester Examinations, September - 2025
PHARMACOGNOSY AND PHYTOCHEMISTRY - 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) The term "Pharmacognosy" was first coined by: [1]
A) Dioscorides B) C.A. Seydler
C) Galen D) Linnaeus

b) Example of an organized crude drug is: [1]
A) Gum arabica B) Digitalis leaf
C) Acacia D) Tragacanth

c) Mutation breeding in medicinal plants is carried out to: [1]
A) Increase yield B) Improve disease resistance
C) Alter phytochemical composition D) All of the above

d) Camera lucida is used in: [1]
A) Chemical evaluation B) Quantitative microscopy
C) Biological testing D) Pharmacological screening

e) Casein is obtained from: [1]
A) Cow's milk B) Soybean
C) Egg yolk D) Goat's milk

f) Beeswax is classified as: [1]
A) Carbohydrate B) Fixed oil
C) Wax D) Protein

g) Glycosides are identified by: [1]
A) Shinoda test B) Keller–Killiani test
C) Dragendorff's reagent D) Ferric chloride test

h) Which of the following is a resin drug? [1]
A) Asafoetida B) Acacia
C) Gelatin D) Wool fat

i) Which type of plant tissue culture produces genetically identical plants? [1]
A) Organ culture B) Meristem culture
C) Protoplast culture D) Callus culture

j) Example of an edible vaccine-producing plant other than banana: [1]
A) Tomato B) Cotton
C) Hemp D) Jute

k) Write a note on taxonomical classification of crude drugs. [3]
l) What are the applications of plant hormones in cultivation of medicinal plants? [3]
m) Mention pharmaceutical applications of Acacia as an excipient. [3]
n) Write the classification of secondary metabolites. [3]
o) Give nutritional requirements of plant tissue culture. [3]

PART - B

(50 Marks)

2.a) Discuss about the Development of Pharmacognosy and add a note on sources of marine drugs.
b) Explain Pharmacological and chemo taxonomical classification of crude drugs. [5+5]

OR

3.a) Write short notes on tissue culture as a source of drugs.
b) Explain in detail about organized and unorganized drugs with suitable examples. [5+5]

4.a) Explain about the processing of crude drugs and add a note on hybridization.
b) Explain the importance of lycopodium spore method in quantitative microscopy of crude drugs. [5+5]

OR

5.a) Define adulteration and write about different types of adulteration in crude drugs with examples.
b) Explain various methods of evaluation of crude drugs with examples. [5+5]

6.a) Write the biological source, chemical nature, commercial uses of Honey and Chaulmoogra oil.
b) Explain the importance of natural allergens and hemp. [5+5]

OR

7.a) Write source, preparation and commercial applications of Agar and Castor oil.
b) Describe the source, chemistry, preparation and evaluation of any one proteolytic enzyme. [5+5]

8.a) Explain the role of Pharmacognosy in Siddha and Naturopathy.
b) Write the classification and properties of flavonoids with examples. [5+5]

OR

9.a) Write the importance of Pharmacognosy in Allopathy system of medicine.
b) What are Glycosides, Classify with suitable examples and write its properties and identification tests. [5+5]

10.a) Explain about different types of plant tissue cultures.
b) Discuss future prospects of edible vaccines. [5+5]

OR

11.a) Write the applications of plant tissue culture in secondary metabolite production.
b) Write a note on maintenance of growth pattern in tissue culture. [5+5]

Code No: 284AD

R22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Pharmacy II Year II Semester Examinations, March - 2025
PHARMACOGNOSY AND PHYTOCHEMISTRY - 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 classification of drugs is based on plant parts used? [1]
A) Morphological B) Taxonomical
C) Alphabetical D) Pharmacological

b) Which of the following is an example of a gum? [1]
A) Myrrh B) Tragacanth
C) Asafoetida D) Resin

c) What does organoleptic evaluation focus on? [1]
A) Taste, smell, and appearance B) Chemical composition
C) Microscopic structure D) Growth environment

d) Which plant hormone promotes flowering in plants? [1]
A) Auxins B) Gibberellins
C) Cytokinins D) Ethylene

e) What is the primary component of beeswax? [1]
A) Protein B) Lipid
C) Carbohydrate D) Enzyme

f) Which is an example of a proteolytic enzyme? [1]
A) Papain B) Pepsin
C) Bromelain D) All of the above

g) Which property is common to all volatile oils? [1]
A) Solubility in water B) Strong odor
C) High boiling point D) Crystallization

h) Which secondary metabolite is identified using the Keller-Kiliani test? [1]
A) Alkaloids B) Glycosides
C) Volatile oils D) Resins

i) What is the main use of edible vaccines? [1]
A) Pest control B) Human immunity
C) Plant growth D) Soil fertility

j) Which of the following is a type of plant tissue culture? [1]
A) Organogenesis B) Angiogenesis
C) Hematogenesis D) Pathogenesis

k) Describe the differences between organized and unorganized drugs with examples. [3]
l) Explain the importance of quality control in natural drugs with examples. [3]
m) Describe the sources and preparation of castor oil. [3]
n) Explain the significance of secondary metabolites in traditional medicine systems like Siddha and Homeopathy. [3]
o) Discuss the nutritional requirements and their importance in plant tissue culture. [3]

PART-B

(50 Marks)

2.a) Explain the various sources of drugs and their contributions to pharmacognosy.
b) Compare and contrast morphological and taxonomical classification of drugs with examples. [5+5]

OR

3.a) Discuss the role of pharmacological classification in drug discovery and development.
b) Explain the chemical classification of drugs with examples from plant and animal sources. [5+5]

4.a) Explain the steps involved in the cultivation and collection of medicinal plants.
b) Describe the applications of polyploidy and hybridization in medicinal plant development. [5+5]

OR

5.a) Propose strategies for improving the quality and yield of medicinal plants.
b) Explain the use of camera lucida in evaluating crude drugs. [5+5]

6.a) Describe the chemical nature and pharmaceutical utility of wool fat and beeswax.
b) Explain the therapeutic and pharmaceutical significance of carbohydrates in natural drugs. [5+5]

OR

7.a) Discuss the role of marine-derived drugs in novel medicinal therapies.
b) Explain the chemical nature and uses of chaulmoogra oil and castor oil. [5+5]

8.a) Describe the classification, properties, and tests for Resins.
b) Compare the role of Pharmacognosy in Allopathy and Naturopathy. [5+5]

OR

9.a) Identify the role of Flavonoids in medicinal plants and their tests.
b) Discuss the importance of Tannins in pharmacognosy and their identification tests. [5+5]

10.a) Identify the major challenges and solutions in plant tissue culture.
b) Discuss the role of plant growth regulators in tissue culture. [5+5]

OR

11.a) Explain the benefits and limitations of edible vaccines.
b) Compare the different types of plant tissue culture techniques. [5+5]

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Code No: 284AE

R22

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

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 prohibited to be imported? [1]
A) Toilet preparations B) Ayurvedic drugs
C) Schedule 'C' 'G' drugs D) Misbranded drugs

b) As per D & C Act "Schedule FF" is related with [1]
A) Parenteral preparation B) Ointment formulation
C) Skin cosmetic reparation D) Ophthalmic preparation

c) As per D and C Act "Schedule N" is related with [1]
A) List of maximum equipments for efficiently running pharmacy
B) Area for opening retail pharmacy
C) List of minimum equipments for efficiently running pharmacy
D) Area required to open wholesale drug store

d) Schedule X of Drugs and Cosmetics Act comprises [1]
A) List of incurable diseases B) Guidelines for clinical Trials
C) List of generic drugs D) None of the above

e) Coca, opium and hemp come under: [1]
A) Insecticide Act B) Poisons Act
C) Dangerous Drug Act D) Spurious Drug Act

f) Pharmacy Council of India (PCI) is reconstituted: [1]
A) Every 2 year B) Every 3 year
C) Every 5 year D) Every 6 year

g) In 1954 one of the following act is passed [1]
A) Narcotic and psychotropic substance Act
B) Drug and magic Remedies Act
C) The Medical Termination of pregnancy Act
D) Poisonous Act.

h) NLEM means [1]
A) National List of Essential Medicines B) National List of Essential Management
C) National Level of Essential Medicines D) All of Above

i) In Phase-2 trial following number of patient should be studied [1]
A) 10-12 patients B) 1-10 patients
C) 100 patients D) 500 patients

j) Patent Act is established in [1]
A) 1948 B) 1940
C) 1970 D) 1919

k) Define Drug and cosmetics Act. [3]
l) What do you mean by sale of the drugs? [3]
m) Define Drug abuse. [3]
n) Write the full form of NDPS. [3]
o) What are the objectives of MTP Act? [3]

PART - B

(50 Marks)

2.a) What are the conditions of license for manufacture of drugs?
b) Write note on cosmetics prohibited from import. [5+5]

OR

3.a) Write note on manufacture of drugs for test examination and analysis.
b) Write note on prohibition of sale of drugs.
c) Discuss about the offences and penalties of drug and cosmetics act. [4+3+3]

4.a) Write note on list of permitted colours.
b) What are the functions of Drugs Technical Advisory Board?
c) What are the Labeling condition for Schedule H? [3+4+3]

OR

5.a) Write in detail about drugs consultative committee.
b) Discuss about duties of Govt drugs analysts.
c) Write in detail about licensing authorities. [4+3+3]

6.a) Write in detail about functions of State Pharmacy Council .
b) Discuss about manufacture in bond.
c) Write in detail about export of opium. [4+3+3]

OR

7.a) Write in detail about registration of pharmacists.
b) Explain National fund for controlling the drug abuse.
c) Write about manufacture of ayurvedic preparations. [3+4+3]

8.a) Write in detail about objectives of Drugs and Magic Remedies act.
b) Explain transfer of animals.
c) Write note on retail price of scheduled formulations. [4+3+3]

OR

9.a) Write in detail about performance of experiments.
b) Explain stocking of animals.
c) Write note on objectives of Drugs price control order. [3+2+4]

10.a) Write in detail about Mudaliar committee.
b) Explain Pharmacist in relation to his medical profession.
c) Write note on Intellectual Property Rights. [3+4+3]

OR

11.a) Write in detail about Health survey and development committee
b) Write note on Pharmacist"s oath. [6+4]

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19AN