



# GPAT PUNCH

*Objective Book For*

**GPAT COMPETITIVE EXAM WITH EXPLANATION**

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TOTAL  
TOPICWISE  
MCQS

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**15 YEAR+**  
GPAT PYQ  
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# GPAT PUNCH



*Objective Book For*

**GPAT COMPETITIVE EXAM WITH EXPLANATION**

**AS PER GPAT LATEST SYLLABUS AND PATTERN**

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## PREFACE

The GPAT Punch Objective Book is meticulously designed to cater to the needs of aspiring pharmacists preparing for the Graduate Pharmacy Aptitude Test (GPAT). This comprehensive guide serves as a one-stop resource, combining a vast array of 12,000+ concept-based MCQs, organized subject-wise and topic-wise, with detailed explanations and a cutting-edge digital test series platform to enhance preparation.

Recognizing the significance of clarity and depth in concept-building, this book is designed to simplify complex topics and strengthen foundational knowledge. The MCQs have been carefully selected and structured to reflect the latest GPAT syllabus and exam pattern, emphasizing the key subjects such as Pharmaceutics, Pharmacology, Pharmaceutical Chemistry, and Pharmacognosy, among others. Each question is accompanied by a digital explanation, providing readers with an instant understanding of the concepts and reasoning behind the correct answers.

Key features of the book include:

- **10,000+ Concept-Based MCQs:** A vast question bank, meticulously divided into subjects and topics for targeted practice.
- **Digital Explanation:** Easily accessible, step-by-step solutions to enhance understanding and retention.
- **Test Series:** Online mock tests to simulate the GPAT exam environment, allowing aspirants to assess their preparedness and identify areas for improvement.
- **Up-to-Date Content:** Questions are aligned with the latest GPAT syllabus, ensuring relevance and exam-oriented preparation.
- **Subject-Wise & Topic-Wise Approach:** Facilitates systematic learning and gradual mastery of topics.

The GPAT Punch Objective Book is not just a collection of questions but a complete preparatory solution that combines traditional learning with modern digital tools. It is designed to instill confidence in aspirants and empower them to excel in the competitive GPAT examination.

We hope this book becomes an invaluable tool in your GPAT preparation journey, helping you achieve your goals and excel in your pharmacy career.

**Authors**

## GPAT EXAM FORMAT & QUESTION DISTRIBUTION

A thorough understanding of the GPAT-2025 exam pattern is essential for aspirants aiming to excel. The exam, conducted by NBEMS, follows a structured pattern designed to evaluate candidates effectively. Familiarizing oneself with this pattern allows aspirants to plan their preparation systematically and stay on track for success.

### GPAT EXAM PAPER PATTERN

Parameter	Exam Pattern
Exam Mode	Online Mode
Frequency	Once a year
Exam Duration	3 hours
Type of Questions	Multiple-choice questions
Total Number of Questions	125
Maximum Marks	500
Marking Scheme	4 marks for correct response; 1 mark deducted for wrong response

### GPAT 2024 EXAM PAPER PATTERN ANALYSIS

Subjects	Total Questions	
	NBEMS Pattern	Questions Asked
Pharmaceutics and Allied Subject	38	32
Pharmacology and Allied Subject	28	41
Pharmaceutical Chemistry and Allied	38	31
Pharmacognosy and Allied Subject	10	10
Other Subjects of B.Pharm Course	11	11
Total	125	125

# GPAT SYLLABUS

## 1. PHYSICAL CHEMISTRY

- Composition and Physical States of Matter
- Colligative Properties
- Thermodynamics
- Chemical Equilibria
- Phase Rule
- Refractive Index
- Solutions
- Electrochemistry
- Ionic Equilibrium
- Kinetics

## 2. PHYSICAL PHARMACY

- Matter and Properties of Matter
- Micromeritics and Powder Rheology
- Surface and Interfacial Phenomena
- Viscosity and Rheology
- Dispersion Systems
- Complexation
- Buffers
- Solubility

## 3. ORGANIC CHEMISTRY

- General Principles
- Different Classes of Compounds
- Protection and Deprotection of Groups
- Aromaticity & aromatic chemistry
- Different aromatic classes of compounds
- Polycyclic Aromatic Hydrocarbons
- Carbonyl Chemistry

- Heterocyclic Chemistry
- Bridged Rings
- Kinetic and Thermodynamic Control
- Stereochemistry
- Carbohydrates
- Amino Acids and Proteins
- Organometallic Chemistry
- Pericyclic Reactions

## 4. PHARMACEUTICAL CHEMISTRY

- Pharmaceutical Impurities
- Monographs
- Isotopes
- Therapeutic Classes of Drugs
- Drug Metabolism
- Various classes of Therapeutic Agents
- Different classes of therapeutic drugs

## 5. PHARMACEUTICS

- Pharmacy Profession
- Pharmaceuticals and Dosage Forms
- Routes of Administration
- ADME (Absorption, Distribution, Metabolism, Elimination)
- Sources of Drug Information
- Allopathic dosage form
- Crude extract
- Allergenic extract
- Ayurvedic system of medicine
- Homeopathic system of medicine
- Biological Products

# GPAT SYLLABUS

• GMP	• Drugs acting on urinary system
• Pharmaceutical Plant, location, layout	• Drugs acting on Respiratory system
• Dosage Form Necessities and Additives	• Pharmacology of central nervous System
• Powders	• Pharmacology of Endocrine system
• Capsules	• Chemotherapy
• Tablets	• Autacoids and their Antagonists
• Parenterals - product requiring sterile packaging	• Pharmacology of drug acting on the gastrointestinal tract
• Suspensions	• Chronopharmacology
• Emulsions	• Immunopharmacology
• Suppositories	• Chemotherapy of Malignant Diseases
• Semisolids	• Peptides and proteins as mediators
• Liquids (solutions, syrups, elixirs, spirits, aromatic water, liquid for external uses)	• Nitric oxide
• Pharmaceutical Aerosols	• Vitamins and Minerals
• Ophthalmic preparations	• Principles of toxicology
• Preformulations	<b>7. PHARMACOGNOSY</b>
• Radio Pharmaceuticals	• Introductory Pharmacognosy
• Stability of formulated products	• Classification of Crude Drugs
• Kinetic Principles and Stability Testing	• Sources of Crude Drugs
• Prolonged Action Pharmaceuticals	• Factors Influencing Quality of Crude Drugs
• Novel Drug delivery system	• Techniques in Microscopy
• Cosmetics	• Introduction to Phytoconstituents
• Packaging Materials	• Principles of Plant Classification
• GMP and Validation	• Pharmaceutical Aids
• Pilot plant scale up techniques	• Animal Products
<b>6. PHARMACOLOGY</b>	• Plant Products
• General Pharmacology	• Toxic Drugs
• Pharmacology of peripheral nervous system	• Enzymes
• Pharmacology of cardiovascular System Drugs	• Natural Pesticides and Insecticides
	• Adulteration and Evaluation of Crude Drugs

# GPAT SYLLABUS

- |  |  |
|--|--|
| • Quantitative Microscopy                                  | • Drugs acting on urinary system                       |
| • Biogenetic Pathways                                      | • Miscellaneous methods of analysis                    |
| • Carbohydrates and Lipids                                 | • Calibration  |
| • Tannins  | • General principles of spectroscopy                   |
| • Volatile Oils  | • UV-Visible Spectroscopy                              |
| • Resinous Drugs   | • Spectrofluorimetry                                   |
| • Glycosides   | • Flame photometry & atomic absorption spectrometry    |
| • Alkaloids  | • Infrared (IR) Spectroscopy                           |
| • Herbarium  | • Proton Nuclear Magnetic Resonance (NMR) Spectroscopy |
| • Extraction and Isolation Techniques                      | • Mass Spectrometry                                    |
| • Phytopharmaceuticals                                     | • Polarography   |
| • Quality Control and Standardization of Herbal Drugs      | • Nephelometry & Turbidimetry                          |
| • Herbal Formulations                                      | • Chromatography                                       |
| • Worldwide Trade of Crude Drugs and Volatile Oils         | • Miscellaneous  |
| • Plant Biotechnology                                      |  |
| • Herbal Cosmetics   |  |
| • Traditional Herbal Drugs                                 |  |
| • Plants-Based Industries and Research Institutes in India |  |
| • Patents  |  |

## 8. PHARMACEUTICAL ANALYSIS

- Importance of quality control in pharmacy
- Acid-Base Titrations
- Non-Aqueous Titrations
- Oxidation-Reduction Titrations
- Precipitation Titrations
- Complexometric Titrations
- Gravimetry
- Extraction techniques

## 9. BIOCHEMISTRY

- Cell
- Carbohydrates
- Proteins
- Lipids
- Vitamins
- Biological oxidations & reductions
- Enzymes
- Nucleic Acids
- Hereditary diseases

## 10. BIOTECHNOLOGY

- Plant Cell and Tissue Culture
- Animal Cell Culture
- Fermentation Technology and Industrial Microbiology

# GPAT SYLLABUS

- Recombinant DNA Technology
- Process and Applications
- Biotechnology Derived Products
- Proteomics
- Formulation of Proteins and Peptides

## 11. MICROBIOLOGY

- Introduction to Microbiology
- Microscopy and Staining Technique
- Biology of Microorganisms
- Fungi and Viruses
- Aseptic Technique
- Sterilization and Disinfection
- Microbial Spoilage
- Immunology and Health
- Vaccines and Sera
- Microbial Assay

## 12. PATHOPHYSIOLOGY

- Basic Principles of Cell Injury and Adaptation
- Basic Mechanisms of Inflammation and Repair
- Hypersensitivity
- Auto-Immunity and Diseases of Immunity
- Neoplastic Diseases
- Shock
- Protein-Calorie Malnutrition, Vitamins, Obesity, and Starvation
- Biological Effects of Radiation
- Pathophysiology of Common Diseases
- Infectious Diseases

## 13. BIOPHARMACEUTICS AND PHARMACOKINETICS

- Biopharmaceutics
- Bioavailability and Bioequivalence
- Biopharmaceutical Statistics

## 14. CLINICAL PHARMACY AND THERAPEUTICS

- Clinical Pharmacy Principles
- Clinical Trials
- Therapeutic Drug Monitoring
- Pharmacovigilance
- Therapy for Systemic and Neurological Disorders
- Therapy for Infectious and Endocrine Disorders
- Therapy for Malignant and Skin Disorders

## 15. ANATOMY, PHYSIOLOGY AND HEALTH EDUCATION

- Cell Physiology
- The Blood
- Gastrointestinal Tract
- Respiratory System
- Autonomic Nervous System
- Sense Organs
- Skeletal System
- Central Nervous System
- Urinary System
- Endocrine Glands
- Reproductive System
- Cardiovascular System
- Lymphatic System

# GPAT SYLLABUS

## 16. PHARMACEUTICAL ENGINEERING

- Fluid Flow
- Heat Transfer
- Evaporation
- Distillation
- Drying
- Size Reduction and Size Separation
- Extraction
- Mixing
- Crystallization
- Filtration and Centrifugation
- Dehumidification and Humidity Control
- Refrigeration and Air Conditioning
- Material of Construction
- Automated Process Control Systems
- Industrial Hazards and Safety Precautions

## 17. PHARMACEUTICAL MANAGEMENT

- Introduction to Management
- Planning and Forecasting
- Organization
- Research Management
- Inventory Management
- Communication
- Marketing Research
- Leadership and Motivation
- Human Resource and Development (HRD)
- GATT
- World Trade Organization (WTO) and Trade Related Intellectual Property Rights (TRIPS)

- Standard Institutions and Regulatory Authorities

## 18. PHARMACEUTICAL JURISPRUDENCE

- Pharmacy Act, 1948
- Drugs and Cosmetics Act, 1940
- Narcotic Drugs and Psychotropic Substances Act
- Drugs and Magic Remedies Act, 1954
- Medicinal and Toilet Preparations Act, 1955
- Medical Termination of Pregnancy Act, 1970
- Consumer Protection Act
- Intellectual Property Rights

## 19. DISPENSING & HOSPITAL PHARMACY

- Laboratory Equipment and Prescription Handling
- Percolation Process Preparations
- Maceration Process Preparations
- Marketed vs. Dispensed Products
- Posological Calculations
- Allegation, Dilution, and Isotonic Preparations
- Patent and Generic Products Study
- Compounding and Dispensing
- Prescription Reading and Counseling
- Mock Pharmacy Design



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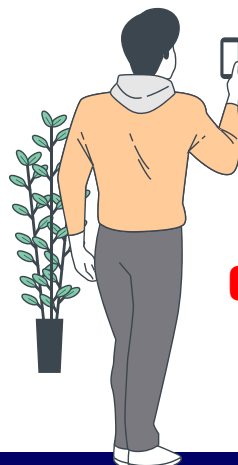
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# PHARMACEUTICS



Cosmetic Technology  
Pharmaceutical Jurisprudence  
Pharmaceutical Engineering  
Pharmaceutical Technology  
Physical Pharmacy  
Biopharmaceutics & Pharmacokinetics  
Dispensing & Hospital Pharmacy



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# COSMETIC TECHNOLOGY

1

## Introduction To Cosmetic Technology

- Cosmetics are substances that are used to enhance**  
(a) Odor of human body (b) Appearance of human body  
(c) Both (a) and (b) (d) None of the above
- The primary component of beeswax are**  
(a) Esters (more than 70%) (b) Alcohols (c) Ether (d) Phenols
- The commonly used natural antioxidant in herbal cosmetics is**  
(a) Butylated Hydroxyanisole (b) Butylated Hydroxytoluene  
(c) Vitamin C (d) None of the above
- Which of these sunscreen ingredients is most likely to cause allergic reactions**  
(a) Avobenzone (b) Zinc oxide (c) Mexoryl SX (d) Oxybenzone
- Which of the following is natural occurring antioxidant**  
(a) Vitamin C (b) Vitamin E (c) Alpha lipoic acid (d) All of the above
- Herbal drug preparations are prepared by**  
(a) Decoction (b) Infusion (c) Maceration (d) All of the above
- Soaps were originally made from**  
(a) Proteins (b) Animal fats and vegetable oils  
(c) Chemicals extracted from the soil (d) Fats
- Soap's work because the "water-loving" end of the soap molecule attracts a water molecule and the "water-hating" end attracts**  
(a) Other soap molecules (b) Water molecules also  
(c) Grease or dirt (d) All of the above
- The scientific term for "water-loving" is**  
(a) Hydrophilic (b) Hydroxide (c) Hydrophobic (d) None of the above
- The scientific term for "water-hating" is**  
(a) Hydroxide (b) Hydrophilic (c) Hydrophobic (d) All of the above
- The "water-loving" end of the soap molecule has a charge that is**  
(a) Positive (b) Negative  
(c) Either positive or negative (d) Neutral
- The water-repelling end of the soap molecule has a**  
(a) Negative charge (b) Positive charge  
(c) Neutral or no charge (d) Both positive and negative charge

45. **How does being in the sun affect acne**  
(a) Clears up pimples (b) Boosts the amount of oil your skin makes  
(c) Makes scars less visible (d) All of the above
46. **What is hyperhidrosis**  
(a) The inability to perspire  
(b) An itchy skin condition caused by sweating  
(c) The medical term for excessive sweating  
(d) Excessively dry skin
47. **The \_\_\_\_\_ gives color to the hair fiber**  
(a) Lymphocytes (b) Monocytes (c) Melanocytes (d) Leucocytes
48. **With an increase in the degree of cold working, tensile strength of material**  
(a) Decreases (b) Remains constant  
(c) First decreases then increase (d) Increases
49. **Melanin protects us from UV radiation by**  
(a) Preventing our DNA from being scrambled  
(b) Preventing Folate in our blood stream to be broken down  
(c) Both (a) and (b)  
(d) None of these
50. **What is the role of fixatives in perfumes**  
(a) Increase rate of evaporation (b) Decrease rate of evaporation  
(c) No change in rate of evaporation (d) None of these

## Cosmetics for Skin Preparation

51. **Vanishing cream is an ointment that may be classified as [GPAT-2023 SHIFT-II]**  
(a) Water soluble base (b) Oleaginous base  
(c) Absorption base (d) Emulsion base
52. **A typical skin cream consisting of stearic acid, potassium hydroxide, glycerin, water, preservative and perfume, would be commonly known as [GPAT-2022]**  
(a) Cold cream (b) Vanishing cream  
(c) Foundation cream (d) All-purpose cream
53. **Titanium dioxide is used in sun screen products as a topical protective. The topical protective effect of titanium dioxide is arising due to one of the following properties Identify that [GPAT-2012]**  
(a) It has a high bulk density  
(b) It has a high LTV absorptivity  
(c) It has a low water solubility  
(d) It has a high refractive index
54. **Which one of the followings is NOT used in preparation of baby powders [GPAT-2012]**  
(a) Stearic acid (b) Boric acid  
(c) Kaolin (d) Calcium carbonate



## Historical Background Drug Legislation in India, Code of Ethics for Pharmacists

- Where is the Indian Pharmacopoeial Lab is situated  
(a) Kolkata (b) Mumbai (c) Ghaziabad (d) Lucknow
- Bengal chemical and pharmaceutical works was started by  
(a) Prof. T.K. Gajjar in 1901 (b) Acharya Prafulla Chandra Ray in 1903  
(c) Prof. T.K. Gajjar in 1903 (d) Acharya Prafulla Chandra Ray in 1901
- Chairman of Drugs Enquiry committee (1927) is [GPAT 2020]  
(a) R.N. Chopra (b) Joseph Bhore (c) SS. Bhatia (d) B. Mukherjee
- The committee appointed by government of India to look into the drug industry and various aspects of drugs like licensing price control, imports, role of foreign sector quality control was headed by  
(a) Mudaliar (b) Bhatia (c) Hathi (d) Bhore
- First time in India, a chemist's shop was opened by \_\_\_ who came to India with East India company in Calcutta  
(a) Mr. Bathgate (b) Mr. Hamilton (c) Ms. Elizabeth (d) Mr. Smith
- In 1903, Who started a small factory at Parel, which led to development of Alembic Chemical Works Ltd. At Baroda  
(a) Prof. T. K. Gajjar (b) Smith Stanistreet  
(c) Acharya Prafulla Chandra Ry (d) Mr. Bathgate
- Who is a pioneer and father of Pharmaceutical Education in India  
(a) Prof. T.K. Gajjar (b) Prof. M.L. Schroff (c) R.N. Chopra (d) A.P. Chandra ray
- At the first time in India, a chemist shop was opened in which year  
(a) 1711 (b) 1946 (c) 1811 (d) 1902
- Who started the Indian Journal of Pharmacy  
(a) Prof. Shroff (b) Prof. Srivastava (c) Prof. G.N. Ghosh (d) Dr. Nityanand
- Compendium of pharmaceuticals and specialties is an International Drug Compendia from [GPAT 2021]  
(a) German Pharmaceutical Association (b) Canadian Pharmaceutical Association  
(c) Australian Pharmaceutical Association (d) Indian Pharmaceutical Association

## The Pharmacy Act

- The number of persons elected as the member of the Pharmacy Council of India from the teaching profession is [GPAT-2023 SHIFT-II]  
(a) Five (b) Six (c) Seven (d) Eight

87. As per Drugs and Cosmetics Act, match correct schedule to their respective titles [GATE-1991]
- |                |  |
|----------------|--|
| 1. Schedule P  | [P] Standard for poison                  |
| 2. Schedule Q  | [Q] Standard for cosmetics               |
| 3. Schedule S  | [R] Standard for ophthalmic preparations |
| 4. Schedule FF | [S] Life period of the drug              |
|                | [T] Coal tar colour used in cosmetics    |
- (a) 1-[T], 2-[Q], 3-[R], 4-[S]      (b) 1-[P], 2-[Q], 3-[S], 4-[R]  
 (c) 1-[S], 2-[T], 3-[Q], 4-[R]      (d) 1-[R], 2-[S], 3-[Q], 4-[P]
88. List below are some schedules 1 to 4 and the rules [P] to [T]. Match them correctly [GATE-1991]
- |      |   |
|------|---|
| 1. C | [P] List of medicine required to be taken only under supervision of R.M.P |
| 2. F | [Q] Biological and special products                                       |
| 3. G | [R] Provision applicable to vaccines, toxins, antigens and sera           |
| 4. M | [S] GMP requirement of factory premises plants, equipment etc.            |
|      | [T] Standards for surgical dressing                                       |
- (a) 1-[P], 2-[Q], 3-[R], 4-[S]      (b) 1-[P], 2-[Q], 3-[S], 4-[R]  
 (c) 1-[Q], 2-[R], 3-[P], 4-[S]      (d) 1-[R], 2-[S], 3-[Q], 4-[P]
89. In Drugs and Cosmetics Act and Rules their under, list of substances that should be sold by retail only on prescription of registered medical practitioner is given in [GATE-1990]
- (a) Schedule H      (b) Schedule V      (c) Schedule X      (d) Schedule Q
90. The following form under schedule A of the Drugs and Cosmetics Act utilized for applying for licenses listed [P] to [T], match them [GATE-1990]
- |              |  |
|--------------|--|
| 1. Form 8    | [P] Application to import drugs for personal use                       |
| 2. Form 12 A | [Q] Application for grant of license to sell, stock or distribute drug |
| 3. Form 19   | [R] Application to import biological products                          |
| 4. Form 24 C | [S] Application to manufacture homeopathy drugs                        |
|              | [T] Application to important drugs for research purposes               |
- (a) 1-[Q], 2-[P], 3-[S], 4-[R]      (b) 1-[P], 2-[Q], 3-[R], 4-[S]  
 (c) 1-[R], 2-[P], 3-[Q], 4-[S]      (d) 1-[R], 2-[T], 3-[Q], 4-[S]
91. Match the following with the schedules listed in [P] to [T] correctly [GATE-1989]
- |  |       |
|--|-------|
| 1. Requirements of factory premises                                | [P] P |
| 2. Standards for disinfectant fluids                               | [Q] V |
| 3. Life period of drugs  | [R] N |
| 4. List of minimum equipment for the efficient running of Pharmacy | [S] O |
- (a) 1-[Q], 2-[S], 3-[P], 4-[R]      (b) 1-[Q], 2-[R], 3-[S], 4-[P]  
 (c) 1-[Q], 2-[R], 3-[P], 4-[S]      (d) 1-[R], 2-[Q], 3-[S], 4-[P]
92. Licence to sell drug specified in schedule C and C1 is given from number [GATE-1989]
- (a) 19      (b) 18      (c) 21      (d) 24
93. According to Drugs and Cosmetics Rules a list of schedule are as follows. Match the appropriate statement [P] to [S] with them [GATE-1988]
- |               |  |
|---------------|--|
| 1. Schedule G | [P] Drugs used under medical supervision           |
| 2. Schedule P | [Q] Drug used only under medical supervision       |
| 3. Schedule J | [R] Minimum equipment needed for a retail pharmacy |
| 4. Schedule N | [S] Diseases that a drug should not claim to cure  |
|               | [T] Life period of drugs                           |
- (a) 1-[P], 2-[Q], 3-[S], 4-[R]      (b) 1-[T], 2-[R], 3-[S], 4-[P]  
 (c) 1-[S], 2-[Q], 3-[P], 4-[R]      (d) 1-[P], 2-[T], 3-[S], 4-[R]



## Size Reduction

- Which of the following mills is based on the mechanism of impact and attrition for size reduction [GPAT-2024]**  
(a) Roller mill                      (b) Colloid mill                      (c) Hammer mill                      (d) Fluid energy mill
- This given equation represents which law: [GPAT-2024]**  
 $E = K_k \ln(d_1/d_2)$   
(a) Bond's law                      (b) Fick's law                      (c) Rittinger's law                      (d) Kick's law
- Rittinger's hypothesis relates [GPAT-2023 SHIFT-I]**  
[P] Energy used in size reduction  
[Q] New surface area produced  
[R] Equivalent shape  
[S] Reynold's number  
(a) P and Q                      (b) Q and S                      (c) P and R                      (d) P and S
- When adhesive attractions between molecules of different species exceeds cohesive attraction between like molecules, the deviation according to Raoult's law is said to be [GPAT-2020]**  
(a) Partial                      (b) Positive                      (c) Neutral                      (d) Negative
- Hardinge mill is a variant of [GPAT-2019]**  
(a) Fluid energy mill                      (b) Ball mill  
(c) Hammer mill                      (d) Rotary cutter mill
- Size reduction of a material with the addition of another material is called as [GPAT-2016]**  
(a) Mixing                      (b) Trituration                      (c) Levigation                      (d) Pulverization
- A pharmaceutical API is prone to environmental oxidation. To achieve a Better therapeutic action, its size needs to be reduced method of choice for pulverization is [GPAT-2015]**  
(a) Ball milling                      (b) Hammer mill                      (c) Colloid mill                      (d) Rotary cutter mill
- How much can be the working revolution per minute (RPM) of the Ball mill [GPAT-2013]**  
(a) 23-28 "D where D means the diameter of jar  
(b) Two times more than the critical revolution per minute  
(c) 42.3 "D (D=diameter of the jar)  
(d) The average of critical RPM and the optimal RPM
- Choose the correct combination [GPAT-2012]**  
(I) Rod mill                      (P) Dried plant drug  
(II) Hammer mill                      (Q) Thermolabile drug  
(III) Fluid energy mill                      (R) Paint  
(a) (I) - (Q), (II) - (P), (III) - (R)                      (b) (I) - (R), (II) - (P), (III) - (Q)  
(c) (I) - (Q), (II) - (R), (III) - (P)                      (d) (I) - (P), (II) - (Q), (III) - (R)

154. Which one of the following is an example for solid-liquid extraction

- (a) Extraction of antibiotics from fermentation broth
- (b) Extraction of diosgenin from tubers
- (c) Extraction of lubricating oils from petroleum
- (d) Pressing of ground nuts for oil

155. The solvents used for the extraction of crude drugs is known as

- (a) Menstrum
- (b) Marc
- (c) Maceration
- (d) Miels

## Crystallization

156. The more appropriate purpose of spiral scrapper in Swenson-Walker crystallizer is [GPAT- 2023 SHIFT-II]

- (a) Agitation of sample (solution)
- (b) Conveying the crystals
- (c) Prevent accumulations of crystals on the cooling surface
- (d) Provides desired temperature to the sample (solution)

157. Match List I of Unit operations of crystallizers with List II of principle/characteristics properties of crystallizer

**CRYSTALLIZER**

**UNIT OPERATIONS**

1. Swenson-walker crystallizer
2. Krystal crystallizer
3. Vacuum crystallizer
4. Forced circulation type crystallizer

**PRINCIPLE/CHARACTERISTICS**

**PROPERTIES**

- [P] Adiabatic evaporative cooling
- [Q] Cooling alone
- [R] Evaporation
- [S] Heat exchange, separation, circulation

Choose the correct answer from the options given below [GPAT-2022]

- (a) 1-[P], 2-[Q], 3-[S], 4-[R]
- (b) 1-[R], 2-[P], 3-[S], 4-[Q]
- (c) 1-[P], 2-[S], 3-[R], 4-[Q]
- (d) 1-[Q], 2-[R], 3-[P], 4-[S]

158. In Mier's theory of supersaturation, solubility chart displays the profile of curve with positive and very low slope in [GPAT-2012]

- (a)  $KNO_3$
- (b) NaCl
- (c)  $MnSO_4$
- (d) None of these

159. Which of the following conditions favor formation of large crystals [GPAT-2012]

- (a) High degree of supersaturation
- (b) Low nucleation rate
- (c) High magma density
- (d) Rapid cooling of magma

160. Which is three-dimensional arrangement of particles in crystals

- (a) Space Lattice
- (b) Surface Angle
- (c) Space Angle
- (d) Surface lattice

161. Formation of crystals by chemical reaction is

- (a) Desolutions
- (b) Seeding
- (c) Precipitation
- (d) Saturation

162. Spurious nucleation in crystal can be avoided by removing

- (a) Solvent
- (b) Impurities
- (c) Solute
- (d) Solution

163. A loose aggregation of molecules/ ions to form crystals is called

- (a) Aggregates
- (b) Cluster
- (c) Agglutinins
- (d) Agrimoles



110. Emulsions are defined as thermodynamically unstable systems. The events that follow sequentially towards instability are
- (a) Coalescence breaking creaming and flocculation
  - (b) Coalescence flocculation creaming and breaking
  - (c) Flocculation creaming breaking and coalescence
  - (d) Flocculation creaming coalescence and breaking
111. Creaming is a \_\_\_\_\_ process
- (a) Reversible
  - (b) Irreversible
  - (c) Both (a) and (b)
  - (d) Difficult to predict
112. O/W emulsions normally cream
- (a) Up first & down then
  - (b) Upward
  - (c) Downward
  - (d) None of the above
113. Downward creaming means \_\_\_\_\_ rate of sedimentation
- (a) Negative
  - (b) Positive
  - (c) Same
  - (d) No change
114. Which one of the following emulsifier is used to stabilise the emulsion of W/O type
- (a) SLS
  - (b) Span 20
  - (c) Tween 20
  - (d) Tragacanth
115. In the stability of emulsion which important instability step should be prevented
- (a) Breaking
  - (b) Coalescence
  - (c) Flocculation
  - (d) Creaming
116. Emulsions made with tweens are
- (a) W/O
  - (b) O/W
  - (c) Clear
  - (d) Unstable
117. The phase inversion occur due to
- (a) Changes in type of emulsifying agent
  - (b) Change in phase volume ratio
  - (c) Both (a) and (b)
  - (d) None of the above
118. Which of the following is used as antioxidants for emulsified systems
- (a) Dodecyl gallate
  - (b) Butylated hydroxy anisole (BHA)
  - (c) Butylated hydroxytoluene (BHT)
  - (d) All of the above
119. Dry Gum Method is also known as
- (a) Continental method
  - (b) English method
  - (c) Bottle method
  - (d) Forbe's method
120. In Dry gum method 4:2:1 consist of
- (a) 4 parts oil 2 parts water and 1 part emulsifier
  - (b) 4 parts water 2 parts oil and 1 part emulsifier
  - (c) 4 parts emulsifier 2 parts water and 1 part emulsifier
  - (d) 4 parts oil 2 parts emulsifier and 1 part water

## Semisolids Dosage Form

121. What should be the log P value for an ideal drug candidate for transdermal permeation? [GPAT 2024]
- (a) Below 1
  - (b) 1-3
  - (c) 5-7
  - (d) Above 7

284. A drug whose solubility is 1 g/L in water, when given orally at a dose of 500 mg is absorbed up to 95% of the administered dose. The drug belongs to which class according to the BCS classification [GPAT-2011]  
(a) Class I (b) Class II (c) Class III (d) Class IV
285. A drug was administered to 30 subjects as a tablet (30 mg), an oral aqueous solution (30 mg) and as an intravenous (0.3 mg). Mean AUC's ( $\mu\text{g}\cdot\text{hr}/\text{mL}$ ), dose normalized to 1mg, for tablet, oral solution and IV were 0.91, 0.87 and 103.0 respectively. Calculate the relative bioavailability of the drug in table compared to the solution to the oral solution absolute bioavailability of tablets from [GATE-2008]  
(a) 104.6%, 0.883% (b) 81%, 5.6% (c) 10.46%, 8.83% (d) 19%, 56%
286. In cross-over bioavailability studies, in which the subjects must be rested for sufficient time between each drug administration to ensure that 'washout' is complete. Practically, wash-out is deemed complete, when [GATE-2008]  
[P] 95% is wash out [Q] 100% is wash out  
[R] 5 biological half-lives have elapsed [S] 2 biological half-lives have elapsed  
Choose the correct option  
(a) [P], [R] (b) [P], [S] (c) [Q], [R] (d) [Q], [S]
287. Which is the ratio of the mean residence time to the absorption time  
(a) Absorption number (b) Dissolution number  
(c) Dose number (d) Intrinsic dissolution
288. USP Apparatus is  
(a) Flow-through- cell (b) Paddle over disk (c) Cylinder (d) Paddle
289. In vitro dissolution rate studies on drug product are useful in bioavailability evaluation if they are correlated with  
(a) Disintegration rate (b) In vivo studies in at least 3 species of animals  
(c) Chemical stability of drugs (d) In vivo studies in human
290. The gold coating on a USP Dissolution apparatus – I basket should be  
(a) Not more than 2.5 m in thickness  
(b) Not more than 0.1 mm in thickness  
(c) Not more than 0.025 m in thickness  
(d) Not more than 0.22 mm in thickness
291. When Statistical Moment theory is used for IVIVC  
(a) Mean dissolution time is correlated with mean residence time  
(b)  $LD_{50}$  is correlated with rate constant of dissolution  
(c) Drug excreted unchanged in urine is correlated with percent drug dissolved  
(d) 63.2% of drug dissolved is correlated with 63.2% of initial concentration reduction
292. Absolute bioavailability is denoted by  
(a)  $\frac{[AUC]_{\text{oral}}}{[AUC]_{\text{i.v.}}}$  (b)  $\frac{[AUC]_{\text{test}}}{[AUC]_{\text{std}}}$   
(c)  $\frac{[AUC]_{\text{oral}} \cdot D_{\text{iv}}}{[AUC]_{\text{iv.}} \cdot D_{\text{oral}}}$  (d)  $\frac{[AUC]_{\text{test}} \cdot D_{\text{std}}}{[AUC]_{\text{std}} \cdot D_{\text{test}}}$
293. The term bioavailability refers to the  
(a) Relationship between the physical and the chemical properties of a drug and the systemic absorption of drug.  
(b) Measurement of the rate and extent of therapeutically active drug that reaches the systemic circulation  
(c) Movement of drug into the body tissues over time  
(d) Dissolution of a drug in the GIT

# PHYSICAL PHARMACY

6



## States of Matter

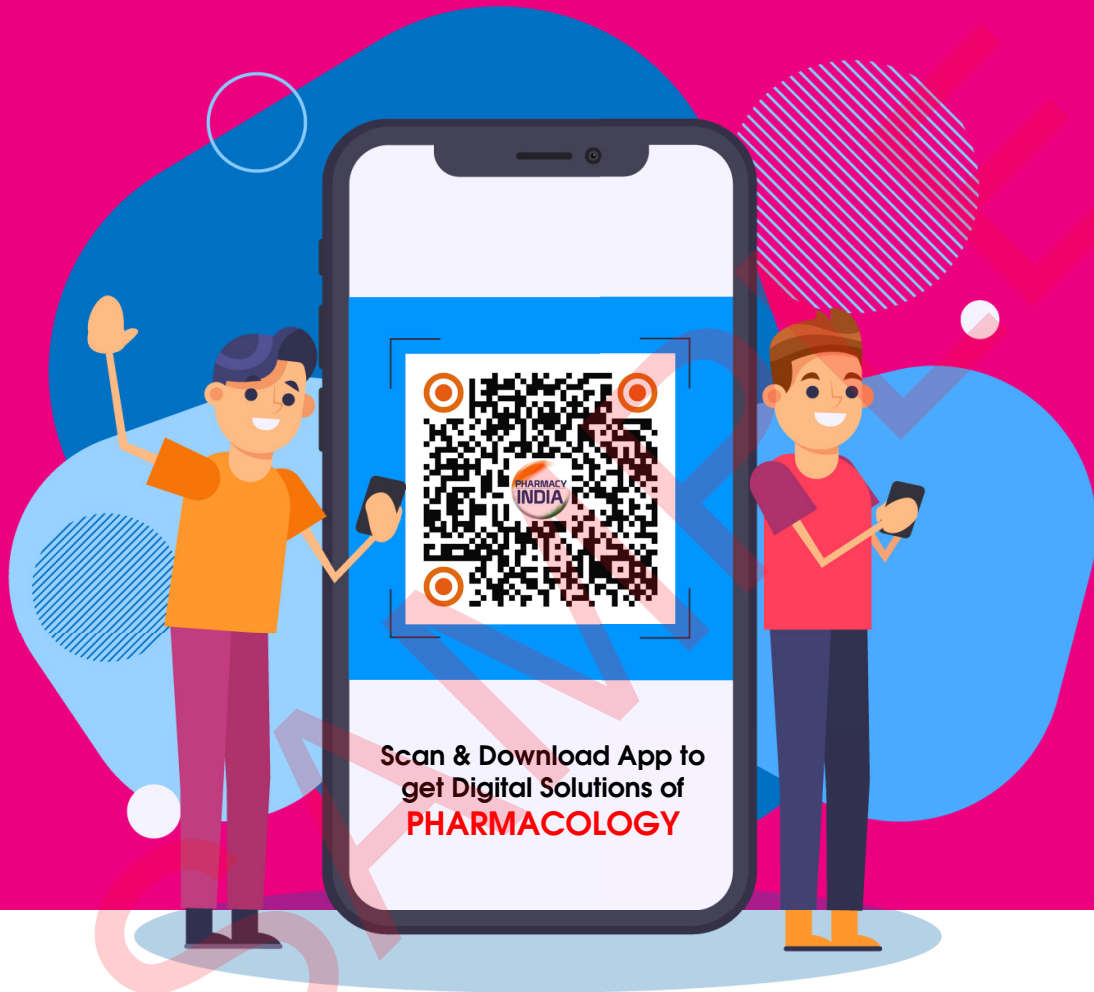
- Dipole-dipole weak interactions are also called as [GPAT-2023 SHIFT-I]**
  - London forces
  - Electrovalent forces
  - Debye interactions
  - Keesom forces
- Which of the following is most appropriate to crystalline solid [GPAT-2022]**
  - Give diffraction bands
  - Characteristics geometrical shapes
  - Sharp melting point
  - All of these
- The relationship between the vapor pressure and the absolute temperature of a liquid expressed by [GPAT-2021]**
  - Biles Equation
  - Lien and Kennon Equation
  - Joule-Thomson Equation
  - Clausius-Clapeyron Equation
- Choose the wrong statement from the following with regard to Amorphous solids [GPAT-2020]**
  - Usually they are anisotropic
  - They tend to flow when subjected to sufficient pressure
  - Considered as super cooled fluids
  - They do not have definite melting point
- The Crystal form of Sulphacetamide is [GPAT-2020]**
  - Rhombohedral
  - Orthorhombic
  - Monoclinic
  - Triclinic
- Identify the molecule which will not exhibit Dipole moment [GPAT-2019]**
  - Carbon dioxide
  - Carbon monoxide
  - Chloroform
  - Ammonia
- Keesom interactions has a force of [GPAT-2018]**
  - 0.5-1 kcal/mol
  - 1-7 kcal/mol
  - 1-3 kcal/mol
  - None of these
- Dipole - induced dipoles are also known as [GPAT-2018]**
  - London forces
  - Keesom forces
  - Debye forces
  - Hydrogen bonding
- The Gibb's Phase rule [GPAT-2016]**
  - Holds only for systems with more than components
  - Predicts that a maximum of three phase can exits in one components system
  - Does not count phase compositions as intensive variables
  - Does not count pressure and temperature as intensive variables
- The equation  $dP/dT = pH_{vap}/RT^2$  is known as [GPAT-2015]**
  - Clausius equation
  - Clapeyron equation
  - Clausius-Clapeyron equation
  - Boltzmann-Planck equation
- Causius-Clapeyron equation is use to express the relationship between [GPAT-2015]**
  - Vapor pressure and absolute temperature
  - Rate of vaporization at a definite temperature
  - Rate of vaporization at a definite pressure
  - Vapor pressure and boiling point

13. According to — law, at definite temperature, the partial pressure of a component in a liquid mixture is equal to vapour pressure in the pure state multiplied by the mole fraction of the component in the solution  
(a) Plank (b) Henderson (c) Henry's law (d) Raoult's
14. — solutions are those which obey Raoult's law at all temperature and for all compositions  
(a) Ideal (b) Non ideal (c) Mixed (d) None of these
15. A modification of the — equation is termed as extended Hildebrand solubility approach  
(a) Wagner-Nelson (b) Scatchard-Hildebrand  
(c) Boltzmann-Planck (d) Henderson-Hasselbalch

### Dissolution

1. According to Noyes-Whitney's equation, the factor that affects the dissolution is:  
(a) Intrinsic solubility (b) Surface area  
(c) Temperature (d) Viscosity
2. From the point of view of dissolution, which of the following drug forms is least absorbed  
(a) Coated tablets (b) Solutions  
(c) Suspensions (d) Uncoated tablets
3. Which category of drugs is evaluated for dissolution  
(a) Highly diffusible (b) Ionizable (c) Poorly-water soluble (d) Water-soluble
4. Which one of the is the initial step in drug absorption from a tablet  
(a) Deaggregation (b) Diffusion  
(c) Disintegration (d) Dissolution
5. Absorption of a drug is NOT a problem, when its solubility is about (in percent)  
(a) 0.001 (b) 0.01 (c) 0.1 (d) 1.0
6. Which one of the following (forms) creates more difficulties regarding dissolution  
(a) Amorphous form (b) Anhydrous form  
(c) Crystalline form (d) Metastable form
7. Which one of the drugs below is expected to have the greatest dissolution  
(a) Ascorbic acid (b) Aspirin (c) Griseofulvin (d) Methylprednisolone
8. Which one of the following excipients enhances the dissolution of a hydrophobic drug  
(a) Gum acacia (b) Ethylcellulose  
(c) Lactose (d) Magnesium stearate
9. For in vitro-in vivo correlations, which one of the following parameters is extensively used  
(a) Mean amount of drug dissolved (b) Per cent of drug dissolved  
(c) Rate of dissolution (d) Time required for maximum dissolution
10. In dissolution experiments, which one of the following coated basket is preferred, when the acid medium is used  
(a) Chrome (b) Gold (c) Teflon (d) Stainless steel

# PHARMACOLOGY



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## Drugs Acting on Autonomic Nervous System

### Cholinergic Drugs

- Organophosphorous insecticides are highly toxic substances which affect nervous system. Their mechanism of action is [GPAT-2024]**
  - They block the proton pump
  - They inhibit  $\text{Na}^+\text{-K}^+$  ATPase
  - They inhibit ion channels
  - They irreversibly bind to catalytic site of acetylcholine esterase
- Pralidoxime chloride is a drug that [GPAT-2024]**
  - Reduces the vesicular stores of catecholamines in adrenergic and dopaminergic neurons
  - Blocks the active transport of choline into cholinergic neurons
  - Reactivates cholinesterase that have been inhibited by organophosphate cholinesterase inhibitors
  - Stimulates the activity of phospholipase C with increased formation of inositol triphosphate
- Fight or Flight responses are mediated by [GPAT-2023 SHIFT-I]**
  - Parasympathetic division of Autonomous nervous system
  - Sympathetic division of Autonomous nervous system
  - Serotonergic nervous system
  - Histaminergic nervous system
- One of the following matches is CORRECT choose it [GPAT-2023 SHIFT-II]**
  - M1 Acetylcholine receptors confined to brain M2 Acetylcholine receptors neural M3 Acetylcholine receptors are cardiac M4 Acetylcholine receptors glandular
  - M1 Acetylcholine receptors neural M2 Acetylcholine receptors confined to brain M3 Acetylcholine receptors are cardiac M4 Acetylcholine receptors glandular
  - M1 Acetylcholine receptors neural M2 Acetylcholine receptors cardiac M3 Acetylcholine receptors are cardiac to glandular M4 Acetylcholine receptors confined to brain
  - M1 Acetylcholine receptors glandular M2 Acetylcholine receptors neural M3 Acetylcholine receptors are cardiac to brain M4 Acetylcholine receptors cardiac
- Which one of the following interferes with the release of cholinergic neurotransmitter, acetylcholine by the neurons of autonomic nervous system [GPAT-2023 SHIFT-II]**
  - Reserpine
  - Guanethidine
  - Hemicholinium
  - Botulinum toxin
- One of the following statements with respect to Carbachol is NOT CORRECT Identify [GPAT-2020]**
  - It can be administered orally
  - It possesses both muscarinic and nicotinic action
  - It is more susceptible to hydrolysis as compared to acetylcholine
  - The amino group decreases electrophilicity of the carbonyl group
- Which of the following is NOT CORRECT for myasthenia gravis [GPAT-2018]**
  - Down regulation of nicotinic receptors (n) leads to myasthenia gravis
  - Tubocurarine is used to treat myasthenia gravis
  - It is an autoimmune disorder
  - Thymectomy is treatment option for myasthenia gravis
- Which of the following is a shortest acting cholinesterase inhibitor enlisted below [GPAT-2018]**
  - Neostigmine
  - Pyridostigmine
  - Edrophonium
  - Physostigmine

## Hormones and Related Drugs

### Pituitary, Thyroid Hormones and Thyroid inhibitors

- Name the gland that is located at the base of the throat, just inferior to the laryngeal prominence (Adam's apple) [GPAT-2024]**  
 (a) Pituitary (b) Pineal gland (c) Hypothalamus (d) Thyroid
- Prominent biochemical features of Graves' disease are [GPAT-2023 SHIFT-I]**  
 (a) Decreased ionized calcium in body fluids  
 (b) Decreased  $T_4$  and  $T_3$  in circulation  
 (c) Increased ionized calcium in body fluids  
 (d) Increased  $T_4$  and  $T_3$  in circulation
- Conversion of  $T_4$  to  $T_3$  inhibition is associated with [GPAT-2021]**  
 (a) Propylthiouracil (b) Radioactive iodine  
 (c) Lugol's iodine (d) Carbimazole
- Which one of the following is an organ specific localized autoimmune disease [GPAT-2020]**  
 (a) Grave's disease (b) Scleroderma  
 (c) Polyarteritis nodosa (d) Rheumatoid arthritis
- Identify the hormone that stimulates sperm production in testes and ovulation in females [GPAT-2018]**  
 (a) Prolactin  
 (b) Luteinizing hormone  
 (c) Follicle stimulating hormone  
 (d) Adrenocorticotrophic hormone
- The thymus secretes several hormones related to the immunity. These hormones promote the maturation of T- lymphocyte cells. These hormones are [GPAT-2017]**  
 1. Thymosin  
 2. Thymic humoral factor  
 3. Thymic factor  
 4. Interleukins  
 (a) Only 1, 2 (b) 1, 2 and 3 (c) Only 3 (d) Only 4
- Insulin and Thyroxine arrive at an organ / tissue / cell at the same time. Thyroxine causes an effect on the organ but insulin does NOT because [GPAT-2017]**  
 (a) The organ cell have receptors for thyroxine but no receptor for insulin  
 (b) Thyroxine is a lipid-soluble hormone and insulin is water soluble  
 (c) The target cell in the organ have up-regulated for thyroxine  
 (d) Thyroxine is local hormone and insulin is a circulating hormone
- Indicate which one of the following drugs may interfere with the uptake of  $^{123}\text{I}$  in thyroid gland [GPAT-2016]**  
 (a) Beta-blockers (b) Alpha-blockers  
 (c) Calcium channel blockers (d) Amiodarone

## Antiarrhythmic Drugs

83. In ECG the P wave corresponds to the following event [GPAT-2023 SHIFT-1]  
 (a) Atrial depolarization (b) Ventricular depolarization  
 (c) Atrial repolarization (d) Ventricular repolarization
84. Which of the following is **WRONGLY** matched combination of anti - arrhythmic drugs and their class [GPAT-2021]  
 (a) Lidocaine-IB (b) Disopyramide - II (c) Diltiazem - IV (d) Amiodarone - III
85. Identify antiarrhythmic drug that increases duration of QT wave and decreases the sinus rate, whereas it has no effect on QRS complex [GPAT-2020]  
 (a) Lidocaine (b) Amiodarone (c) Verapamil (d) Quinidine
86. All of the following mechanisms of action correctly match a drug **EXCEPT** [GPAT-2016]  
 (a) Quinidine: Blocks sodium channels (b) Bretylium: Blocks potassium channels  
 (c) Verapamil: Blocks calcium channels (d) Procainamide: Blocks potassium channels
87. This drug is a Class IC antiarrhythmic drug [GPAT-2015]  
 (a) Flecainide (b) Sotalol (c) Lidocaine (d) Verapamil
88. All of the following are common side effects of quinidine administration **EXCEPT** [GPAT-2014]  
 (a) Diarrhoea (b) Nausea and vomiting (c) Dry mouth (d) Tinnitus
89. Which of the following drugs can cause Torsade de pointes [GPAT-2013]  
 (a) Quinidine (b) Lignocaine (c) Esmolol (d) Flecainide
90. The pacemaker potential is due to [GPAT-2013]  
 (a) Fast Na<sup>+</sup> channel (b) Decrease in K<sup>+</sup> permeability  
 (c) Slow Ca<sup>2+</sup> channel (d) Rapid repolarization
91. Which one of the following anti-arrhythmic drugs acts by inhibiting potassium, sodium and calcium channels [GPAT-2012]  
 (a) Quinidine (b) Lignocaine (c) Amiodarone (d) Flecainide
92. Digitalis toxicity is enhanced by co-administration of [GPAT-2010]  
 (a) Potassium (b) Quinidine (c) Diuretics (d) Antacids
93. The drug which increases the plasma concentration of digoxin by a pharmacokinetic mechanism is [GATE-2009]  
 (a) Lidocaine (b) Captopril (c) Quinidine (d) Hydrochlorothiazide
94. Choose the correct class IV anti-arrhythmic that is primarily indicated for the treatment of supraventricular tachyarrhythmias [GATE-2000]  
 (a) Mexiletine (b) Diltiazem (c) Nifedipine (d) Propranolol
95. In supra ventricular arrhythmia Digoxin when supplemented with is dangerous [GATE-1998]  
 (a) Quinidine (b) Procaine (c) Calcium (d) Xylocaine
96. True about quinidine is/are  
 (a) It increases effective refractory period (b) Used in hypertension  
 (c) Causes paradoxical bradycardia (d) It decreases absolute refractory period
97. Drug of choice for supraventricular tachycardia is  
 (a) Verapamil (b) Diltiazem (c) Digoxin (d) Phenytoin

**131. Leprosy is caused by which microorganism**

- (a) Clostridium perfringes (b) Mycobacterium leprae  
(c) Mycobacterium tuberculosis (d) None of the above

**132. The drug that should be used for prophylaxis of close contact of a patient suffering from meningococcal meningitis is**

- (a) Rifampicin (b) Dapsone (c) Erythromycin (d) Amikacin

**133. Pigmentation and ichthyosis are side effects of**

- (a) Clofazimine (b) Rifampicin (c) Dapsone (d) Ethionamide

**134. In leprosy, the best bactericidal agent is**

- (a) Clofazimine (b) Dapsone (c) Rifampicin (d) Ethionamide

**135. Most common drug used in leprosy is**

- (a) Dapsone (b) Clofazimine (c) Ethionamide (d) Ofloxacin

**Antifungal Drugs**

**136. Antifungal agent 5-fluorocytosine is converted to its active metabolite 5-fluorouracil by one of the following fungal enzymes [GPAT-2020]**

- (a) Cytosine deacetylase (b) Cytosine reductase  
(c) Cytosine demethylase (d) Cytosine deaminase

**137. Terbinafine acts as [GPAT-2016]**

- (a) Competitive inhibitor of squalene epoxidase  
(b) Noncompetitive inhibitor of squalene epoxidase  
(c) Competitive inhibitor of folate synthetase  
(d) Noncompetitive inhibitor of folate synthetase

**138. Gynecomastia and menstrual irregularities are the adverse effects of [GPAT-2015]**

- (a) Terbinafine (b) Flucytosine (c) Griseofulvin (d) Ketoconazole

**139. Which antifungal acts by non-competitive inhibition of squalene epoxidase thereby inhibition of ergosterol synthesis [GPAT-2013]**

- (a) Caspofungin (b) Amphotericin B  
(c) Terbinafine (d) Ketoconazole

**140. Group I Group II [GATE-2008]**

- | Drugs          | Mechanisms                                     |
|----------------|--|
| 1. Terbinafine | [P] Inhibition of reverse transcriptase        |
| 2. Cidofovir   | [Q] Selective inhibition of squalene epoxidase |
| 3. Imatinib    | [R] Inhibition of DNA polymerase               |
| 4. Stavudine   | [S] Tyrosine kinase inhibitor                  |
- (a) 1-[P], 2-[Q], 3-[R], 4-[S] (b) 1-[S], 2-[R], 3-[Q], 4-[P]  
(c) 1-[Q], 2-[R], 3-[S], 4-[P] (d) 1-[R], 2-[Q], 3-[P], 4-[S]

**141. One of the drugs when coadministered with Terfenadine may lead to life threatening Cardiac arrhythmia [GATE-2001]**

- (a) Lomefloxacin (b) Clofazimine (c) Itraconazole (d) Neomycin

# PHARMACOGNOSY



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## General Introduction

- The following classification of herbal drugs gives better understanding of biosynthetic pathway in the drug [GPAT-2021]**
  - Botanical
  - Chemotaxonomical
  - Taxonomical
  - Chemical
- Which one of the following is unorganized drug [GPAT-2021]**
  - Rauwolfia Root
  - Acacia Gum
  - Senna Leaves
  - Cinchona Bark
- Plants which are not differentiated into root, stem and leaves are [GPAT-2020]**
  - Plant aginales
  - Principes
  - Thallophyte
  - Bromeliales
- All members of this order are trees or shrubs; mostly evergreen with needle - like leaves, monoecious or dioecious - sporophylls usually in cones. Resin ducts occur in all parts [GPAT-2019]**
  - Cycadales
  - Ginkgoales
  - Taxales dark
  - Coniferae
- The CCCN code indicating the botanical drugs is [GPAT-2018]**
  - 2211
  - 1122
  - 1211
  - 1311
- Animal cells do not contain [GPAT-2016]**
  - Chloroplast
  - Cytoplasm
  - Nucleus
  - Cell membrane
- Meristematic tissues have following characteristics EXCEPT [GPAT-2014]**
  - They do not have any capacity for multiplication
  - The cells are small & isodiametric in nature
  - The cells are thin walled with prominent nucleus
  - The cells are compactly arranged without any intercellular spaces
- Identify the mismatched pair [GPAT-2013]**
  - Hydathodes- Piper betel
  - Arillode- Cardamom
  - Caruncle- Belladonna
  - Strophiole- Colchicum
- Identify the wrong statement regarding mucilage [GPAT-2013]**
  - They are normally sulphuric acid esters
  - They are the normal products of the cell
  - They are produced by injury to plant
  - The ester group is a complex polysaccharide
- Arillode is [GATE-2007]**
  - Warty out-growth from microphyll, e.g. castor
  - Succulent growth from hilum covering the entire seed, e.g. nutmeg
  - Outgrowth originating from micropyle and covering the seeds, e.g. cardamom
  - Enlarged funicle, e.g. colchicum seed
- Fruits which are derived from plants Umbelliferae are all of the type [GATE-1991]**
  - Cremocarp
  - Pericarp
  - Epicarp
  - Mesocarp
- Who coined the term Pharmacognosy**
  - Hippocrates
  - Pelletier
  - Aristotle
  - Seydler

## Alkaloids

- The ring structure present in strychnine is [GPAT-2023 SHIIFT-I]**  
(a) Indole (b) Purine  
(c) Rotating the plane of polarized light (d) Phenanthrene
- Quinine and Quinidine differs in [GPAT-2023 SHIIFT-I]**  
(a) Chemical nature (b) Molecular formula  
(c) Rotating the plane of polarized ligst (d) Precursor of biosynthesis
- Terpene indole alkaloid derived from L-Tryptophan via Secologanin is [GPAT-2023 SHIFT-II]**  
(a) Morphine (b) Codeine (c) Ajamalicine (d) Thebaine
- Which one of the following drug is skeletal muscle relaxant [GPAT-2023 SHIFT-II]**  
(a) Datura stramonium (b) Atropa belladonna  
(c) Hyoscyamus niger (d) Chondrodendron tomentosum
- Which of the following materials are specified as a suitable diluent for powdered opium [GPAT-2022]**  
[A] Powdered grass [B] Powdered cocoa husk  
[C] Lactose colored with burnt sugar [D] Powdered digitalis  
**Choose the correct answer from the options given below**  
(a) A and D only (b) B and D only (c) B and C only (d) A and C only
- Tropane nucleus is combination of [GPAT-2022]**  
(a) Pyrrolidine & Piperidine (b) Pyrrolidine & Pyridine  
(c) Pyrrolidine & Oscine (d) Piperidine & Oscine
- Type of alkaloids present in Colchicum [GPAT-2022]**  
(a) Tropane alkaloids (b) Steroidal glycoalkaloids  
(c) Amino alkaloids (d) Quinoline alkaloids
- Which one of the following alkaloids contains isoquinoline nucleus [GPAT-2021]**  
(a) Quinine (b) Hyoscyamine (c) Piperine (d) Papaverine
- In the process of Extraction, ethanol is used as a solvent for [GPAT-2020]**  
(a) Sucrose (b) Waxes (c) Alkaloids (d) Gums
- Nicotine from tobacco is an alkaloid which is [GPAT-2020]**  
(a) Oxygen free liquid (b) Semisolid  
(c) Crystalline (d) Oxygen free solid
- Dragendorff's reagent is [GPAT-2020]**  
(a) Potassium iodate (b) Potassium bismuth iodide  
(c) Potassium mercuric iodide (d) Potassium picrate
- In colour test for alkaloids colchicine with mineral acids gives [GPAT-2020]**  
(a) Blue colour (b) Red colour (c) Yellow colour (d) Violet colour
- Regholarrhenines A-F have been isolated from [GPAT-2019]**  
(a) Veratrums (b) Areca (c) Aconite (d) Kurchi
- Which of the following alkaloid (form) is used to treat migraine [GPAT-2017]**  
(a) Vinca (b) Coca (c) Ergot (d) Belladonna

**Resins**

- The biological name of Indian Bdellium is: [GPAT-2024]**  
(a) Commiphora berryi (b) Commiphora wightii  
(c) Commiphora mukul (d) Commiphora molmol
- Etoposide and Teniposide are the semi-synthetic derivatives of: [GPAT-2024]**  
(a) Podophyllotoxin (b) Taxol (c) Digoxin (d) Vincristine
- If the resins contain benzoic acids or cinnamic acids they are called [GPAT-2023 SHIFT-I]**  
(a) Colophony (b) Balsams (c) Glycoresins (d) Resin
- In Gambir - fluorescein test the petroleum spirit layer shows a strong [GPAT-2019, GPAT-2021]**  
(a) Green fluorescence (b) Blue fluorescence  
(c) Yellow fluorescence (d) Red fluorescence
- Pungency of Zingiber officinale rhizome is due to the presence of [GPAT-2019]**  
(a) Citral (b) Gingerol (c) Commiphoric acid (d) Gingeral
- Shellac is a resinous substance prepared from a secretion that encrusts the bodies of a scale insect [GPAT-2019]**  
(a) Viverra civet (b) Kerria lacca  
(c) Acipenser huso (d) Alverites moschiferus
- Which of the following constituents is responsible for colour of shellac [GPAT-2017]**  
(a) Shelloic acid (b) Laccaic acid  
(c) Aleuritic acid (d) All of these
- Etoposide and Teniposide are the semisynthetic derivatives of [GPAT-2017]**  
(a) Myrrhabolic acid (b) Podophyllotoxin  
(c) Abietic acid (d) Umbelliferone
- Asafoetida + Nitric acid gives [GPAT-2013]**  
(a) Reddish-brown colour (b) Green colour  
(c) Yellowish-orange colour (d) Blue fluorescence
- “May apple” plant do possess [GPAT-2013]**  
(a) Anti ulcer (b) Purgative (c) Hypoglycaemic (d) Anti-cancer
- Study the relationship between the given two statements [GPAT-2012]**  
[P] Capsanthin is a red coloured principle from Capsicum annum  
[Q] Capsanthin is a vanillyl amide of isodecanoic acid  
**Choose the correct answer**  
(a) Both P and Q are correct  
(b) Both P and Q are incorrect  
(c) P is correct but Q is incorrect  
(d) P is incorrect but Q is correct
- Rhizomes of Zingiber officinale contain some sesquiterpene hydrocarbons Some hydrocarbons are given below [GPAT-2012]**  
[P] B-Bisabolene [Q] Gingerone A  
[R] Gingerol [S] Zingiberene  
**Identify the correct pair of constituents present in the rhizomes**  
(a) P and S (b) P and Q (c) Q and S (d) Q and R

# PHARMACEUTICAL CHEMISTRY



Organic Chemistry  
Inorganic Chemistry  
Physical Chemistry  
Medicinal Chemistry  
Pharmaceutical Analysis



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## Classification of Organic Compounds

- Organic compounds are broadly classified as \_\_\_\_\_**  
(a) Open chain compounds and acyclic compounds  
(b) Open chain compounds and linear chain compounds  
(c) Cyclic compounds and alicyclic compounds  
(d) Alicyclic compounds and acyclic compound
- Aliphatic compound is the other name for \_\_\_\_\_**  
(a) Acyclic compounds  
(b) Alicyclic compounds  
(c) Ring compounds  
(d) Closed chain compounds
- Which among the following is not an example of Acyclic compound?**  
(a) Acetaldehyde  
(b) Ethane  
(c) Cyclopropane  
(d) Isobutane
- Which among the following is not an example of alicyclic compound**  
(a) Cyclohexane  
(b) Cyclohexene  
(c) Tetrahydrofuran  
(d) Acetic acid
- Which among the following is not an aromatic compound (in specific)?**  
(a) Naphthalene  
(b) Aniline  
(c) Pyridine  
(d) Tropolone
- Find the odd one among the following.**  
(a) Alicyclic compounds  
(b) Heterogeneous compounds  
(c) Branched chain compounds  
(d) Aromatic compounds
- Identify the odd one among the following.**  
(a) Indene  
(b) Anthracene  
(c) o, m, p-xylene  
(d) Azulene
- Organic compounds can be classified even based upon the functional groups. Identify the one which is not a functional group?**  
(a) Isocyanide  
(b) Isociano  
(c) Carboxyl  
(d) Carbonyl
- Which among the following is not a class of organic compound?**  
(a) Carbonyl compound  
(b) Nitro compound  
(c) Amides  
(d) Electro compounds
- Which among these is not associated with aliphatic compounds?**  
(a) They contain  $(4n+2)$  pi electrons  
(b) Contain straight chain compounds  
(c) Contain branched chain compounds  
(d) Has appropriate number of H-atoms and functional groups
- Find the odd one out**  
(a) Aromatic  
(b) Alkanes  
(c) Alkynes  
(d) Alkenes
- Compounds which have different arrangements of atoms in space while having same atoms bonded to each other are said to have**  
(a) Position isomerism  
(b) Functional group isomerism  
(c) Chain isomerism  
(d) Stereoisomerism

**126. Determine the correctness or otherwise of the following Assertion [A] and the Reason [R] [GPAT-2011]**

**Assertion (A):** Quaternary ammonium phase transfer catalysts can enhance the rate of nucleophilic aliphatic substitution reactions in biphasic systems with water soluble nucleophiles

**Reason (R):** Quaternary ammonium compounds are highly polar, positively charged water soluble compounds

- (a) Both (A) and (R) are true but (R) is not the correct reason for (A)  
 (b) Both (A) and (R) are true and (R) is the correct reason for (A)  
 (c) Both (A) is true (R) is false  
 (d) Both (A) and (R) are false

**127. Arrange the following Lowry-Bronsted acids into their decreasing order of acidity (highest to lowest)**

**[GPAT-2011]**

**[P]  $C_2H_5OH$       [Q]  $H_3C-C\equiv CH$       [R]  $H_2O$       [S]  $CH_3NH_2$**

- (a)  $R > P > Q > S$       (b)  $P > R > Q > S$   
 (c)  $P > Q > R > S$       (d)  $R > Q > P > S$

**128. Aprotic polar solvents increase the rate of  $S_N2$  reactions manifold. Enhancement in the rate of such reactions is due to which one of the following effects [GPAT-2011]**

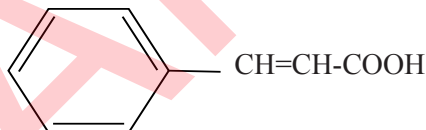
- (a) Solvation of the anion by the solvent leaving the cation unaffected  
 (b) Solvation of both of the ionic species  
 (c) Desolvation of the cation and solvation of the anion  
 (d) Solvation of the cation by the solvent leaving the anion unaffected

**129. In nucleophilic aliphatic substitution reactions arrange the following leaving groups in decreasing order of their leaving capacity [GPAT-2011]**

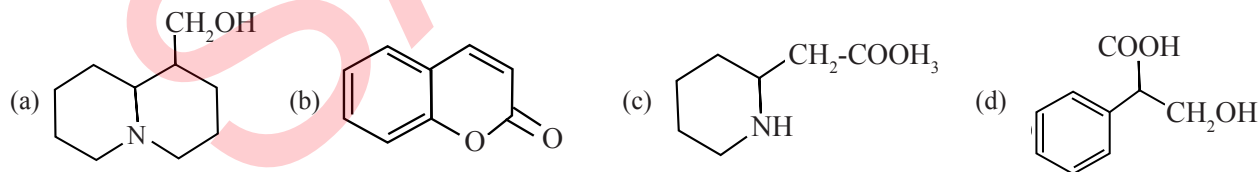
**[P] Bromyl      [Q] Hydroxyl      [R] Chloro      [S] Mesyl**

- (a)  $S > R > P > Q$       (b)  $P > S > R > Q$   
 (c)  $R > Q > S > P$       (d)  $R > S > Q > P$

**130. Choose the correct option [GATE-2008]**



is the precursor for the biosynthesis of

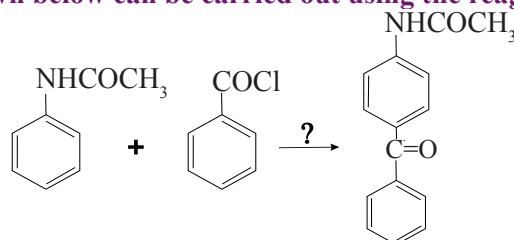


**131. Acidity of Ascorbic acid is due to the presence of [GATE-1989]**

- (a) Free carboxylic acid      (b) A number of hydroxyl group  
 (c) Enolic groups      (d) None of these

**132. The chemical reaction shown below can be carried out using the reagent listed from A to D Indicate the correct one [GATE-1991]**

- (a)  $CH_3-HgBr$   
 (b)  $CuCl$   
 (c)  $AlCl_3$   
 (d)  $CH_3COONa$

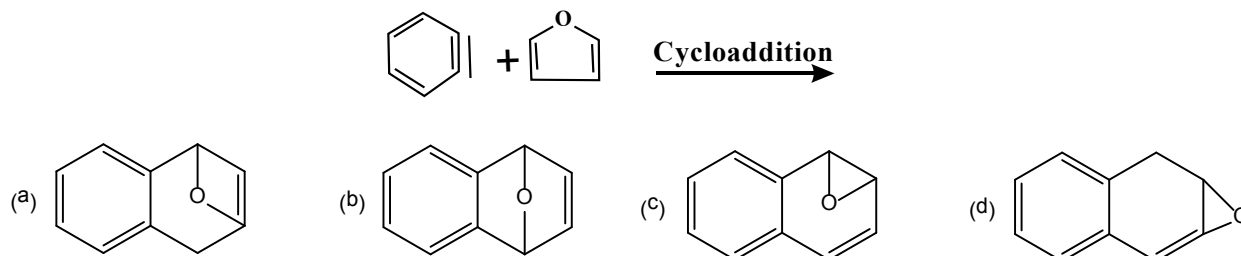


## Protection and Deprotection Groups

- Amine group protection during peptide synthesis can be accomplished by converting the amine to [GPAT-2021]**
  - 9 - Fluorenyl methyl carbamate
  - 1, 3- Dithiane
  - Tetrahydropyranyl ether
  - Dimethyl acetal
- One of the following is a most commonly used protecting group for amines [GPAT-2019]**
  - Para Methyl benzyl (PMB)
  - t-Butyloxy carbonyl (t-BOC)
  - Methoxy methylene (MOM)
  - Tetra hydro pyranyl oxy (THP)
- Protection of amino group in aniline by acetyl group result in**
  - Increased activation potential of amino group
  - Decreased activation potential of amino group
  - No effect on reactivity of benzene towards electrophiles
  - Makes group meta directing
- What is formed when an Formaldehyde is protected with ethane-1, 2- diol (ethyleneglycol)**
  - Ether
  - ketal
  - Formal
  - Ester
- Dithianes can be further removed by**
  - Camphor
  - Lewis base
  - Metal salt
  - None of the above

## Pericyclic Reaction

- The perfect orientation for a Diels-Alder reaction between the reactants is [GPAT-2023 SHIFT-I]**
  - Diene should be S-cis and reaction endo facing
  - Diene should be S-cis and reaction exo facing
  - Diene should be S-trans and reaction endo facing
  - Diene should be S-trans and reaction exo facing
- A reagent may attach itself to a conjugated diene to the carbons at the two ends of the conjugated system. Identify the reaction involved from the following [GPAT-2023 SHIFT-I]**
  - 1,2-addition
  - 1,4-addition
  - 1,3-addition
  - 2,4-addition
- The major product formed in the below reaction is [GPAT-2022]**



# INORGANIC CHEMISTRY

11



## Indian Pharmacopoeia

- The first edition of Indian Pharmacopoeia was published in**  
(a) 1955 (b) 1966 (c) 1947 (d) 1945
- Who publish the Indian Pharmacopoeia**  
(a) Central Governor (b) Central drug laboratory  
(c) Ministry of Health and Family Welfare (d) Central Indian Pharmacopoeial Laboratory
- IP 2015 incorporates**  
(a) 1550 monographs (b) 2050 monographs (c) 2550 monographs (d) 3050 monographs
- The first edition of British Pharmacopoeia was published in which year**  
(a) 1854 (b) 1857 (c) 1864 (d) 1867
- Indian Pharmacopoeia uses**  
(a) Metric system (b) Avoirdupois system (c) Apothecaries system (d) All of these
- Latest edition of Indian Pharmacopoeia was published in the year**  
(a) 1996 (b) 2022 (c) 2010 (d) 2007
- In which year the government of India constituted a permanent Indian Pharmacopoeia committee**  
(a) 1955 (b) 1948 (c) 1960 (d) 1945
- Which of the following test is NOT official as per Indian Pharmacopoeia**  
(a) Uniformity of content (b) Uniformity of weight (c) Uniformity of colour (d) Disintegration
- In 1885, which of the following Pharmacopoeias was made official in India**  
(a) Indian Pharmacopoeia (b) European Pharmacopoeia  
(c) United States (d) British Pharmacopoeia
- The number of newly added monographs in Indian Pharmacopoeia 2022 is**  
(a) 92 (b) 74 (c) 63 (d) 103

## Limit Test

- In which limit test, Thioglycolic acid is used:[GPAT-2024]**  
(a) Limit test for sulphate (b) Limit test for iron  
(c) Limit test for chloride (d) Limit test for arsenic
- Silver nitrate reagent is used for limit test in Indian Pharmacopoeia for [GPAT-2021]**  
(a) Lead (b) Iron (c) Chloride (d) Mercury
- Which method is used for the Limit test for arsenic [GPAT-2018]**  
(a) Gutzeit method (b) Oswald method (c) Arrhenius method (d) Karl-Fischer method
- Limit test is used to detect [GPAT-2015]**  
(a) Purity (b) Heavy metals (c) Pyrogen (d) All of these

### Chemical Kinetics

1-b	2-c	3-c	4-c	5-a	6-c	7-d	8-d	9-c	10-d
11-b	12-c	13-b	14-b	15-a	16-a	17-c	18-b	19-c	20-b
21-b	22-d	23-b	24-b	25-c	26-	27-b	28-b	29-b	30-b
31-b									

### Electrochemistry

1-a	2-b	3-d	4-a	5-a	6-d	7-c	8-a	9-c	10-a
11-d	12-c	13-a	14-b	15-b	16-c	17-a	18-d	19-d	20-a

### Chemical & Ionic Equilibrium

1-d	2-d	3-b	4-b	5-c	6-c	7-b	8-a	9-b	10-c
11-d	12-d	13-a	14-d	15-c	16-a	17-b	18-d	19-a	20-d



## Introduction to Medicinal Chemistry

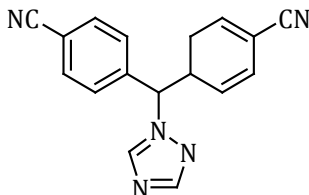
- Which functional group in drug molecules is most likely to undergo phase I metabolic oxidation by cytochrome P450 enzymes: [GPAT-2024]  
 (a) Ester group (b) Amide group (c) Hydroxyl group (d) Methyl group
- What software programme is used to determine the Verloop steric parameter in QSAR [GPAT-2018]  
 (a) Alchemy (b) Chem3D (c) Sterimol (d) Chem-Draw
- Craig plot is used in [GPAT-2014]  
 (a) Drug designing (b) Protein structure determination  
 (c) Nucleic acid structure determination (d) Carbohydrate structure determination
- Which one of the following is NOT a bioisosteric pair [GPAT-2011]  
 (a) Divalent ether (-O-) and amine (-NH) (b) Hydroxyl (-OH) and thiol (-SH)  
 (c) Carboxylate (CO<sub>2</sub>) and sulfone (SO<sub>2</sub>) (d) Hydrogen(-H) and fluorine (-F)
- Conjugation of a drug includes the following EXCEPT [GPAT-2023 SHIFT-II]  
 (a) Glucuronidation (b) Sulfate formation (c) Hydrolysis (d) Methylation
- Light directed synthesis on silica wafers is a part of [GPAT-2021]  
 (a) Bulk synthesis (b) Combinatorial synthesis  
 (c) Asymmetric synthesis (d) Inorganic synthesis
- Metabolic oxidation of carbon-nitrogen, carbon-oxygen and carbon-Sulphur systems principally involves two basic types of bio-transformation processes [GATE-2007]  
 [P] Hydroxylation of the  $\alpha$ -carbon atom attached directly to the heteroatom  
 [Q] Mixed function oxidase system also oxidizes carbon atom adjacent to carbonyl and imino functions  
 [R] Hydroxylation of the hetero-atom only  
 [S] Microsomal hydroxylation at allylic carbon atom  
 (a) [P], [R] (b) [P], [S] (c) [Q], [P] (d) [R], [S]
- Light directed synthesis on silica wafers is a part of [GPAT-2021]  
 (a) Bulk synthesis (b) Combinatorial synthesis  
 (c) Asymmetric synthesis (d) Inorganic synthesis
- What does the Hansch equation in QSAR primarily relate?  
 (a) Solubility and melting point (b) Biological activity and physicochemical properties  
 (c) Toxicity and boiling point (d) Dosage and potency
- Which of the following physicochemical properties is most commonly correlated with biological activity in QSAR studies?  
 (a) Boiling point (b) Melting point  
 (c) Color of the compound (d) Partition coefficient (log P)
- In QSAR,  $\pi$  represents which property?  
 (a) Hydrophilicity (b) Hydrophobicity (c) Toxicity (d) Surface tension

**62. Choose the correct statement about estrogen**

- (a) Ring D is benzenoid and –OH group at C<sub>17</sub> is phenolic
- (b) Ring A is benzenoid and –OH group at C<sub>3</sub> is phenolic
- (c) Ring A is quinonoid and –OH group at C<sub>3</sub> is alcoholic
- (d) Ring D is quinonoid and –OH group at C<sub>17</sub> is phenolic

**63. Identify the given structure**

- (a) Letrozole
- (b) Prednisolone
- (c) Cortisone
- (d) Aldosterone



**64. The type of ring system found in Anastrozole is**

- (a) Triazole ring
- (b) Pteridine ring
- (c) Oxazaphosphorine ring
- (d) None of the above

**65. Drug belonging to the class of 5 $\alpha$ -reductase inhibitor is**

- (a) Testosterone
- (b) Finasteride
- (c) Flutamide
- (d) Stanozolol

**Drugs Acting On Peripheral Nervous System**

**Local Anaesthetics**

**1. The starting raw material for synthesis of lignocaine is: [GATE-1989, GPAT-2024]**

- (a) p-Nitroacetophenone
- (b) 4-Chlorobenzyl cyanide
- (c) 4-Amino-3-Nitroanisole
- (d) 2, 6-Xylidine

**2. Following statements are given for local anaesthetic drug lidocaine [GPAT-2012]**

- [P] It contains a xylidine moiety
- [Q] It can be used as antiarrhythmic agent on oral administration
- [R] When administered along with adrenaline its toxicity is reduced and its effect is prolonged
- [S] Chemically it is 2-diethylamino-2, 6-dimethylphenyl acetamide

**Choose the correct combination of statements**

- (a) P, Q and S
- (b) P, Q and R
- (c) P, R and S
- (d) Q, R and S

**3. Chemical nomenclature of Procaine is [GPAT-2010]**

- (a) 2-Diethylaminoethyl 4-aminobenzoate
- (b) N, N-Diethyl 4-aminobenzoate
- (c) 4-Aminobenzamidoethyl amine
- (d) 4-Amino-2-diethylaminoethyl benzoate

**4. Four sets of intermediates are listed below. Choose the correct set for the synthesis of Bupivacaine IP [GATE-1998]**

- (a)  $\alpha$  -Picolinic Acid Chloride with 2, 6-Diethyl Aniline
- (b)  $\alpha$ -Picolinic Acid Chloride with 2, 6-Dimethyl Aniline
- (c)  $\alpha$  -Picolinic Acid Chloride with Aniline Hydrochloride
- (d)  $\alpha$  -Picolinic Acid Chloride with 2, 6-Di Methyl Aniline



## Analytical Errors, Accuracy and Precision

### 1. Match list I with list II [GPAT-2022]

List I (VOLUMETRIC SOLUTION)	List II (PRIMARY STANDARD)
1. 0.1 M Iodine	[P] Potassium iodate
2. 0.1M Sodium thiosulphate	[Q] Potassium bromate
3. 0.1M Sodium hydroxide	[R] Potassium hydrogen phthalate
4. 0.1M Perchloric acid	[S] Arsenic trioxide
	[T] Potassium hydrogen phthalate

Choose the correct answer from the options given below

- (a) 1- [S], 2- [Q] 3- [R], 4- [T]                      (b) 1- [S], 2- [Q], 3- [R], 4- [P]  
 (c) 1- [P], 2- [S] 3- [Q], 4- [R]                      (d) 1- [R], 2- [Q], 3- [S], 4- [P]
2. Closeness of a measured value to the value is known as [GPAT-2020]  
 (a) Accuracy                      (b) Deviation                      (c) Precision                      (d) Bias
3. Permitted tolerance limit for a 100 ml class B volumetric flask and 1000 ml class B volumetric flask according to BS 1792 specifications respectively are [GPAT-2019]  
 (a) 0.15 and 0.80                      (b) 0.80 and 0.30                      (c) 1.00 and 10.00                      (d) 0.15 and 1.5
4. What quantity of an indicator solution shall be added when quantity is not mentioned in an assay or test [GPAT-2018]  
 (a) 0.1 ml                      (b) 0.05 ml                      (c) 0.2 ml                      (d) 0.5 ml
5. Which one of the following statements is NOT true [GPAT-2010]  
 (a) Accuracy expresses the correctness of measurement  
 (b) Precision represents reproducibility of measurement  
 (c) High degree of precision implies high degree of accuracy also  
 (d) High degree of accuracy implies high degree of precision also
6. Which of the following is a measure of precision?  
 (a) Standard deviation                      (b) Bias                      (c) Mean value                      (d) Percent error
7. Which type of error affects the accuracy of measurements?  
 (a) Random error                      (b) Systematic error                      (c) Gross error                      (d) All of the above
8. The term "bias" in analytical measurements refers to:  
 (a) Random errors in the data                      (b) Consistent deviation from the true value  
 (c) Fluctuations due to environmental conditions                      (d) High variability in repeated measurements
9. What type of error can be minimized by increasing the number of measurements?  
 (a) Systematic error                      (b) Instrumental error                      (c) Random error                      (d) Gross error
10. Precision in analytical measurement refers to:  
 (a) Closeness of repeated measurements to each other                      (b) Closeness of measurements to the true value  
 (c) Ability to detect small differences                      (d) Consistent errors in measurements

20. One of the following is the technique used in preparing the column
- (a) Dry packing technique (b) Wet packing technique  
(c) Both (a) & (b) (d) None of the above

## High Performance Liquid Chromatography (HPLC)

1. An essential requirement of the mobile phase in HPLC is that [GATE-1988]
- (a) It must have constant flow rate with pulses (b) It must be freshly distilled  
(c) It must be run at 20°C only (d) It must flow with pulses
2. The particle size of stationary phase in HPLC is
- (a) 100 $\mu$  (b) 60-200 $\mu$  (c) 3-20 $\mu$  (d) 20-40 $\mu$
3. Column is made up of which material
- (a) Glass (b) Carbon (c) Aluminum (d) Any metal
4. Operating pressure of HPLC is
- (a) 500 — 3000 psi (b) 500 — 1000 psi (c) 500 — 2000 psi (d) 500 — 5000 psi
5. The flow rates of mobile phase should be
- (a) Greater than 3mL/min (b) Less than 1mL/min  
(c) 3 mL/min (d) None of the above
6. In Reverse phase HPLC, the polar & nonpolar compounds travel
- (a) Faster, slower respectively (b) Faster, faster respectively  
(c) Slower, slower respectively (d) Slower, faster respectively
7. Which of the following is not an example for non-polar column
- (a) Octa decyl silane (b) C4 (c) C8 (d) Silica gel
8. In HPLC, the analytical performance improves when
- (a) Particle diameter is increased (b) Particle diameter is reduced  
(c) Coarser particles are paired with shorter columns (d) Low temperature is used
9. Which pumps operate at constant flow rates
- (a) Pneumatic pump (b) Check pump (c) Mechanical pump (d) Pulsar pump
10. In low pressure mixing chamber which gas is used for degassing solvents
- (a) H<sub>2</sub> (b) N<sub>2</sub> (c) Ar (d) He

## Gas chromatography

1. The principle of gas-liquid chromatography is [GPAT-2020]
- (a) Partition chromatography (b) Affinity chromatography  
(c) Adsorption chromatography (d) Ion exchange chromatography
2. Which among the following carrier gases has the highest thermal conductivity [GPAT-2019]
- (a) Nitrogen (b) Oxygen (c) Helium (d) Compressed Air

### Electrochemical Method of Analysis Conductometry and Voltammetry

1-b	2-a	3-d	4-c	5-a	6-c	7-a	8-c	9-b	10-a
11-b	12-a	13-b	14-c	15-c	16-c	17-a	18-b	19-c	20-b

### Potentiometry

1-c	2-a	3-d	4-a	5-b	6-c	7-a	8-c	9-d	10-b
11-d	12-a	13-c	14-c	15-a	16-b	17-d	18-b	19-a	20-b

### Polarography

1-b	2-d	3-a	4-d	5-c	6-c	7-b	8-b	9-a	10-b
11-c	12-a	13-b	14-c	15-b					

### Amperometry

1-d	2-b	3-d	4-c	5-b	6-c	7-d	8-b	9-a	10-c
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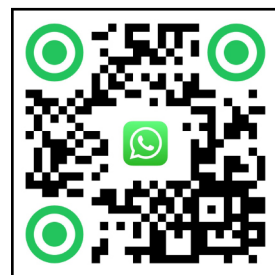
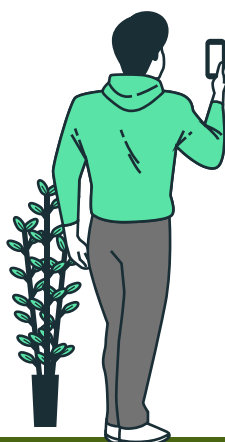
### Kjeldahl Method and Thermoanalytical Technique

1-c	2-c	3-d	4-c	5-a	6-c	7-a	8-c	9-c	10-a
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# MINOR SUBJECTS



Biochemistry  
Microbiology  
Human Anatomy and Physiology  
Biotechnology  
Pathophysiology  
Pharmaceutical Management



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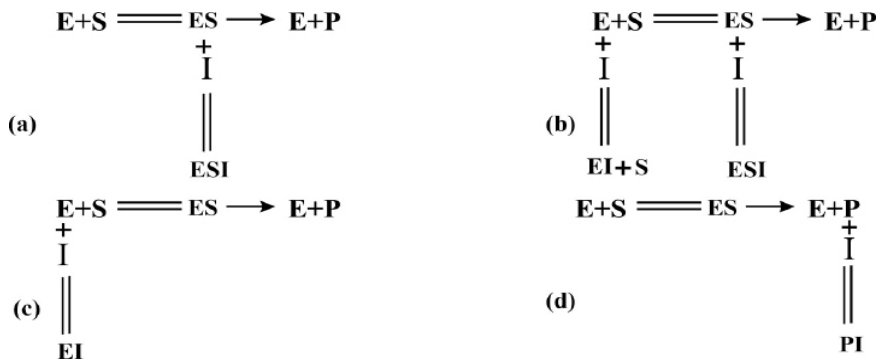
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## Carbohydrates

- Establishing a complete structure of \_\_\_\_\_ is more complex problem than others [GPAT-2023 SHIFT-I]**  
 (a) Polysaccharide (b) Protein (c) Nucleic acid (d) Peptide
- Which one is not the characteristics of the Hexose Monophosphate Pathway [GPAT-2023 SHIFT-I]**  
 (a) It produces  $\text{CO}_2$   
 (b) It requires ATP for phosphorylation  
 (c) It is controlled by inhibition of glucose-6 phosphate dehydrogenase by NADPH  
 (d) It produces ribose-5-phosphate
- The C-2 epimer of D-glucose is [GPAT-2023 SHIFT-II]**  
 (a) D-Mannose (b) L-Fructose (c) D-Glucopyranose (d) L-Arabinose
- Carbohydrates have hydrogen oxygen atom ratio of [GPAT-2023 SHIFT-II]**  
 (a) 1:2 (b) 3:1 (c) 1:3 (d) 2:1
- Identify pair of C-4 epimers [GPAT-2023 SHIFT-II]**  
 (a) D-glucose and D-galactose (b) D-glucose and D-fructose  
 (c) D-glucose and D-mannose (d) D-glucose and D-xylulose
- Citric acid cycle is the final pathway during the oxidation of [GPAT-2022]**  
 (a) Carbohydrates (b) Lipids (c) Proteins (d) All of these
- Given below are the two statements**  
**Statement I: Glucose-6-phosphate can be formed from glucose, but not from glycogen**  
**Statement II: Glucose-1-phosphate may be hydrolyzed to yield free glucose in liver**  
**Choose the most appropriate answer from the options given below [GPAT-2022]**  
 (a) Both Statement I and Statement II are correct  
 (b) Both Statement I and Statement II are incorrect  
 (c) Statement I is correct but Statement II is incorrect  
 (d) Statement I is incorrect but Statement II is correct
- Glucose upon treatment with nitric acid yields [GPAT-2021]**  
 (a) Gluconic acid (b) Glucaric acid (c) Glucitol (d) Heptanoic acid
- Which of the following is false about HMP shunt [GPAT-2021]**  
 (a) No ATP formation (b) Formation of NADPH  
 (c) Synthesis of ribose - 5 - phosphate (d) Non-oxidative phase of HMP pathway is irreversible
- An aldopentose can be converted into aldohexose by [GPAT-2020]**  
 (a) Ruffs degradation method (b) Wohl's method  
 (c) Kiliani-Fischer synthesis (d) Hoffmann degradation method
- Which of the following is the example of "Invert Sugar" [GPAT-2020]**  
 (a) Sucralose (b) Lactulose (c) Lactose (d) Sucrose

4. Which of the following equilibrium suggests noncompetitive inhibition of enzyme E for conversion of substrate S to product P with inhibitor [GPAT-2018]



5. The Michaelis-Menten hypothesis [GPAT-2017]

- (a) Postulates the formation of an enzyme substrate complex  
 (b) Enables us to calculate the isoelectric point of an enzyme  
 (c) States that the rate of a chemical reaction may be independent of substrate concentration  
 (d) States that the reaction rate is proportional to substrate concentration

6. Cytochrome oxidase contains [GPAT-2016]

- (a) Cu & Zn                      (b) Zn & Fe                      (c) Cu & Fe                      (d) Mn & Cu

7. Which of the following is true about Michaelis-Menten kinetics [GPAT-2013]

- (a)  $K_m$  the Michaelis constant, is defined as that concentration of substrate at which enzyme is working at maximum velocity  
 (b) It describes single substrate enzymes  
 (c)  $K_m$  the Michaelis constant is defined as the dissociation constant of the enzyme-substrate complex  
 (d) It assumes covalent binding occurs between enzyme and substrate

8. Group I

Type of inhibitor

1. Competitive inhibitors

2. Non-competitive inhibitors

3. Uncompetitive inhibitors

4. Suicide inhibitors

(a) 1-[R], 2-[Q], 3-[P], 4-[S]

(c) 1-[S], 2-[P], 3-[R], 4-[Q]

- Group II [GATE-2009]

Description

[P] Have affinity only for the [E-S] complex and not for the free [E]

[Q] Binding of the inhibitor and that of the natural substrate are mutually exclusive

[R] Ultimately binds covalently to the enzyme

[S] Binds with the same affinity to [E] and [E-S]

(b) 1-[P], 2-[R], 3-[Q], 4-[S]

(d) 1-[Q], 2-[S], 3-[P], 4-[R]

9. Group I

Enzymes

1.  $\text{Na}^+ - \text{K}^+$  ATPase

2. Cytochrome c oxidase

3. Malate dehydrogenase

4. Tyrosine kinase

(a) 1-[R], 2-[P], 3-[Q], 4-[S]

(c) 1-[Q], 2-[S], 3-[P], 4-[R]

- Group II [GATE-2008]

Function

[P] Electron transport

[Q] Pathway converting pyruvate to oxaloacetate

[R] Generation of electrochemical Potential gradient across membranes

[S] Signal transduction

(b) 1-[P], 2-[R], 3-[S], 4-[Q]

(d) 1-[S], 2-[R], 3-[Q], 4-[P]



## Introduction to Microbiology

- Father of microbiology is**  
 (a) Louis Pasteur (b) Lister (c) A.V. Leeuwenhoek (d) Robert Koch
- Who is regarded as the father of antiseptic surgery**  
 (a) Robert Koch (b) Louis Pasture (c) Lord Joseph Lister (d) Paul Ehrlich
- Vaccines against anthrax and rabies were developed by**  
 (a) Robert Koch (b) Louis Pasture (c) Joseph Lister (d) Paul Ehrlich
- Pasteurization is developed by**  
 (a) Robert Koch (b) Louis Pasture (c) Joseph Lister (d) Paul Ehrlich
- Father of Medical Microbiology is**  
 (a) Pasteur (b) Jenner (c) Koch (d) None of these
- Which of the following scientist is known as father of modern microbiology**  
 (a) Hansen (b) Louis Pasteur (c) Loffler (d) Ruska
- Who provide the evidence that bacteriophage nucleic acid but not protein enters the host cell during infection**  
 (a) Alfred D.Hershey & Leonard Tatum in 1951 (b) Alfred D.Hershey & Zindar Lederberg in 1951  
 (c) Alfred D.Hershey & Martha Chase in 1952 (d) Alfred D.Hershey & Macleod in 1952
- Disease that affects many people at different countries is termed as**  
 (a) Sporadic (b) Pandemic (c) Epidemic (d) Endemic
- Paul Ehrlich coined the term**  
 (a) Hydrotherapy (b) Physiotherapy (c) Chemotherapy (d) All of the above
- Which of the following is a smallest bacterium**  
 (a) Neisseria gonorrhoeae (b) Mycobacterium tuberculosis  
 (c) Mycoplasma (d) Vibrio cholerae

## Biology of Microorganisms

- The optimum temperature for rapid growth of mesophiles is: [GPAT-2024]**  
 (a) 15 to 20 °C (b) 40 to 50 °C (c) 25 to 40 °C (d) 50 to 60 °C
- Which of the following is a causative organism for Syphilis: [GPAT-2024]**  
 (a) Clostridium tetani (b) Vibrio cholerae  
 (c) Bacillus pertussis (d) Treponema pallidum



**Biology of Microorganisms**

1 - c	2 - d	3 - d	4 - a	5 - a	6 - d	7 - a	8 - b	9 - b	10 - c
11 - a	12 - b	13 - b	14 - b	15 - c	16 - c	17 - a	18 - d	19 - d	20 - b
21 - a	22 - b	23 - c	24 - d	25 - b	26 - c	27 - c	28 - b	29 - b	30 - d
31 - c	32 - b	33 - c	34 - b	35 - a	36 - d	37 - d	38 - a	39 - b	40 - c

**Microscopy & Staining Techniques**

1 - c	2 - b	3 - d	4 - c	5 - b	6 - b	7 - b	8 - c	9 - c	10 - c
11 - c	12 - a	13 - d	14 - b	15 - c					

**Fungi and Viruses**

1 - c	2 - a	3 - c	4 - d	5 - d	6 - c	7 - b	8 - a	9 - d	10 - c
11 - c	12 - c	13 - c	14 - a	15 - a	16 - b	17 - c	18 - c	19 - d	20 - d

**Aseptic Technique**

1 - a	2 - c	3 - b	4 - d	5 - b	6 - d	7 - c	8 - a	9 - c	10 - b
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**Sterilization and Disinfectant**

1 - d	2 - c	3 - a	4 - d	5 - b	6 - a	7 - d	8 - a	9 - b	10 - c
11 - c	12 - c	13 - b	14 - c	15 - b	16 - b	17 - b	18 - a	19 - b	20 - b



## Cell and its Structure

- The Phase in which two identical copies of DNA are formed is: [GPAT-2024]**  
(a) G1 phase (b) S phase (c) G2 phase (d) M phase
- RNA molecules having intrinsic catalytic activity are called as [GPAT-2019]**  
(a) mRNAs (b) Ribozymes (c) snRNAs (d) rRNAs
- Which of the following statement is NOT TRUE about prokaryotes [GPAT-2018]**  
(a) Nucleus is not bounded by nuclear membrane (b) Cell wall contains peptidoglycan  
(c) 80s ribosomes are distributed in cytoplasm (d) It is Haploid in nature
- Which of the following statements is TRUE about the Nucleus**  
(a) It is absent in prokaryotes (b) It is called the brain of the cell  
(c) It contains DNA and other genetic materials (d) All of the above
- Lysosomes are known as “suicidal bags” because**  
(a) Parasitic activity (b) Presence of food vacuole  
(c) Hydrolytic activity (d) Catalytic activity
- Which of the following cell organelles regulates the entry and exit of molecules to and from the cell**  
(a) Lysosomes (b) Golgi bodies (c) Cell membrane (d) Mitochondria
- Which type of movement occurs when Na/K pump is used**  
(a) Na ions moves out of the cell and K<sup>+</sup> move in (b) K<sup>+</sup> ion moves out of cell and Na ion move in  
(c) Both Na and K<sup>+</sup> ions move inside the cell (d) Both Na and K<sup>+</sup> move out of the cell
- Which of the following signal molecules is not used for extracellular signaling**  
(a) Autocrine (b) Endocrine (c) Cyclic AMP (d) None of the above
- Which of the following phenomena is commonly referred as ‘cell drinking’**  
(a) Pinocytosis (b) Exocytosis (c) Endocytosis (d) Phagocytosis
- This organelle functions in cellular respiration**  
(a) Mitochondria (b) Lysosome (c) Endoplasmic reticulum (d) Golgi apparatus

## Tissue

- Conversion of pseudostratified columnar epithelium in chronic bronchitis and bronchiectasis to columnar type epithelium is an example of which type of metaplasia [GPAT-2021]**  
(a) Squamous metaplasia (b) Columnar metaplasia  
(c) Osseous metaplasia (d) Cartilaginous metaplasia

- 2. Activation of the sympathetic nervous system leads to the 'fight and flight' response. Which of these is not part of that process**
  - (a) Vasodilatation in skeletal muscle
  - (b) Sweating
  - (c) Bladder relaxation
  - (d) Increased gut motility
- 3. Which of the following is not caused by the activation of the sympathetic nervous system**
  - (a) An increase Ca<sup>2+</sup> release in cardiomyocytes
  - (b) An increase in cardiac output
  - (c) An increase in blood pressure
  - (d) A decrease in heart rate
- 4. Why is the adrenal gland unique in its autonomic innervation**
  - (a) It is innervated by parasympathetic cholinergic preganglionic neurons
  - (b) The postganglionic neurons are cholinergic rather than noradrenergic despite being part of the sympathetic nervous system
  - (c) The post-synaptic response is mediated via muscarinic acetylcholine receptors
  - (d) It is directly innervated by the spinal cord without passing through ganglia
- 5. Which of the following generally acts to conserve energy**
  - (a) Somatic nervous system
  - (b) Peripheral nervous system
  - (c) Sympathetic nervous system
  - (d) Parasympathetic nervous system
- 6. The autonomic nervous system**
  - (a) Controls smooth muscle, skeletal muscle and cardiac muscle
  - (b) Controls smooth muscle, cardiac muscle and glandular activity
  - (c) Mainly provides the afferent pathways for involuntary control of organs
  - (d) Is subdivided into parasympathetic and sympathetic systems that mostly work antagonistically on blood vessels
- 7. Parasympathetic neurons**
  - (a) Originate in the brain stem and then run via the vagus to the paravertebral ganglia
  - (b) Release noradrenaline at their terminals which in turn activates adrenergic receptors
  - (c) Cause vasodilatation in the blood vessels of the external genitalia and salivary glands
  - (d) Coordinate the so-called 'fight or flight' response
- 8. In the synapse**
  - (a) Action potentials are usually transmitted from one neuron to another by electronic coupling
  - (b) Transmitter substances are stored in vesicles that are about 200 nm in diameter
  - (c) The presynaptic axon terminates in a bulbous swelling called a bouton which is separated from the postsynaptic neuron by a synaptic cleft
  - (d) The arrival of an action potential at the nerve ending causes an influx of Na<sup>+</sup> which in turn causes the fusion of the vesicles containing the transmitter substance with the cell membrane and the subsequent release of the neurotransmitter
- 9. Considering the autonomic nervous system, the nervous system which prepares the human body in dealing with emergencies is called**
  - (a) Sympathetic nervous system
  - (b) Parasympathetic nervous system
  - (c) Reflexive nervous system
  - (d) Temporal nervous system
- 10. In the autonomic nervous system, the system which promotes digestion slows the breathing rate and heartbeat is called**
  - (a) Sympathetic nervous system
  - (b) Prosympathetic nervous system
  - (c) Parasympathetic nervous system
  - (d) None of above



## Immunology

- Match the following antibodies with their correct description: [GPAT-2024]**

Antibody	Description
P. IgE	(i) Cross the placenta
Q. IgG	(ii) Dominant antibody produced in immune responses
R. IgM	(iii) It is found in the mother's milk
S. IgA	(iv) Responsible for autoimmune responses including allergies

(a) P-(i), Q-(ii), R-(iii), S-(iv)                      (b) P-(iv), Q-(i), R-(ii), S-(iii)  
 (c) P-(i), Q-(iii), R-(ii), S-(iv)                      (d) P-(iv), Q-(ii), R-(iii), S-(i)
- Autoimmunity refers to [GATE-2004, GPAT-2023 Shift-II]**

(a) An automatic trigger of the immune system directed against a specific pathogen  
 (b) Failure to distinguish between self and non-self  
 (c) An automatic segregation of T and B cells  
 (d) Failure of B-cells to interact with T-cells
- The immunity acquired by inoculation of living organism of attenuated virulence is [GPAT-2021]**

(a) Natural passive immunity                      (b) Passive immunity  
 (c) Artificial acquired immunity                      (d) Natural active immunity
- In treating immunodeficiency disease the goal is to maintain IgG levels at about [GPAT-2019]**

(a) 100 mg/dL                      (b) 400 mg/dL                      (c) 200 mg/dL                      (d) 300 mg/dL
- Cells that contribute for immune system are [GPAT-2017]**

1. T Lymphocytes                      2. Eosinophil  
 3. B Lymphocytes                      4. Dendritic cells  
 5. Erythrocytes                      6. Natural killer cells

(a) 1, 3, 4 and 6                      (b) 1, 2, 4 and 6                      (c) 1, 3, 5 and 6                      (d) 1, 2, 5 and 6
- Which is a secretory antibody [GPAT-2015]**

(a) IgG                      (b) IgD                      (c) IgE                      (d) IgA
- Antibody which is responsible for agglutination of blood is [GPAT-2014]**

(a) IgA                      (b) IgD                      (c) IgE                      (d) IgM
- Which of the following cell types are responsible for initiating a secondary immune response [GPAT-2013]**

(a) Memory cells                      (b) Macrophages                      (c) Stem cells                      (d) B cells
- Quantification of minute quantity of a drug from a complex matrix, without prior separation can be done using one of the following techniques. Identify that [GPAT-2012]**

(a) Coulometry  
 (b) Potentiometry  
 (c) Fluorescence spectroscopy  
 (d) Radioimmunoassay



- Put the events of acute inflammation in proper sequence [GPAT-2023 SHIFT-I]**

  - Accumulation of fluid and plasma at the affected site → intravascular activation of platelets → polymorphonuclear neutrophils → followed by healing
  - Polymorphonuclear neutrophils → accumulation of fluid and plasma at the affected site → intravascular activation of platelets → followed by healing
  - Accumulation of fluid and plasma at the affected site → polymorphonuclear neutrophils → intravascular activation of platelets → followed by healing
  - Intravascular activation of platelets → followed by healing → accumulation of fluid and plasma at the affected site → polymorphonuclear neutrophils
- Which one of the following is an autosomal dominant syndrome in its inheritance [GPAT-2023 SHIFT-III]**

  - Gilbert's syndrome
  - Crigler-Najjar syndrome Type-I
  - Dubin-Johnson syndrome
  - Rotor syndrome
- Which is a protein marker that can be detected within three hours of acute ischemic kidney injury from a patient's urine [GPAT-2023 SHIFT-III]**

  - N-acetyl-β-D-glucosaminidase
  - Glutathione-S-transferase
  - Neutrophil gelatinase-associated lipocalin
  - γ-glutamyltranspeptidase
- Laboratory findings of which one of the following diseases include markedly elevated serum amylase levels during the first 24 hours followed by rising serum lipase levels within 72-96 hours [GPAT-2023 SHIFT-II]**

  - Acute pancreatitis
  - Cirrhosis of the liver
  - Jaundice
  - Cystic fibrosis of the lungs
- Which one of the following types of hepatitis can lead to fulminant hepatitis causing massive hepatic cell death more frequently among infected pregnant women, showing third-trimester mortality as high as 30% [GPAT-2023 SHIFT-II]**

  - Hepatitis A
  - Hepatitis B
  - Hepatitis C
  - Hepatitis E
- Which of the following is a specific enzyme marker of cell death in acute myocardial infarction [GPAT-2022]**

  - Creatine Kinase-MB
  - Aspartate aminotransferase
  - Lactate dehydrogenase
  - Cardiac troponin
- Viable cells (viability assay) are assayed by all of the following methods EXCEPT [GPAT-2022]**

  - MTT/MTS/Resazurin assay
  - Apoptosis assay
  - ATP assay
  - Protease marker assay
- Which of the following type is a reversible cell injury? [GPAT-2022]**

  - Karyolysis
  - Nuclear clumping
  - Phagocytosis
  - Cytoskeletal damage
- At the site of tissue in the activated platelet releases ADP and activates surrounding platelets to form platelet-plug, but this process will not continue to activate whole platelets in the body to form a massive ball of platelets because [GPAT-2022]**

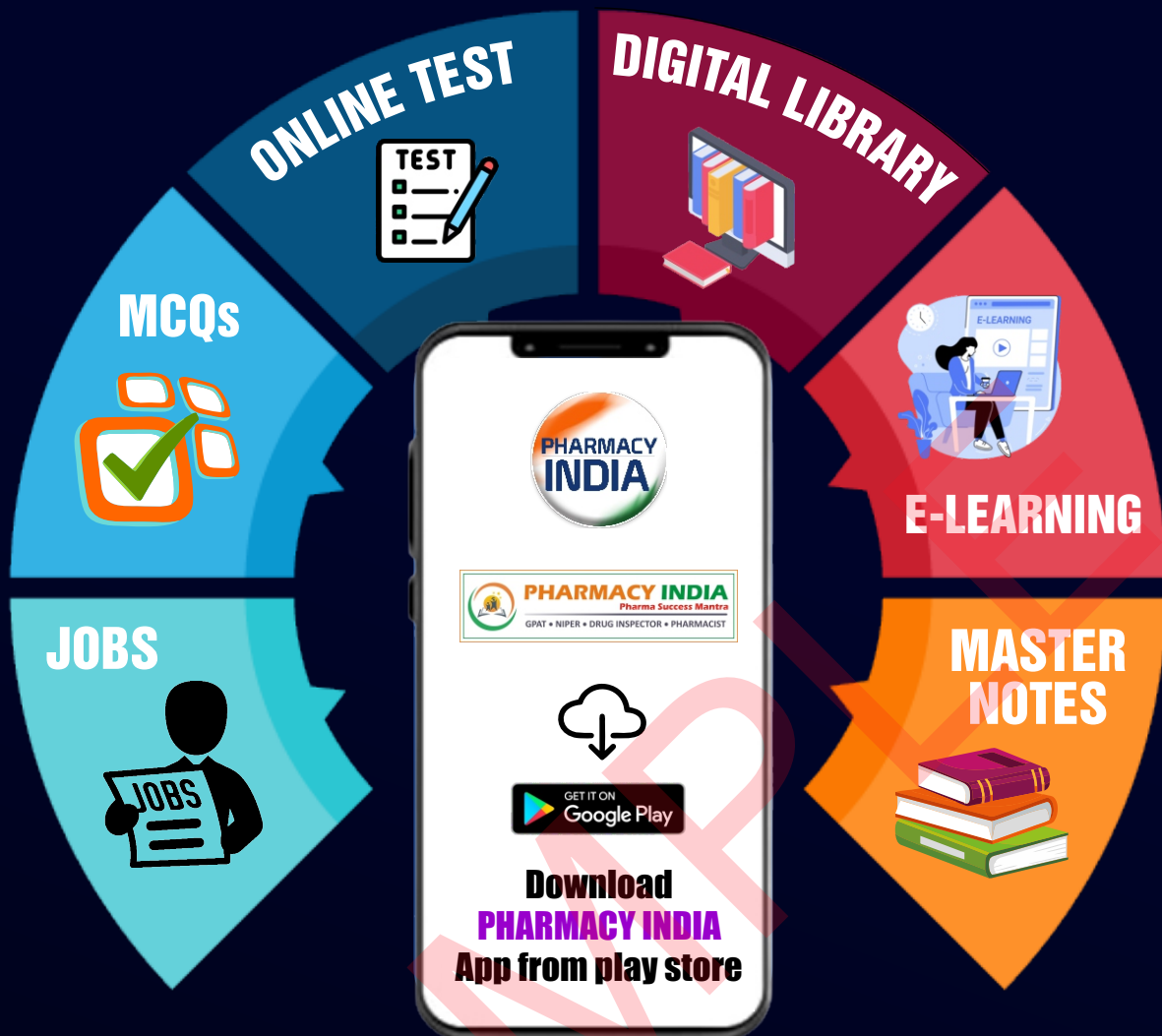
  - The adjacent normal endothelial cells physiologically release 'NO' which is a platelet inhibitor
  - There will be plasminogen activators in the plasma
  - There will be plasminogen activator inhibitors in plasma
  - There will be a tissue plasminogen activator (tPA) which inhibits the platelets

# 20

# PHARMACEUTICAL MANAGEMENT



- Which of the following represents a complete list of products that are offered by a company for sale [GPAT-2023 SHIFT-I]**  
(a) Product Variety (b) Product Mix (c) Product Item (d) Product Line
- Shift from “Try my product” to “Prefer my brand” marketing strategy is done at what stage of product life cycle [GPAT-2023 SHIFT-II]**  
(a) Introduction (b) Growth (c) Maturity (d) Decline
- The good management principle revolves around the three R’s these are [GPAT-2023 SHIFT-II]**  
(a) Ration, Rotation and Responsibility (b) Reward, Recognition and Responsibility  
(c) Research, Recreation and Responsibility (d) Reverse engineering, Research and Responsibility
- Who is the primary source of information for doctors prescribing behaviour [GPAT-2023 SHIFT-II]**  
(a) Competitor (b) Wholesaler (c) Fellow doctor (d) Retailer
- The process of establishing a product in the minds of target customers is called as [GPAT-2022]**  
(a) Product positioning (b) Product differentiation (c) Product targeting (d) Market segmentation
- Boston Consulting Group (BCG) Matrix is used for [GPAT-2022]**  
(a) Product life cycle management (b) SWOT analysis  
(c) Product portfolio management (d) Gap analysis
- Which of the following statement is the correct description of product positioning [GPAT-2021]**  
(a) Selecting one or more segment to enter  
(b) Occupying distinctive position in the mind of customer  
(c) Identifying group of buyers with common need  
(d) Distinguishes company’s product from competitor’s product
- Which of the following statement is the correct description of product positioning [GPAT-2021]**  
(a) Selecting one or more segment to enter  
(b) Occupying distinctive position in the mind of customer  
(c) Identifying group of buyers with common need  
(d) Distinguishes company’s product from competitor’s product
- Which of the following product life cycle phases, it is indicative of market saturation in the sense that all the potential customers have bought the product EXCEPT those who have decided not to have it [GPAT-2021]**  
(a) Growth phase (b) Introductory phase (c) Decline phase (d) Maturity phase
- Which of the following is not a fundamental (primary) factor considered for selection of a location for the construction of pharmaceutical or chemical plant [GPAT-2020]**  
(a) Soil (b) Market for products (c) Labour supply (d) Raw materials
- Consumers who are loyal to two-three brands are considered as [GPAT-2019]**  
(a) Split loyals (b) Switcher loyals (c) Semi-core loyals (d) Shifting loyals
- Henri Fayol’s principle “Espirit de corps” means [GPAT-2018]**  
(a) Corporate objective (b) Group objective (c) Team activity (d) Team spirit
- How customer’s bias about the product will influence the marketing communication [GPAT-2018]**  
(a) Positive effect (b) Negative effect (c) No effect (d) Both (a) and (b)



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