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PHARMACY INDIA

GATE- 1988-2009, GPAT- 2010-2025

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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
- Pharmaceutical Plant, location, layout
- Dosage Form Necessities and Additives
- Powders
- Capsules
- Tablets
- Parenterals - product requiring sterile packaging
- Suspensions
- Emulsions
- Suppositories
- Semisolids
- Liquids (solutions, syrups, elixirs, spirits, aromatic water, liquid for external uses)
- Pharmaceutical Aerosols
- Ophthalmic preparations
- Preformulations
- Radio Pharmaceuticals
- Stability of formulated products
- Kinetic Principles and Stability Testing
- Prolonged Action Pharmaceuticals
- Novel Drug delivery system
- Cosmetics
- Packaging Materials
- GMP and Validation
- Pilot plant scale up techniques

6. PHARMACOLOGY

- General Pharmacology
- Pharmacology of peripheral nervous system
- Pharmacology of cardiovascular System Drugs
- Drugs acting on urinary system
- Drugs acting on Respiratory system
- Pharmacology of central nervous System
- Pharmacology of Endocrine system
- Chemotherapy
- Autacoids and their Antagonists
- Pharmacology of drug acting on the gastrointestinal tract
- Chronopharmacology
- Immunopharmacology
- Chemotherapy of Malignant Diseases
- Peptides and proteins as mediators
- Nitric oxide
- Vitamins and Minerals
- Principles of toxicology

7. PHARMACOGNOSY

- Introductory Pharmacognosy
- Classification of Crude Drugs
- Sources of Crude Drugs
- Factors Influencing Quality of Crude Drugs
- Techniques in Microscopy
- Introduction to Phytoconstituents
- Principles of Plant Classification
- Pharmaceutical Aids
- Animal Products
- Plant Products
- Toxic Drugs
- Enzymes
- Natural Pesticides and Insecticides
- Adulteration and Evaluation of Crude Drugs

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

TABLE OF CONTENT

GPAT-2025

Section-A

1. **Which technique is employed for the location of radioactive isotopes in biological and other materials by using X-ray sensitive film:**
(a) Liquid Scintillation Counter
(b) Sequential analysis
(c) Precursor–product sequence
(d) Autoradiograph

2. **Pyridine is a base with Kb equal to:**
(a) 3.2 × 10-6 (b) 3.8 × 10-7
(c) 2.3 × 10-9 (d) 1.7 × 10-12

3. **Which is an example of continuous shelf moving bed dryer:**
(a) Vacuum Tumble Dryer (b) Turbo Tray Dryer
(c) Tray Dryer (d) Spray Dryer

4. **Match the following with the type of causative agents:**

Disease	Causative agents
P. Tuberculosis	i. Bacteria
Q. Diphtheria	ii. Viral
R. Yellow fever	iii. Toxoid
S. Malaria	iv. Protozoa

(a) P(i), Q(iii), R(ii), S(iv) (b) P(i), Q(ii), R(iii), S(iv)
(c) P(ii), Q(iii), R(iv), S(i) (d) P(iv), Q(iii), R(ii), S(i)

5. **Total number of stereoisomers for 3-bromo-2-butanol is:**
(a) 2 (b) 4 (c) 6 (d) 8

6. **Cis-trans (Z/E) isomerism is exhibited by all except:**
(a) 4-chloro-2 -pentene (b) 1-butene
(c) 2-chloro-3-hexene (d) 2 butene-1-ol

7. **In supercritical fluid extraction, critical temperature (tc) and critical pressure (pc) for CO_2 are:**
(a) 31°C and 54 atm (b) 51°C and 74 atm
(c) 51°C and 54 atm (d) 31°C and 74 atm

8. **Trikatu in Ayurveda is the combination of:**
(a) Black mustard, long pepper and ginger
(b) Black pepper, small pepper and ginger
(c) Black pepper, long pepper and betal
(d) Black pepper, long pepper and ginger

9. **Molecules in the smectic liquid crystals are characterized by which one of the following:**
(a) Mobility in two directions and no rotation
(b) Mobility in three directions and rotation in one axis
(c) Mobility in three directions and no rotation
(d) Mobility in two directions and rotation in one axis

10. **Arrange the following alkenes in order of its stability:**
(a) Trans-2-butene > cis-2-butene > isobutene > but-1-ene
(b) Cis-2-butene > trans-2-butene > but-1-ene > isobutene
(c) Trans-2-butene > isobutene > cis-2-butene > but-1-ene
(d) Isobutene > trans-2-butene > cis-2-butene > but-1-ene

11. **Which of the following is the correctly matched pair:**

Parameter	Method
P. True density	(i) Reciprocal of bulk density
Q. Granule density	(ii) Graduated cylinder method
R. Bulk density	(iii) Helium pycnometer
S. Bulkiness	(iv) Mercury displacement method

(a) P(i), Q(ii), R(iii), S(iv) (b) P(iii), Q(iv), R(ii), S(i)
(c) P(iii), Q(ii), R(iv), S(i) (d) P(i), Q(ii), R(iv), S(iii)

12. **Which of the following diluent is incompatible with primary amines:**
(a) Mannitol (b) Dextrose
(c) Microcrystalline Cellulose (d) Lactose

13. **When the highest dose of a drug is soluble in 250 ml or less of an aqueous medium over the pH range from 1 to 6.8 at 37°C and the extent of absorption in humans is expected to be more than or equal to 85 % of the administered dose, the drug is said to be classified in which of the BCS Class:**
(a) Class I (b) Class III (c) Class II (d) Class IV

14. **Identify the naturally occurring pilocarpine:**
(a) 2S,5R-(+)-pilocarpine (b) 2R,4R-(-)-pilocarpine
(c) 3R,4S-(-)-pilocarpine (d) 3S,4R-(+)-pilocarpine

15. **Which among the following is a class-II methods for tonicity adjustment:**
(a) Sodium chloride equivalent method
(b) Molecular concentration method
(c) White Vincent method
(d) Cryoscopic method

16. **Benzene undergoes Friedel-Crafts reaction with isopropyl bromide in the presence of anhydrous aluminum chloride catalyst to give:**
(a) Acetophenone (b) n-Propylbenzene
(c) Isopropylbenzene (d) Benzophenone

17. **Match pair of drug with its family:**

Column A	Column B
a) Snake Root	i) Compositae
b) Artemisia	ii) Rosaceae
c) Bitter Almond	iii) Apocyanaceae
d) Myrrh	iv) Burseraceae

56. In A/B trans ring junction of steroid, hydrogen atom at 5th position has:
(a) Alpha configuration (b) Eclipsed conformation
(c) Gauche conformation (d) Beta configuration

57. Which of the following is a peroxisome proliferator-activated receptor gamma agonist:
(a) Sulphonyl ureas (b) Metformin
(c) Pioglitazone (d) Acarbose

58. Match the following:

Class	Antiarrhythmic drugs
1. Class I	a. Disopyramide
2. Class-II	b. Metoprolol
3. Class-III	c. Amiodarone
4. Class-IV	d. Verapamil

(a) 1-d, 2-b, 3-c, 4-a (b) 1-d, 2-c, 3-b, 4-a
(c) 1-a, 2-b, 3-c, 4-d (d) 1-a, 2-c, 3-b, 4-d

59. Which one of the following antiplatelet drug acts by P2Y12 receptor antagonism:
(a) Dipyridamol (b) Tirofiban
(c) Clopidogrel (d) Aspirin

60. The cyanide ions can be determined by Nephelo-Turbidimetry as salt of cyanide with:
(a) Silver (Ag) (b) Gold (Au)
(c) Sodium (Na) (d) Potassium (K)

61. The number of carbon present in Pregnane is:
(a) 27 (b) 18 (c) 19 (d) 21

62. Albinism is due to complete or partial absence of the following enzyme:
(a) Hydroxylase (b) Tyrosinase
(c) β hydroxylase (d) Pyurvase

63. Match the following:

Class	Drug
1. Alkylating agent	a. Mechlorethamine
2. Platinum analog	b. Cisplatin
3. Antimetabolite	c. 5-Fluorouracil
4. Growth factor receptor inhibitor	d. Cetuximab

(a) 1-b, 2-a, 3-c, 4-d (b) 1-a, 2-b, 3-d, 4-c
(c) 1-b, 2-a, 3-d, 4-c (d) 1-a, 2-b, 3-c, 4-d

64. Which of the following will be most easily diazotised:
(a) P-Nitro aniline (b) P-Choloroaniline
(c) Aniline (d) P-Bromo aniline

65. Mirabegron is primarily used in the treatment of overactive bladder. It is well known as:
(a) β2-selective adrenergic receptor agonist
(b) β3-selective adrenergic receptor agonist
(c) Non-selective α-blocker
(d) Selective M3 receptor antagonist

66. Which of the following is not a part of the Karl Fischer reagent:
(a) Sulfur dioxide (b) Pyridine
(c) Pyrimidine (d) Iodine

67. Arrange the following steps in the correct order as they occur in the drug discovery process:
1. Lead Optimisation 2. Target Selection
3. Lead Finding
(a) 2 -> 1 -> 3 (b) 2 -> 3 -> 1
(c) 3 -> 1 -> 2 (d) 1 -> 2 -> 3

68. Which parasitic worm is responsible for causing lymphatic filariasis:
(a) Necator americanus (b) Onchocerca volvulus
(c) Ancylostoma duodenale (d) Brugia malay

69. Oral vaccines such as Dukoral® and ShancholTM, provide protection against:
(a) Ebola virus (b) Pneumonia
(c) Cholera (d) Polio

70. Methotrexate is the classic antimetabolite of folic acid structurally derived by Nmethylation of the para-aminobenzoic acid residue (PABA) and replacement of a pteridine hydroxyl by the following bioisosteric group:
(a) SH (b) CF (c) CH3 (d) NH2

71. A structural hybrid of Meperidine and Methadone is:
(a) Lofentanil (b) Pentazocine
(c) Loperamide (d) Diphenoxylate

72. Which of the following statement(s) is/are correct regarding Salt bridge used in potentiometric titrations:
I. Prevents possible contamination of the reference electrodes with the test solutions
II. Not designed as part of reference electrode
III. Has no effect on liquid junction potential
IV. Mostly solidified with 3% agar
(a) I & IV (b) III & IV (c) I only (d) I & III

73. Match the following:

Pancreatic islet cells type	Secretory Product
1. Alpha (α) cell	a. Glucagon
2. Beta (β) cell	b. Somatostatin
3. Delta (δ) cell	c. Gastrin
4. G cell	d. Proinsulin

(a) 1-d, 2-a, 3-c, 4-b (b) 1-a, 2-d, 3-c, 4-b
(c) 1-a, 2-b, 3-c, 4-d (d) 1-a, 2-d, 3-b, 4-c

74. Select the proper sequence from start of contraction regarding skeletal muscle contraction:
A. Release of calcium from sarcoplasmic reticulum after change in potential
B. Stimulation of motor end plate with acetylcholine
C. Troponin binds with calcium causing expose of binding sites for myosin
D. Actin and myosin crossbridge leads to power stroke
(a) ABCD (b) BACD (c) BCAD (d) BCDA

GPAT-2024

Pharmaceutics

1. **Coating of Eudragit NE40D on tablets is done to prepare**
   (a) Buccal tablets (b) Sublingual tablets
   (c) CR tablets (d) IR tablets
2. **Examples of BCS class III drugs are**
   (a) Taxol, Ellagic acid, Aspirin
   (b) Chloroquine, Diltiazem, Metoprolol
   (c) Acyclovir, Atenolol, Captopril
   (d) Aspirin, Paracetamol, Amoxycillin
3. **Schedule T of Drugs and Cosmetics Rules, 1945 deals with**
   (a) GMP for Homeopathy medicine
   (b) GMP for ASU drugs
   (c) GLP and requirement of premises and equipments
   (d) GMP for Pharmaceutical product
4. **During compression of tablets, dwell time is**
   (a) Time it takes for the punches to eject tablet under the primary compression rollers
   (b) Time it takes for the punches to eject the tablets
   (c) Time it takes for the punches to stop moving vertically and to achieve maximum penetration in the die under the primary compression rollers
   (d) Time it takes for the punches to punch tablet
5. **Which of the following is NOT a method for solubility enhancement**
   (a) Crystallization (b) Co-solvency
   (c) Hydrotropy (d) Salt formation
6. **The bloom strength is directly proportional to**
   (a) Density
   (b) Viscosity
   (c) Measure of the strength and stiffness of the gelatin
   (d) Molecular weight
7. **Size of a pilot plant batch is**
   (a) 1/10th of marketing batch
   (b) 1/5th of marketing batch
   (c) 1/5th of production batch
   (d) 1/10th of production batch
8. **Nitrostat® is an example of**
   (a) Effervescent tablet (b) Bolus tablet
   (c) CR tablet (d) Sublingual tablet
9. **The rate limiting step for the absorption of controlled release tablet is the**
   (a) Dissolution of the drug (b) Excretion of the drug
   (c) Metabolism of the drug (d) Distribution of the drug
10. **Core tablet coated with cellulose acetate phthalate has been administered to a patient. Where do you expect the drug to be released**
    (a) Stomach (b) Intestine
    (c) Liver (d) Oral cavity
11. **Based on the rheological behavior of fluid, all of the following shows time independent property, EXCEPT**
    (a) Anti-thixotropic (b) Non-newtonian
    (c) Plastic (d) Pseudoplastic
12. ***An elixir contains 47%v/v alcohol, what is the proof spirit according to USP [Dropped Question]**
    (a) 82% (b) 70% (c) 63% (d) 91%
13. **Which of the following protective colloids has high gold number**
    (a) Tragacanth (b) Albumin
    (c) Acacia (d) Gelatin
14. **Which of the following mills is based on the mechanism of impact and attrition for size reduction**
    (a) Roller mill (b) Colloid mill
    (c) Hammer mill (d) Fluid energy mill
15. **Which of the following climatic zones can be categorized into the hot and dry zone**
    (a) Zone-IV (b) Zone-II (c) Zone- III (d) Zone-I
16. **Antioxidant which is obtained from a desert plant and shows synergistic action with citric acid is**
    (a) Tocopherols (b) Maleic acid
    (c) Nordihydroguaiaretic acid (NDGA) (d) BHA
17. **Which of the following type of viscometer is used for the measurement of viscosity of a Newtonian fluid**
    (a) Cup and bob viscometer (b) Pycnometer
    (c) Ostwald viscometer (d) Brookfield's viscometer
18. **Which of the following is/are in-process QC test(s) for tablets**
    (a) Dissolution Test
    (b) Drug content, Puncture Test
    (c) Zeta-sizing Test
    (d) Hardness, Friability, Average weight
19. **Central Government approved factory premises where Opium alkaloids are processed is situated at**
    (a) Ghazipur and Kota
    (b) New Delhi and Ghaziabad
    (c) Neemuch and Ghazipur
    (d) Gwalior and Kota
20. **Who has the power to fix the ceiling price of scheduled formulations**
    (a) National Pharmaceutical Pricing Authority
    (b) Director General Health Services
    (c) National Medical Commission
    (d) Pharmacy Council of India
21. **How many Pharmacists are required for a hospital having up to 300 beds**
    (a) 15 (b) 8 (c) 10 (d) 5

116. Which one of the following diseases is caused by the deficiency of niacin
(a) Anemia (b) Pellagra
(c) Scurvy (d) Night Blindness

117. Which of the following is the best technique for detecting HIV
(a) Real-time PCR
(b) Widal test
(c) Reverse transcriptase-PCR
(d) Polymerase chain reaction

118. Histogram can be drawn only for
(a) Continuous frequency distribution
(b) Discrete frequency distribution
(c) Cumulative frequency distribution
(d) Relative frequency distribution

119. If one event is unaffected by the outcome of another event, the two events are said to be
(a) Either dependent or independent
(b) Dependent
(c) Independent
(d) Mutually exclusive

120. A hypothesis stipulating that there is no difference between the situations, groups and outcomes called
(a) Null hypothesis
(b) Hypothesis of association
(c) Hypothesis of differences
(d) Alternative hypothesis

121. Aerobic dehydrogenase in biological oxidation contains
(a) NADP (b) NAD
(c) FMN & FAD (d) NADH

122. Influenza viruses are RNA viruses and belong to which family
(a) Orthomyxoviridae (b) Papoviridae
(c) Retroviridae (d) Parvoviridae

123. Which of the following is a causative organism for Syphilis
(a) Clostridium tetani (b) Bacillus pertussis
(c) Treponema pallidum (d) Vibrio cholerae

124. The optimum temperature for rapid growth of mesophiles is
(a) 40 to 50°C (b) 50 to 60°C
(c) 25 to 40°C (d) 15 to 20°C

125. Virus mediated transfer of host DNA from one cell to another cell is known as
(a) Transcription (b) Integration
(c) Transduction (d) Transformation

Answer Key

1-c	2-c	3-b	4-c	5-a	6-d	7-d	8-d	9-a	10-b
11-a	12-*	13-a	14-d	15-c	16-c	17-c	18-d	19-c	20-a
21-c	22-c	23-a	24-d	25-b	26-*	27-d	28-b	29-d	30-a
31-b	32-d	33-d	34-d	35-b	36-b	37-d	38-c	39-b	40-a
41-c	42-a	43-c	44-a	45-c	46-b	47-*	48-c	49-c	50-c
51-d	52-a	53-a	54-a	55-b	56-c & d	57-a	58-a	59-b	60-a
61-d	62-b	63-d	64-d	65-b	66-a	67-a	68-c	69-d	70-d
71-b	72-c	73-b	74-a	75-a	76-a	77-a	78-c	79-d	80-b
81-d	82-d	83-d	84-b	85-b	86-c	87-d	88-b	89-c	90-b
91-c	92-b	93-a	94-c	95-d	96-d	97-c	98-b	99-d	100-d
101-b	102-b	103-c	104-b	105-c	106-d	107-b	108-c	109-a	110-c
111-c	112-a	113-b	114-c	115-c	116-b	117-c	118-a	119-c	120-a
121-c	122-a	123-c	124-c	125-c					

GPAT-2023
SHIFT-I

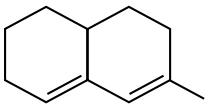
Pharmaceutics

1. **Which of the following terms is used to describe the "Partial or complete separation of the top or body crowns of a tablet from the main body of the tablet"?**
   (a) Lamination (b) Capping
   (c) Picking (d) Mottling
2. **The law of relative lowering of vapour pressure was given by**
   (a) Raoult (b) Ostwald
   (c) Henry (d) Van't Hoff
3. **Dipole-dipole weak interactions are also called as**
   (a) London forces (b) Debye interactions
   (c) Electrovalent forces (d) Keesom forces
4. **Invert sugar is a product obtained by the hydrolysis of**
   (a) Maltose (b) Sucrose (c) Lactose (d) Dextrin
5. **The time taken at a fixed temperature or the radiation dose required to achieve a 90% reduction in viable bacterial cells is called**
   (a) F value (b) Z value (c) D value (d) T value
6. **In pharmacokinetic models, the term "Compartment" means**
   (a) Blood (b) Individual organ
   (c) Extracellular fluid (d) Hypothetical pool of tissue
7. **The most efficient heat exchange between the particles and flowing air occurs in the**
   (a) Tray dryer (b) Vacuum Dryer
   (c) Fluidized bed dryer (d) Rotary dryer
8. **The Drug Price Control Order (DPCO) is an order issued by the Government under the _____ which enables it to fix the prices of some essential bulk and their formulations**
   (a) Essential Commodities Act
   (b) Essential Commodities Amendment
   (c) Essential Commodities Accessories
   (d) Ethical Commodities Act
9. **According to IP and BP, very fine powder is one in which**
   (a) All particles pass through 120# sieve
   (b) 90% particles pass through 350# sieve
   (c) All particles pass through 350# sieve
   (d) 90% particles are of size < 10 µm
10. **Which of the following pharmaceutical solvent has the highest dielectric constant, at 25 degree C**
    (a) Glycerin (b) Ethanol (c) Acetone (d) Phenol
11. **Kozeny Carman equation is used to determine the**
    (a) Surface area of the powder (b) Viscosity of a liquid
    (c) Surface tension of a liquid (d) Density of a liquid
12. **Which of the following emulsifiers has the highest HLB value**
    (a) Span 80 (b) Acacia
    (c) Tween 80 (d) Sodium lauryl sulfate
13. **Which of the following substances are not used as humectants in emulsions?**
    (a) Propylene glycol (b) Sorbitol
    (c) Tocopherol (d) Glycerol
14. **Under which of the following conditions in-vitro-in-vivo correlation for a drug fails**
    (a) When the drug is highly soluble
    (b) When the drug's absorption takes place by a complex process
    (c) When the dissolution medium is adequately simulated
    (d) When the drug is highly permeable but poorly soluble
15. **A crystalline powder that contains water of crystallization or hydration; this water can be liberated either during manipulations or on exposure to a low-humidity environment then the powder will become sticky and pasty, or it may even liquefy. Such a powder is called**
    (a) Eutectic (b) Hygroscopic
    (c) Deliquescent (d) Efflorescent
16. **The formula to calculate liquid pressure is**
    (a) P = mgh (b) P = wgh (c) P = ρgh (d) P = Fgh
17. **Out of the following solvents which one is not a polar solvent**
    (a) Ethanol (b) Methanol (c) Hexane (d) Water
18. **Which of the following molecular properties can be determined by Thermogravimetric Analysis**
    (a) Solubility (b) Hygroscopicity
    (c) Colour stability (d) Hydrolysis
19. **Which of the following levels of IVIVC is represented by "the relationship between one dissolution time point (e.g. $t_{50\%}$) and one mean pharmacokinetic parameter, such as AUC, T_{max} or C_{max}"**
    (a) Level A (b) Level B
    (c) Level C (d) Level D
20. **Which of the following USP Glass Types is NOT SUITABLE for parenteral packaging**
    (a) Type I (b) Type II (c) Type III (d) Type IV
21. **The difference in velocity between two planes of liquids separated/infinitesimal distance is called**
    (a) Rate of shear (b) Rate of flow
    (c) Rate of force (d) Shearing stress
22. **The required amount of adjusting substance required to make a hypotonic solution, isotonic is given by the (Where, W = Adjusting substance, a = Freezing point depression of unadjusted solution and b = Freezing point depression of water)**

65. When exposed to carbon monoxide, the base pigment of Cytochrome P enzymes absorb light at
(a) 450 nm (b) 370 nm
(c) 254 nm (d) 600 nm

66. In atomic absorption spectroscopy, back ground correction performed using a single hol low cathode lamp pulsed first with a low current and then with a high current is called
(a) Smith Hieftje background correction
(b) Continuous source background correction
(c) Zeeman effect background correction
(d) Hollow cathode background correction

67. Predict the theoretical max value for the following compound using Woodward-Fieser rules. Base value for the compound is 215 nm
(a) 240 nm
(b) 220 nm
(c) 225 nm
(d) 235 nm



68. All the following about back titration are true, EXCEPT
(a) It is performed when the rate of reaction between the analyte and reagent is fast
(b) It is performed when the rate of reaction between the analyte and reagent is slow
(c) It is performed when the standard solution lacks stability
(d) It is the process in which excess of standard solution used to react with an analyte is determined by titration with a second standard solution

69. A chromatogram of a peak provided a retention time at 5.4 minutes and 0.41 base width of the peak. The number of plates or the peak obtained is
(a) 210.7 (b) 173 .5 (c) 78.4 (d) 2775.5

70. In UV spectrophotometer, lamp used to generate UV spectrum is
(a) Tungsten (b) Sodium vapor
(c) LED (d) Deuterium

71. Ostwald's dilution law is applicable to
(a) Weak electrolytes (b) Strong electrolytes
(c) Non-electrolytes (d) All electrolytes

Pharmacology

72. Following statement is correct with respect to voltage sensitive calcium channels
(a) L-type Blocker: Nifedipine
(b) T-type Blocker: Verapamil
(c) N-type Blocker: Mibefradil
(d) R-type Blocker: Diltiazem

73. One of the following drugs is not meant for systemic use
(a) Netilmycin (b) Sisomicin
(c) Neomycin (d) Paromomycin

74. Which among the following is not used as NSAID
(a) Indomethacin extended release 75 mg
(b) Aspirin 75 mg
(c) Naproxen 500 mg
(d) Mefenamic acid 500 mg

75. Fight or Flight responses are mediated by
(a) Parasympathetic division of Autonomous nervous system
(b) Sympathetic division of Autonomous nervous system
(c) Serotonergic nervous system
(d) Histaminergic nervous system

76. Which one of the following is an autosomal dominant syndrome in its inheritance
(a) Gilbert's syndrome
(b) Crigler-Najjar syndrome Type-I
(c) Dubin- Johnson syndrome
(d) Rotor syndrome

77. One of the following match is correct choose it
(a) M_1 Acetylcholine receptors confined to brain M_2 Acetylcholine receptors neural M_3 Acetyl choline receptors are cardiac M_4 Acetylcholine receptors glandular
(b) M_1 Acetylcholine receptors neural M_2 Acetylcholine receptors confined to brain M_3 Acetylcho line receptors are cardiac M_4 Acetylcholine receptors glandular
(c) M_1 Acetylcholine receptors neural M_2 Acetylcholine receptors cardiac M_3 Acetylcholine receptors are confined to glandular M_4 Acetylcholine receptors confined to brain
(d) M_1 Acetylcholine receptors glandular M_2 Acetylcholine receptors neural M_3 Acetylcholine receptors are con fined to brain M_4 Acetylcholine receptors cardiac

78. Is a protein marker which can be detected within three hours of acute ischemic kidney injury from patient's urine
(a) N-acetyl- β-D-glucose aminidase
(b) Glutathione-S-transferase
(c) Neutrophil gelatinase associated lipocalin
(d) γ-glutamyl transpeptidase

79. Which of the following genes responsible for graft rejection in humans
(a) Highly polymorphic HLA genes (b) APP genes
(c) hMSH2 gene (d) FMR1 gene

80. Match List I with List II

List - I		List - II	
1.	Vibrations in skeletal muscles of larynx	[P]	Facial contractions
2.	Involuntary contraction of skeletal muscles that is regulated by the brain	[Q]	Regulate voice
3.	Contraction of skeletal muscles in the legs	[R]	Shivering
4.	Pull of skeletal muscles on attachments to skin of face	[S]	Assists return of blood to the heart
		[T]	Causes facial expressions

Choose the correct answer from the options given below
(a) 1-[Q], 2-[R], 3-[S], 4-[P]
(b) 1-[R], 2-[S], 3-[P], 4-[T]
(c) 1-[Q], 2-[R], 3-[S], 4-[T]
(d) 1-[R], 2-[S], 3-[T], 4-[P]

Multiple Choice Questions

Pharmaceutics

1. **The intracellular fluid volume including those of the blood cells is approximately**
(a) 15 litres (b) 20 litres (c) 27 litres (d) 35 litres

2. **India's first Central Drug Laboratory was established at**
(a) Mumbai (b) Lucknow
(c) Kolkata (d) Hyderabad

3. **Which of the following instrument is used to determine surface area and pore structure of pharmaceutical powders**
(a) Coulter counter (b) Andrerson apparatus
(c) Quantasorb (d) Optical microscopy

4. **In the process of extraction, if maceration is accomplished by heating the drug and solvent in a close vessel, then this modification is known as**
(a) Digestion (b) Refining
(c) Expression (d) Rendering

5. **The below mentioned complex is not the type of inclusion compounds**
(a) Channel-Lattice type (b) Quinhydrone complex
(c) Layer type (d) Clathrates

6. **Prescription price consists of**
(a) Cost of ingredients only
(b) Cost of professional fee only
(c) Cost of ingredients and cost of dispensing only
(d) Cost of ingredients and professional fee only

7. **Given below are two statements**
Statement I: Drugs Controller General of India is the Chairman of Drugs Technical Advisory Board (DTAB)
Statement II: In DTAB, there will be eight ex-officio members, five nominated and five elected members
In light of the above statements, choose the most appropriate answer from the options given below
(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement 1 is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

8. **Which of the following vehicles (not required to be sterile, but must be pyrogen free) is intended to be used in the manufacture of injectable products to be sterilized after preparation**
(a) Purified Water
(b) Water for Injection USP
(c) Sterile Water for Injection USP
(d) Bacteriostatic Water for Injection USP

9. **As per the Pharmacy Act, in the composition of Pharmacy Council of India, the total number of Ex-officio members is**
(a) THREE (b) FOUR (c) SIX (d) EIGHT

10. **Match List 1 of Unit operations of crystallizers with List II of principle/characteristics properties of crystallizer**

Crystallizer	Principle/Characteristics
Unit operations	Properties
1. Swenson-walker crystallizer	[P] Adiabatic evaporative cooling
2. Krystal crystallizer	[Q] Cooling alone.
3. Vacuum crystallizer	[R] Evaporation
4. Forced circulation type crystallizer	[S] Heat exchange, separation, circulation

Choose the correct answer from the options given below
(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]

11. **The process of establishing a product in the minds of target customer is called as**
(a) Product positioning (b) Product differentiation
(c) Product targeting (d) Market segmentation

12. **Which of the following materials are specified as a suitable diluent for powdered opium**
[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

13. **Which of the following statement is false**
(a) Reducing agents often cause fading of dyes
(b) Anionic dyes are the most stable at acid pH
(c) Basic dyes are not sensitive to alkalies
(d) Cationic dyes may be precipitated by soaps and clays

14. **In the process of sugar coating, to prevent moisture penetration into the tablet core, which one of the following step is performed**
(a) Seal Coating (b) Subcoating
(c) Syrup Coating (d) Polishing

15. **Oral efficacy of Sabin Polio Vaccine can be adequately explained by which of the following processes of absorption**
(a) Passive diffusion (b) Active transport
(c) lon-pair transport (d) Pinocytosis

45. Conversion of T, to T, inhibition is associated with
(a) Propylthiouracil (b) Radioactive iodine
(c) Lugol's Iodine (d) Carbimazole

46. Hemophilia A is caused due to the reduction in the quantity or activity of which of the following clotting factors
(a) Vitamin-K (b) Clotting factor - IV
(c) Clotting factor-IX (d) Clotting factor-VIII

47. A hypertensive patient Mr. Zee already receiving a drug 'X' to control his blood pres sure was prescribed a tricyclic antidepressant. This resulted in the abolition of the antihypertensive action of 'X: Which of the following drug could be X.
(a) Enalapril (b) Clonidine
(c) Atenolol (d) Diltiazem

48. Which one of the following drugs that is not absorbed orally, is not a bronchodilator, does not have any direct effects on smooth muscles yet is effective in antigen-induced exercise-induced and irritant - induced asthma though not all asthmatics respond to It positively
(a) Salbutamol (b) Montelukast
(c) Sodium cromoglycate (d) Terbutaline

49. Which one of the following is NOT an endogenous opioid peptide
(a) Met enkephalin (b) Leuenkephalin
(c) Dynorphin (d) Beta lipotropin

50. The split up of time cycle of cardiac cycle
(a) VS-0.3 sec VD-0.5 sec AS-0.1sec AD-0.7 sec
(b) VS-0.5 sec VD-0.3 sec AS-0.7 sec AD -0.1 sec
(c) VS-0.3 sec VD-0.5 sec AS-0.5 sec AD -0.3 sec
(d) VS-0.5 sec AD-0.3 sec AS-0.3 sec AD -0.5 sec

51. Vigabatrin produces anti- epileptic activity through
(a) Potentiating GABA mediated neuronal inhibition by depressing GABA transporters
(b) Modifying synaptic release of glutamate/GABA by binding to a specific synaptic protein
(c) Inhibiting GABA transaminase enzyme which degrades GABA
(d) Potentiating post synaptic GAGA receptor effect

52. Match the following

1. Apoptosis	[P] Progressive degradative action of Enzymes
2. Necrosis cells to day	[Q] Tightly regulated intracellular program in which destined
3. Anaplasia	[R] Abnormal mass of tissue
4. Neoplasm	[S] Lack of differentiation

Choose the correct answer from the options given below
(a) 1- [Q], 2 - [P], 3 - [S], 4 - [R]
(b) 1- [S], 2 - [R], 3 - [Q], 4 - [P]
(c) 2- [P], 3 - [Q], 4 - [R], 1 - [S]
(d) 3- [Q], 4 - [R], 1 - [S], 2 - [P]

53. Which one of the following plexus is a part of the central nervous system in the brain and consists of capillaries, ventricles, and ependymal cells
(a) Celiac plexus (b) Choroid plexus
(c) Cervical plexus (d) Brachial plexus

54. To monitor the safety of the new drug under actual conditions of use in large number of patients has been classified as _____ Clinical trials
(a) Phase III (c) Phase IV
(b) Phase II (d) Phase I

55. Which among the following statement is correct with respect to their mechanism of action
(a) Sitagliptin/Vildagliptin: Dipeptidyl peptidase-4 inhibitors
(b) Dapagliflozine/Canaglifozine: AMPK activators
(c) Glibenclamide/ Glimepiride: a-Glucosidase inhibitors
(d) Acarose/Metformin: KATP channel blockers

56. Which of the following is non-epithelial malignancy tumor
(a) Naevus (b) Adenoma
(c) Lipoma (d) Fibrosarcoma

57. Conversion of pseudostratified columnar epithelium in chronic bronchitis and bronchiectasis to columnar type epithelium is an example of which type of metaplasia
(a) Squamous metaplasta (b) Columnar metaplasia
(c) Osseous metaplasia (d) Cartilaginous metaplasia

58. Long-term use of thiazide diuretics in hypertension can produce all of the following EXCEPT
(a) Hyperkalemia (b) Hyperuricemia
(c) Hyperlipidemia (d) Hyperglycemia

59. Total number of facial bones in the human adult
(a) 1 (b) 7 (c) 14 (d) 21

60. The B1 and B2 adrenergic receptor subtype agonist acting at atrioventricular node produces following responses
(a) Increases contractility and conduction velocity
(b) Increases automaticity and conduction velocity
(c) Increases contractility and automaticity
(d) Increases conduction velocity and heart rate

61. Which one of the following is a competitive antagonist at benzodiazepine site of GABA-receptor gated chloride channel
(a) Muscimol (b) Flumazenil
(c) Picrotoxin (d) Beta carboline (DMCM)

62. Some individuals are obsessed with using purgatives regularly as a reflection of their psychological problem. Dangers of purgative overuse include all of the following EXCEPT
(a) Flaring up of intestinal pathology like rupture of inflamed appendix
(b) Fluid and electrolyte imbalance, especially hypokalemia
(c) Steatorrhoea, malabsorption syndrome
(d) Protein build up in the body as a result of enteropathy

63. Which of the following is wrongly matched combination of anti-arrhythmic drugs and their class
(a) Lidocaine - IB (b) Disopyramide - II
(c) Diltiazem-IV (d) Amiodarone III

(a) Growth phas (b) Introductory phase
(c) Decline Phase (d) Maturity phase

121. Glucose upon treatment with nitric acid yields
(a) Gluconic acid (b) Glucaric acid
(c) Glucitol (d) Heptanoic acid

122. The artificial or synthetic seeds are prepared by the following process
(a) Somatic hybridization and culture
(b) Somatic embryogenesis and immobilization
(c) Microprojectile and transformation
(d) Artificial pollination and embryogenesis

123. Which of the following statement is the correct description of product positioning
(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 form competitor's product

124. The total number of amino acids in human insulin (total number of amino acids in A and B chain) is
(a) 51 (b) 84 (c) 32 (d) 08

125. Mixed micelle of lipids with bile acids and lipid soluble vitamins are absorbed by
(a) Pancreatic lipase (b) Apo lipoproteins
(c) Enterocytes (d) Chylomicrons

Answer Key

1-d	2-c	3-a	4-c	5-a	6-b	7-a	8-a	9-b	10-d
11-c	12-c	13-a	14-c	15-d	16-b	17-d	18-a	19-b	20-d
21-b	22-b	23-a	24-a	25-c	26-c	27-d	28-b	29-a	30-b
31-c	32-d	33-b	34-b	35-a	36-d	37-b	38-c	39-a	40-a
41-a	42-b	43-d	44-d	45-a	46-c	47-b	48-c	49-d	50-a
51-c	52-a	53-b	54-c	55-a	56-d	57-b	58-a	59-c	60-b
61-b	62-d	63-b	64-d	65-c	66-c	67-d	68-b	69-a	70-a
71-a	72-b	73-a	74-b	75-b	76-b	77-a	78-b	79-d	80-a
81-d	82-b	83-d	84-b	85-c	86-a	87-a	88-a	89-b	90-d
91-b	92-a	93-d	94-c	95-b	96-c	97-a	98-b	99-c	100-b
101-d	102-b	103-d	104-b	105-b	106-b	107-d	108-c	109-d	110-b
111-d	112-c	113-c	114-b	115-c	116-b	117-c	118-d	119-a	120-d
121-b	122-b	123-b	124-a	125- c					

Pharmaceutics

1. **Hydrated proton is called**
   (a) Water proton (b) Hydronium ion
   (c) Oxonium ion (d) Proton pump

2. **Burow'ssolution is**
   (a) Aluminium acetate solution strong
   (b) Calcium phosphate solution strong
   (c) Ammonium acetate solution strong
   (d) Calcium hydroxide solution strong

3. **When the concentration of an aqueous sodium chloride solution has the same colliga tive properties as the solution in question, the value so obtained is known as**
   (a) Normality (b) Isotonicity value
   (c) Molarit (d) Molality

4. **As per the Drugs and Cosmetics Act-1940, if a drug is not labelled in prescribed manner it is a**
   (a) Spurious drug (b) Substandard drug
   (c) Adulterated drug (d) Misbranded drug

5. **The general purpose soda lime glass is not a suitable material for fabricating the con tainer for**
   (a) Parenteral (b) Oral solutions
   (c) Liquids for external use (d) Dry powders

6. **The mechanism by which fluorides inhibit dental caries is**
   (a) By increasing susceptibility to acid
   (b) By increasing the sensitivity of tooth enamel
   (c) Decreased acid solubility of enamel
   (d) Increased acid solubility of enamel

7. **When a solid forms a gel more readily when gently shaken or otherwise sheared than when allowed to form the gel while the material is kept at rest, the phenomenon is known as**
   (a) Thixotropy (b) Rheopexy
   (c) Negative rheopexy (d) Anti thixotropy

8. **The dispersion of course material by shearing in a narrow gap between and a rapidly rotating cone is caused by a static cone**
   (a) Colloid Mill (b) Electrical Dispersion
   (c) Peptisation (d) Ultrasonic Irradiation

9. **Which of the following is not a fundamental (primary) factor considered for selection of a location for the construction of pharmaceutical or chemical plant**
   (a) Soll (b) Market for products
   (c) Labour supply (d) Raw materials

10. **The drug concentration between Minimum effective concentration (MEC) and maxi mum safe concentration (MSC) is called**
    (a) Toxic range (b) Therapeutic index
    (c) Therapeutic ratio (d) Therapeutic range

11. **Violin gut is obtained from intestine of**
    (a) Horse (b) Cat (c) Sheep (d) Camel

12. **In capsule making the Bloom strength of gelatin is proportional to molecular weight of the gelatin and is a measure of the;**
    (a) Cohesive strength of the solvent molecules
    (b) Cohesive strength of the crosslinking that occurs between gelatin molecules
    (c) Adhesive strength of gelatin with dipping pins
    (d) Adhesive strength of gelatin with other polymer

13. **Dimethyl sulfoxide acts as penetration enhancer for topical formulations by**
    (a) Increasing solubility
    (b) Denaturing proteins
    (c) Increasing transepidermal loss
    (d) Altering solvent nature of membrane

14. **Relative sweetness of sucrose, to saccharin**
    (a) 1: 200 (b) 1:500 (c) 1: 100 (d) 1:400

15. **Choose the wrong statement from the following with regard to Amorphous solids**
    (a) Usually they are anisotropic
    (b) They tend to flow when subjected to sufficient pressure
    (c) Considered as super cooked fluids
    (d) They do not have definite melting point

16. **Following statement is more accurate with respect to limitations of Arrhenius relation ship for stability prediction**
    (a) Order of degradation will alter at higher temperature
    (b) Equal moisture concentrations will be mentioned at different temperatures
    (c) Less relative humidity and oxygen solubility at higher temperature
    (d) Same degradation mechanisms may predominate at different temperatures

17. **According to distribution law, select the appropriate expression for the concentration of a solute when it exist as monomer in solvent A and dimer in solvent B Assume**
    C = concentration of solute in solvent A
    C= concentration of solute in solvent B
    α = degree of dissociation
    (a) $K=\frac{C_A}{2\times\sqrt{C_B}}$ (b) $K=\frac{C_A}{C_B\times(1-\alpha)}$
    (c) $K=\frac{C_A}{C_B\times(2-\alpha)}$ (d) $K=\frac{C_A}{\sqrt{C_B}}$

18. **Which of the following will result in very closest value to the Glomerular Filteration Rate (GFR)**

GPAT-2018

Pharmaceutics

1. **Following are endogenous carriers use for targeted drug delivery EXCEPT**
   (a) Lipoprotein (b) Serum Albumin
   (c) Erythrocyte (d) Microparticulates

2. **Keesom interactions has a force of**
   (a) 0.5-1 kcal/mol (b) 1-7 kcal/mol
   (c) 1-3 kcal/mol (d) None of these

3. **Dipole-induced dipoles are also known as**
   (a) London forces (b) Keesom forces
   (c) Debye forces (d) Hydrogen bonding

4. **The angle of repose is calculated by**
   (a) tan α Radius/Height (b) tan α 1+ Radius/Height
   (c) tan α 1- Radius/Height (d) tan α Height/Radius

5. **Which method is used by pharmacists for complete blending of potent powders with large quantities of diluents**
   (a) Spatulation (b) Levigation
   (c) Trituration (d) Geometric dilution

6. **IVIVC utilizes the principles of statistical moment analysis**
   (a) Level A (b) Level B (c) Level C (d) Level D

7. **As per Factories Act 1948, in CHAPTER VI dealing with working hours of adults, no adult worker shall be required or allowed to work in a factory for more than_____ hours in a week**
   (a) 30 (b) 40 (c) 48 (d) 56

8. **Which of the following is not patentable in India as per the Patents Act 1970**
   (a) New product
   (b) New process
   (c) New use of existing drug
   (d) New process for existing drug

9. **Which of the following agencies is not classified as an 'executive agency' for administration of the act under the provision of Drugs and Cosmetics Act 1940**
   (a) Licensing authority
   (b) Drug inspectors
   (c) Drugs Consultative Committee
   (d) Customs collectors

10. **Statement 1: Vortex formation can be minimized by push pull mechanism**
    Statement 2: Vortex formation reduces the mixing intensity by increasing the velocity of impeller
    (a) True, False
    (b) True, True
    (c) False, False
    (d) Fake, True

11. **Which statements are correct for the micelle formation**
    [P] Micelles are dynamic structures that are continually formed and broken down in solution
    [Q] The typical micelle diameter is about 2-3 pm and so they are visible under the light microscope
    [R] Micelle formation is a spontaneous process
    [S] When the surfactant concentration is increased above the CMC, the number of micelles increases and the free surfactant concentration decreases below CMC
    (a) [P] and [Q] (b) [P] and [R]
    (c) [P] and [S] (d) [R] and [S]

12. **When considering drug delivery to the brain which of the following is false**
    (a) The cells in the blood vessels that supply the brain are tightly connected which restricts drug absorption
    (b) Only relatively small lipophilic molecules readily, passively diffuse in to the brain
    (c) Drugs with a low log P value show improved passive diffusion into the brain (oil/water partition coefficient)
    (d) Polar molecules can be taken up into the brain through active transport

13. **When Ke is constant and Ka is larger**
    (a) C_{max} is more and t_{max} is longer
    (b) C_{max} is lesser and t_{max} is longer
    (c) C_{max} is lesser and t_{max} is short
    (d) C_{max} is more and t_{max} is short

14. **The systems that follows, Weibull Mathematical Model used to describe drug release kinetics are**
    (a) Swellable polymeric devices
    (b) Diffusion matrix formulation
    (c) Erodible matrix formulation
    (d) Transdermal system

15. **HLB value of tragacanth is**
    (a) 4.7 (b) 8.7 (c) 13.2 (d) 14.3

16. **Substance used to reduce friction during tablet compression and facilitate ejection of tablets from the die cavity is called as**
    (a) Lubricant (b) Glidant
    (c) Anti-adherent (d) Humectant

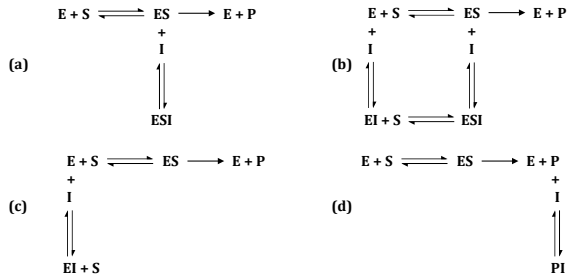
17. **What quantities of 95% v/v and 45% v/v alcohols are to be mixed to make 800 ml of 65% v/v alcohol**
    (a) 480 ml of 95% and 320 ml of 45% alcohol
    (b) 320 ml of 95% and 480 ml of 45% alcohol
    (c) 440 ml of 95% and 360 ml of 45% alcohol
    (d) 360 ml of 95% and 440 ml of 45% alc

18. **The proportion of NaCl liquid to give 1.5% solution of drug isotonic with blood plasma is (The freezing point of 1% w/v solution of drug is -0.122 and NaCl is -0.576 °C)**
    (a) 0.79% (b) 0.585%
    (c) 0.9% (d) 0.5%

Other Subjects

108. A technique of using very small metal particles coated with desired DNA in the gene transfer is called
(a) Microinjection (b) Biolistic
(c) Liposome mediated (d) Electroporation

109. Which of the following equilibrium suggests non-competitive inhibition of enzyme E for conversion of substrate S to product P with inhibitor I



110. Galactose and Glucose are
(a) Epimers (b) Anomers
(c) Isomers (d) Ketose Akose isomers

111. Which among the following is a non-essential
(a) Lysine (b) Threonine
(c) Serine (d) Histidine

112. Which of the following statement is NOT TRUE about prokaryotes amino acid
(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

113. Which of the following are obligatory intracellular parasites
[P] Virus **[Q] Fungus**
[R] Mycobacterium **[S] Rickettsia**
(a) [P], [Q], [R] and [S] (b) [P] [Q] and [R]
(c) [R] and [S] (d) [P] and [S]

114. Henri Fayol's principle "Espirit de corps" means
(a) Corporate objective (b) Group objective
(c) Team activity (d) Team spirit

115. Which of the following about the Varicella-Zoster Virus (VZV) is NOT true
(a) Varicella develops after an individual is exposed to VZV for the first time
(b) Herpes zoster develops from reactivation of the virus later in life
(c) There are no vaccines for this virus
(d) The infection results in post-herpetic neuralgia

116. Match the following diseases under column I with the respective causative organisms under Column II

Column I	Column II
1. Creutzfeldt-Jacob disease	[P] Yersinia pestis
2. Typhus	[Q] Prions
3. Syphilis	[R] Rickettsia prowazekii
4. Plague	[S] Treponema palladium

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

117. The hexose monophosphate pathway produces distinctively two useful products. Identify these products with the ratio in which they are produced
(a) One NADPH to two ribose-6-phosphate
(b) Two NADPH to one ribose-5-phosphate
(c) Two NADPH to one ribulose-5-phosphate
(d) Two NADPH to one fructose-6-phosphate

118. Which of the following replacement of amino acid in a protein may produce greatest change in its conformation
(a) Ser' → Thr (b) Glu' → Val
(c) Gln' → Tyr (d) Phe' → lle

119. How customer's bias about the product will influence the marketing communication
(a) Positive effect (b) Negative effect
(c) No effect (d) Both positive and Negative

120. Match the following enzymes in Column I with their respective functions under Column II

Column I	Column II
[1] DNA ligase	[P] Synthesize a DNA copy of RNA
[2] Alkaline phosphatase	[Q] Forms a bond between 3'-OH and 5' - P * 0
[3] Reverse transcriptase	[R] Removes terminal PO 4 from 3or 5'end of DNA
[4] Polynucleotide kinase	[S] Adds phosphate to 5'-OH end

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

121. All of the following enzymes are used in ELISA EXCEPT
(a) Glucose oxidase (b) Alkaline phosphatase
(c) Coagulase (d) β-galactosidase

122. Which of the following disinfectant effectively destroys vegetative bacterial cells including gram positive and gram negative bacteria, bacterial endospores, fungi, and viruses
(a) 8% formaldehyde + 70 % alcohol
(b) 70% Alcohol
(c) 0.1% Phenol aqueous
(d) 0.1% Iodine aqueous

123. Arrange the following steps in sequence of their order for production of recombinant Insulin
[P] Fusion of A and B chains for disulphide bond
[Q] Cynogen bromide treatment to remove methionine and β galactosidase
[R] Introduction of A and B chain in the plasmid containing β galactosidase gene
[S] Synthesis of A and B chain in E. coli
(a) [P] → [Q] → [S] → [R] (c) [R] → [S] → [Q] → [P]
(b) [S] → [R] → [P] → [Q] (d) [Q] → [P] → [S]→[R]

GPAT-2017

Pharmaceutics

1. **Which of the following is not a thermoplastic resin**
   (a) Phenolic (b) Polystyrene
   (c) Polyethylene (d) Polypropylene

2. **Which among the following statements describing surface activity for surfactants is incorrect**
   (a) Increase in length of hydrocarbon chain decreases surface activity
   (b) Increase in ethylene oxide chain of polyoxy ethylated nonionic surfactant ethylene decrease of surface activity
   (c) Increase in the surface activity results in decrease in surface tension
   (d) Relationship between hydrocarbon chain length and surface activity is expressed by Traube,s rule

3. **Type IV dissolution apparatus as per USP is**
   (a) Flow through cell
   (b) Paddle type apparatus
   (c) Reciprocating cylinder
   (d) Paddle over disk apparatus

4. **[Weight in pound/150] × Adult Dose =Child dose. The above formula is known as _in Posology**
   (a) Young's formula (b) Dilling's formula
   (c) Clark's formula (d) Friend's formula

5. **The type of particle diameter obtained by microscopic method of evaluations is**
   (a) Projected diameter
   (b) Surface – volume diameter
   (c) Volume – surface diameter
   (d) Stoke diameter

6. **Apparent volume of distribution will be highest in case of the drug with % plasma protein binding**
   (a) 10 (b) 89 (c) 50 (d) 68

7. **The useful variable form in vitro dissolution test data for IVIVC includes**
   (a) $t_{50\,\%} - t_{63.2\,\%}$ (b) Sampling interval
   (c) Sample volume (d) Volume of dissolution fluid

8. **For the measurement of particle size of powders, the distance measured between two tangents on opposite sides of the particle parallel to some fixed direction is called**
   (a) Feret diameter (b) Martin diameter
   (c) Projected area diameter (d) Edmundson diameter

9. **If the drug substance has been substituted wholly or in part by another drug or substance , it is called as**
   (a) Spurious drug
   (b) Adulterated drug
   (c) Misbranded drug
   (d) Mixed drug

10. **Antioxidant used as blocking agent in sterile product is**
    (a) Ascorbic acid esters
    (b) Sodium bisulphate
    (c) Ascorbic acid
    (d) EDTA

11. **Bulk product is defined as**
    (a) Product completing all processing stages but not necessarily final packing
    (b) A product ready for final dispatch
    (c) Raw material used for making final dosage form
    (d) A defined quantity of raw material from the same batch

12. **If the pKa of probability is 7.9 and pH of the infected tissue is 8.9, the fraction of drug in the ionized form will be**
    (a) 10% (b) 1% (c) 90% (d) 99%

13. **To rule out the probability of dose dumping from an oral CR dosage form, USP has included which sampling time point for in vitro dissolution test where D is normal dosing interval**
    (a) 0.50D (b) 0.25D (c) 50-1.0D (d) 1.0-2.0D

14. **Hot stage microscopy is an important tool in preformulation studies for the study of**
    (a) Pseudopolymorphism
    (b) Particle size measurement
    (c) Microbial contamination
    (d) Compaction behavior

15. **Which among the following is a class-I method, used for rendering a solution of drug isotonic with body fluids**
    (a) Cryoscopic sphere viscometer
    (b) White – Vincent method
    (c) Sprowls method
    (d) Hammarlund method

16. **Hoeppler viscometer is type of**
    (a) Failing sphere viscometer
    (b) Capillary viscometer
    (c) Cup and Bob viscometer
    (d) Cone and plate viscometer

17. **In Bismuth subgallate suppositories B.P.S, when no strength of the drug is specified, B.P.C directs _____ bismuth subgallate per suppository**
    (a) 300 mg (b) 200 mg (c) 100 mg (d) 400 mg

18. **Hixon Crowell' s cube root law of dissolution states that**
    (a) There is a change in particle size and surface area during dissolution of drug
    (b) Dissolution process is controlled by diffusion of molecules / ions
    (c) High free energy of activation is required for solution
    (d) Renewal of surface fluid layer around drug particle

GPAT-2014

Pharmaceutics

1. **Whitfield ointment contains which of the antifungal drug**
   (a) Itraconazol (b) Terbinafine
   (c) Benzoic acid and Salicylic acid (d) Ketoconazole
2. **Identify the incorrect match of MOA of penetration enhancer**
   (a) DMSO-Protein denaturation
   (b) Pyrrolidones - Alter solvent nature of membrane
   (c) Adapalene - Lipid fluidization
   (d) Pyrrolidones - Increase drug solubility & thermodynamic activity
3. **Which of the following is act as supercritical fluid**
   (a) Nitrogen (b) Oxygen
   (c) Carbon-di-oxide (d) Helium
4. **Cam tracks are used guiding the movement of**
   (a) Hopper (b) Dies (c) Punches (d) None of these
5. **Which of the following is not used as cosolvent in small volume parenteral**
   (a) Glycerol (b) Ethanol
   (c) Benzyl alcohol (d) All of these
6. **Which of the following is used for the measurement of radioactivity**
   (a) Curie meter (b) Roenrgen tube
   (c) Luminiscence detector (d) Geiger-Muller counter
7. **A drug (200 mg dose) administered in tablet form and as intravenous injection (50 mg dose) showed AUC of 100 and 200 microgram hr/ml, respectively. The absolute availability of the drug through oral administration is**
   (a) 125% (b) 250 % (c) 12.5% (d) 1.25%
8. **Commonly used concentration of benzyl alcohol in parenterals is**
   (a) 0.5% (b) 1% (c) 1.5% (d) 2%
9. **Secobarbital is_____drug**
   (a) Schedule G (b) Schedule H
   (c) Schedule Q (d) Schedule X
10. **Occusert is a sustained delivery system of**
    (a) Latanoprost (b) Phenylepinephrine
    (c) Pilocarpine (d) Tropicamide
11. **What is the renal clearance of a substance, if its concentration in plasma is 10 m concentration in urine is 100 mg and urine flow is 2 ml/min**
    (a) 0.02 ml/min (b) 0.2 ml/min
    (c) 2ml/min (d) 20 ml/min
12. **Regarding the role of surfactants in pharmaceutical suspensions for oral administration which of the following statements is false**
    (a) Surfactants decrease the water contact angle of dispersed drug particle
    (b) Surfactants promote flocculation
    (c) Surfactants with high HLB stabilize oral suspensions
    (d) Surfactants increase the viscosity of the continuous phase of pharmaceutical suspensions
13. **The Franz diffusion cell which is used for the evaluation of transdermal drug delivery systems consists of**
    (a) 1 chamber (b) 2 chamber
    (c) 3 chamber (d) None of these
14. **In which method an order of a fixed number of items is placed every time an inventory level falls to a predetermined point**
    (a) A-B-C method
    (b) Maximum and minimum method
    (c) Open to-buy method
    (d) Economic order quantity
15. **Methyl cellulose and similar agent are used in ophthalmic solution to**
    (a) Increase drop size
    (b) Increase ocular contact time
    (c) Reduce inflammation to the eye
    (d) Reduce drop size
16. **As per schedule Y of the drugs and cosmetics act, the animal toxicity study requirements for marketing of a drug depends upon tentative route and duration of administration in humans. In This context, which one of the following statements is incorrect**
    (a) Single dose human use-animal toxicity for 2 weeks in 2 species
    (b) Oral use for 2 weeks in humans animal toxicity for 4 week in 2 species
    (c) Aerosol use by repeated use in humans- animal toxicity for 24 weeks in 2 species
    (d) Multiple daily ocular application for short duration iregation test in 1 species for 3 weeks
17. **Fluctuations occurs in rate of excretion method these can be minimized by**
    (a) Wagner-Nelson method (b) Sigma-minus method
    (c) Loo Reigelman method (d) Method of residuals
18. **Identity the non-absorbable suture**
    (a) Catgut suture (b) Chromic catgut suture
    (c) Silk suture (d) Polydioxanone suture
19. **Dose dumping may be a general problem in the formulation of**
    (a) Soft gelatin capsules
    (b) Suppositories
    (c) Modified release drug products
    (d) None of these

92. Which of the following is present in tak as an impurity
(a) Mg (b) Al (c) Na (d) Fe

93. 2-naphthyl-N-methyl (3-methylphenyl) thiocarbamate is IUPAC name of
(a) Tropicamide (b) Fluconazole
(c) Clotrimazole (d) Tolnaftate

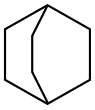
94. 1, 2, 4-trioxane ring is found in which of the following antimalarial
(a) Artemisinin (b) Proguanil
(c) Cycloguanil (d) Halofantrine

95. Which of the following compounds exhibit geometrical isomerism
(a) 1-pentene (b) 2-methyl-2-pentene
(c) 2-pentene (d) 2-methyl-2-butene

96. The conversion of acetamide to methylamine by the reaction of Br_2/ KOH is an example of
(a) Cannizzaro reaction (b) Esterification
(c) Hofmann reaction (d) Bromoform reaction

97. What is the synthetic precursor of Chloramphenicol?
(a) 4-nitro acetophenone (b) 4-chloro acetophenone
(c) 4-amino acetophenone (d) 4-hydroxy acetophenone

98. What is the IUPAC name of the following compound
(a) Bicyclo [2.2.2] octane
(b) Tricyclo [2.2.2] ontane
(c) Bicyclo (2.2.0] octane
(d) Bicyclo [2.2.1] heptanes

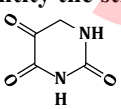
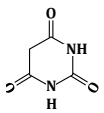
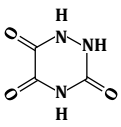
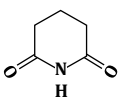


99. Basic ring present in Moricizine is
(a) Phenodiazepine (b) Phenoxazone
(c) Phenothiazine (d) Benzothiazepine

100. In which rearrangement reaction, Isocyanate is formed
(a) Curtious rearrangement (b) Lossen rearrangement
(c) Both (a) and (b) (d) None of these

101. Which of the following is false statement for S_N1 reaction
(a) Follows first order kinetics
(b) Absence of racemization
(c) Rearrangement
(d) 3° > 2° > 1°

102. Choose the FALSE statement for BECKMANN rearrangement
(a) Conversion of amide to amine
(b) Conversion of aldoxime/ketoxime to N-substituted amide
(c) Group anti to the OH group that migrate from carbon to nitrogen
(d) Rearrangement occur in presence of an acid

103. Identity the structure of barbituric acid
(a) 
(b) 
(c) 
(d) 

104. Codeine differ in structure from Morphine by
(a) N-methyl group (b) Acetyl group at C_1 and C_6
(c) $-OC_2H_5$ group (d) $-OCH_3$ group

105. Isotopes differ in
(a) The number of protons (b) The valency number
(c) The chemical activity (d) The number of neutrons

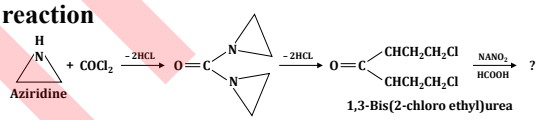
106. Elimination reaction via conjugate base (E1cb) which reaction intermediate will form
(a) Carbocation (b) Carbanion
(c) Free redical (d) All of these

107. Anticholinesterase agent quaternary ammonium compound, intermediate-duration carbonylating agent, used in cobra bite and in myasthenia gravis
(a) Physostigmine (b) Neostigmine
(c) Edrophonium (d) Tacrine

108. In the Reimer-Tiemann reaction reacts with phenol to give the ortho-formylated product
(a) Carbene (b) Carbocation
(c) Carbanion (d) Free redical

109. Ethylene oxide is starting material synthesis of
(a) Mechlorethamine (b) Chlorambucil
(c) Ifosfamide (d) Cyclophosphamide

110. Which of the following drug will synthesize in given reaction



(a) Carmustine (b) Busulfan
(c) Lomustine (d) Somustine

111. A hypochromic shift is a displacement of a band
(a) To a longer wavelength
(b) To a shorter wavelength
(c) An increase in absorption intensity
(d) A decrease in absorption intensity

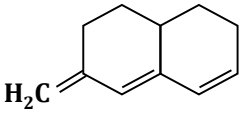
112. o, m, p-isomers can be differentiated on the basis of
(a) Chemical shift (b) Coupling constant
(c) Extinction coefficient (d) Dipole moment

113. Titration in Volhard's method is done in the presence of
(a) Nitric acid (b) Sulfuric acid
(c) Hydrochloric acid (d) Acetic acid

114. Back titration is done for
(a) Strong acid weak base titration
(b) Weak acid base titration
(c) Weak acid strong base titration
(d) Strong acid base titration

115. In IR spectra, C-H stretching of aklehyde at
(a) 2850-2750 cm^{-1} (b) 1750-1725 cm^{-1}
(c) 2250-2150 cm^{-1} (d) 2100 cm^{-1}

116. Determine the maximum wavelength of the given structure
(a) 262
(b) 270
(c) 254
(d) 287



GPAT-2013

Pharmaceutics

1. **Pitot tube measure_____ using a manometer**
   (a) Surface area (b) Liquidity
   (c) Velocity head (d) Pressure head
2. **What kind of substances can't permeate membranes by passive diffusion**
   (a) Lipid-soluble (b) Non-ionized substances
   (c) Hydrophobic substances (d) Hydrophilic substances
3. **Which among of the following variable is not a reason of errors during particle analysis by sieving method**
   (a) Sieve loading (b) Intensity of agitation
   (c) Duration of agitation (d) Size of the particles
4. **The time in minute at a specific temperature needed to kill a population of cell or spore is called**
   (a) D-value (b) F-value
   (c) Z-value (d) None of these
5. **Study the following statements**
   [P] Fixatives in perfumes decrease rate of evaporation
   [Q] Astringent is main ingredient in antiperspirant
   [R] Melanin protects breakdown of bones
   [S] Hard water contains a lot of calcium and potassium salt
   Choose the correct combination of statements
   (a) [P] and [Q] are correct (b) [R] and [S] are correct
   (c) [P] and [S] are correct (d) [Q] and [R] are correct
6. **All are true EXCEPT**
   (a) Soft soaps give emulsions with a pH in the basic range
   (b) Hard soaps form water-in-oil emulsions
   (c) Water-soluble polymers favour the formation of water-in-oil (w/o) emulsions
   (d) On the HLB system, lower numbers are assigned to lipophilic compounds while higher numbers are assigned to hydrophilic compounds.
7. **Study conditions for long term stability testing of new drugs is**
   (a) 30° C ± 2°C/ 65% RH ± 5% RH
   (b) 30°C ± 2°C/ 75% RH ± 5% RH
   (c) 40°C ± 2°C/ 65% RH ± 5% RH
   (d) 40° C ± 2°C/ 75% RH ± 5% RH
8. **Myrj 52 is**
   (a) Sodium oleate
   (b) Polyoxy ethylene Mono-stearate
   (c) Polyoxy lauryl ether
   (d) Polyoxy ethylene castor oil
9. **Which among the following is the Henderson Hasselbach equation for a weak base and its salt**
   (a) pH = pKa+Log([salt]/[base]
   (b) pH = pKa+Log([base]/[salt])
   (c) pH = pKb+Log([salt]/[base]]
   (d) pH = pKb+ Log([base]/[salt])
10. **Hydroxy ethyl carboxy methyl alkyl imidazolium hydroxide is an amphoteric surfactant which is known as**
    (a) Macrogol (b) Miranol
    (c) Poly vinyl pyrrolidone (d) Povidone
11. **The antibacterial activity of phenols is increased by**
    (a) Increasing the pH
    (b) The presence of 10% vegetable oil phase
    (c) Increasing the temperature
    (d) The addition of a quaternary ammonium compound
12. **Which of the following schedules includes shelf life of drugs**
    (a) Schedule P (b) Schedule M
    (c) Schedule N (d) Schedule S
13. **Which aerosol particles will be deposited in alveoli**
    (a) >20 µm (b) <0.6 µm
    (c) 2 and 6 µm (d) 1-2 µm
14. **How much can be the working revolution per minute (RPM) of the ball mill**
    (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 optional RPM
15. **HEPA filter prevents the entry of microbes of size**
    (a) Less than 0.3µ (b) Less than 0.1µ
    (c) More than 0.3µ (d) More than 0.1µ
16. **The biological half-life of procaine in a patient was 35 minutes & Its V, was estimated to be 60L. The total clearance rate of procaine is**
    (a) 1.188L/min (b) 0.115L/min
    (c) 11.5 L/min (d) 5.57L/min
17. **Liposomes are used for all EXCEPT**
    (a) Amphotericin-B (b) Doxorubicin
    (c) Propranolol (d) Vincristine
18. **The chelate, EDTA can described as what type of chelating ligand**
    (a) Bidentate (b) Tetradentate
    (c) Hexadentate (d) Tridentate
19. **How much duty has to charge for the Ayurveda preparations which can be consumed as alcoholic beverages per L.P. litre.**
    (a) Rs. 2/- (b) Rs: 1/- (c) Rs. 5/- (d) Rs.30/-
20. **Browne's tube is used**
    (a) As a chemical indicator for sterilization
    (b) To check density
    (c) To measure viscosity
    (d) To store brown solutions

GPAT-2011

Pharmaceutics

1. **Which of the following isotherms are produced when the heat of condensation of successive layers is more than the heat of adsorption of first layer**
   (a) Type III and IV (b) Type II and V
   (c) Type I and III (d) Type III and V
2. **Which of the following forces contribute to stability of charge-transfer complexes**
   (a) Resonance forces
   (b) Resonance and London dispersion forces
   (c) Dipole-dipole interactions and London dispersion forces
   (d) Resonanse forces and dipole-dipale interactions
3. **Which of the followings act as a non ionic emulsifying agent**
   (a) Triethanolamine oleate
   (b) Polyoxyethylene sorbitan monooleate
   (c) N-Cetyl N-ethyl morpholinium ethosulfate
   (d) Dioctyl sulphosuccinate
4. **The minimal effective flow rate of air in laminar flow hood should be not less than how many cubic feet per minute**
   (a) 10 (b) 50 (c) 100 (d) 1000
5. **Which of the following Schedules include shelf life of drugs**
   (a) Schedule F (b) Schedule M
   (c) Schedule G (d) Schedule P
6. **Which of the following pumps is used in handling of corrosive liquids**
   (a) Turbine pump (b) Volute pump
   (c) Air binding pump (d) Peristaltic pump
7. **By addition of which of the followings the shells of soft gelatin capsules may be made elastic**
   (a) Polyethylene glycol (b) Sorbitol
   (c) Propylene glycol (d) Dibutyl phthalate
8. **Convert 90% v/v alcohol to Proof strength. Choose the correct answer**
   (a) 57.77° under proof (b) 57.77° over proof
   (c) 47.41° over proof (d) 47 41° under proof
9. **Department of Transport Test (DOT) is performed for which of the followings**
   (a) Strip packing (b) Aerosols
   (c) Injection packing (d) Glass containers
10. **What is the Heat of vaporization of water at 100°C**
    (a) 2790 cal/mole (b) 7290 cal/mole
    (c) 7920 cal/mole (d) 9720 cal/mole
11. **Determine the correctness or otherwise of the following**
    Assertion [A] and the Reason [R]
    Assertion [A]: For a pharmaceutical powder true density is greater than the granule density
    Reason [R]: Mercury displacement used for determining granule density penetration of liquid into internal pores of the particles
    (a) [A] is true but [R] is false
    (b) Both (A) and [R] are false
    (c) Both [A] and [R] are true and [R] is the correct reason for [A]
    (d) Both [A] and [R] are true but [R] is not the correct reason for [A]
12. **Determine the correctness or otherwise of the following statements**
    [P] Rheopexy is the phenomenon when a sol forms gel more readily when sheared gently
    [Q] In a rheopectic system, sol is the equilibrium form
    [R] Rheopexy is a phenomenon when a sol forms gel when the material is kept at rest
    (a) [R] is true but [P] and [Q] are false
    (b) [P] is true but [Q] and [R] are false
    (c) [P], [Q] and [R] all are false
    (d) [P], [Q] and [R] all are true
13. **Define Plasmapheresis. Choose the correct answer**
    (a) The process of collecting plasma and returning the red blood cells concentrate to the donor
    (b) The process of collecting red blood cells concentrate and returning the plasma to the donor
    (c) The process of separating white blood cells from blood
    (d) The process of generating artificial blood plasma expanders
14. **Molecules in the smectic liquid crystals are characterized by which one of the followings**
    (a) Mobility in three directions and rotation in one axis
    (b) Mobility in two directions and rotation in one axis
    (c) Mobility in two directions and no rotation
    (d) Mobility in three directions and no rotation
15. **Choose the correct sequence of Moisture vapor Transmission Rate in packaging materials**
    (a) Paper Aluminium foil > PVC > PVdC
    (b) Aluminium foil > PVC > PVdC > Paper
    (c) Aluminium foil PVdC > PVC > Paper
    (d) Paper > PVC > PVdC > Aluminium foil
16. **How many mL of 50% (w/v) dextrose solution and how many mL of 5% (w/v) dextrose solution are required to prepare 4500 ml of a 10 (w/v) solution**
    (a) 500 ml of 50% and 4000 ml. of 5%
    (b) 1000 mL of 50% and 3500 ml of 5%
    (c) 4000 ml of 50% and 500 mL of 5%
    (d) 1500 mL of 50% and 3000 mL of 5%

45.

Group I	Group II
Term used	Explanation
1.Chromophore	[P] Amino group
2.Blue shift	[Q] Increase in wavelength of absorption
3.Auxochrome	[R] Decrease in wavelength of absorption
4.Red shift	[S] Carbonyl group

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

46.

Group I	Group II
Symbol	Description
1. v	[P] Specific resistance
2. id	[Q] Chemical shift
3. δ	[R] Diffusion current
4. ρ	[S] Frequency

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

47.

Group I	Group II
Type of inhibitor	Description
1.Competitive inhibitors	[P] Have affinity only for the [E-S] complex and not for the free [E]
2.Non competitive inhibitors	[Q] Binding of the inhibitor and that of the natural substrate are mutually exclusive
3. Uncompetitive inhibitors	[R] Ultimately binds covalently to the enzyme
4.Suicide inhibitors	[S] Binds with the same affinity to [E] and [E-S]

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

48.

Group I	Group II
Process	Required molecules
1. Post translation modification	[P] Signal peptidase
2.DNA repair	[Q] Sigma factor
3.Control of prokaryotic transcription	[R] Proteasome complex
4. Protein degradation	[S] Photolyase

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

49.

Group I	Group II
Microorganism	Typical characteristics
1.Corynebacterium diptheriae	[P] Cells divide in three planes in an irregular pattern, producing bunches
2. Streptococcus pyogenes	[Q] Cells are lined side by side like matchsticks and at angles to one another
3. Staphylococcus aureus	[R] Longbranched multinuclear filaments called hyphae
4. Streptomyces viridochromogenes	[S] Cells divide in one plane and remain attached to form chain

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

50.

Group I	Group II
Condition	Description
1.Agranulocytosis	[P] Reduced lifespan of erythrocytes
2.Anisocytosis	[Q] Lack of neutrophils
3.Aplastic anemia	[R] Abnormal variation in RBC size
4.Hemolytic anemia	[S] Depression of synthesis of all cell types in bone marrow

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

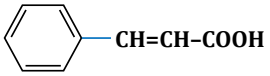
51. The method Transgenic plants are devekiped by genetic engineering techniques
(a) Individual genes from one species inserted inte another; the offspring will contain coples of now gene
(b) By crusing two species or varieties differing at least in one set of characters.
(c) Exposing the plant tissue to radiation
(d) Bioproduction of natural compounds under aseptic conditions

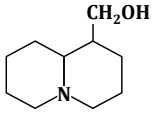
52. In the production of transgenic plants, the gene transfer is carried out by
(a) Induction of meristematic primordial
(b) Gel filtration
(c) Clonal propagation
(d) Silicon carbide whiskers

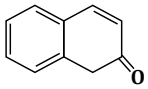
53. In the design of Captoprit the
(a) -COOH group is introduced in proline to enhance the binding capability at the receptor site the binding capability of the drug with cubation of

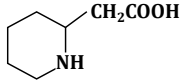
22. A cardio selective beta blocker with vasodilating properties is
(a) Pindolol (b) Atenolol
(c) Bisoprolol (d) Nebivolol

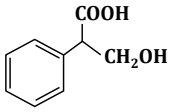
23. Choose the correct option is the precursor for the biosynthesis of



(a) 

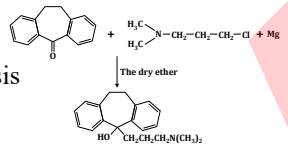
(b) 

(c) 

(d) 

24. (-)-Hyoscyamine is
(a) 15-20 times more active as a mydriatic than (+)-hyoscyamine
(b) Inactive as a mydriatic
(c) 3-5 times less active as a mydriatic than () hyoscyamine
(d) 100 times more active as a mydriatic [+]-hyoscyamine

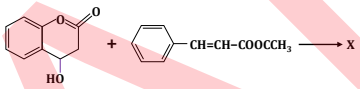
25. The reaction is known as



(a) Grignard reaction
(b) Gabriel phthalimide synthesis
(c) Gomberg reaction
(d) Reimer Tiemann reaction

26. In thiazole diuretics, the position 7 is very important and is occupied by a
(a) CH_3 group (b) Free sulphamoyl group
(c) Chloro group (d) Free – NH_2 group

27. Compound I reacts with II to form X. is
(a) Ethyl biscoumacetate
(b) Phenindione
(c) Warfarin
(d) Dicoumarol



28. A mass spectrum is obtained by plotting graph of
(a) Molecular weight versus peak height
(b) Concentration versus peak height
(c) Concentration versus degree of deflection of ions
(d) Abundance of ions versus their m/e ratio

29. Aldehydes can be distinguished from other C=O containing compounds by IR, due to
(a) The low frequency of absorption of aldehydes
(b) The alkyl or aryl group is attached to >C=0=O
(c) The double bond present
(d) The doublet at the C-H-strecthing region

30. A super disintegrant in tablet formulation is
(a) Sodium starch glycollate
(b) Starch
(c) PVP
(d) Mg--Aluminium silicate

31. 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 (ng hr/ml.), dose normalized to1 mg, for tablet, oral solution and IV were 0.91, 0.87 and 103 0 respectively. Calculate the relative bioavailability of the drug in tablet compared to the oral solution absolute bioavailability of tablet from
(a) 104.6%, 0.883% (b) 81% 5.6%
(c) 10.46% 8.83% (d) 19 %, 56%

32. When ammonium chloride is gradually and slowly incorporates in to an emulsion stabilized with ammonium oleate
(a) Emulsion will crack immediately
(b) It will invert from o/w to w/o type
(c) It will invert from w/o to o/w type
(d) There will be no impact on its physical stability

33. A prescription requires 4 mEq/liter of hydrogen phosphate ion HPO_4^{-2}. How many milligrams of diabasic potassium phosphate, K_2HPO_4 (molecular weight 174) will be required
(a) 174 mg/liter (b) 130.5 mg/liter
(c) 522 mg/liter (d) 348 mg/liter

34. Gram positive bacterial typically contain
(a) Cell wall that lack peptidoglycans
(b) Repeating units arabinogalactan and mycolates in their cell walls
(c) Peptidoglycan muramic acid and D-amino acids in their cell walls
(d) Cell walls containing predominantly polysaccharides and glycoproteins

35. Quartenary structure of a protine molecule refers to
(a) Specific association to two or more copies of a poly peptide chain to result in a biologically active molecule
(b) Regular seen local structure within a polypeptide chain
(c) The portion of the polypeptide chain that comes into contact with another protein molecule
(d) The portion of the structure that gets stabilized upon binding to nucleic acid

36. A blood sample is treated with alkaline phosphotungstic acid to from tungsten blue, which is estimated colorimetrically to give a positive reaction. The sample contains.
(a) Protein (b) Serum creatinine
(c) Serum phenylalanine (d) Uric acid

37. Two important steps for plant regeneration by organogenesis are
[P] Establishment of callus cultures
[Q] Initiation of somatic embryogenesis
[R] Germination of seeds
[S] Initiation of cell suspensions
(a) [Q], [S] (b) [P], [R] (c) [P], [S] (d) [Q], [R]

38. Two tests for ephedrine are
[P] A solution in dilute HCI, treated with copper sulphate and sodium hydroxide gives a violet colour
[Q] An alcoholic solution gives a red colour with $FeCI_3$
[R] On shaking with solvent ether, the organic layer shows purple while the aqueous layer becomes blue in colour
[S] A solution of vanillin gives a violet-red colour
(a) [Q], [S] (b) [P], [S] (c) [P], [R] (d) [Q], [R]

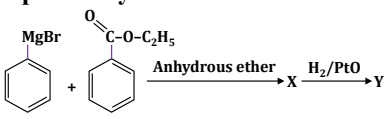
(c) Direct somatic embryogenesis
(d) Premature germination

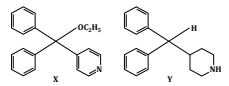
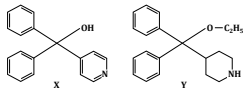
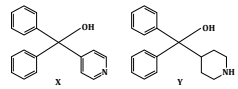
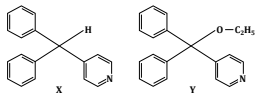
18. While performing chemo microscopy of a drug lignified trichomes were observed Probable drug is
(a) Buchu (b) Lobelia
(c) Nux vomica (d) Mint leaves

19. A common organism that causes meningitis belongs to the genus
(a) Candida (b) Neisseria
(c) Pseudomonas (d) Clostridium

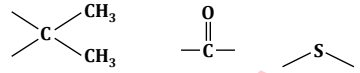
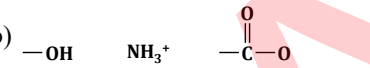
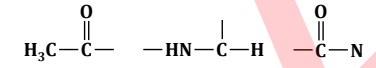
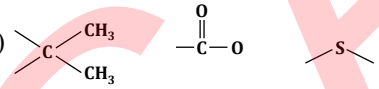
20. Bradykinin is
(a) A steroidal hormone (b) A serotonin derivative
(c) A nonapeptide (d) A lipoprotein

21. Identify the correct combination of the Intermediate X and the product y



(a) 
(b) 
(c) 
(d) 

22. Amoxycillin, a polyfunctional drug has different pKa values such as 9.6, 7.4 and 2.4, at physiological pH. Groups responsible respectively are

(a) 
(b) 
(c) 
(d) 

23. A drug which has potent peripheral vasodilatory properties inhibits the voltage dependent calcium channel in vascular smooth much is
(a) Diethyl 1,4-dihydro-2,6-dimethyl-4-(2-nitrophenyl) 3,5 Pyridine carboxylate
(b) Dimethyl 1,4-dihydro-2,6-diethyl-4-(2-nitrophenyl) 1.5 Pyridine carboxylate
(c) Dimethyl 1,4-dihydro 2,6-dimethyl 4 12-nitrophenyl)-3,5- Pyrazine carboxylate
(d) Dimethyl 1,4-dihydro-26 dimethyl-4-12-nitrophenyl) 3,5-Pyridine

24. In the Bragg's equation $n\lambda = 2d \sin\theta$, 2θ is the angle between
(a) The direction between the incident beam and the refracted beam
(b) The surface of the crystal and the incident fluorescent beam
(c) The direction of the incident and that of the diffracted beam
(d) Two incident beams

25. The colour which human eye perceives is not the colour corresponding to the wavelength of the light
(a) Reflected (b) Absorbed (c) Refracted (d) Diffracted

26. During compression of moisture critical granules a hygroscopic substance used to maintain a proper moisture level is
(a) Sorbitol (b) Talc (c) Acacia (d) Tragacanth

27. The integrated rate equation for a first order reaction is
(a) x/a(a-x) = kt (b) log a/(a-x) 2.303/t
(c) log a/(a-x) kt/2.303 (d) x = kt

28. Which one of the following is used as a local anaesthetic in the formulation of parenteral products
(a) Acetic acid (b) Benzyl alcohol
(c) Ethyl alcohol (d) Sorbitol

29. In the formulation of suspensions for soft gelatine encapsulation base adsorption of the solid to be suspended is expressed as
(a) The number of grams of liquid base required to produce a capsulatable mixture when mixed with 1 gm of solid
(b) The number of ml of liquid base required to produce a capsulatable mixture when mixed with 1 gm of Solid
(c) The number of grams of solid base required to produce a capsulatable mixture when mixed with 1 gm of solid
(d) The number of mgs of liquid base required to produce a capsulatable mixture when mixed with 10 gms of solid

30. The drug that binds to AT_1 receptor with high affinity is
(a) Pinacidil (b) Valsartan
(c) Moexipril (d) Ranolazine

31. A person taking Nitro-glycerine consumes alcohol The drug interacts with alcohol the effect seen is
(a) Severe hypotension and collapse
(b) Drowsiness
(c) Anticoagulant effect
(d) Hypertension

32. The biogenetic origin of methyl substitution at N_1, N_2 and N_7 in Caffeine molecule is
(a) S-adenosyl methionine
(b) S-methyl
(c) S-methyl cysteine
(d) Adenosyl mono phosphate

33. In WHO guidelines for the herbal drugs, contaminants include
(a) Purines and Pyrimidine bases
(b) Amino acids
(c) Pentoses
(d) Pesticidal residues, Arsenic, Heavy metals, Microbial load

34. The ratio of lecithin to sphingomyelin in amniotic fluid is measured
(a) To obtain neonatal lipid profile

GATE-2005

1. **If the Carr's index of a powder is 10% then the type of powder flow is**
   (a) Poor (b) Excellent (c) Very poor (d) Good
2. **Mixing of semisolids is carried out using**
   (a) Double cone mixer (b) Rotating cube mixer
   (c) Planetary mixer (d) Fluidized bed mizer
3. **In the preparation of small pox vaccine, the drying process used is**
   (a) Spray drying (b) Vacuum drying
   (c) Drum drying (d) Freeze drying
4. **In cosmetic preparations, an antioxidant used in an aqueous system, is**
   (a) Sodium formaldehyde sulphoxylate
   (b) α-Tocopherol
   (c) Methyl paraben
   (d) Phenol
5. **In tablet coating process, inadequate spreading of the coating solution before drying causes**
   (a) Orange peel effect (b) Sticking effect
   (c) Blistering effect (d) Picking effect
6. **Presence of one of the following characteristics show that the Rauwolfia serpenting is adulterated with other species of Rauwolfia**
   (a) Compound starch grains
   (b) Cluster crystals of calcium oxalate
   (c) Lignified sclereids
   (d) Unlignified pericyclic fibres
7. **Chinese rhapontic rhubarb can be distinguished from Indian rhubarb by fluorescence developed in UV light which is**
   (a) Deep yellow (b) Deep viokt (c) Green (d) Blue
8. **Citrus flavonoids are rich in**
   (a) Aesculetin (b) Fraxin
   (c) Hesperidin (d) Scopoktin
9. **The quantitative values determined for the identification of leaf drugs remain constant throughout the age of plant**
   (a) Stomatal number (b) Vein termination number
   (c) Veiniskt number (d) Stomatal Index
10. **The alkalid which inhibits the cholinesterase undergoes hydrolysis in solution to give Methykarbamic acid and Eseroline is**
    (a) Scopolamine (b) Pyridostigmine
    (c) Neostigmine (d) Physostigmine
11. **Luminescence is the term applied to**
    (a) Absorbed radiation
    (b) Re-emission of previously absorbed radiation
    (c) Excited radiation
    (d) Transmitted radiation
12. **Polarogram of a solution containing an electro-reducible substance is obtained by plotting the graph of**
    (a) Current vsVolume (b) Current vs. Potential
    (c) Resistance vs. Time (d) Potential vs. Volume
13. **Silica gel used in most of the absorbent columns contains-OH groups. So it is**
    (a) Basic (b) Neutral
    (c) Acidic (d) Both acidic and basic
14. **The electronic transition possible in Br_2 is**
    (a) $\sigma - \sigma^*$ (b) $\sigma - \sigma^*$ and n - σ^*
    (c) $\sigma - \pi^*$ and $\pi - \pi^*$ (d) n - σ^* and $\sigma - \pi^*$
15. **Ferrous ion is very weakly colored for colorimetric analysisIt can be converted into highly colored complex using**
    (a) H_2SO_4 (b) PDAB
    (c) Thymol blue (d) 1, 10-Phenanthroline
16. **Prazepam, Oxazepam, Clonazepam are structurally similar and have the system**
    (a) SH-Dibenz (b, f) azepine
    (b) 1,2,4-Benzothiadiazepine
    (c) Benzodiazepine
    (d) Phenothiazine
17. **11 β,21-Dihydroxy pregn-4-ene-3,18,20-trione is**
    (a) Aldosterone (b) Progesterone
    (c) Cholesterol (d) Cortisone
18. **4, 7-Dichloroquinoline on treatment with 4-amino phenol gives**
    (a) 7-chloro-2-(2-hydroxy phenyl amino) quinoline
    (b) 7-chloro-4-(4-amino phenyl) quinoline
    (c) 7-chloro-4-(4-hydroxy phenyl amino) quinoline
    (d) 4-chloro-7-(4-Hydroxy phenyl amino) quinoline
19. **Ecgonine, a hydrolytic product of cocaine on treatment with chromium trioxide gives a keto acid, which on thermal decarboxylation results in**
    (a) Atropic acid (b) Tropic acid
    (c) Pseudo cocaine (d) Tropinone
20. **A natural product derivative developed as an antimalarial is**
    (a) Artemether (b) Paludrine
    (c) Pyrimethamine (d) Halofantrine
21. **Ternary complex' refers to the state when**
    (a) An enzyme forms a covalent complex with its substrate
    (b) An enzyme forms a non covalent complex with either a substrate or a product
    (c) An enzyme that catalyses a reaction with two or more substrates, is concurrent complexed with both substrates
    (d) An enzyme complexed to a product, just after catalysis

82. Conversion of 2-phosphoglycerate to phosphoenol pyruvate
(a) Pyruvate kinase
(b) Phosphoglycerate mutase
(c) Phosphoglycerate kinase
(d) Enolase

Statement for linked answer Question 83-84

Methotrexate. Trimethoprim and Pyrimethamine are all known to be inhibitors of dihydrofolate reductase. Yet they are classified in different therapeutic categories

83. Trimethoprim has an advantage over methotrexate in its therapeutic category because
(a) Trimethoprim binds to bacterial DHFR about 50,000 times more strongly as compared to thehost DHFR
(b) Trimethoprim can be administered orally
(c) Trimethoprim exhibits no significant adverse effects
(d) Trimethoprim has additional anti-inflammatory properties

84. Methotrexate is thought to exert its actions by
(a) Interfering with purine synthesis
(b) Intracellular formation of an amine adduct
(c) Forming a conjugate with nucleic acids
(d) Inhibiting the synthesis of folic acid

Statement for linked answer Question 85-88

An administrative officer having high blood pressure, gastric acidity and diabetes is prescribed Famotidine, Enalapril and Tolbutamide

85. From the structural features of the drugs, predict which will be ionized in the stomach
(a) Famotidine
(b) Enahpril
(c) Tolbutamide
(d) Enalapril and Tolbutamide

86. The patient cannot tolerate Enalapril Which of the following can be substituted
(a) Omeprazole (b) Losartan
(c) Rosiglitazone (d) Clofibrate

87. Famotidine acts as
(a) H_1-histamine antagonist (b) H_2-histamine antagonist
(c) Proton pump inhibitor (d) H_1agonist

Statement for linked answer Question 88-90

2-Methoxy naphthalene on treatment with acetyl chloride in presence of AICI, gives 2- 6-methoxy naphthalene. This is converted with a set of reagents-X to 6-methoxy-2-naph acetic acid, which is esterified with methanol to the mehyl ester. Ester on treatment w gives DL-2-(6-methoxy-2-naphthyl)-propionic acid methyl ester. This on hydrolysis gives Z (final compound)

88. The set of reagents-X are
(a) Morpholine/Sulphur followed by H_2SO_4/H_2O
(b) Morphine/Sulphur followed by HCI/H_2O
(c) Formic acid/Cu followed by acetic acid
(d) Hydroiodic acid followed by H_2SO_4/H_2O

89. Identify the reagents-Y
(a) $NaOH/CH_3OH$ (b) NaH/CH_3I
(c) $Hydrazine/CH_3I$ (d) $LiAIH_4/CH_3OH$

90. The final compound Z is
(a) Naphazoline (b) Carprofen
(c) Pranoprofen (d) Naproxe

Answer Key

1-a	2-c	3-d	4-d	5-b	6-d	7-c	8-c	9-d	10-b
11-b	12-c	13-b	14-b	15-c	16-a	17-a	18-b	19-a	20-c
21-d	22-a	23-d	24-a	25-c	26-a	27-c	28-d	29-b	30-c
31-b	32-a	33-d	34-c	35-d	36-b	37-a	38-b	39-c	40-a
41-b	42-a	43-b	44-b	45-a	46-c	47-b	48-d	49-b	50-a
51-c	52-b	53-c	54-a	55-b	56-a	57-c	58-c	59-a	60-a
61-c	62-a	63-a	64-a	65-b	66-c	67-d	68-a	69-b	70-a
71-a	72-c	73-d	74-b	75-a	76-c	77-d	78-b	79-c	80-d
81-a	82-d	83-a	84-a	85-a	86-b	87-b	88-a	89-b	90-d

GATE-2000

Pharmaceutics

1. **Diclofenac tablet coated with cellulose acetate phthalate has been administered to a patient. Where do you expect the drug to be released**
   (a) Stomach (b) Oral cavity
   (c) Small intestine (d) Liver

2. **One of the substances is listed is used as muco adhesive. Identify**
   (a) Acacia (b) SCMC (c) Burnt sugar (d) Saccharin

3. **The dip tube in an aerosol container is made from one of the following. Choose the correct one**
   (a) Polypropylene (b) Glass
   (c) Stainless steel (d) Aluminium

4. **Choose the correct pH of the lachrymal fluid**
   (a) 8.0 (b) 6.2 (c) 7.4 (d) 9.0

5. **In the preparation of multilayer tablets one of the substances listed is used to hydrophilic matrix coating**
   (a) CMC (b) Shellac
   (c) Stearyl alcohol (d) Bees wax

6. **The diameter of the mesh aperture in the I.P disintegration test apparatus is given below. Choose the correct size**
   (a) 2.00 mm (b) 4.00 mm (c) 1.00 mm (d) 1.50 mm

7. **The following prescription is given to the pharmacist by the physician to dispense**
   R_x
   Calciferol solution 0.3 ml
   Water to Q.S 5.0 ml send 25 ml
   Final dosage form of this prescription will be
   (a) Solution (b) Elixir
   (c) Emulsion (d) Suspension

8. **An original license or renewed license to sell drugs remains valid upto**
   (a) 31st March next year in which it is granted
   (b) 30th June of the following year in which it is granted or renewed
   (c) 31st January of the same year in which it is granted
   (d) 31st December of the year following the year in which it is granted or renewed

9. **Taste sensation of some liquid oral formulation are given. Match the compatible flavor used in the formulation**

1. Salt	**[P] Wild cherry**
2. Sour	**[Q] Vanilla**
	[R] Citrus
	[S] Chocolate

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

10. **Excipients used in parenteral products are given. Match them**

1. Chelating agents	**[P] Benzyl akohol**
2. Local anesthetic	**[Q] Phenol**
	[R] Gelatin
	[S] Disodium edetate

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

11. **HLB values are given. Match them with correct surfactant**

1. 0 – 3	**[P] Solubilizing agent**
2. 4 – 6	**[Q] Detergent**
	[R] Antifoaming agent
	[S] W/O emulgents

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

12. **Given below are the type of excipients. Match them with the examples**

1. Disintegrant	**[P] Tale**
2. Glidant	**[Q] PVP**
	[R] Lactose
	[S] Acacia

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

13. **Listed below are the Schedules to the Drugs and Cosmetics Act. Match them**

1. Schedule M	**[P] Standard for disinfectant fluids**
2. Schedule O	**[Q] Standard for ophthalmic preparation**
	[R] Requirement of factory premises
	[S] Standard for cosmetics

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

14. **Given below are the Schedules as per D and C Act 1940. Match them with information to be given in the label**

1. Schedule H	**[P] For external use only**
2. Schedule G	**[Q] For therapeutic use only**
	[R] Caution-It is dangerous to take this preparation except under medical supervision
	[S] To be sold by retail on the pre scription of a R.M.P. only

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

Pharmacology

15. **Choose the correct class IV anti-arrhythmic that is primarily indicated for the treatment of supraventricular tachyarrhythmias**

2.3 Types of anticancer drugs and examples

Drug class	Example
1. Antifolate	[P] Vinblastine
2. Purine analogue	[Q] Thioguanine
3. Pyrimidine analogue	[R] 5-Fluorouracil
4. Antimitotic	[S] Methotrexate
	[T] Actinomycin
	[U] Cytarabine

(a) 1-[D], 2-[B], 3-[C], 4-[A]
(b) 1-[A], 2-[C], 3-[D], 4-[E]
(c) 1-[A], 2-[C], 3-[E], 4-[D]
(d) 1-[A], 2-[B], 3-[C], 4-[F]

2.4 Heterocyclic systems and natural products

Heterocycle	Natural product
1. Imidazole	[P] Reserpine
2. β-Carboline	[Q] Pilocarpine
3. Heterosteroidal	[R] Conessine
4. Isoquinoline	[S] Ergotamine
	[T] Papaverine
	[U] Scopolamine

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

2.5 Starting materials used for the synthesis of the following drugs are given [P] to [U]. Match them.

1. Mepyramine Maleate	[P] Azocine and Chloromethyl cyanide
2. Guanethidine Sulphate	[Q] 10-11 Dihydro-5-H. dibenz. [b-f] azepine
3. Isoxsuprine	[R] 5-Oxo 10-11 dihydro 5-H dibenz [a-d] cycloheptene
4. Imipramine Hydrochloride	[S] 4-hydroxy norephedrine
	[T] Benzaldehyde and 2-chloro pyridine
	[U] 4-methyl benzaldehyde and 2-amino pyridine

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

2.6 Listed below are some tests carried out to identify the constituents given in [P] to [U]. Match them correctly

1. Benedict's test	[P] Bile salt
2. Hay's test	[Q] Calcium
3. Gmelin's test	[R] Bile pigments
4. Salkowski test	[S] Urea
	[T] Ketone bodies
	[U] Glucose

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

2.7 Antibiotics and their biochemical origins are given below. Match them

1. Cycloserine	[P] Two amino acid units
2. Cephalosporin	[Q] Single amino acid
3. Neomycin	[R] Sugars
4. Erythromycin	[S] Polypeptides
	[T] Acetate or Propionate
	[U] Polycyclic units

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

2.8 Match the following relationship correctly

1. Hypokalemia	[P] Biotransformation prior to eliciting pharmacological response
2. Spironolactone	[Q] Competitive antagonist of Aldosterone
3. Rhodopsin in Retina	[R] Sugars
4. Prodrug	[S] Vitamin A
	[T] Reduction of Serum K+ level
	[U] Competitive antagonist of cortisone

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

2.9 In parenteral products, listed below are some ingredients. Their main functions are given in [P] to [U]. Match them

1. Thiomersal	[P] Chelating agent
2. Ascorbic Acid	[Q] Buffer
3. EDTA-salt	[R] Anti-oxidant
4. Sodium Chloride	[S] Anti-microbial agent
	[T] Vehicle
	[U] Tonicity adjusting agent

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

24. Give the principal function of the following equipments used in pharmaceutical industry
(i) Ponman whistle (ii) Pycnometer
(iii) Monsanto tester (iv) Breaking tester
(v) Oscillating granulator

25. During the manufacturing of the tablets, the following defects were noticed. Give reasons for these defects in one sentence for each
(i) Rat holing (ii) Blistering (iii) Hazing
(iv) Picking (v) Double impression

26. Assing the main structural features of the compound C_2H_2O from the following IR absorption data 1450 cm^{21}, 1265 cm^{21}, 750 cm^{31}, 1360 cm^{21} and 1680 cm-1

27. A Pharmaceutical formulation contains Zn, Mg and Cu ions. Suggest a suitable method to determine them without separation

28. What will be the adverse reactions, if the following drugs are administered together
(i) Rifampin and Oral Contraceptive
(ii) Tolbutamide and Sulphonamide
(iii) Levodopa and Vitamin B
(iv) Chloramphenicol and Phenobarbitone
(v) Erythromycin and Carbamazepine

29. Give answers in one or two sentences only
(i) Naloxone is N-allyl derivative of Oxymorphone. How does it exert its action
(ii) What is positive ionotropic effect
(iii) How does Verapamil, Nifedipine etc. act as a Calcium channel blocker
(iv) How does Vinca alkaloids exert anticancer effects
(v) What way the sulphonyl urea exerts their hypoglycemic effect

Answer Key

PART (SECTION - I)

i - a	ii - a	iii - d	iv - a	v - c	vi - c	vii - b	viii - c	ix - d	x - b
xi - b	xii - c	xiii - b	xiv - c	xv - a	xvi - b	xvii - c	xviii - c	xix - c	xx - a

PART (SECTION - II)

i - a	ii - d	iii - a	iv - b	v- a

GATE-1993

PART - A SECTION-I
(Choose The Correct Answer)

1. Multiple choice question

i. Triamcinolone is
(a) 9 a-Fluoro-16 a-hydroxyprednisolone
(b) 9 B-Fluoro-16 a-hydroxyprednisolone
(c) 9 a-Fluoro 16 l-hydroxyprednisolone
(d) 9 a-Bromo-16 a-hydroxyprednisolone

i. Surfactants are characterized by the presence of
(a) Water solubilising groups alone
(b) Fat solubilizing groups alone
(c) Water and fat solubilising groups in the same molecule
(d) Groups with positive charge

i. Gamma-globulin is separated from serum by
(a) Agglutination (b) Dialysis
(c) Centrifugation (d) Salting out

i. The stationary phase in Thin-kayer chromatography is
(a) Liquid held between glasses (b) Silica gel
(c) Glass Plate (d) None of the above

i. Benzoyl peroxide is
(a) An astringent (b) An emollient
(c) A preservative (d) A keratolytic

i. Water for injection differs from sterile distilled water as it is free from
(a) Carbon dioxide (b) Pyrogens
(c) Preservatives (d) Antioxidant

i. The correct equivalent for-10°C is
(a) -10°F (b) +22°F (c) -18°F (d) +14°F

i. The active metabolite of anti-cancer cyclophosphamide is
(a) N-hydroxyl cyclophosphamide
(b) N-methyl cyclophosphamide
(c) 4-hydroxyl cyclophosphamide
(d) N-acetyl cyclophosphamide

i. Mebandazole, an anthelmintic drug, has one group at 5-position in the Benz imidazole structure. It is
(a)-S-CH2-CH2-CH, (b)-S-Ph
(c) Ph-SO_2- (d) Ph-CO-

i. Sedative action of barbiturates is due to substituents at C, It is due to
(a) High lipophilicity of groups at C, position
(b) Electronic withdrawing effect
(c) Steric effect
(d) Metal chelation

i. Monoamine oxidase (MAO) Inhibitors have serious side effects and boxicities. The Alternate drugs of choice are
(a) Tricyclic antidepressants (b) Hallucinogens
(c) Amphetamines (d) Xanthine alkaloids

i. Sterility test for the materials meant for surgical suture requires incubation for
(a) 7 days (b) 14 days (c) 21 days (d) 28 days

i. Silver-Silver chloride electrode consists of
(a) Silver wire coated with calomel
(b) Silver wire coated with potassium chloride
(c) Silver wire coated with silver chloride
(d) Platinum wire coated with silver chloride

i. Extinction E=
(a) Log (I_0/I_t) (b) Log T
(c) It/I0 (d) $I010^{-ct}$

i. Senna leaf LP. Consists of
(a) Dried leaflets of Cassia acutifolia and Cassia angustifolia
(b) Dried leaflets of Cassia indica
(c) Dried leaflets of Cassia carpinifolia
(d) Dried leaflets of Cassia carpinifolia and Cassia acutifolia

i. Conformational isomerism is
(a) Cis-trans isomerism
(b) Optical isomerism
(c) Dextro-and levo-rotatory
(d) Non-Identical spatial arrangement of atoms in molecules resulting from rotation about one or more simple bonds

i. According to pH partition theory, a weakly acidic drug will most likely be absorbed from the stomach because the drug which exist primarily in the
(a) Un-ionised, more lipid soluble form
(b) Lonised, more water soluble form
(c) Form of weak acid and more soluble in acid media
(d) Lonic form of the drug which facilitates diffusion

i. Blood flow through a capillary is described by one of the following equations. Choose the correct one
(a) Langmuir (b) Noyes Whitney
(c) Hildebrand (d) Stokes

i. Ionic mobility is denoted by
(a) cm/sec (b) Degree celcius/sec
(c) mg/sec (d) None of these

i. A mixture of hydrochloric acid and acetic acid can be titrated satisfactorily by
(a) Potentiometry (b) Conductometry
(c) Amperumetry (d) Spectrophotometry

SECTION-II
(Match the Following)

20. Caffeine has the UV absorption maximum at 272 mμ.1316 g of this drug was dissolved in enough water to make 1 litre. Exactly 10 ml of this solution was dilute to 100 ml and absorbance of this solution in 1.0 cm cell at 272 mu was 0.854.
(i) Calculate molar absorptivity of caffeine.
(ii) Calculate the concentration of unknown solution of this drug which gave an absorbance of 1.022 in 2.0 c of cell
The molecular weight of caffeine is 194.2

21. The IR absorption band of an organic compound are observed as follow: 3080, 2960, 1680, 1580, 1430,1360, 755 and 690 cm^{1}. Indicate the functional groups corresponding to these bands (The empirical formula of this compound is C8H8O)

22. Define the following term used in parenteral filtration:
(a) Polishing (b) Cold sterilization (c) Impaction

23. Describe the terms mentioned below and give two examples of each
(a) Antipruritis (b) Keratoplastics (c) Keratolytics

24. (a) What is sterile water for injection? How you will identify the oxidizable impurities in it?
(b) Calculate the amount of sodium chloride required to adjust 500 ml of a 0.5 %solution of procaine hydrochloride isotonic with blood plasma. The F.P.D. of 1% solution of procaine HCl is -0.12° C and sodium chloride is -58° C.

25. Mention the possible drug-drug interaction of the following combinations
(a) Aluminium hydroxide gel with isoniazid
(b) Aspirin with heparin injection
(c) Phenytoin with sulphasomidine

26. Define the following terms used in tablets coating
(a) Opaquants
(b) Bridging
(c) Compression coating

27. Define the term mentioned below used in aerosol technology:
(a) Leak test (b) Biological test (c) Spray test

Answer Key

PART (SECTION - I)

i - b	ii - a	iii - b	iv - a	v - b	vi - c	vii - c	viii - a	ix - c	x - b
xi - b	xii - a	xiii - a	xiv - a	xv - a	xvi - a	xvii - c	xviii - b	xix - b	xx - b
xxi - a	xxii - c	xxiii - b	xxiv - b	xxv - c	xxvi - a	xxvii - a	xxviii - c	xxix - c	xxx- a
xxxi - d	xxxii - b	xxxiii - b	xxxiv - c	xxxv - d	xxxvi - c	xxxvii- d	xxxviii - c	xxxix - a	xI - d

PART (SECTION - II)

i - b	ii - c	iii - a	iv - c	v - b	vi - d	vii - a	viii - c	ix - a	x - b
xi - d	xii - c	xiii - b	xiv - c	xv - a	xvi - b	xvii - c	xviii - d	xix - c	xx - c

GATE-1989

PART - A Section-I
(Choose The Correct Answer)

1. Multiple choice question

i. Repeated administration of Tyramine results in its decreasing effectiveness
(a) Gets detoxicated easily
(b) Displaces Nor-adrenaline from nerve ending binding site
(c) Displaces Adrenaline from nerve ending binding site
(d) None of the above

ii. Atropine on hydrolysis with Barium hydroxide gives
(a) Tropanol and Tropic acıd
(b) Scopine and Tropic acid
(c) Ecgonine and Benzoic acid
(d) Benzyi Ecgonine and Methanol

iii. The concentration of sucrose in simple Syrup BP is
(a) 85% w/w (b) 60.70% w/w
(c) 66.70% w/w (d) 40.74% w/w

iv. Stratified cork and forked are the characteristic diagnostic features of
(a) Apocynaceae (b) Scrophulariaceae
(c) Gentianaceae (d) Polygonaceae

v. Most accepted mechanism for developing bacterial resistance to Sulphonamides is
(a) An increasing capacity to inactivate or destroy the drug
(b) An alternative metabolic pathway for synthesis of an essential metabolite
(c) An increasing product of drug antagonist
(d) An alternation in enzyme that utilize PABA

vi. C_{17} α-ß unsaturated lactone ring is a common feature in
(a) Digitalis and Squill glycosides
(b) Digitalis and Strophanthus glycosides
(c) Digitalis and Senna glycosides
(d) Digitalis and Amygdalin

vii. For drying blood plasma the following technique is used
(a) Spray drying (b) Freeze drying
(c) Vacuum drying (d) Fluid bed drying

viii. C_3 O-glycoside Digitoxin is used for
(a) Cardiac action
(b) Hypotensive action
(c) Precipitating steroids from solution
(d) Precipitating Anthraquinone glycosides

ix. Chemical name of Amoxicillin is
(a) 6- [D-(-) α-amino p-hydroxy phenyl acetamido]penicillanic acid
(b) 4- [D-(-) α-amino p-hydroxy phenyl acetamido] penicillanic acid
(c) ß - hydroxy analogue of Benzyl penicillin
(d) α - Carboxy benzyl penicillin

x. The HLB value of sodium lauryl sulphate is
(a) 6.5 (b) 13.8 (c) 25.0 (d) 40.0

xi. Claviceps purpurea yields after infecting ovaries of Graminaceous plants
(a) Digitoxın (b) Lysergic acid derivatives
(c) Reserpine (d) Polypeptides

xii. In the official bioassay of Erythromycin strain used is
(a) Bacillus subtilis (b) Micrococcus luteus
(c) Salmonella typhi (d) Escherichia coli

xiii. The disintegration time for sugar coated tablet is
(a) 30 minutes (b) 45 minutes
(c) 60 minutes (d) 75 minutes

xiv. Idioblasts of crystal layer of calcium oxalate is a diagnostic feature of
(a) Hyoscyamus Niger leaves
(b) Deadly nightshade leaves
(c) Cinchona bark
(d) Senna leaves

xv. Antibiotic which interacts with calcium ion is
(a) Erythromycin (b) Streptomycin
(c) Tetracycline (d) Ampicillin

xvi. Flow rate of granules from the hopper can be improved by adding
(a) Disintegrant (b) Glidant
(c) Binder (d) Lubricant

xvii. Silicon carbide rod heated to a high temperature is used as a
(a) Detector in infra-red spectroscope
(b) Source of light in infra-red spectroscope
(c) Source of light fluorimetry
(d) Detector in gas chromatography

xviii. Anomocytic type stomata are found in the leaves of
(a) Fox glove (b) Urginea maritima
(c) Cassia acutifolia (d) Atropa belladonna

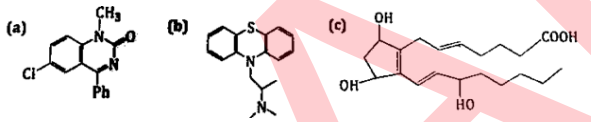
xix. Liver microsomal enzymes are stimulated (enzymatic induction) by
(a) Cimetidine (b) Phenobarbitone
(c) Procaine (d) Adrenaline

xx. Enteric coating is achieved by using
(a) Hydroxy propyl methyl cellulose
(b) Carboxy methyl cellulose
(c) Cellulose acetate Phthalate
(d) Povidone

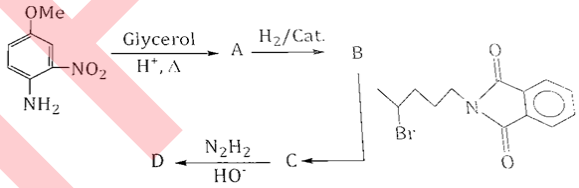
xxi. Carr's price reaction is applied for the photometric evaluation of
(a) Vitamin A
(b) Tocopherol
(c) Nandrolone Phenyl Propionate
(d) Benzodiazepine

PART - B

3. **How arachidonic acid is liberated endogenously? Name its major groups of active metabolites**
4. **Write briefly and precisely (in 2-3 lines each) one the following terms**
   a. Chromophore b. Auxochrome c. R-bands
5. **Name the precautions to be followed in the manufacture of radiopharmaceutical preparations**
6. **Described briefly (in about 10 lines) how absorbent cotton wool is prepared from comber waste**
7. **Give the composition of black fluid as per schedule O. How are they graded? What is their respective Rideal-Walker Coefficient?**
8. **Outline two step syntheses of aspirin from phenol, giving mechanism of each step.**
9. **Balance the following equations**
   (a) $Cr_2O_7^{+2} + Fe^{+2} = Cr^{+++} + Fe^{+++}$
   (b) $MnO^-_4 + H_4C_2O_4 = Mn^{++} + CO_2$
   (c) $H_2O_2 + I^- = I_2 + H_2O$
10. **Give reasons for using lycopodium as standards as quantitative microscopy. Write the formula.**
11. **Why water soluble ointment bases are in extensive use? Mention their specific properties**
12. **A prescription requires 500 ml of sodium chloride; it will contain 500 mEq of Na^+. How many gram of NaCl (MW = 58.5) are required**
13. **Name the three important metabolic processes for each of the following drugs**



14. **Give the most probable mechanism of action for each of the following (2-3 lines each)**
   (a) Indomethacin (anti-inflammatory)
   (b) Warfarin (anticoagulant)
   (c) Verapamil (antiarrhythmic)
15. **(a) Calculate the approximate molarity of conc. HCI (Density of conc. HCl = 1.19, conc. HCI has a concentration of about 38% by weight)**
   (b) Convert the given values of hydronium ion concentration to pH
   (i) (H) = 4.5 x 105 N
   (ii) (H_2) =0.00143 N
16. **What do you understand from "Static Test on prepared tablets" Explain Briefly?**
17. **Write therapeutic uses of Caffeine, Theophylline and Theobromine. How do they differ in their action on CNS diuresis and respiration?**
18. **What is the bioavailability of drug? Mention the parameters important in evaluating the bioavailability of drugs**
19. **Give the principle involved in the official assay of Sulfadimidine and Vit. C.**
20. **Synthesis of primaquine is outline below. Give the structures of A-D Mention the names of the reactions involved in this synthesis**



21. **What are prodrugs? Mention their usefulness**
22. **Write briefly on the role of plasticizers in capsule**
23. **How will you avoid 'Caramelisation' in the preparation of injection? What is 'Leaker Test'?**
24. **How the entry of drugs molecule into the CNS is controlled? What are the other biological varriers?**
25. **How does the Blister package protect the content from moisture?**
26. **Given below are some absorption frequencies in an IR spectrum. Indicate the appropriate functional group for the same**
   (a) 3500-330 cm^{31}
   (b) 3030-3010 cm
   (c) 1750 cm^1
27. **Give only names of the enzymes involved in the biosynthesis of epinephrine form tyrosine**

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