

JELET Pharmacy Sample Paper-8

Duration: 120 Minutes

Maximum Marks: 100

Instructions

- This paper contains **100** Multiple Choice Questions (Single Correct).
- Each correct answer carries **+1 marks**.
- Each incorrect answer carries: **-0.25** marks.
- Unattempted questions carry **0** marks.
- Only one option is correct for each question.
- Use of mobile phones, smartwatches, calculators, or any electronic gadgets is strictly prohibited.

Q1. Which of the following is considered a chemical incompatibility when dispensing a prescription containing caffeine and sodium benzoate?

- (A) Formation of a damp powder mixture due to hygroscopic nature
- (B) Liquefaction due to the formation of a low-melting eutectic mixture
- (C) Production of a clear, highly soluble complex through complexation
- (D) Precipitation of caffeine due to immediate salt hydrolytic cleavage

Q2. What is the fundamental mechanism of sterilization utilized in an autoclave?

- (A) Alkylation of microbial proteins by chemical oxidation
- (B) Coagulation and denaturation of microbial structural proteins
- (C) Structural disruption of cell walls by dry thermal stress
- (D) Ionization of atomic structures within microbial nuclear DNA

Q3. In the classification of crude drugs, the arrangement based on the morphological parts used (such as leaves, roots, or flowers) is specifically called:

- (A) Taxonomical classification



- (B) Morphological classification
- (C) Chemical classification
- (D) Pharmacological classification

Q4. Which of the following cells in the gastric mucosa are responsible for secreting intrinsic factor, which is essential for Vitamin B₁₂ absorption?

- (A) Peptic cells
- (B) Mucus neck cells
- (C) Parietal cells
- (D) G-cells

Q5. Under the Drugs and Cosmetics Act, 1940 and Rules 1945, Schedule M explicitly relates to which of the following provisions?

- (A) Requirements and guidelines for clinical trials of new chemical entities
- (B) Good Manufacturing Practices (GMP) and requirements of factory premises
- (C) List of prescription drugs that can be sold only on the prescription of a Registered Medical Practitioner
- (D) Standards for mechanical contraceptives and surgical dressings

Q6. In inventory control, the technique that categorizes items based on their critical importance to production or hospital functioning rather than monetary value is:

- (A) ABC Analysis
- (B) VED Analysis
- (C) EOQ Model
- (D) FSN Analysis

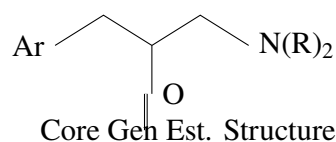
Q7. A solution has a hydrogen ion concentration of 1.0×10^{-5} M. What is the calculated pH of this buffer system?

- (A) 5.0



- (B) 9.0
- (C) 4.0
- (D) 7.0

Q8. Which structural functional group is characteristically present in all local anesthetics belonging to the ester class, such as procaine?



- (A) Amide group interlinked with a basic side chain
- (B) Carboxylic acid group complexed to an aromatic core
- (C) Ester linkage between an aromatic acid and an alcohol amino group
- (D) Ether bridge connecting an aliphatic backbone to an aryl ring

Q9. Which of the following diagnostic clinical tests is specific for the detection and confirmation of Typhoid fever?

- (A) Widal Test
- (B) Dick Test
- (C) Schick Test
- (D) Mantoux Test

Q10. How many grams of sodium chloride are required to prepare 500 mL of an isotonic 0.9% w/v physiological saline solution?

- (A) 0.45 g
- (B) 4.50 g
- (C) 9.00 g
- (D) 45.0 g

Q11. The process of cultivation where plants are grown in nutrient-enriched water solutions without the use of any physical soil medium is known as:



- (A) Micropropagation
- (B) Hydroponics
- (C) Layering
- (D) Polyploidy cultivation

Q12. Which of the following vitamins is a water-soluble compound that acts as an essential coenzyme in oxidative decarboxylation reactions of carbohydrates?

- (A) Thiamine (Vitamin B₁)
- (A) Retinol (Vitamin A)
- (B) Cholecalciferol (Vitamin D)
- (C) Tocopherol (Vitamin E)

Q13. What is the key therapeutic role of an “ABC” analysis in hospital pharmacy inventory management?

- (A) Controlling high-cost items by monitoring total annual consumption value
- (B) Categorizing items purely on vital, essential, and desirable availability
- (C) Eliminating out-of-stock items for emergency surgical setups
- (D) Determining the shelf-life degradation speed of specialized biologicals

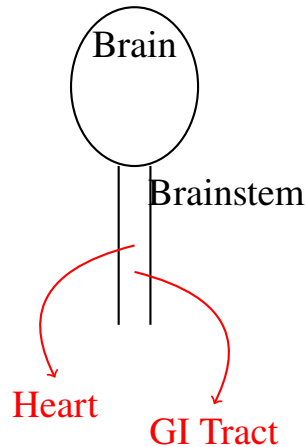
Q14. The term “Bioavailability” refers to the:

- (A) Total quantity of an administered drug dose that is excreted unchanged by the kidneys
- (B) Rate and relative extent to which an active drug moiety reaches the systemic circulation
- (C) Speed with which a dosage form undergoes complete disintegration in the stomach
- (D) Ratio of drug bound to plasma proteins compared to the total free drug fraction



Q15. Which cranial nerve is primarily responsible for regulating the sensory and motor functions of the human heart, lungs, and gastrointestinal tract?

- (A) Trigeminal nerve (V)
- (B) Facial nerve (VII)
- (C) Vagus nerve (X)



- (D) Hypoglossal nerve (XII)

Q16. Which of the following acts as a competitive antagonist at muscarinic acetylcholine receptors, causing pupillary dilation and dry mouth?

- (A) Pilocarpine
- (B) Atropine
- (C) Physostigmine
- (D) Propranolol

Q17. The main legislative objective of the Pharmacy Act, 1948 is to:

- (A) Regulate the import, manufacture, distribution, and sale of all drugs in India
- (B) Control the supply and prohibit the illegal use of psychotropic substances
- (C) Regulate the profession and practice of pharmacy across the country
- (D) Prevent the misleading advertisement of drugs for certain specific diseases

Q18. Which of the following is a specific identification test used for the detection of carbohydrates, yielding a purple/violet ring at the junction of two liquids?



- (A) Biuret Test
- (B) Molisch's Test
- (C) Ninhydrin Test
- (D) Halphen's Test

Q19. Which organelle is recognized as the primary site for cellular respiration and the synthesis of adenosine triphosphate (ATP)?

- (A) Golgi apparatus
- (B) Mitochondrion
- (C) Lysosome
- (D) Endoplasmic reticulum

Q20. In the processing of hard gelatin capsule shells, which agent is added to the formulation mixture specifically to provide opacity?

- (A) Titanium dioxide (TiO_2)
- (B) Sorbitol
- (C) Methyl paraben
- (D) Acacia gum

Q21. The phenomenon where an increased concentration of an electrolyte decreases the solubility of a non-electrolyte or another electrolyte is termed as:

- (A) Salting-in
- (B) Salting-out
- (C) Hydrotropy
- (D) Cosolvency

Q22. Which of the following is an example of an organophosphorus compound used in agriculture that acts as an irreversible acetylcholinesterase inhibitor?

- (A) Malathion



- (B) Neostigmine
- (C) Edrophonium
- (D) Carbachol

Q23. The legal authority responsible for issuing and renewing licenses for manufacturing drugs at a state level in India is the:

- (A) Drugs Controller General of India (DCGI)
- (B) State Licensing Authority
- (C) Pharmacy Council of India (PCI)
- (D) Narcotics Commissioner of India

Q24. In the limit test for Iron, what is the role of citric acid?

- (A) To prevent the precipitation of iron by ammonia by forming a soluble complex
- (B) To act as a reducing agent converting ferric ions to ferrous ions
- (C) To provide an acidic medium for the development of a purple color
- (D) To precipitate heavy metals other than iron out of the test sample

Q25. Which of the following crude drugs belongs to the category of organized drugs?

- (A) Acacia gum
- (B) Cinchona bark
- (C) Agar
- (D) Aloe juice

Q26. The volumetric mechanism by which the human lungs increase in volume during quiet, relaxed inspiration depends primarily on the:

- (A) Relaxation of the internal intercostal muscles
- (B) Contraction and downward movement of the diaphragm

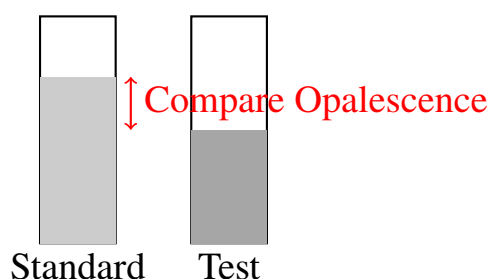


- (C) Passive recoil of the elastic alveolar tissue layers
- (D) Increase in the intrapleural pressure above atmospheric limits

Q27. When a hospital pharmacy purchases drugs directly from a manufacturer using a formal bidding process where any supplier can submit a bid, it is called:

- (A) Restricted tender purchasing
- (B) Open tender purchasing
- (C) Direct negotiation purchasing
- (D) Rate contract purchasing

Q28. What is the primary purpose of conducting a “Limit Test” for a specific impurity in an official pharmaceutical substance?



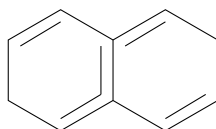
- (A) To determine the exact quantitative amount of the chemical impurity present
- (B) To identify and isolate the structural formula of an unknown degradant
- (C) To demonstrate that the impurity does not exceed a designated allowable limit
- (D) To check if the active component has degraded entirely into toxic products

Q29. Which of the following is a non-reducing disaccharide composed of glucose and fructose units?

- (A) Maltose
- (B) Lactose
- (C) Sucrose
- (D) Cellobiose



- Q30.** The primary biological site for the metabolic biotransformation of most exogenous drugs in the human body is the:
- (A) Kidneys
 - (B) Lungs
 - (C) Liver
 - (D) Small Intestine
- Q31.** Which of the following structural parts of the human brain contains the vital autonomic reflex centers for regulating heart rate, blood pressure, and respiration?
- (A) Cerebrum
 - (B) Medulla oblongata
 - (C) Cerebellum
 - (D) Thalamus
- Q32.** A container that protects its contents from contamination by extraneous solids, liquids, or vapors during normal handling, shipment, and storage is defined as a:
- (A) Light-resistant container
 - (B) Well-closed container
 - (C) Hermetically sealed container
 - (D) Tamper-evident container
- Q33.** Which of the following chemical groups represents an aromatic ring configuration containing two fused benzene rings?



- (A) Benzene ring
- (B) Pyridine ring



- (C) Naphthalene ring
- (D) Phenanthrene ring

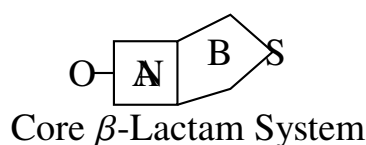
Q34. The therapeutic combination of sulfamethoxazole and trimethoprim (co-trimoxazole) is highly effective because it produces:

- (A) Sequential blockade of bacterial folic acid synthesis
- (B) Competitive inhibition of bacterial cell wall assembly
- (C) Acceleration of renal drug excretion pathways
- (D) Antagonism of ribosomal protein synthesis mechanics

Q35. In community pharmacy practice, a patient presenting with a sudden acute cough accompanied by thick green sputum and high fever should be managed by:

- (A) Dispensing a potent OTC antitussive syrup for symptomatic relief
- (B) Recommending immediate referral to a registered medical practitioner
- (C) Initiating an empirical 3-day course of broad-spectrum amoxicillin
- (D) Advising the patient to use steam inhalation with menthol crystals alone

Q36. Which structural feature is fundamentally responsible for the chemical stability and antibiotic activity of penicillin drugs?



- (A) β -lactam ring (Ring A)
- (B) Thiazolidine ring (Ring B)
- (C) Macrolide ring
- (D) Phenothiazine ring

Q37. The fundamental functional unit of the human skeletal system, representing the concentric structural rings found within compact bone tissue, is known as the:



- (A) Osteoblast
- (B) Haversian system (Osteon)
- (C) Trabeculae
- (D) Canaliculi

Q38. What type of pharmaceutical incompatibility occurs when two or more substances are mixed together, resulting in the formation of a liquefied mass due to a drop in melting point?

- (A) Chemical incompatibility
- (B) Therapeutic incompatibility
- (C) Physical (Eutectic) incompatibility
- (D) Structural hydrolysis incompatibility

Q39. Which of the following is an example of an indigenous national health program aimed at eradicating a chronic vector-borne disease across India?

- (A) National Vector Borne Disease Control Programme (NVBDCP)
- (B) Revised National Tuberculosis Control Programme (RNTCP)
- (C) National AIDS Control Programme (NACP)
- (D) Universal Immunization Programme (UIP)

Q40. Which of the following chemical compounds is an inorganic gas commonly used for the chemical gas sterilization of heat-sensitive surgical instruments?

- (A) Nitrogen dioxide
- (B) Ethylene oxide
- (C) Carbon monoxide
- (D) Chlorine dioxide

Q41. The primary purpose of counseling a patient on the correct use of a metered-dose inhaler (MDI) containing a corticosteroid is to:

- (A) Maximize systemic drug absorption into the bloodstream



- (B) Ensure correct deposition in the lungs and minimize local oral thrush
- (C) Prevent the rapid chemical degradation of the aerosol propellant
- (D) Avoid the development of immediate systemic physical dependence

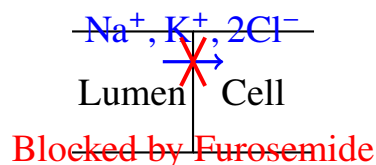
Q42. Which of the following is a primary clinical feature or diagnostic sign of metabolic ketoacidosis in an uncontrolled Type 1 diabetes mellitus patient?

- (A) Marked bradycardia and hypoventilation
- (B) Deep, rapid breathing (Kussmaul respiration) and fruity breath odor
- (C) Profuse sweating and immediate elevation of blood volume
- (D) Increased pH of the blood plasma above 7.45

Q43. The adulteration of digitalis leaves with the leaves of *Verbascum thapsus* is an example of which type of crude drug adulteration?

- (A) Substitution with exhausted drugs
- (B) Substitution with superficially similar inferior natural drugs
- (C) Artificially manufactured substance addition
- (D) Presence of microscopic vegetative matter

Q44. What is the primary physiological mechanism by which the loop diuretic furosemide produces a rapid increase in urine output?



- (A) Inhibition of the $\text{Na}^+/\text{K}^+/2\text{Cl}^-$ cotransporter in the thick ascending limb of the loop of Henle
- (B) Antagonism of aldosterone receptors in the late distal tubule and collecting duct
- (C) Selective inhibition of carbonic anhydrase in the proximal convoluted tubule
- (D) Blocking of the simple Na^+/Cl^- symporter system in the early distal tubule



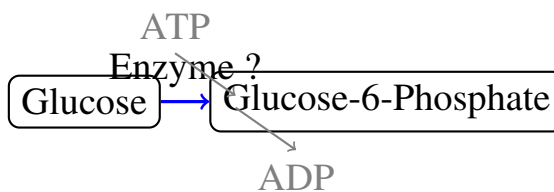
Q45. Which of the following compounds is chemically classified as a basic heterocyclic compound containing a nitrogen atom in a six-membered saturated ring system?

- (A) Pyridine
- (B) Piperidine
- (C) Pyrrole
- (D) Imidazole

Q46. The legal operational layout, structural space, and minimum qualified staff requirements for setting up a retail pharmacy store in India are monitored under the:

- (A) State Pharmacy Council Rules
- (B) Education Regulations of the PCI
- (C) Drugs and Cosmetics Rules, 1945
- (D) Magic Remedies Act, 1954

Q47. Which enzyme is responsible for catalyzing the conversion of glucose to glucose-6-phosphate in the first step of the glycolytic pathway in hepatic tissue?



- (A) Phosphofructokinase-1
- (B) Hexokinase / Glucokinase
- (C) Pyruvate kinase
- (D) Glucose-6-phosphatase

Q48. The structural component of the human male reproductive system where functional sperm cells undergo maturation and are stored prior to ejaculation is the:



- (A) Seminiferous tubules
- (B) Vas deferens
- (C) Epididymis
- (D) Prostate gland

Q49. Which of the following is an example of an endogenous mineralocorticoid hormone secreted by the outer layer of the adrenal cortex?

- (A) Cortisol
- (B) Aldosterone
- (C) Epinephrine
- (D) Glucagon

Q50. When evaluating crude drugs, the determination of the total amount of acid-insoluble ash is specifically useful to detect the presence of:

- (A) Water-soluble active glycosidic principles
- (B) Adulteration with silica, earth, or sand particles
- (C) Volatile aromatic organic compounds
- (D) Moisture content left after thermal drying

Q51. What term defines the maximum volume of air that a human being can forcefully expire after a maximum, deep inspiration?

- (A) Tidal Volume
- (B) Residual Volume
- (C) Vital Capacity
- (D) Total Lung Capacity

Q52. Which of the following acts as a chemical protective or topical protectant in inorganic pharmaceutical chemistry, commonly used in calamine lotion?

- (A) Zinc oxide (ZnO)



- (B) Sodium thiosulfate
- (C) Calcium carbonate
- (D) Selenium sulfide

Q53. Under the Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985, cultivation of which of the following plants without a valid central government license is a severely punishable offense?

- (A) *Cannabis sativa*
- (B) *Digitalis purpurea*
- (C) *Cinchona calisaya*
- (D) *Rauwolfia serpentina*

Q54. Which of the following serves as an important primary physiological buffer system inside human erythrocytes to maintain internal acid-base equilibrium?

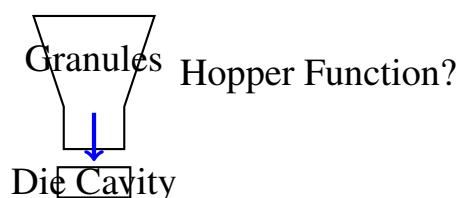
- (A) Phosphate buffer system
- (B) Bicarbonate-carbonic acid buffer system
- (C) Hemoglobin buffer system
- (D) Acetate buffer system

Q55. In family welfare programs, the primary long-term operational objective of implementing the “No Scalpel Vasectomy” technique is to:

- (A) Decrease the incidence of sexually transmitted blood-borne infections
- (B) Provide a permanent, highly effective surgical sterilization method for males
- (C) Temporarily space pregnancies among young married couples
- (D) Increase maternal health indices during the postpartum phase

Q56. What is the primary mechanical function of the “Hopper” in a standard single-punch tablet compression machine?





- (A) Compressing the granulated material into a solid tablet form
- (B) Holding and feeding the dry granulation mixture into the die cavity
- (C) Ejecting the finished tablet from the lower die surface
- (D) Adjusting the total weight variance of successive tablets

Q57. Which type of primary packaging material is most prone to the chemical phenomenon of “leaching” when filled with aqueous parenteral solutions?

- (A) Type I Borosilicate glass
- (B) Polyvinyl chloride (PVC) plastic
- (C) Stainless steel containers
- (D) Aluminium metal foil

Q58. If a child dose is to be calculated from an adult dose of 60 mg for a child aged 4 years, what is the correct dose using Young’s Rule?

- (A) 12 mg
- (B) 15 mg
- (C) 20 mg
- (D) 24 mg

Q59. The structural feature that chemically distinguishes an alkaloid from other secondary plant metabolites like tannins or volatile oils is that alkaloids:

- (A) Always contain a phenolic hydroxyl group
- (B) Possess a basic nitrogen atom, usually in a heterocyclic ring
- (C) Are always liquid at standard room temperature
- (D) Form complex ester linkages with glucose molecules



- Q60.** Which of the following is a potential toxic effect uniquely associated with the rapid intravenous administration of the antibiotic Vancomycin?
- (A) Gray Baby Syndrome
 - (B) Red Man Syndrome
 - (C) Hemolytic Anemia
 - (D) Permanent Tendon Rupture
- Q61.** What is the physiological pacemaker of the human heart, responsible for initiating the regular electrical impulses that drive cardiac contraction?
- (A) Atrioventricular (AV) node
 - (B) Sinoatrial (SA) node
 - (C) Bundle of His
 - (D) Purkinje fibers
- Q62.** The process of separation of a liquid mixture into its individual components based on differences in their boiling points through vaporization and condensation is:
- (A) Filtration
 - (B) Distillation
 - (C) Crystallization
 - (D) Drying
- Q63.** Which of the following biological molecules is classified as an essential omega-3 polyunsaturated fatty acid?
- (A) Oleic acid
 - (B) Linolenic acid
 - (C) Palmitic acid
 - (D) Stearic acid
- Q64.** In clinical toxicology, the specific antidote used to reverse the toxic cardiac effects of an acute overdose of Digoxin is:



- (A) N-acetylcysteine
- (B) Atropine sulfate
- (C) Digoxin-specific Fab fragments
- (D) Deferoxamine

Q65. Which of the following is an example of an OTC (Over-the-Counter) medication commonly used as a short-term osmotic laxative?

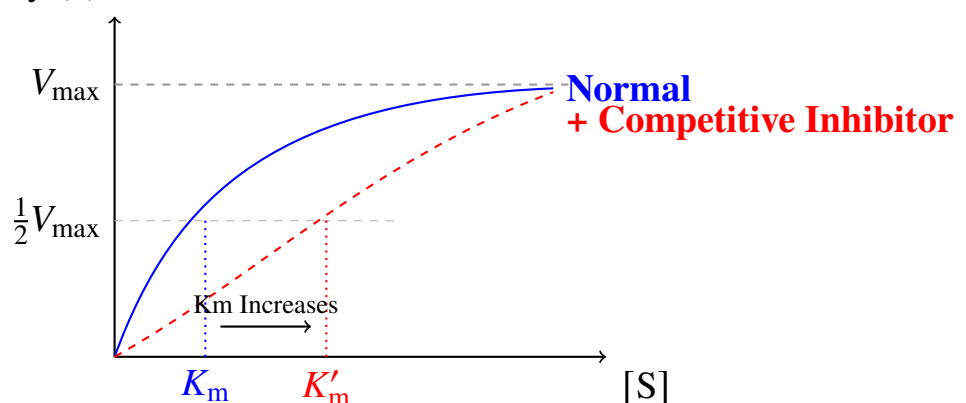
- (A) Magnesium hydroxide [Milk of Magnesia, $\text{Mg}(\text{OH})_2$]
- (B) Loperamide hydrochloride
- (C) Omeprazole magnesium
- (D) Ranitidine hydrochloride

Q66. The primary role of the Hospital Formulary System is to provide a:

- (A) List of all the medical practitioners employed within the hospital setup
- (B) Continually revised compilation of approved pharmaceuticals available for use in the institution
- (C) Financial logbook recording the daily cash income of the pharmacy store
- (D) Direct directory of all pharmaceutical manufacturing units operating locally

Q67. Which biochemical change occurs during the competitive inhibition of an enzyme?

Reaction Velocity (v)



- (A) The apparent K_m increases while V_{max} remains unchanged
- (B) The apparent K_m remains unchanged while V_{max} decreases
- (C) Both K_m and V_{max} decrease proportionally
- (D) Both K_m and V_{max} increase proportionally

Q68. Which of the following parts of a medical prescription contains the primary core directions given to the pharmacist regarding the dosage form and quantity to be dispensed?

- (A) Superscription
- (B) Inscription
- (C) Subscription
- (D) Transcription

Q69. The epidemiological study of the distribution, determinants, and prevention of diseases in human populations falls under the core domain of:

- (A) Clinical Pharmacy
- (B) Public Health
- (C) Pharmaceutics
- (D) Forensic Pharmacy

Q70. Which of the following is a prominent drug-induced side effect of the typical antipsychotic drug Haloperidol, resulting from dopamine receptor blockade in the basal ganglia?

- (A) Severe orthostatic hypotension
- (B) Extrapyrimal symptoms (EPS)
- (C) Marked hyperglycemia
- (D) Acute cardiac arrhythmias

Q71. The phenomenon of “Mottling” in tablet manufacturing refers to:

- (A) Separation of a tablet into two or more distinct layers



- (B) Unequal distribution of color on the surface of a tablet
- (C) Partial or complete removal of the top or bottom caps of a tablet
- (D) Adherence of the tablet granulation material to the punch faces

Q72. Which of the following routes of drug administration completely bypasses the first-pass hepatic metabolism and provides an immediate 100% systemic drug bioavailability?

- (A) Oral route
- (B) Intravenous route
- (C) Subcutaneous route
- (D) Transdermal route

Q73. What type of physical chemical degradation is primarily responsible for the spoilage of fixed oils and fats containing unsaturated fatty acids upon exposure to atmospheric oxygen?

- (A) Hydrolytic cleavage
- (B) Photolytic photolysis
- (C) Oxidative rancidity
- (D) Structural racemization

Q74. Which of the following structural parts of the human nephron is the primary site where the bulk (65%) of water, sodium, and potassium filtration reabsorption occurs?

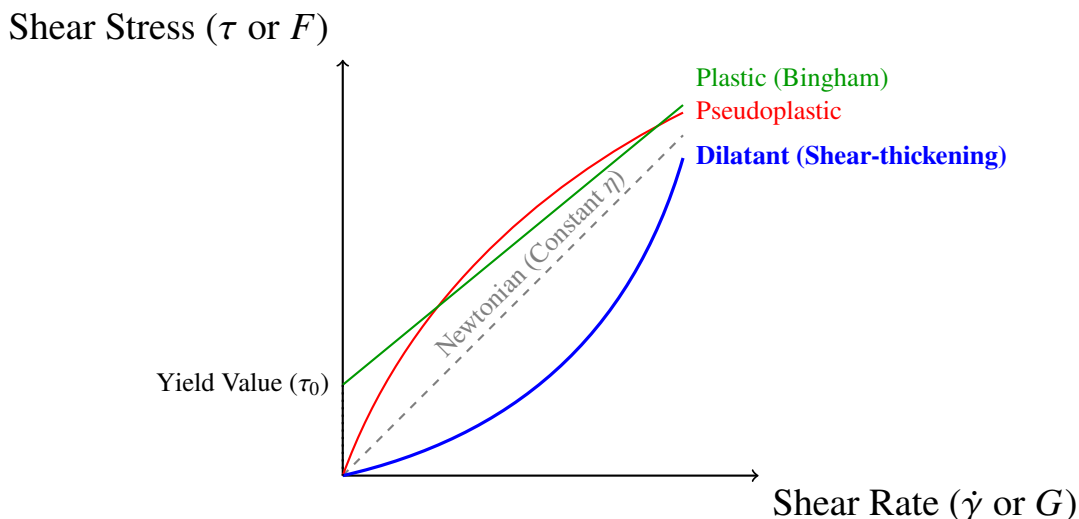
- (A) Proximal Convolute Tubule (PCT)
- (B) Loop of Henle
- (C) Distal Convolute Tubule (DCT)
- (D) Collecting Duct

Q75. The term “Stomata” in pharmacognosy refers to the microscopic structures located on leaves that are evaluated to calculate the “Stomatal Index.” This value is constant for:



- (A) All plants grown within the same geographic climate
- (B) A given genus regardless of individual species variation
- (C) A given species of crude drug leaves
- (D) Leaves collected during different seasons from the same plant

Q76. Which type of fluid flow behavior is characterized by an increase in viscosity or resistance to flow as the applied shear rate or shaking force increases?



- (A) Plastic flow
- (B) Pseudoplastic flow
- (C) Dilatant flow
- (D) Newtonian flow

Q77. A prescription requires the preparation of an emulsion using an emulsifying agent with an HLB value of 4. What type of emulsion will this agent favor?

- (A) Oil-in-Water (O/W) emulsion
- (B) Water-in-Oil (W/O) emulsion
- (C) Multiple Water-in-Oil-in-Water (W/O/W) emulsion
- (D) Microemulsion system

Q78. Which of the following is an essential compound containing an aromatic ring system merged with an imidazole ring, representing the fundamental core of purine bases?



- (A) Indole
- (B) Quinoline
- (C) Purine
- (D) Isoquinoline

Q79. When an asset or inventory item loses its economic value over a period of time due to physical wear and tear or technological obsolescence, the accounting process used to allocate this cost is:

- (A) Depreciation
- (B) Amortization
- (C) Valuation
- (D) Auditing

Q80. Which of the following legal rules dictates that no person shall publish any advertisement referring to any drug used for the cure or mitigation of certain specified scheduled diseases like blindness or cancer?

- (A) Pharmacy Act, 1948
- (B) Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954
- (C) Medicinal and Toilet Preparations Act, 1955
- (D) Essential Commodities Act, 1955

Q81. The primary structural protein that makes up the human hair, nails, and the outer cornified layer of the skin tissue is:

- (A) Collagen
- (B) Elastin
- (C) Keratin
- (D) Melanin

Q82. Which of the following mechanisms is responsible for the transport of small lipid-soluble drug molecules across the lipoidal cell membrane along their concentration gradient?



- (A) Active transport
- (B) Passive diffusion
- (C) Facilitated diffusion
- (D) Endocytosis

Q83. What is the fundamental clinical purpose of establishing “Satellite Pharmacies” within a large modern hospital setup?

- (A) To conduct large-scale analytical testing of bulk incoming drug chemicals
- (B) To decentralize drug distribution and provide rapid services directly to specific nursing wards
- (C) To act as a manufacturing plant for the institutional preparation of large volume parenterals
- (D) To store old administrative hospital prescription files away from the main building

Q84. Which of the following chemical testing parameters is monitored to check for the presence of heavy metals like Lead in official compendial drugs?

- (A) Limit test for Heavy Metals using Hydrogen Sulfide reagent
- (B) Limit test for Chloride using Silver Nitrate
- (C) Limit test for Sulfate using Barium Chloride
- (D) Karl Fischer volumetric titration technique

Q85. What specific term describes the structural arrangement of two or more stereoisomers that are non-superimposable mirror images of each other?

- (A) Diastereomers
- (B) Enantiomers
- (C) Geometric isomers
- (D) Meso compounds

Q86. Which of the following is a key objective of public health interventions targeted at preventing the transmission of communicable fecal-oral diseases?



- (A) Increasing access to high-fat nutritional supplements
- (B) Implementing strict vectors chemical control sprays
- (C) Ensuring safe drinking water sanitation and sewage disposal
- (D) Promoting personal protective equipment against airborne droplets

Q87. The primary clinical utility of monitoring the international normalized ratio (INR) in a patient on long-term warfarin therapy is to prevent:

- (A) Severe hepatic lipid accumulation
- (B) Fatal thromboembolic events or excessive internal hemorrhage
- (C) Acute bone marrow suppression
- (D) Severe skeletal muscle wasting and rhabdomyolysis

Q88. Which of the following structures acts as a primary mechanical filter inside the human respiratory tract to trap large inhaled dust and foreign particles?

- (A) Alveolar macrophage cells
- (B) Epiglottis muscular fold
- (C) Nasal hairs and ciliated mucous membranes
- (D) Surfactant layer inside bronchioles

Q89. In a community pharmacy, what is the best practice for storing insulin vials to preserve their long-term structural and therapeutic stability?

- (A) Storing in the deep freezer compartment below -10°C
- (B) Keeping on the open counter under ambient room illumination
- (C) Storing in a refrigerator at a controlled temperature between 2°C and 8°C
- (D) Protecting inside a closed desiccator chamber away from humidity

Q90. Which of the following parameters is mathematically defined as the volume of plasma completely cleared of a specific drug substance per unit of time by the kidneys?

- (A) Elimination half-life ($t_{1/2}$)



- (B) Volume of distribution (V_d)
- (C) Renal clearance (Cl_r)
- (D) Elimination rate constant (K_e)

Q91. What is the composition of the stationary phase traditionally used in TLC (Thin Layer Chromatography) for separating chemical components of crude plant extracts?

- (A) A volatile organic solvent mixture moving up a support matrix
- (B) A thin layer of adsorbent material (like silica gel) coated on a solid plate
- (C) A porous cellulose paper sheet suspended in an enclosed chamber
- (D) A column packed with specialized cross-linked dextran beads

Q92. Which structural part of the human eye contains the photoreceptor cells (rods and cones) responsible for transducing light energy into neural electrical impulses?

- (A) Cornea
- (B) Sclera
- (C) Choroid
- (D) Retina

Q93. The specific metabolic disorder characterized by the accumulation of uric acid crystals within the synovial joints, causing acute painful arthritis, is known as:

- (A) Rheumatoid arthritis
- (B) Osteoarthritis
- (C) Gout
- (D) Osteoporosis

Q94. Which of the following structural categories of immunoglobulins is the most abundant in human blood plasma and can readily cross the placenta to provide passive immunity to the fetus?

- (A) Immunoglobulin M (IgM)



- (B) Immunoglobulin G (IgG)
- (C) Immunoglobulin A (IgA)
- (D) Immunoglobulin E (IgE)

Q95. What specific title is given to the legal officer appointed by the central or state government to inspect drug manufacturing premises and retail outlets to ensure compliance with the law?

- (A) Government Analyst
- (B) Drug Inspector
- (C) Licensing Authority
- (D) Controlling Authority

Q96. The processing step where a crude drug is systematically dried at a low controlled temperature immediately after collection is crucial to:

- (A) Increase the total macro-weight of the crude drug consignment
- (B) Stop enzymatic degradation reactions and prevent microbial spoilage
- (C) Facilitate the intentional adulteration with foreign botanical elements
- (D) Transform the primary structural fiber into volatile oil fractions

Q97. Which of the following values represents the average normal blood pressure reading recorded in a healthy adult human being?

- (A) 80/120 mm Hg
- (B) 120/80 mm Hg
- (C) 140/90 mm Hg
- (D) 100/60 mm Hg

Q98. In inventory control, the term “Lead Time” refers explicitly to the time interval between:

- (A) Placing an order and its actual receipt in the inventory store
- (B) Manufacturing a batch of drugs and its ultimate expiry date



- (C) Receiving a prescription and dispensing the item to a patient
- (D) Selling out the existing stock and completing the final annual audit

Q99. Which of the following clinical tests is routinely performed to monitor long-term glycemic control over the preceding 2 to 3 months in a diabetic patient?

- (A) Fasting Blood Sugar (FBS)
- (B) Oral Glucose Tolerance Test (OGTT)
- (C) Glycated Hemoglobin Test (HbA_{1c})
- (D) Post-Prandial Blood Sugar (PPBS)

Q100. What is the fundamental physiological role of the bile salts synthesized by the human liver and stored inside the gallbladder?

- (A) Initiating the chemical enzymatic hydrolysis of structural proteins
- (B) Emulsifying large dietary lipid droplets to facilitate their digestion and absorption
- (C) Neutralizing the alkaline juices entering the upper segments of the ileum
- (D) Actively activating salivary amylase enzymes in the gastric environment



Detailed Solutions**Q1.****Solution****Concept:**

Pharmaceutical incompatibilities are divided into physical, chemical, and therapeutic categories. A chemical incompatibility occurs due to chemical reactions between two or more components in a formulation, which may lead to precipitation, decomposition, color changes, or effervescence. In this specific prescription containing caffeine and sodium benzoate, a chemical complexation occurs to yield a highly water-soluble addition compound rather than a destructive degradation reaction.

Solution:

Step 1: Identify the components present in the prescription mixture. The ingredients are caffeine (a purine alkaloid) and sodium benzoate (a salt of an aromatic organic acid).

Step 2: Evaluate the physical and chemical interactions between these two chemical moieties in an aqueous environment. Caffeine has limited water solubility on its own at standard temperature conditions.

Step 3: Analyze the chemical phenomenon. When sodium benzoate is mixed with caffeine, it acts as a solubilizing agent through a specific chemical reaction known as complexation or hydrotrophy.

Step 4: The aromatic ring structure and ionic charge distribution of sodium benzoate enable it to associate with the purine core structure of caffeine. This forms a distinct intermolecular coordination complex called caffeine-sodium benzoate.

Step 5: This resulting chemical complex exhibits significantly higher aqueous solubility than caffeine alone, leading to a stable, clear solution. Therefore, the incompatibility manifests as the production of a highly soluble addition complex.

Final Answer: Production of a clear, highly soluble complex through complexation

Answer: (C)

[Go Back to Question 1](#)



Q2.

Solution**Concept:**

Sterilization techniques utilize either physical heat, chemical radiation, or mechanical filtration actions to destroy all forms of microbial life, including vegetative cells and highly resilient bacterial spores. Moist heat sterilization in an autoclave operates under elevated steam pressure. The high moisture content drastically lowers the temperature needed to disrupt and destroy vital microbial structural proteins.

Solution:

Step 1: Identify the operation of an autoclave. It utilizes saturated steam under pressure, typically at 121°C for 15 minutes at 15 psi pressure to achieve thermal microbial destruction.

Step 2: Understand the role of water molecules in moist heat. Water behaves as an excellent conductor of thermal energy and penetrates microbial cell membranes much more rapidly than dry heat.

Step 3: Evaluate the structural impact of moist heat on cellular biomolecules. The combination of high temperature and moisture breaks the delicate hydrogen bonds maintaining the three-dimensional shapes of proteins.

Step 4: This structural collapse leads to rapid coagulation and irreversible denaturation of essential enzymatic and structural proteins within the bacterial cells and spores.

Step 5: Without functional metabolic enzymes or structural cell proteins, the microorganisms can no longer survive or replicate, rendering the materials completely sterile.

Final Answer:

Answer: (B)

[Go Back to Question 2](#)



Q3.

Solution**Concept:**

Crude drugs derived from natural plant or animal origins must be organized systematically to study their features efficiently. The primary classification methods include alphabetical, taxonomical, morphological, chemical, pharmacological, and chemotaxonomical frameworks. Morphological classification groups crude materials based on the macroscopic structural parts of the source organism that are harvested and utilized.

Solution:

Step 1: Define the basis of the given grouping criteria. The question specifies organizing drugs based on parts like leaves, roots, bark, seeds, or flowers.

Step 2: Evaluate the morphological sub-divisions. This method splits natural materials into organized drugs (having defined cellular structures, such as barks, leaves, and wood) and unorganized drugs (lacking cellular structure, such as gums, juices, and resins).

Step 3: Contrast this approach with alternative methods. Taxonomical systems rely on biological hierarchies like genus and species, chemical systems group by active principles like alkaloids or glycosides, and pharmacological methods focus on therapeutic actions.

Step 4: Since the system relies strictly on identifying the structural, anatomical plant organs or parts visible to the naked eye, it belongs explicitly to the morphological framework.

Final Answer:

Answer: (B)

[Go Back to Question 3](#)



Q4.

Solution**Concept:**

The human gastric mucosa contains highly specialized glandular pits lined with distinct epithelial cell types. These cells include mucous neck cells, parietal (oxyntic) cells, chief (peptic) cells, and endocrine G-cells. Each cell type is responsible for secreting specific components of the gastric juice or regulatory hormones needed for human digestion and absorption.

Solution:

Step 1: Match each cell type with its biological secretion. Peptic (chief) cells synthesize and release pepsinogen, an inactive proenzyme. Mucus neck cells produce protective, alkaline mucus.

Step 2: Examine the physiological role of parietal (oxyntic) cells. These large, pyramid-shaped cells contain an extensive secretory network of canaliculi that actively pump out hydrogen and chloride ions to form hydrochloric acid (HCl).

Step 3: Analyze the concurrent non-acidic secretion of parietal cells. Alongside hydrochloric acid, these cells secrete a specialized glycoprotein known as intrinsic factor (Castle's intrinsic factor).

Step 4: Determine the clinical purpose of intrinsic factor. This glycoprotein binds tightly to dietary Vitamin B₁₂ (cyanocobalamin) in the acidic duodenal lumen, forming a complex that prevents its premature digestion.

Step 5: This complex travels down to the terminal ileum, where specialized receptors recognize it and facilitate the receptor-mediated endocytosis of Vitamin B₁₂ into the bloodstream. Hence, parietal cells are uniquely responsible for this mechanism.

Final Answer:

Answer: (C)

[Go Back to Question 4](#)



Q5.

Solution**Concept:**

The Drugs and Cosmetics Act of 1940 and its subsequent Rules of 1945 control the manufacture, distribution, import, and sale of pharmaceuticals across India. The regulatory rules include various alphanumeric statutory schedules (Schedules A through Y) that prescribe specific standards, legal formats, and administrative guidelines for different categories of therapeutic items.

Solution:

Step 1: Review the operational definition of the specified schedule. Schedule M details the precise statutory norms for factory infrastructure, layout design, environmental sanitation, equipment quality, and raw material handling.

Step 2: Connect these legal provisions with international pharmaceutical benchmarks. These requirements collectively constitute Good Manufacturing Practices (GMP).

Step 3: Differentiate Schedule M from other options. Guidelines for clinical trials fall under Schedule Y. Prescription drug lists are managed under Schedule H and Schedule X. Standards for mechanical contraceptives belong to Schedule R.

Step 4: Therefore, any pharmaceutical facility manufacturing active ingredients or finished dosage forms must conform strictly to Schedule M guidelines to legally secure and retain a valid manufacturing license.

Final Answer: Good Manufacturing Practices (GMP) and requirements of factory premises

Answer: (B)

[Go Back to Question 5](#)



Q6.

Solution**Concept:**

Inventory management in institutional healthcare and retail business utilizes specialized analytical methods to streamline stock levels, minimize holding expenses, and avoid running out of essential items. These methodologies categorize stored items based on metrics like monetary expenditure, turnover frequency, or functional necessity.

Solution:

Step 1: Analyze the specific sorting criteria highlighted in the problem statement. The focus is strictly on an item's critical importance to operational continuity rather than its price point or market value.

Step 2: Evaluate the VED analysis framework. The acronym VED stands for Vital, Essential, and Desirable.

Step 3: Break down the categories within VED. 'Vital' items are completely indispensable; their absence stalls hospital functions or puts patient lives at immediate risk. 'Essential' items are necessary but can be managed with short lags, while 'Desirable' items do not impact core operations if temporarily unavailable.

Step 4: Contrast VED with other methods. ABC analysis sorts strictly by annual cost value. FSN analysis groups items by how fast they move (Fast, Slow, Non-moving), and EOQ calculates optimal ordering quantities. Thus, VED is the correct operational tool.

Final Answer:

Answer: (B)

[Go Back to Question 6](#)



Q7.

Solution**Concept:**

The term pH represents the power of hydrogen and serves as a logarithmic measurement scale for the relative acidity or alkalinity of an aqueous solution. Mathematically, pH is defined as the negative logarithm (to the base 10) of the molar hydrogen ion concentration (H^+) present in the solution.

Solution:

Step 1: Write down the primary mathematical formula used to calculate pH:

$$pH = -\log_{10}[H^+]$$

Step 2: Substitute the given molar concentration of hydrogen ions from the question into the mathematical expression:

$$[H^+] = 1.0 \times 10^{-5} \text{ M}$$

$$pH = -\log_{10}(1.0 \times 10^{-5})$$

Step 3: Apply standard logarithmic expansion properties, specifically $\log_{10}(A \times B) = \log_{10} A + \log_{10} B$:

$$pH = -[\log_{10}(1.0) + \log_{10}(10^{-5})]$$

Step 4: Recall that $\log_{10}(1.0) = 0$ and simplify the exponent term using the power rule $\log_{10}(10^n) = n$:

$$pH = -[0 + (-5)]$$

$$pH = -[-5] = 5.0$$

Step 5: The resulting value of 5.0 indicates that this chemical buffer solution is moderately acidic.

Final Answer:

Answer: (A)

[Go Back to Question 7](#)



Q8.

Solution**Concept:**

Local anesthetics block nerve impulse conduction along peripheral nerve axons by inhibiting voltage-gated sodium channels. Structurally, classic local anesthetics follow a common architectural template consisting of three distinct structural segments: a lipophilic aromatic ring, an intermediate hydrocarbon linkage chain, and a hydrophilic substituted amino group. This intermediate chain determines whether the molecule is classified as an ester or an amide.

Solution:

Step 1: Break down the chemical structure of procaine. Procaine features a para-aminobenzoic acid (PABA) ring serving as its lipophilic core.

Step 2: Examine the intermediate chain linkage. The aromatic carboxylic acid group is joined to an aliphatic diethylaminoethanol group via a covalent ester carbon-oxygen bond (-COO-).

Step 3: Contrast this configuration with amide-type anesthetics like lidocaine or bupivacaine, which feature an amide functional group (-NH-CO-) linking the regions.

Step 4: This distinction is crucial because ester linkages are rapidly broken down in human plasma by pseudocholinesterase enzymes, resulting in a shorter duration of action and a distinct degradation pathway compared to amides. Therefore, the definitive group is the ester linkage.

Final Answer: Ester linkage between an aromatic acid and an alcohol amino group

Answer: (C)

[Go Back to Question 8](#)



Q9.

Solution**Concept:**

Diagnostic clinical pathology utilizes various serological, immunological, and biological tests to identify infectious diseases. These tests work by detecting specific microbial antigens or identifying circulating host antibodies produced in response to an active infection.

Solution:

Step 1: Evaluate the pathogenesis of Typhoid fever. Typhoid fever is a systemic gastrointestinal infection caused by the bacterium *Salmonella typhi*.

Step 2: Examine the mechanism of the Widal test. It is an agglutination assay that detects circulating antibodies (anti-O and anti-H agglutinins) present in a patient's serum against the specific somatic (O) and flagellar (H) antigens of *Salmonella typhi*.

Step 3: Review the diagnostic utility of the alternative choices. The Dick test assesses susceptibility to Scarlet fever. The Schick test determines immunity status against *Corynebacterium diphtheriae*, and the Mantoux test is a skin test for *Mycobacterium tuberculosis*.

Step 4: Consequently, the Widal test remains the specific, classic serological method used to confirm typhoid fever.

Final Answer:

Answer: (A)

[Go Back to Question 9](#)



Q10.

Solution**Concept:**

The concentration expression percent weight-in-volume (% w/v) is a standard pharmaceutical calculation metric. It specifies the total mass of a solid solute measured in grams dissolved in exactly 100 mL of the final liquid solution. Isotonic solutions must maintain this relative weight ratio to match the osmotic pressure of natural human body fluids.

Solution:

Step 1: Interpret the given concentration value. A 0.9% w/v solution of sodium chloride (NaCl) means:

0.9 grams of NaCl is present in 100 mL of solution

Step 2: Set up a proportional mathematical equation to find the total mass of solute required for the new volume of 500 mL:

$$\frac{0.9 \text{ g}}{100 \text{ mL}} = \frac{X \text{ g}}{500 \text{ mL}}$$

Step 3: Rearrange the algebraic expression to solve for the unknown variable X :

$$X = \left(\frac{0.9 \text{ g}}{100 \text{ mL}} \right) \times 500 \text{ mL}$$

Step 4: Perform the final multiplication step:

$$X = 0.9 \times 5 = 4.50 \text{ grams}$$

Step 5: Therefore, exactly 4.50 g of pure sodium chloride must be weighed and dissolved to prepare a 500 mL volume of isotonic physiological saline.

Final Answer:

Answer: (B)

[Go Back to Question 10](#)



Q11.

Solution**Concept:**

Agricultural and pharmacognostical cultivation techniques use specialized strategies to optimize growth conditions, improve secondary metabolite yields, and make harvesting medicinal plants easier. These methods range from traditional soil farming to modern soil-free environments.

Solution:

Step 1: Analyze the key constraint detailed in the question. The plant root system must develop inside an aqueous nutrient medium without any physical soil.

Step 2: Define hydroponics. It is a modern system of geocentric botany where terrestrial plants are suspended over tanks filled with a water solution containing essential minerals like nitrogen, phosphorus, and potassium.

Step 3: Evaluate other cultivation methods. Micropropagation is a tissue culture process using agar media in sterile vials. Layering is a vegetative propagation technique where plant branches are bent into the ground, and polyploidy involves altering chromosome counts to boost yield.

Step 4: Because the question describes a soil-free, liquid-based cultivation approach, it refers explicitly to hydroponics.

Final Answer:

Answer: (B)

[Go Back to Question 11](#)



Q12.

Solution**Concept:**

Vitamins are organic compounds required in small quantities to sustain normal human metabolic processes. They are classified into fat-soluble vitamins (A, D, E, K) and water-soluble vitamins (B-complex family and Vitamin C). Water-soluble vitamins act as essential precursors for structural coenzymes in cellular energy pathways.

Solution:

Step 1: Identify the biochemical pathway specified in the question. The conversion of pyruvate into acetyl-CoA involves an oxidative decarboxylation reaction.

Step 2: Determine the core coenzyme required for this step. This reaction requires thiamine pyrophosphate (TPP), which is the active biological derivative of Vitamin B₁ (thiamine).

Step 3: Rule out the fat-soluble choices. Retinol (A), cholecalciferol (D), and tocopherol (E) are fat-soluble compounds stored in adipose tissues that do not participate as coenzymes in carbohydrate breakdown.

Step 4: Therefore, Thiamine (Vitamin B₁) is the specific water-soluble vitamin required to support carbohydrate metabolism.

Final Answer:

Answer: (A)

[Go Back to Question 12](#)



Q13.

Solution**Concept:**

Hospital pharmacy inventory management requires strict cost-containment measures to distribute financial resources across numerous therapeutic categories. The ABC analytical technique applies Pareto's principle of material distribution to categorize stocked pharmaceuticals based on their total annual monetary usage value.

Solution:

Step 1: Review the three subdivisions of ABC inventory analysis. Category 'A' comprises a small percentage (10 – 15%) of total items that account for the highest share (70 – 80%) of the annual budget.

Step 2: Category 'B' represents intermediate items (20 – 25%) consuming moderate funding (15 – 20%), while Category 'C' contains a large volume of low-cost items requiring minimal expenditure.

Step 3: Understand the primary operational purpose of this division. By highlighting Category 'A' products, hospital pharmacists can enforce strict management controls, minimize waste, and prevent high capital lock-up.

Step 4: This financial categorization operates independently of an item's clinical urgency (which is handled by VED analysis) or storage life. Thus, it serves primarily to monitor and control high-cost items based on annual consumption value.

Final Answer: Controlling high-cost items by monitoring total annual consumption value

Answer: (A)

[Go Back to Question 13](#)



Q14.

Solution**Concept:**

Pharmacokinetics tracks how the human body processes an administered drug through absorption, distribution, metabolism, and excretion (ADME). Bioavailability is a core pharmacokinetic parameter used to measure the efficiency of drug absorption from non-vascular routes.

Solution:

Step 1: Define bioavailability. It represents the relative rate and total extent to which an active drug ingredient is absorbed from its dosage form and enters systemic circulation unchanged.

Step 2: Consider the vascular reference standard. Intravenous administration bypasses absorption barriers entirely, giving it a baseline bioavailability of 100% ($f = 1$).

Step 3: Analyze non-vascular routes like oral ingestion. Physical barriers like gastric degradation and hepatic first-pass metabolism reduce the total amount of active drug that reaches systemic blood circulation.

Step 4: Differentiate bioavailability from related metrics. Disintegration measures dosage breakdown speed, excretion tracks waste removal, and protein binding describes distribution within the plasma. Therefore, bioavailability specifically monitors access to systemic circulation.

Final Answer:

Rate and relative extent to which an active drug moiety reaches the systemic circulation

Answer: (B)

[Go Back to Question 14](#)



Q15.

Solution**Concept:**

The human peripheral nervous system includes twelve pairs of specialized cranial nerves originating directly from the brainstem. These nerves provide sensory, motor, or mixed autonomic innervation to the head, neck, and various internal visceral organs.

Solution:

Step 1: Examine the physiological pathways of the listed cranial nerves. Nerve V (Trigeminal) controls facial sensation and mastication muscles. Nerve VII (Facial) manages facial expressions and anterior tongue taste.

Step 2: Analyze the anatomy of Cranial Nerve X, the Vagus nerve. The term vagus means wandering, which reflects its extensive path. It is the longest cranial nerve and carries the bulk of the body's parasympathetic nervous system fibers.

Step 3: Trace the visceral path of the Vagus nerve. It descends from the medulla oblongata to provide regulatory autonomic innervation to the heart, lungs, and the gastrointestinal tract down to the splenic flexure.

Step 4: Contrast this with Nerve XII (Hypoglossal), which strictly controls tongue movements. Therefore, the Vagus nerve is uniquely responsible for managing these thoracic and abdominal visceral functions.

Final Answer:

Answer: (C)

[Go Back to Question 15](#)



Q16.

Solution**Concept:**

Autonomic pharmacology classifies drugs by their ability to stimulate or inhibit receptors within the sympathetic and parasympathetic nervous systems. Acetylcholine acts on muscarinic receptors to stimulate secretions, constrict pupils, and lower heart rate. A competitive muscarinic antagonist binds to these same receptors to block acetylcholine, reversing its physiological effects.

Solution:

Step 1: Analyze the therapeutic actions of the listed options. Pilocarpine is a direct muscarinic agonist used to treat glaucoma by constricting the pupil.

Step 2: Physostigmine is an acetylcholinesterase inhibitor that increases acetylcholine levels, amplifying parasympathetic activity. Propranolol is a non-selective beta-adrenergic blocker.

Step 3: Evaluate Atropine. Atropine is a natural alkaloid that acts as a competitive antagonist at all muscarinic acetylcholine receptor subtypes (M_1 through M_5).

Step 4: By blocking muscarinic receptors, atropine inhibits parasympathetic tone. This leads to symptoms like mydriasis (pupillary dilation) in the eyes and reduced salivary gland secretion, which causes dry mouth.

Final Answer:

Answer: (B)

[Go Back to Question 16](#)



Q17.

Solution**Concept:**

Pharmaceutical legislation in India regulates manufacturing standards, trade, and professional practice to safeguard public health. Different statutes are enacted to manage specific operational areas within the healthcare ecosystem.

Solution:

Step 1: Identify the main focus of the Pharmacy Act of 1948. This specific statute was enacted to raise the standard of pharmacy practice in India by ensuring only properly trained and qualified individuals can practice the profession.

Step 2: Review the regulatory bodies established by this act. It created the Pharmacy Council of India (PCI) and State Pharmacy Councils to design education regulations and maintain state registers of pharmacists.

Step 3: Differentiate this statute from alternative laws. The Drugs and Cosmetics Act of 1940 regulates the import, manufacture, sale, and distribution of medicines. The NDPS Act of 1985 controls psychotropic substances, and the Magic Remedies Act of 1954 stops misleading advertisements.

Step 4: Therefore, the primary legislative objective of the Pharmacy Act of 1948 is to regulate the profession and practice of pharmacy nationwide.

Final Answer:

Regulate the profession and practice of pharmacy across the country

Answer: (C)

[Go Back to Question 17](#)



Q18.

Solution**Concept:**

Biochemical analysis uses colorimetric chemical reactions to identify specific classes of macromolecules like carbohydrates, proteins, or lipids. These diagnostic tests rely on characteristic color changes that occur when special reagents react with functional groups on the target analyte.

Solution:

Step 1: Review the purpose of the listed chemical tests. The Biuret test detects peptide bonds in proteins, yielding a violet-pink color. The Ninhydrin test reacts with alpha-amino acids to form a deep blue complex.

Step 2: Examine Molisch's test. This is a highly sensitive qualitative test for the presence of all carbohydrates, including monosaccharides, disaccharides, and polysaccharides.

Step 3: Understand the chemical reaction steps of Molisch's test. Concentrated sulfuric acid hydrolyzes glycosidic bonds and dehydrates the resulting monosaccharides into furfural or hydroxymethylfurfural derivatives.

Step 4: These furfural molecules then condense with alpha-naphthol (Molisch's reagent) at the interface of the two liquid layers. This chemical condensation produces a highly visible purple or violet-colored ring, confirming the presence of carbohydrates.

Final Answer:

Answer: (B)

[Go Back to Question 18](#)



Q19.

Solution**Concept:**

Eukaryotic cells contain specialized, membrane-bound internal structures called organelles. Each organelle plays a distinct role in sustaining cellular viability, managing protein synthesis, processing cellular waste, or generating metabolic energy.

Solution:

Step 1: Match each listed organelle with its primary biological function. The Golgi apparatus modifies, sorts, and packages macromolecules for secretion. Lysosomes contain hydrolytic enzymes to break down waste.

Step 2: The endoplasmic reticulum manages lipid synthesis and houses protein-translating ribosomes.

Step 3: Examine the role of the mitochondrion. Mitochondria are double-membraned structures that contain the machinery for the citric acid cycle (Krebs cycle) and the electron transport chain along their inner cristae.

Step 4: Through oxidative phosphorylation, mitochondria harness energy from metabolic substrates to synthesize large amounts of adenosine triphosphate (ATP). This central energy-producing role earns them the designation of the primary site for cellular respiration.

Final Answer:

Answer: (B)

[Go Back to Question 19](#)



Q20.

Solution**Concept:**

Manufacturing hard gelatin capsule shells requires combining specialized additives with a base gelatin solution to achieve the desired physical properties, appearance, and stability. These additives include plasticizers, colorants, preservatives, and opacifying agents.

Solution:

Step 1: Analyze the role of each pharmaceutical ingredient. Plasticizers like sorbitol or glycerin are added to reduce brittleness and make the capsule shell flexible. Methyl paraben is added as an antimicrobial preservative.

Step 2: Understand the need for an opacifying agent. Clear gelatin shells allow light to pass through, which can cause photodegradation in light-sensitive active pharmaceutical ingredients.

Step 3: Identify the specific chemical used to create opacity. Titanium dioxide (TiO_2) is an insoluble white powder with a high refractive index.

Step 4: When suspended in the gelatin mixture, titanium dioxide scatters entering light rays. This makes the capsule shell opaque, protecting the internal drug content from light exposure.

Final Answer:

Answer: (A)

[Go Back to Question 20](#)



Q21.

Solution**Concept:**

Physical pharmaceutical chemistry studies how electrolytes and non-electrolytes interact in solutions to alter solubility boundaries. The addition of a highly soluble ionic electrolyte can change the solvent structure and weaken the solubility of other dissolved substances.

Solution:

Step 1: Define the behavior described in the question. The addition of a concentrated electrolyte solution reduces the solubility of a non-electrolyte or another solute, causing it to precipitate.

Step 2: Understand the molecular mechanism of this phenomenon. Ionic electrolytes have a high charge density and attract polar water molecules, forming a tight hydration shell around themselves.

Step 3: This intensive attraction ties up the available water molecules, leaving fewer free solvent molecules to interact with and dissolve other solutes.

Step 4: As a result, the other solute is forced out of solution and forms a precipitate. This specific physical chemical phenomenon is known as salting-out.

Final Answer:

Answer: (B)

[Go Back to Question 21](#)



Q22.

Solution**Concept:**

Toxicology and neuropharmacology classify compounds by how they interact with vital neurotransmitter systems. Acetylcholinesterase is an enzyme that breaks down acetylcholine in the synaptic cleft. Inhibiting this enzyme leads to an accumulation of acetylcholine, causing continuous stimulation of both nicotinic and muscarinic receptors.

Solution:

Step 1: Review the chemical classification of the listed options. Neostigmine and edrophonium are synthetic carbamate compounds that reversibly inhibit acetylcholinesterase, used primarily to treat myasthenia gravis.

Step 2: Carbachol is a direct-acting choline ester agonist that resists enzymatic breakdown.

Step 3: Analyze Malathion. Malathion is an organophosphorus compound widely used as an agricultural insecticide.

Step 4: Organophosphates work by forming a highly stable, covalent phosphate bond with the active serine site of the acetylcholinesterase enzyme. This bond resists spontaneous hydrolysis, causing irreversible enzyme inhibition.

Step 5: This makes malathion a significant neurotoxic agent in agricultural worker exposure, matching the description of an irreversible organophosphorus inhibitor.

Final Answer:

Answer: (A)

[Go Back to Question 22](#)



Q23.

Solution**Concept:**

The administrative framework of the Drugs and Cosmetics Act of 1940 divides regulatory authority between central and state government agencies. This division ensures balanced oversight of drug imports, clinical trial approvals, manufacturing processes, and retail licensing across India.

Solution:

Step 1: Identify the roles of central regulatory bodies. The Drugs Controller General of India (DCGI) heads the CDSCO, which primarily manages new drug approvals, sets medical standard parameters, and regulates drug imports.

Step 2: Examine the licensing responsibilities at the state level. Each state government establishes a dedicated State Licensing Authority under its food and drug administration department.

Step 3: Pinpoint the specific duties of this state-level agency. The State Licensing Authority is legally empowered to inspect local production units, issue official permissions, and renew licenses for manufacturing and selling finished pharmaceuticals within that state.

Step 4: Therefore, the State Licensing Authority is the correct regulatory body for issuing and renewing state-level manufacturing licenses.

Final Answer:

Answer: (B)

[Go Back to Question 23](#)



Q24.

Solution**Concept:**

Official pharmacopoeias mandate limit tests to control the levels of inorganic impurities in pharmaceutical chemicals. These qualitative or semi-quantitative assays rely on visible precipitation or color changes to determine if an impurity stays within safe, allowable limits.

Solution:

Step 1: Understand the chemical basis of the limit test for Iron. The test relies on the reaction between iron and thioglycolic acid in a medium buffered with ammonia to produce a purple-colored ferrous thioglycolate complex.

Step 2: Analyze the role of ammonia in this reaction mixture. Ammonia is added to create the alkaline environment necessary for the purple color to develop fully.

Step 3: Identify a potential chemical complication caused by adding ammonia. In an alkaline solution, iron can react with hydroxyl ions to form an insoluble precipitate of ferric hydroxide, which interferes with visual color comparisons.

Step 4: Determine how citric acid prevents this issue. Citric acid acts as a chelating agent that binds tightly to iron ions, forming a stable, water-soluble iron-citrate complex.

Step 5: This chelation keeps the iron ions dissolved in the alkaline ammonia solution, preventing precipitation and ensuring a clear colorimetric assessment.

Final Answer: To prevent the precipitation of iron by ammonia by forming a soluble complex

Answer: (A)

[Go Back to Question 24](#)



Q25.

Solution**Concept:**

In pharmacognosy, crude drugs are broadly divided into organized and unorganized drugs based on their structural characteristics. Organized drugs consist of direct, defined anatomical parts of a plant or animal that preserve their native cellular structures. Unorganized drugs are non-cellular substances obtained through extraction, incision, or physical processing methods.

Solution:

Step 1: Evaluate the structural composition of the listed options. Acacia gum is a dried exudate collected from incisions in stems, making it an unorganized drug without cellular structures.

Step 2: Agar is a dried gelatinous extract obtained from marine algae, and Aloe juice is a dried liquid extract from leaves; both are classified as unorganized drugs.

Step 3: Analyze Cinchona bark. Cinchona bark is a solid, harvested structural tissue layer containing intact, organized plant cells like phloem fibers, parenchyma, and cork cells.

Step 4: Because it retains its native cellular organization and distinct microscopic anatomy, cinchona bark is classified as an organized crude drug.

Final Answer:

Answer: (B)

[Go Back to Question 25](#)



Q26.

Solution**Concept:**

Human respiratory physiology relies on pressure gradients between the atmospheric air and the air inside the lungs (intra-alveolar pressure). Boyle's law states that the volume and pressure of a gas are inversely proportional. To pull air into the lungs, the respiratory system must expand the thoracic cavity to lower internal pressure.

Solution:

Step 1: Analyze the mechanics of quiet, relaxed inspiration. This is an active physiological process driven by the contraction of primary respiratory muscles.

Step 2: Identify the primary muscle involved. The diaphragm is a dome-shaped skeletal muscle sheet that separates the thoracic and abdominal cavities.

Step 3: Track the movement of the diaphragm during contraction. When stimulated by the phrenic nerve, the diaphragm flattens out and moves downward.

Step 4: Examine the volume changes that result from this movement. This downward shift increases the vertical dimensions of the thoracic cavity, expanding the lungs and lowering intra-alveolar pressure below atmospheric pressure. This pressure difference draws air into the lungs.

Final Answer: Contraction and downward movement of the diaphragm

Answer: (B)

[Go Back to Question 26](#)



Q27.

Solution**Concept:**

Pharmaceutical procurement strategies in hospital systems are designed to balance material quality, supply reliability, and cost efficiency. Various purchasing methods are utilized depending on the urgency, scale, and value of the required medical items.

Solution:

Step 1: Analyze the operational characteristics described in the problem. The purchasing process involves a formal bidding setup open to all interested pharmaceutical manufacturers and suppliers.

Step 2: Define open tender purchasing. This procurement method uses public advertisements to invite formal competitive bids from any qualified supplier. It ensures transparency and helps secure competitive pricing.

Step 3: Contrast this with alternative procurement methods. Restricted tenders invite bids from a pre-screened list of manufacturers. Direct negotiation bypasses formal bidding entirely, and rate contracts establish fixed prices over a set period.

Step 4: Because this process is structured as a formal competitive bid open to all vendors, it is classified as open tender purchasing.

Final Answer:

Answer: (B)

[Go Back to Question 27](#)



Q28.

Solution**Concept:**

Limit tests are quantitative or semi-quantitative quality control assays mandated by official pharmacopoeias. These tests are designed to identify and restrict trace chemical impurities (such as iron, heavy metals, chlorides, or sulfates) that may remain in a pharmaceutical substance during its manufacture.

Solution:

Step 1: Identify the main objective of a limit test. The purpose is not to determine the exact quantitative amount of an impurity down to precise decimal levels.

Step 2: Analyze the operational procedure of a limit test. The test compares a visible change (such as color, turbidity, or opalescence) in a sample solution against a parallel standard solution prepared with a known, maximum allowable amount of the impurity.

Step 3: Evaluate the pass/fail criteria. If the turbidity or color of the test sample is less intense than that of the standard solution, the sample passes the test.

Step 4: This confirms that the impurity is present only below the designated safe threshold. Therefore, the test serves to demonstrate that the impurity does not exceed an allowable limit.

Final Answer: To demonstrate that the impurity does not exceed a designated allowable limit

Answer: (C)

[Go Back to Question 28](#)



Q29.

Solution**Concept:**

Carbohydrate chemistry classifies sugars as reducing or non-reducing based on the accessibility of their functional groups. Reducing sugars possess a free anomeric aldehyde or ketone group that can donate electrons to reduce chemical agents like Fehling's or Benedict's reagents. In non-reducing sugars, these functional groups are locked within a glycosidic linkage.

Solution:

Step 1: Examine the chemical structures of the given options. Maltose is a disaccharide composed of two glucose units linked by an alpha-1,4-glycosidic bond, which leaves one free anomeric carbon open for oxidation.

Step 2: Lactose consists of galactose and glucose linked by a beta-1,4-bond, which also retains a reducing end. Cellobiose has a similar reducing structure with a beta-1,4-linkage.

Step 3: Analyze Sucrose. Sucrose is a disaccharide formed by linking a glucose monomer and a fructose monomer.

Step 4: Look closely at the glycosidic bond in sucrose. The linkage forms between the anomeric carbon-1 of glucose and the anomeric carbon-2 of fructose (α -1, β -2 link).

Step 5: This bond locks both reducing functional groups within the linkage, leaving no free carbonyl groups open to reduce test reagents. Consequently, sucrose is classified as a non-reducing disaccharide.

Final Answer:

Answer: (C)

[Go Back to Question 29](#)



Q30.

Solution**Concept:**

Drug metabolism, or biotransformation, is a key pharmacokinetic process that chemically modifies exogenous compounds within the body. This metabolism alters lipophilic drug molecules into polar, water-soluble metabolites that can be easily excreted by the kidneys. This process relies on specialized enzyme systems like the cytochrome P450 family.

Solution:

Step 1: Consider the distribution of drug-metabolizing enzymes across human organs. While organs like the kidneys, lungs, and small intestine contain some metabolizing enzymes, their total capacity is limited.

Step 2: Examine the unique physiology of the liver. The liver is the largest internal metabolic organ and receives portal blood flow directly from the gastrointestinal tract.

Step 3: Analyze the cellular microenvironment of hepatic tissue. Hepatocytes contain a high concentration of smooth endoplasmic reticulum packed with cytochrome P450 mixed-function oxidases and various conjugation enzymes.

Step 4: This high concentration of enzymes allows the liver to process the bulk of incoming medications and foreign chemicals. This makes the liver the primary biological site for metabolic biotransformation.

Final Answer:

Answer: (C)

[Go Back to Question 30](#)



Q31.

Solution**Concept:**

The human central nervous system controls body functions through specialized regions within the brain. Higher-order cognitive tasks, processing sensory inputs, coordination, and the regulation of vital autonomic reflexes are distributed across distinct anatomical structures.

Solution:

Step 1: Match each brain region with its primary role. The cerebrum manages conscious thought, voluntary motor control, and sensory integration. The cerebellum coordinates complex skeletal muscle balance and posture.

Step 2: The thalamus acts as a primary relay station for sensory pathways heading to the cerebral cortex.

Step 3: Analyze the medulla oblongata, located at the base of the brainstem. This region contains specialized networks of neurons that function as vital reflex centers.

Step 4: These include the cardiac center (regulating heart rate), the vasomotor center (controlling blood pressure via blood vessel diameter), and the respiratory center (setting the baseline rhythm of breathing).

Step 5: This concentration of life-sustaining autonomic controls makes the medulla oblongata the correct physiological choice.

Final Answer:

Answer: (B)

[Go Back to Question 31](#)



Q32.

Solution**Concept:**

Pharmaceutical containers must be selected to protect sensitive drug formulations from environmental hazards during transport, handling, and storage. Official pharmacopoeias provide distinct definitions for container categories based on the level of physical protection they provide.

Solution:

Step 1: Analyze the specific protection criteria stated in the prompt. The container must shield its contents from extraneous solids, liquids, or vapors during normal handling and shipment.

Step 2: Define a well-closed container. This type of container provides a reliable physical barrier that prevents external solid contaminants or liquids from entering and protects the product from loss under typical distribution conditions.

Step 3: Contrast this with a hermetically sealed container. Hermetic seals are completely airtight and impervious to gas or air exchange, which provides a higher level of protection than required here. Light-resistant containers focus specifically on blocking ultraviolet light.

Step 4: Therefore, the description matches the standard compendial definition of a well-closed container.

Final Answer:

Answer: (B)

[Go Back to Question 32](#)



Q33.

Solution**Concept:**

Organic chemistry classifies polycyclic aromatic hydrocarbons by the number and arrangement of fused benzene rings within their structures. Fused rings share two adjacent carbon atoms and a common carbon-carbon double bond, which alters the overall chemical properties and stability of the molecule.

Solution:

Step 1: Analyze the structural components of the options. Benzene is a single, isolated six-membered unsaturated ring (C_6H_6). Pyridine is a single heterocyclic ring containing five carbon atoms and one nitrogen atom.

Step 2: Examine Naphthalene ($C_{10}H_8$). Naphthalene consists of two individual benzene rings fused together side-by-side, sharing two carbon atoms.

Step 3: Compare this with phenanthrene, which contains three fused benzene rings arranged in a non-linear, angular pattern.

Step 4: Because the question asks for a structure composed of exactly two fused benzene rings, it matches naphthalene.

Final Answer:

Answer: (C)

[Go Back to Question 33](#)



Q34.

Solution**Concept:**

Antimicrobial pharmacology uses fixed-dose combination strategies to expand therapeutic coverage, delay the onset of bacterial resistance, and achieve synergistic drug interactions. The combination of a sulfonamide drug with a dihydrofolate reductase inhibitor is a classic example of this approach.

Solution:

Step 1: Analyze the metabolic pathway targeted by these drugs. Bacteria must synthesize their own folic acid to generate the purines and pyrimidines needed for DNA replication.

Step 2: Track the mechanism of sulfamethoxazole. Sulfamethoxazole is a structural analog of para-aminobenzoic acid (PABA) that competitively inhibits the enzyme dihydropteroate synthase, blocking the first step of folic acid synthesis.

Step 3: Track the mechanism of trimethoprim. Trimethoprim inhibits a downstream enzyme in the same pathway, dihydrofolate reductase, which blocks the conversion of dihydrofolate into active tetrahydrofolate.

Step 4: This simultaneous inhibition of two consecutive steps in the same metabolic pathway is known as sequential blockade. This synergistic combination makes co-trimoxazole bactericidal, whereas each drug is merely bacteriostatic when used alone.

Final Answer: Sequential blockade of bacterial folic acid synthesis

Answer: (A)

[Go Back to Question 34](#)



Q35.

Solution**Concept:**

Community pharmacy practice requires assessing clinical presentations to determine when a patient can be safely managed with over-the-counter (OTC) symptomatic treatments and when they must be referred for medical evaluation. Recognizing key red-flag symptoms helps prevent complications from severe, untreated infections.

Solution:

Step 1: Analyze the clinical signs described in the patient presentation: an acute cough accompanied by thick green sputum and a high fever.

Step 2: Interpret these symptoms. Green sputum points to a likely bacterial lower respiratory tract infection, and the high fever indicates a significant systemic inflammatory response, such as pneumonia or acute bronchitis.

Step 3: Evaluate the appropriate management options. Dispensing simple OTC cough suppressants would mask the symptoms without treating the underlying infection, which could lead to severe respiratory complications.

Step 4: Initiating oral prescription antibiotics like amoxicillin without a definitive diagnosis or prescription violates professional practice acts.

Step 5: Therefore, the safest and most appropriate action for the community pharmacist is to immediately refer the patient to a registered medical practitioner for a thorough diagnostic evaluation.

Final Answer:

Answer: (B)

[Go Back to Question 35](#)



Q36.

Solution**Concept:**

The core pharmacological activity and chemical reactivity of penicillin-class antibiotics depend on their central core structure. This core features a bicyclic ring system made of a saturated four-membered ring fused alongside a five-membered heterocycle.

Solution:

Step 1: Identify the components of the core structure of penicillin. The molecule contains a four-membered cyclic amide ring fused to a five-membered sulfur-containing thiazolidine ring.

Step 2: Locate the specific chemical group responsible for its antibacterial action. The four-membered cyclic amide ring is known as the β -lactam ring.

Step 3: Analyze how this ring acts on bacteria. The highly strained β -lactam ring binds to and inhibits bacterial penicillin-binding proteins (PBPs), which blocks cell wall cross-linking and causes bacterial lysis.

Step 4: This structural element is also vulnerable to degradation by bacterial beta-lactamase enzymes. Thus, the β -lactam ring is the essential structural feature responsible for penicillin's therapeutic activity.

Final Answer:

Answer: (A)

[Go Back to Question 36](#)



Q37.

Solution**Concept:**

The human skeletal system is made up of dense, highly organized compact bone tissue alongside lighter cancellous bone. Compact bone tissue features a structured matrix designed to optimize mechanical strength and withstand physical loading.

Solution:

Step 1: Examine the microscopic anatomy of compact bone tissue. The tissue is organized into repeating structural cylinders aligned parallel to the long axis of the bone.

Step 2: Identify these cylindrical matrix units. Each individual cylinder is called an osteon or a Haversian system.

Step 3: Detail the components of a Haversian system. It consists of a central Haversian canal containing blood vessels and nerve fibers, surrounded by concentric layers of hard, calcified bone matrix called lamellae.

Step 4: Differentiate this from the other options. Osteoblasts are cells that build bone matrix, trabeculae form the network in spongy bone, and canaliculi are tiny communication channels between cells. Therefore, the Haversian system is the core structural unit.

Final Answer:

Answer: (B)

[Go Back to Question 37](#)



Q38.

Solution**Concept:**

Pharmaceutical compounding and dispensing require careful monitoring to identify and prevent incompatibilities that can compromise product uniformity, dosage accuracy, or appearance. These issues can be physical, chemical, or therapeutic in nature.

Solution:

Step 1: Analyze the physical phenomenon described in the question. When two or more solid organic compounds are combined, the mixture liquifies at room temperature.

Step 2: Understand the underlying chemical cause. Mixing specific compounds, such as menthol, camphor, or thymol, creates an intermolecular interaction that lowers the melting point of the combination below room temperature.

Step 3: This specific combination is known as a eutectic mixture. Since this liquefaction is a change in physical state without chemical bond cleavage or molecular decomposition, it is classified as a physical incompatibility.

Final Answer:

Answer: (C)

[Go Back to Question 38](#)



Q39.

Solution**Concept:**

National public health initiatives design specific interventions to manage, contain, or eradicate critical infectious diseases within a population. These programs use targeted strategies depending on how the pathogen spreads, whether via airborne droplets, direct contact, or biological vectors.

Solution:

Step 1: Analyze the core requirement specified in the question: the initiative must target a chronic, vector-borne disease. Vector-borne diseases are transmitted to humans by organisms like mosquitoes, sandflies, or ticks.

Step 2: Evaluate the scope of the National Vector Borne Disease Control Programme (NVBDCP). This program coordinates national efforts to control diseases like malaria, filariasis, kala-azar, dengue, and Japanese encephalitis.

Step 3: Contrast this with the other options. The RNTCP focuses on tuberculosis (an airborne bacterial infection), the NACP targets HIV/AIDS (transmitted via body fluids), and the UIP manages vaccine-preventable childhood diseases.

Step 4: Therefore, the NVBDCP is the national program designed to manage vector-borne conditions.

Final Answer:

Answer: (A)

[Go Back to Question 39](#)



Q40.

Solution**Concept:**

Sterilization methods must be selected carefully based on the physical properties of the items being treated. Heat-sensitive surgical supplies, such as plastic catheters, optical endoscopes, and disposable syringes, can melt or degrade in an autoclave or dry-heat oven, requiring cold chemical sterilization alternatives.

Solution:

Step 1: Review the chemical agents used for gas sterilization. The agent must behave as an effective alkylating gas capable of destroying all microbial life at low processing temperatures.

Step 2: Analyze Ethylene Oxide (C₂H₄O). Ethylene oxide is a cyclic ether that exists as a gas at room temperature and possesses excellent material penetration capabilities.

Step 3: Understand its mechanism of action. Ethylene oxide replaces labile hydrogen atoms within microbial proteins, DNA, and enzymes with alkyl groups. This alkylation disrupts cellular metabolism and destroys the microorganisms.

Step 4: Because it kills microbes effectively without utilizing high temperatures, ethylene oxide is widely used for gas sterilization of heat-sensitive equipment.

Final Answer: Ethylene oxide

Answer: (B)

[Go Back to Question 40](#)



Q41.

Solution**Concept:**

Patient counseling sessions help ensure the correct administration of specialized dosage forms, such as metered-dose inhalers (MDIs). Proper inhalation technique maximizes drug delivery to the target lungs and reduces local and systemic side effects.

Solution:

Step 1: Identify the class of drug in the inhaler: a corticosteroid, which acts as a local anti-inflammatory agent to manage chronic asthma.

Step 2: Analyze the consequences of poor inhalation technique. If a patient swallows the dose or fails to coordinate actuation with inhalation, a large percentage of the drug deposits on the oral mucosa and throat.

Step 3: Examine the clinical risks of local corticosteroid deposition. Corticosteroids suppress local immune responses in the mouth, which can lead to opportunistic infections like oral candidiasis (oral thrush).

Step 4: Determine how counseling mitigates this risk. Instructing patients on proper device coordination and advising them to rinse their mouth with water after each use helps remove residual drug particles from the oral cavity. This ensures optimal lung delivery while preventing oral thrush.

Final Answer: Ensure correct deposition in the lungs and minimize local oral thrush

Answer: (B)

[Go Back to Question 41](#)



Q42.

Solution**Concept:**

Diabetic ketoacidosis (DKA) is an acute metabolic crisis that can occur in patients with uncontrolled Type 1 diabetes mellitus. A severe shortage of insulin prevents cells from utilizing glucose for energy, forcing the liver to rapidly break down fatty acids into acidic ketone bodies instead.

Solution:

Step 1: Track the biochemical consequences of ketone body accumulation. The high level of acetoacetate and beta-hydroxybutyrate releases excessive hydrogen ions, lowering blood plasma pH below 7.35.

Step 2: Identify the respiratory system's response to this metabolic acidosis. The respiratory center in the brain stem detects the drop in blood pH and triggers a compensatory breathing pattern.

Step 3: Detail this characteristic breathing pattern, known as Kussmaul respiration. The body attempts to eliminate excess acid by blowing off carbon dioxide through deep, rapid breathing.

Step 4: Identify a secondary diagnostic sign associated with DKA. The volatilization of acetone, a metabolic byproduct of ketone bodies, produces a distinct fruity or sweet odor on the patient's breath. Thus, these signs are classic indicators of DKA.

Final Answer:

Answer: (B)

[Go Back to Question 42](#)



Q43.

Solution**Concept:**

Crude drug evaluation requires identifying and preventing intentional or accidental adulteration, which can compromise the safety and efficacy of natural pharmaceuticals. Adulteration often involves substituting genuine medicinal plant parts with inferior material.

Solution:

Step 1: Analyze the specific adulteration scenario. Genuine digitalis leaves are mixed with or replaced by the leaves of *Verbascum thapsus* (commonly known as mullein leaves).

Step 2: Examine the physical features of the substitute material. Mullein leaves share a similar macroscopic shape, size, and green appearance with digitalis leaves, making them difficult to distinguish visually.

Step 3: Evaluate the therapeutic content of the substitute. Unlike genuine digitalis, *Verbascum thapsus* leaves lack the active cardioactive glycosides required for therapeutic efficacy, making it an inferior natural drug.

Step 4: This practice matches the definition of substituting a genuine crude drug with a superficially similar but therapeutically inferior natural plant material.

Final Answer: Substitution with superficially similar inferior natural drugs

Answer: (B)

[Go Back to Question 43](#)



Q44.

Solution**Concept:**

Renal pharmacology classifies diuretic drugs by their site of action along the nephron and the specific transport proteins they inhibit. Loop diuretics are highly potent agents used to treat acute pulmonary edema and severe hypertension by increasing water and solute clearance.

Solution:

Step 1: Locate the primary anatomical site of action for furosemide. Furosemide acts along the thick ascending limb of the loop of Henle.

Step 2: Identify the specific transport protein in this region. The luminal membrane of these epithelial cells contains a co-transporter protein called the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ symporter (NKCC2).

Step 3: Analyze the mechanism of furosemide. Furosemide binds to the chloride-binding site of this symporter, blocking the reabsorption of sodium, potassium, and chloride ions from the tubular fluid.

Step 4: This mechanism causes a large amount of unabsorbed solutes to remain within the nephron lumen. This solute load creates an osmotic gradient that prevents water reabsorption downstream, leading to a rapid increase in urine excretion.

Final Answer:

Inhibition of the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ cotransporter in the thick ascending limb of the loop of Henle

Answer: (A)[Go Back to Question 44](#)

Q45.

Solution**Concept:**

Heterocyclic organic chemistry classifies cyclic compounds by their ring size, the presence of heteroatoms (such as nitrogen, oxygen, or sulfur), and their degree of chemical saturation. Saturated rings contain only single carbon-carbon bonds, maximize their hydrogen atom count, and lack aromatic resonance properties.

Solution:

Step 1: Analyze the structure of Pyridine (C_5H_5N). Pyridine is a six-membered ring containing a nitrogen atom, but it features three alternating double bonds that make it unsaturated and aromatic.

Step 2: Analyze the structure of Pyrrole (C_4H_5N) and Imidazole ($C_3H_4N_2$). Both are five-membered unsaturated rings.

Step 3: Examine Piperidine ($C_5H_{11}N$). Piperidine is a six-membered cyclic ring structure containing five methylene groups ($-CH_2-$) and one secondary amine group ($-NH-$).

Step 4: Because piperidine contains only single covalent bonds, it is a fully saturated six-membered nitrogen heterocycle, which matches the criteria in the question.

Final Answer:

Answer: (B)

[Go Back to Question 45](#)



Q46.

Solution**Concept:**

The legal framework of the Drugs and Cosmetics Act of 1940 includes specific administrative rules added in 1945 to control the retail sale and distribution of pharmaceuticals. These rules set minimum standards for space, layout, and staffing that retail stores must maintain to operate safely.

Solution:

Step 1: Identify the main focus of the regulations mentioned in the question. The provisions mandate physical requirements like a minimum floor area of 10 square meters and the constant supervision of a Registered Pharmacist.

Step 2: Determine which statute contains these specific rules. These operational and structural standards are laid down within the comprehensive provisions of the Drugs and Cosmetics Rules of 1945.

Step 3: Differentiate this from the other options. The State Pharmacy Council handles registration rosters, the PCI regulations focus on academic criteria, and the Magic Remedies Act regulates drug advertising.

Step 4: Therefore, retail pharmacy licensing and operations are monitored under the authority of the Drugs and Cosmetics Rules of 1945.

Final Answer: Drugs and Cosmetics Rules, 1945

Answer: (C)

[Go Back to Question 46](#)



Q47.

Solution**Concept:**

Glycolysis is a central metabolic pathway that breaks down glucose to generate ATP and metabolic intermediates. The first step of glycolysis involves phosphorylating neutral glucose into an anionic form, which traps the sugar molecule within the cell cytoplasm.

Solution:

Step 1: Identify the first reaction step of glycolysis. A phosphate group from adenosine triphosphate (ATP) is transferred to the carbon-6 hydroxyl group of glucose, producing glucose-6-phosphate.

Step 2: Identify the enzyme families that catalyze this reaction. This phosphorylation is performed by hexokinase in most peripheral tissues and by its isoenzyme glucokinase in hepatic and pancreatic tissues.

Step 3: Differentiate this from the other options listed. Phosphofructokinase-1 catalyzes a downstream step in glycolysis, pyruvate kinase handles the final step, and glucose-6-phosphatase reverses this reaction during gluconeogenesis.

Step 4: Therefore, Hexokinase/Glucokinase is the enzyme responsible for initiating the glycolytic pathway.

Final Answer: Hexokinase / Glucokinase

Answer: (B)

[Go Back to Question 47](#)



Q48.

Solution**Concept:**

The human male reproductive system consists of primary gonads and a network of accessory ducts and glands. Sperm cells are produced via spermatogenesis inside the testes but must travel through specialized structures to complete their functional development.

Solution:

Step 1: Trace the path of sperm cell development. Immature spermatids are generated within the seminiferous tubules of the testes but lack individual motility.

Step 2: Identify the next anatomical structure in the pathway. Sperm move from the testes into the epididymis, a highly coiled crescent-shaped tube structure resting on the posterior surface of each testis.

Step 3: Analyze the role of the epididymis. Within this microenvironment, sperm cells spend several weeks undergoing maturation steps that allow them to develop forward motility and the capacity to fertilize an egg.

Step 4: The tail section of the epididymis also serves as a primary storage site for mature sperm prior to ejaculation. This makes it the correct anatomical choice.

Final Answer:

Answer: (C)

[Go Back to Question 48](#)



Q49.

Solution**Concept:**

The human adrenal glands consist of an outer cortex and an inner medulla, each secreting distinct classes of hormones. The adrenal cortex is further divided into three cellular zones: the zona glomerulosa, the zona fasciculata, and the zona reticularis, which synthesize specific steroid hormones.

Solution:

Step 1: Review the hormonal secretions of each zone of the adrenal cortex. The outer zona glomerulosa layer synthesizes mineralocorticoids, which regulate electrolyte and water balance.

Step 2: The intermediate zona fasciculata produces glucocorticoids like cortisol, which regulate glucose metabolism and stress responses. The inner layer secretes adrenal androgens.

Step 3: Identify the primary mineralocorticoid hormone. Aldosterone is the principal mineralocorticoid synthesized by the adrenal cortex.

Step 4: Analyze its physiological mechanism. Aldosterone acts on the distal tubules of the kidneys to promote sodium and water reabsorption in exchange for potassium excretion. This mechanism helps regulate blood volume and blood pressure, confirming its classification.

Final Answer:

Answer: (B)

[Go Back to Question 49](#)



Q50.

Solution**Concept:**

Pharmacognostical evaluation uses various ash values as analytical parameters to determine the purity and quality of crude drugs. Ashing burns away organic plant matter, leaving behind inorganic residues that reflect the presence of mineral components or external contaminants.

Solution:

Step 1: Differentiate between total ash and acid-insoluble ash. Total ash measures both physiological minerals naturally present within plant tissues and non-physiological impurities adhering to the surface.

Step 2: Analyze the process for determining acid-insoluble ash. The total ash residue is treated with dilute hydrochloric acid (HCl), which dissolves calcium carbonate and other soluble mineral salts.

Step 3: Identify what remains after this acid treatment. The insoluble residue consists primarily of silica, sand, dirt, and earthy matter that entered the sample during collection or processing.

Step 4: Therefore, measuring the total amount of acid-insoluble ash provides an accurate way to detect contamination from external sand and soil particles.

Final Answer: Adulteration with silica, earth, or sand particles

Answer: (B)

[Go Back to Question 50](#)



Q51.

Solution**Concept:**

Pulmonary physiology uses distinct lung volumes and capacities to evaluate ventilation efficiency and mechanical performance. Lung capacities represent combinations of two or more anatomical lung volumes. Vital capacity measures the maximum usable volume of air that can be moved into or out of the respiratory tract during a single respiratory cycle.

Solution:

Step 1: Define the volume component descriptions. Tidal volume represents standard, quiet air exchange. Residual volume is the air trapped in the lungs after a full, forced exhalation that cannot be cleared.

Step 2: Examine the mechanical maneuver described in the prompt. The subject first pulls in air to full capacity, maximizing the inspiratory reserve volume.

Step 3: The subject then performs a maximum forced exhalation. This pushes out the inspiratory reserve volume, the standard tidal volume, and the expiratory reserve volume.

Step 4: Combine these three dynamic volumes mathematically:

Vital Capacity (VC) = Inspiratory Reserve Volume + Tidal Volume + Expiratory Reserve Volume

Step 5: This combined volume represents the total air capacity available for forced respiration, matching the definition of vital capacity.

Final Answer: Vital Capacity

Answer: (C)

[Go Back to Question 51](#)



Q52.

Solution**Concept:**

Inorganic pharmaceutical chemistry classifies topical agents by their physical and chemical actions on exposed epithelial tissues. Topical protectants are chemically inert substances applied to damaged skin to form a physical protective barrier against mechanical irritation and chemical fluids.

Solution:

Step 1: Analyze the chemical composition of calamine. Calamine consists primarily of zinc oxide mixed with a trace amount of ferric oxide (Fe_2O_3), which gives it a characteristic pink color.

Step 2: Examine the chemical properties of zinc oxide (ZnO). It is an amorphous white powder that is insoluble in water and exhibits mild astringent, antiseptic, and protective actions.

Step 3: Evaluate how it works on the skin. When applied in a lotion or ointment, it covers the skin surface to shield nerve endings from irritation, absorb moisture, and soothe inflammation from rashes or insect bites.

Step 4: Differentiate this from the other options. Calcium carbonate acts as an antacid, sodium thiosulfate works as an antidote, and selenium sulfide is used as an anti-dandruff agent. Therefore, zinc oxide is the primary protectant ingredient.

Final Answer:

Answer: (A)

[Go Back to Question 52](#)



Q53.

Solution**Concept:**

The Narcotic Drugs and Psychotropic Substances (NDPS) Act of 1985 controls cultivation, production, transport, and sale operations involving narcotic plants and habit-forming chemicals. The statute enforces strict licensing requirements on specific botanical species to prevent illicit drug production.

Solution:

Step 1: Identify the main focus of the NDPS Act. The act regulates specific narcotic plants, including the opium poppy (*Papaver somniferum*), the coca bush (*Erythroxylum coca*), and hemp (*Cannabis sativa*).

Step 2: Examine the rules regarding *Cannabis sativa*. Cultivating this plant produces leaves (bhang), resin (charas), and flowering tops (ganja), which contain psychotropic cannabinoids.

Step 3: Evaluate the legal restrictions. The NDPS Act prohibits cultivating this species without an official license from the appropriate government authority.

Step 4: Contrast this with the other options. *Digitalis*, *Cinchona*, and *Rauwolfia* contain important medicinal alkaloids or glycosides, but they do not exhibit addictive properties and are regulated under standard agricultural and pharmacy laws rather than the NDPS Act.

Final Answer:

Answer: (A)

[Go Back to Question 53](#)



Q54.

Solution**Concept:**

Human physiological homeostatic mechanisms maintain blood plasma pH within a strict range of 7.35 to 7.45. This stability is supported by distinct chemical buffer systems operating within extracellular fluids and cellular compartments.

Solution:

Step 1: Identify the primary buffer systems in the body. The bicarbonate system works mainly in extracellular plasma fluids, while the phosphate system operates primarily in the renal tubules and intracellular fluids.

Step 2: Analyze the internal microenvironment of erythrocytes (red blood cells). Erythrocytes contain a high concentration of the specialized oxygen-transport protein hemoglobin.

Step 3: Examine the chemical buffering properties of hemoglobin. The histidine residues within hemoglobin molecules can bind or release hydrogen ions in response to shifts in blood acidity.

Step 4: Track its role in respiration. As carbon dioxide enters the red blood cell and forms carbonic acid, hemoglobin binds the resulting free hydrogen ions. This process prevents intracellular acidification, making hemoglobin the dominant physiological buffer within erythrocytes.

Final Answer:

Answer: (C)

[Go Back to Question 54](#)



Q55.

Solution**Concept:**

National family welfare initiatives utilize public health programs and contraceptive options to manage population growth and support maternal and child health. Family planning methods are divided into temporary spacing options and permanent sterilization procedures.

Solution:

Step 1: Analyze the surgical procedure mentioned in the question. "No Scalpel Vasectomy" (NSV) is an advanced, minimally invasive surgical approach for male sterilization.

Step 2: Examine how the procedure works. The surgeon makes a tiny puncture in the scrotal skin to isolate, cut, and ligate the vas deferens tubes. This path block prevents sperm from entering the ejaculatory fluid.

Step 3: Determine the long-term clinical objective. The goal of this procedure is to provide a permanent, irreversible method of surgical contraception for men who have completed their families.

Step 4: Differentiate this from the other options. It does not act as a barrier to prevent blood-borne or sexually transmitted infections, nor does it serve as a temporary spacing method. Thus, it functions as a permanent surgical sterilization method.

Final Answer: Provide a permanent, highly effective surgical sterilization method for males

Answer: (B)

[Go Back to Question 55](#)



Q56.

Solution**Concept:**

Industrial pharmaceutical processing utilizes specialized equipment for tablet manufacturing. A single-punch tablet press consists of distinct mechanical components, including a hopper, a feed frame, upper and lower punches, and a central die cavity, which work together in a coordinated cycle.

Solution:

Step 1: Identify the component highlighted in the diagram and question. The hopper is a funnel-shaped storage container positioned at the top of the feeding mechanism.

Step 2: Analyze its mechanical function during operation. Granulated powder mixtures are loaded into the upper opening of the hopper.

Step 3: Track the movement of material. Gravity and mechanical agitation guide the dry granules down through the hopper neck into the feed frame assembly.

Step 4: The feed frame then directs the granulated material into the lower die cavity, filling it to a pre-set depth before compaction occurs.

Step 5: This mechanical path shows that the primary function of the hopper is holding and feeding the dry granulation mixture into the die cavity.

Final Answer:

Answer: (B)

[Go Back to Question 56](#)



Q57.

Solution**Concept:**

Pharmaceutical packaging choices must ensure chemical compatibility and long-term stability between a drug formulation and its container. Leaching is a physical-chemical phenomenon where components of the packaging container material migrate or dissolve into the enclosed drug solution.

Solution:

Step 1: Review the properties of Type I Borosilicate glass. This material possesses high hydrolytic resistance and a low alkali content, making it highly resistant to leaching and suitable for parenterals.

Step 2: Examine the chemical composition of Polyvinyl chloride (PVC) plastics. PVC is naturally rigid and requires the addition of chemical plasticizers, such as phthalate esters, to make it flexible enough for intravenous fluid bags and tubing.

Step 3: Analyze the risks associated with plastic packaging. These plasticizer molecules are not chemically bound to the polymer framework and can easily leach into aqueous or lipid-based drug solutions over time.

Step 4: This leaching can contaminate the injection fluid and pose safety risks to patients, making PVC plastics highly susceptible to this phenomenon compared to stable borosilicate glass or inert metals.

Final Answer: Polyvinyl chloride (PVC) plastic

Answer: (B)

[Go Back to Question 57](#)



Q58.

Solution**Concept:**

Pharmaceutical calculations utilize standard mathematical formulas to determine appropriate pediatric drug dosages based on adult baselines. These formulas scale down dosages using parameters like age, body weight, or total body surface area. Young's rule uses a child's age in years to calculate the dosage.

Solution:

Step 1: State the algebraic expression for Young's rule:

$$\text{Child Dose} = \frac{\text{Age in years}}{\text{Age in years} + 12} \times \text{Adult Dose}$$

Step 2: Identify the variables provided in the problem statement:

$$\text{Age of the child} = 4 \text{ years}$$

$$\text{Standard Adult Dose} = 60 \text{ mg}$$

Step 3: Substitute these values into the formula:

$$\text{Child Dose} = \frac{4}{4 + 12} \times 60 \text{ mg}$$

Step 4: Simplify the denominator and evaluate the fraction:

$$\text{Child Dose} = \frac{4}{16} \times 60 \text{ mg}$$

$$\text{Child Dose} = \frac{1}{4} \times 60 \text{ mg} = 15 \text{ mg}$$

Step 5: This calculation shows that the correct pediatric dose for a 4-year-old child is exactly 15 mg.

Final Answer: 15 mg

Answer: (B)

[Go Back to Question 58](#)



Q59.

Solution**Concept:**

Pharmacognosy and phytochemistry classify plant secondary metabolites based on their chemical functional groups and biosynthetic origins. The major classes of secondary metabolites include alkaloids, glycosides, tannins, volatile oils, and flavonoids.

Solution:

Step 1: Review the chemical characteristics of alkaloids. Alkaloids are naturally occurring organic compounds derived primarily from amino acids.

Step 2: Identify the key structural feature of alkaloids. They contain at least one basic nitrogen atom, which is typically incorporated into a heterocyclic ring structure (such as pyridine, piperidine, or indole rings).

Step 3: Examine their chemical behavior. This basic nitrogen atom allows alkaloids to form water-soluble crystalline salts when treated with acids, a property that forms the basis for their extraction and isolation.

Step 4: Contrast this with other metabolites. Tannins are complex polyphenolic compounds lacking nitrogen, and volatile oils consist primarily of nitrogen-free terpenes. Therefore, the presence of a basic nitrogen atom is the distinguishing chemical feature of alkaloids.

Final Answer: Possess a basic nitrogen atom, usually in a heterocyclic ring

Answer: (B)

[Go Back to Question 59](#)



Q60.

Solution**Concept:**

Clinical pharmacology tracks specific adverse drug reactions associated with antibiotic administration. These toxic manifestations can result from intrinsic drug properties, high serum concentrations, or specific administration techniques.

Solution:

Step 1: Identify the antibiotic specified in the question: Vancomycin, a glycopeptide antibiotic used to treat severe Gram-positive bacterial infections like MRSA.

Step 2: Analyze the adverse effects associated with its administration. Rapid intravenous infusion of vancomycin can trigger a non-immune, direct degranulation of mast cells.

Step 3: Track the physiological response. This degranulation releases large amounts of histamine into the bloodstream, causing systemic vasodilation, cutaneous flushing, and a red maculopapular rash across the face, neck, and upper torso.

Step 4: Identify the name of this clinical presentation. This specific reaction is known as Red Man Syndrome (or Red Neck Syndrome). It can be prevented by slowing the intravenous infusion rate to run over at least 60 minutes.

Step 5: Contrast this with the other options. Gray baby syndrome is caused by chloramphenicol, and tendon rupture is an adverse effect associated with fluoroquinolones.

Final Answer:

Answer: (B)

[Go Back to Question 60](#)



Q61.

Solution**Concept:**

The human heart relies on a specialized intrinsic conduction system to coordinate the rhythmic cycle of atrial and ventricular contractions. This system is made up of self-excitabile neuromuscular tissue layers that generate and distribute electrical action potentials throughout the myocardium.

Solution:

Step 1: Trace the path of electrical activation in the heart. The impulse originates in the upper posterior wall of the right atrium, moves through the internodal pathways to the atrioventricular (AV) node, travels down the bundle of His, and spreads out along the Purkinje fibers.

Step 2: Identify the primary site of impulse generation. The sinoatrial (SA) node consists of a cluster of specialized cells that exhibit the highest baseline rate of spontaneous depolarization.

Step 3: Determine its pacing rate. The SA node generates regular action potentials at an intrinsic rate of 60 – 100 beats per minute, which suppresses slower downstream pacemakers.

Step 4: Because it sets the baseline rhythm for the entire heart under normal physiological conditions, the sinoatrial (SA) node functions as the primary physiological pacemaker.

Final Answer: Sinoatrial (SA) node

Answer: (B)

[Go Back to Question 61](#)



Q62.

Solution**Concept:**

Pharmaceutical unit operations use distinct physical mechanisms to separate components, reduce material size, or dry formulations. Separating liquid mixtures containing components with different volatilities requires selecting an operation based on boiling point differentials.

Solution:

Step 1: Analyze the physical transformation steps described. The process involves heating a liquid mixture to convert its components into vapor, followed by cooling those vapors to condense them back into separate liquid fractions.

Step 2: Identify this separation process. Distillation relies on differences in the boiling points of the components within a liquid mixture.

Step 3: Contrast this with the other options. Filtration separates solid particles from a liquid using a porous medium. Crystallization focuses on solid-liquid separation via crystal growth, and drying removes moisture from solid materials.

Step 4: Because the operation uses sequential vaporization and condensation steps to separate a liquid mixture based on boiling point differences, it is defined as distillation.

Final Answer:

Answer: (B)

[Go Back to Question 62](#)



Q63.

Solution**Concept:**

Lipid biochemistry classifies fatty acids based on their carbon chain length, their degree of saturation, and the location of their double bonds. Polyunsaturated fatty acids (PUFAs) contain two or more carbon-carbon double bonds along their hydrocarbon chain. Omega-3 (ω -3) fatty acids feature their first double bond at the third carbon atom from the terminal methyl end.

Solution:

Step 1: Evaluate the structures of the given options. Oleic acid is a monounsaturated fatty acid (18:1, ω -9). Palmitic acid (16:0) and stearic acid (18:0) are saturated fatty acids containing no double bonds.

Step 2: Analyze Linolenic acid, specifically alpha-linolenic acid (ALA). This molecule is an 18-carbon polyunsaturated fatty acid containing three double bonds (18:3).

Step 3: Locate the double bonds. The first double bond is situated at the third carbon atom from the methyl (ω) terminus, which classifies it as an omega-3 fatty acid.

Step 4: Because the human body cannot synthesize this structure from simpler precursors due to the lack of specific desaturase enzymes, linolenic acid is classified as an essential omega-3 polyunsaturated fatty acid.

Final Answer:

Answer: (B)

[Go Back to Question 63](#)



Q64.

Solution**Concept:**

Clinical toxicology utilizes specific pharmacological antidotes to reverse drug toxicities and manage chemical overdoses. These antidotes work through mechanisms like competitive receptor antagonism, metabolic channel diversion, or direct chemical neutralization via antibody chelation.

Solution:

Step 1: Analyze the mechanisms of the listed antidotes. N-acetylcysteine restores glutathione levels to treat acetaminophen poisoning. Atropine sulfate treats organophosphate toxicity, and deferoxamine chelates excess iron.

Step 2: Examine the pathophysiology of an acute Digoxin overdose. Digoxin inhibits the Na^+/K^+ -ATPase pump, which can lead to life-threatening cardiac arrhythmias and hyperkalemia.

Step 3: Identify the specific antidote for digoxin toxicity. Digoxin-specific Fab fragments (Digibind) are monovalent antibody fragments derived from anti-digoxin antibodies raised in sheep.

Step 4: Analyze how they work. These Fab fragments bind with high affinity to circulating digoxin molecules, forming a stable complex that pulls the drug away from its myocardial receptors. This complex is then safely excreted by the kidneys, reversing toxic cardiac effects.

Final Answer:

Answer: (C)

[Go Back to Question 64](#)



Q65.

Solution**Concept:**

Gastrointestinal pharmacology categorizes drugs by their therapeutic actions and mechanism of effect on bowel motility and fluid dynamics. Laxatives are used to treat constipation and are divided into bulk-forming, stimulant, lubricant, and osmotic types based on how they alter stool consistency.

Solution:

Step 1: Evaluate the pharmacological classification of the given options. Loperamide is an opioid agonist used as an anti-diarrheal agent. Omeprazole and ranitidine are acid-suppressing agents.

Step 2: Analyze Magnesium hydroxide [Milk of Magnesia, $\text{Mg}(\text{OH})_2$]. This inorganic compound is an over-the-counter medication that remains largely unabsorbed within the intestinal lumen.

Step 3: Understand the osmotic mechanism. The unabsorbed magnesium and hydroxide ions exert an osmotic force that draws water from surrounding vascular tissues into the intestinal tract.

Step 4: This accumulation of fluid distends the colon, softens the stool, and stimulates peristaltic contractions to facilitate evacuation. This makes magnesium hydroxide a classic short-term osmotic laxative.

Final Answer: Magnesium hydroxide [Milk of Magnesia, $\text{Mg}(\text{OH})_2$]

Answer: (A)

[Go Back to Question 65](#)



Q66.

Solution**Concept:**

Hospital pharmacy management relies on standardized formulary frameworks to control drug inventory, optimize therapeutic outcomes, and manage healthcare costs. This framework is designed and maintained by the institutional Pharmacy and Therapeutics Committee (PTC).

Solution:

Step 1: Define the primary purpose of a hospital formulary system. It is an administrative and clinical tool that provides a continually updated list of approved, high-quality medications available for use within that healthcare facility.

Step 2: Understand the selection process. The PTC evaluates available medications based on clinical efficacy, safety profiles, bioequivalence data, and cost-effectiveness to select the most appropriate options for the patient population.

Step 3: Evaluate how it guides clinical practice. The formulary system helps prevent duplication of therapeutic options and provides clinicians with clear guidelines on available medications, supporting safe and consistent prescribing practices.

Step 4: Therefore, it functions primarily as a continually revised compilation of approved pharmaceuticals selected for institutional use.

Final Answer:

Continually revised compilation of approved pharmaceuticals available for use in the institution

Answer: (B)

[Go Back to Question 66](#)



Q67.

Solution**Concept:**

Enzyme kinetics tracks how inhibitors alter the rate of enzymatic reactions using parameters like maximum velocity (V_{\max}) and the Michaelis-Menten constant (K_m). Competitive inhibition occurs when an inhibitor structurally resembles the natural substrate and competes for binding at the enzyme's active site.

Solution:

Step 1: Analyze the competitive inhibition mechanism. Because the inhibitor and substrate compete for the same active site, high concentrations of the substrate can displace the inhibitor from the enzyme.

Step 2: Determine the effect on maximum velocity. At high substrate concentrations, the enzyme can still reach its full catalytic capacity, meaning the maximum velocity (V_{\max}) remains unchanged.

Step 3: Analyze the effect on substrate affinity. The presence of the competitive inhibitor increases the concentration of substrate needed to achieve half-maximal velocity.

Step 4: This requirement causes an increase in the apparent Michaelis constant (K'_m), shifting the value to the right on a Michaelis-Menten plot as shown in the provided diagram.

Step 5: Therefore, competitive inhibition is characterized by an increase in the apparent K_m while V_{\max} remains unchanged.

Final Answer: The apparent K_m increases while V_{\max} remains unchanged

Answer: (A)

[Go Back to Question 67](#)



Q68.

Solution**Concept:**

A medical prescription is a legal document issued by a registered practitioner that contains specific operational parts. These parts include the superscription, inscription, subscription, and transcription, which provide structured information for dispensing and administering medications.

Solution:

Step 1: Define the parts of a prescription. The superscription consists of the Rx symbol, which serves as a traditional introductory command. The inscription lists the active ingredients and their respective strengths.

Step 2: Examine the purpose of the subscription section. The subscription contains specific directions addressed directly to the pharmacist regarding how to compound or prepare the medication, the required dosage form, and the total quantity of doses to be dispensed.

Step 3: Contrast this with the transcription (signatura), which contains directions intended for the patient regarding how to take the medication.

Step 4: Therefore, the section containing core directions for the pharmacist regarding dosage form and quantity is the subscription.

Final Answer:

Answer: (C)

[Go Back to Question 68](#)



Q69.

Solution**Concept:**

Healthcare and medical systems are divided into distinct specialties based on their primary operational focus. Public health initiatives use epidemiological and biostatistical frameworks to monitor health trends, manage disease risks, and improve wellness outcomes across populations.

Solution:

Step 1: Analyze the core professional focus described in the prompt. The domain centers on studying how diseases are distributed across populations, identifying their underlying environmental or behavioral causes, and designing systemic prevention strategies.

Step 2: Define public health. Public health is the science of protecting and improving the health of communities through education, policy making, and organized research into disease prevention.

Step 3: Contrast this with alternative options. Clinical pharmacy focuses on individualized patient care and bedside medication monitoring. Pharmaceutics deals with the design and manufacturing of dosage forms, and forensic pharmacy handles legal regulations.

Step 4: Therefore, the population-level study of disease distribution and prevention falls under the core domain of public health.

Final Answer:

Answer: (B)

[Go Back to Question 69](#)



Q70.

Solution**Concept:**

Neuropharmacology categorizes antipsychotic medications based on their receptor binding profiles and side effect tendencies. First-generation (typical) antipsychotics exhibit strong, competitive antagonism at post-synaptic dopamine D_2 receptors across different brain pathways.

Solution:

Step 1: Identify the drug specified: Haloperidol, a high-potency butyrophenone typical antipsychotic.

Step 2: Trace its mechanism of action. Haloperidol blocks dopamine D_2 receptors. While blocking these receptors in the mesolimbic pathway reduces psychotic symptoms, it also blocks receptors in the nigrostriatal pathway.

Step 3: Analyze the functional consequences in the nigrostriatal pathway. The nigrostriatal system within the basal ganglia coordinates voluntary motor function. Inhibiting dopamine signals in this pathway causes a relative excess of cholinergic activity.

Step 4: Identify the resulting clinical side effects. This pathway imbalance leads to extrapyramidal symptoms (EPS). EPS presents as acute dystonias, akathisia, drug-induced parkinsonism (rigidity, tremors), and long-term tardive dyskinesia.

Final Answer:

Answer: (B)

[Go Back to Question 70](#)



Q71.

Solution**Concept:**

Industrial pharmaceutical manufacturing processes must control processing parameters to prevent defects in finished solid dosage forms. Common tablet manufacturing defects include capping, lamination, picking, sticking, and mottling, each caused by specific mechanical or formulation issues.

Solution:

Step 1: Define the specific tablet defect described in the prompt: "Mottling."

Step 2: Analyze the visual presentation of mottling. It is characterized by an unequal or uneven distribution of color on the surface of the tablet, showing dark and light patches rather than a uniform appearance.

Step 3: Identify the underlying formulation causes. Mottling occurs when a drug has a different color than the excipients, or when a water-soluble dye migrates unevenly during the granulation drying step.

Step 4: Contrast this with the other options. Capping is the separation of the top or bottom cap of the tablet, lamination is a split into multiple layers, and sticking is material adhering to the punch faces. Thus, mottling refers specifically to color non-uniformity.

Final Answer:

Answer: (B)

[Go Back to Question 71](#)



Q72.

Solution**Concept:**

The route of drug administration determines the rate and extent of systemic absorption, which influences bioavailability. Bioavailability is reduced when a drug undergoes hepatic first-pass metabolism, a process where enzymes in the liver break down a portion of the drug before it reaches the rest of the body.

Solution:

Step 1: Analyze the oral route. Orally administered medications are absorbed from the gastrointestinal tract and travel directly through the portal vein to the liver, where they undergo significant hepatic first-pass metabolism.

Step 2: Examine non-vascular parenteral routes like subcutaneous or transdermal administration. These routes bypass the portal system but rely on absorption through local tissues, which can cause a delay in drug entry.

Step 3: Evaluate the intravenous (IV) route. Intravenous injection introduces the drug solution directly into a systemic vein.

Step 4: Determine the pharmacokinetic parameters. By placing the full dose directly into the systemic circulation, the IV route completely avoids absorption barriers and first-pass hepatic metabolism. This results in an immediate drug response and a baseline bioavailability of 100%.

Final Answer:

Answer: (B)

[Go Back to Question 72](#)



Q73.

Solution**Concept:**

Pharmaceutical chemistry tracks different degradation pathways to ensure the stability of excipients and active drug substances. Fixed oils and vegetable fats consist of triglycerides containing saturated and unsaturated fatty acid chains.

Solution:

Step 1: Identify the chemical structures vulnerable to degradation. Unsaturated fatty acids contain carbon-carbon double bonds (-CH=CH-), which have reactive allylic carbon centers.

Step 2: Trace the reaction with atmospheric oxygen. Exposure to oxygen initiates a free radical chain mechanism that includes initiation, propagation, and termination phases.

Step 3: Analyze the chemical products of this reaction. Oxygen reacts with the double bonds to form unstable hydroperoxides. These molecules break down into short-chain aldehydes, ketones, and carboxylic acids.

Step 4: Identify the name of this degradation process. This chemical breakdown is known as oxidative rancidity. It produces a characteristic unpleasant odor and taste, indicating that the lipid component has spoiled.

Final Answer:

Answer: (C)

[Go Back to Question 73](#)



Q74.

Solution**Concept:**

The human renal system regulates fluid and electrolyte balance through glomerular filtration followed by selective reabsorption along specialized segments of the nephron. The nephron structures include the proximal convoluted tubule, the loop of Henle, the distal convoluted tubule, and the collecting duct system.

Solution:

Step 1: Review the transport capacity of the proximal convoluted tubule (PCT). The PCT is lined with simple cuboidal epithelial cells featuring an extensive brush border of microvilli that increases the available absorptive surface area.

Step 2: Quantify the reabsorption that occurs in this segment. The cells in the PCT use active and passive transport mechanisms to reabsorb approximately 65% of the filtered water, sodium (Na^+), and potassium (K^+) ions back into the peritubular capillaries.

Step 3: Contrast this with downstream segments. The loop of Henle primarily functions to concentrate urine via a countercurrent multiplier system. The DCT handles fine-tuning under hormonal control, and the collecting duct regulates final water clearance.

Step 4: Because the bulk of solute and water reabsorption happens immediately after filtration, the PCT is the primary site of reabsorption.

Final Answer: Proximal Convoluted Tubule (PCT)

Answer: (A)

[Go Back to Question 74](#)



Q75.

Solution**Concept:**

Pharmacognosy uses quantitative microscopy parameters to identify botanical crude drugs and detect adulteration in leaf samples. These parameters include vein-islet numbers, vein-termination numbers, palisade ratios, and the stomatal index.

Solution:

Step 1: Define the mathematical formula for calculating the stomatal index (I):

$$I = \frac{S}{E + S} \times 100$$

Where S represents the total number of stomata per unit area, and E represents the number of ordinary epidermal cells in the same area.

Step 2: Analyze the variability of this parameter. While the absolute number of stomata on a leaf surface can change based on environmental conditions, soil quality, or leaf size, the percentage ratio remains stable.

Step 3: Determine its diagnostic value. The calculated stomatal index is a constant structural value for a given plant species.

Step 4: This stability allows researchers to use the stomatal index to identify genuine crude drugs and distinguish them from closely related substitute species.

Final Answer:

Answer: (C)

[Go Back to Question 75](#)



Q76.

Solution**Concept:**

Rheology deals with the study of fluid flow behavior and deformation properties under applied stress forces. Fluids are classified into Newtonian and non-Newtonian types based on whether their viscosity remains constant or shifts in response to an applied shear rate.

Solution:

Step 1: Analyze the rheological behavior described in the prompt. As the applied shear rate or shaking force increases, the fluid exhibits an increase in viscosity and resistance to flow.

Step 2: Identify this type of fluid behavior. This property is known as shear-thickening behavior, which describes a dilatant flow system.

Step 3: Examine the molecular mechanism of dilatant flow. At rest, the particles in a dilatant suspension are closely packed with minimal solvent filling the spaces between them. Increasing the shear force causes the particles to shift into an open, irregular arrangement, leaving less free solvent to lubricate their movement and increasing resistance.

Step 4: Contrast this with pseudoplastic flow (shear-thinning), where viscosity decreases as stress rises.

Step 5: Therefore, a fluid that thickens and shows increased resistance to flow under stress is exhibiting dilatant flow.

Final Answer:

Answer: (C)

[Go Back to Question 76](#)



Q77.

Solution**Concept:**

The Hydrophilic-Lipophilic Balance (HLB) scale is an empirical numerical framework used to measure the relative affinity of surfactant molecules for oil and water phases. The scale ranges from 1 to 20, where lower values indicate lipophilic properties and higher values indicate hydrophilic properties.

Solution:

Step 1: Analyze the specific HLB value provided in the problem: $HLB = 4$.

Step 2: Categorize this value on the HLB scale. Surfactants with HLB values between 3 and 6 are predominantly lipophilic (oil-soluble) agents, such as sorbitan esters (Spans).

Step 3: Determine which type of emulsion this surfactant favors. Because the emulsifying agent dissolves more readily in oil, it stabilizes the interface by surrounding water droplets dispersed throughout a continuous oil phase.

Step 4: This mechanism favors the formation of a water-in-oil (W/O) emulsion.

Step 5: Contrast this with hydrophilic surfactants (HLB 8 – 16), which dissolve in water and stabilize oil-in-water (O/W) emulsions. Thus, an HLB of 4 favors a W/O system.

Final Answer:

Answer: (B)

[Go Back to Question 77](#)



Q78.

Solution**Concept:**

Heterocyclic chemistry classifies polycyclic compounds based on the types and arrangement of fused rings within their core architecture. Fusing a six-membered ring with a five-membered ring containing multiple nitrogen heteroatoms creates a bicyclic aromatic core that serves as a building block for nucleic acids.

Solution:

Step 1: Analyze the structural components described in the prompt. The compound consists of a six-membered pyrimidine ring fused alongside a five-membered imidazole ring.

Step 2: Identify this specific fused heterocycle. This combination forms the purine ring system, which contains four nitrogen atoms at the 1, 3, 7, and 9 positions.

Step 3: Review its biological significance. The purine ring system serves as the structural core for the nitrogenous bases adenine and guanine, which are essential components of DNA, RNA, and ATP molecules.

Step 4: Contrast this with the other options. Indole features a benzene ring fused to a pyrrole ring. Quinoline and isoquinoline consist of a benzene ring fused to a pyridine ring. Therefore, the purine core matches the description.

Final Answer:

Answer: (C)

[Go Back to Question 78](#)



Q79.

Solution**Concept:**

Pharmacy administration and business management utilize standard accounting principles to track operational expenses, asset values, and material overhead costs. Fixed assets, such as manufacturing machinery, analytical laboratory instruments, and delivery vehicles, gradually lose economic value over their operational lifespans.

Solution:

Step 1: Identify the accounting process described. The scenario involves allocating the cost of a tangible physical asset over its useful life due to wear, tear, and aging.

Step 2: Define depreciation. Depreciation is the systematic accounting method used to distribute the initial cost of a tangible asset over the years it remains operational, reflecting its gradual loss of value.

Step 3: Differentiate this from amortization. Amortization applies a similar cost-allocation method but is used strictly for intangible assets, such as patents, trademarks, or copyrights.

Step 4: Because the asset in question is a physical item losing value due to mechanical wear and tear, the correct accounting term is depreciation.

Final Answer:

Answer: (A)

[Go Back to Question 79](#)



Q80.

Solution**Concept:**

Pharmaceutical legislation controls drug advertising to safeguard public health and prevent misleading claims. The publication of false or exaggerated claims regarding cures for severe medical conditions can lead patients to delay seeking professional medical treatment.

Solution:

Step 1: Identify the specific legislative act described. The statute targets misleading advertisements concerning drugs and remedies that claim to prevent or cure certain severe conditions.

Step 2: Review the provisions of the Drugs and Magic Remedies (Objectionable Advertisements) Act of 1954. This law contains a statutory schedule listing diseases, such as blindness, cancer, diabetes, and leprosy, for which drug advertisements are prohibited.

Step 3: Determine the purpose of these restrictions. The law aims to eliminate self-medication for severe conditions by banning advertisements that claim a product can mitigate or cure the specified scheduled diseases.

Step 4: Therefore, the Drugs and Magic Remedies Act of 1954 is the specific statute that regulates these advertisements.

Final Answer: Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954

Answer: (B)

[Go Back to Question 80](#)



Q81.

Solution**Concept:**

Human anatomical tissues are made up of specialized structural proteins that provide mechanical support, flexibility, or environmental protection. Epithelial tissues undergo differentiation processes to synthesize protective proteins that resist mechanical wear and water penetration.

Solution:

Step 1: Identify the structural protein specified in the question. The protein must form the primary material for human hair, nails, and the outer layer of the skin (stratum corneum).

Step 2: Analyze the characteristics of keratin. Keratin is a fibrous, sulfur-rich structural protein produced by keratinocytes in the epidermis.

Step 3: Examine its physical properties. The polypeptide chains in keratin are cross-linked by strong disulfide bonds, creating a tough, water-insoluble barrier that protects underlying tissues from mechanical injury and dehydration.

Step 4: Contrast this with alternative proteins. Collagen provides tensile strength to deeper connective tissues, elastin allows blood vessels to stretch, and melanin is a pigment skin molecule. Thus, keratin is the correct structural protein.

Final Answer:

Answer: (C)

[Go Back to Question 81](#)



Q82.

Solution**Concept:**

Pharmacokinetics tracks how drug molecules cross cellular lipid bilayers to achieve systemic absorption and tissue distribution. Transport mechanisms are categorized into passive and active processes based on their energy requirements and use of carrier proteins.

Solution:

Step 1: Analyze the specific transportation parameters stated in the prompt. The drug molecules are small and lipophilic (lipid-soluble), and they move along their concentration gradient.

Step 2: Define passive diffusion. Passive diffusion is the spontaneous movement of solute molecules across a concentration gradient, traveling from an area of higher concentration to one of lower concentration.

Step 3: Evaluate its membrane requirements. Lipophilic drug molecules can dissolve directly into the hydrophobic lipid bilayer of the cell membrane, allowing them to cross without requiring chemical energy (ATP) or specialized transmembrane carrier proteins.

Step 4: Contrast this with other mechanisms. Active transport requires ATP to move molecules against a gradient, while facilitated diffusion relies on a carrier protein. Therefore, passive diffusion is the mechanism responsible for this transport.

Final Answer:

Answer: (B)

[Go Back to Question 82](#)



Q83.

Solution**Concept:**

Hospital pharmacy services use distinct operational layouts to manage drug distribution across large medical centers. Distribution systems can be centralized within a single main pharmacy or decentralized using sub-units located closer to patient care areas.

Solution:

Step 1: Define the operational role of a satellite pharmacy. A satellite pharmacy is a small, decentralized dispensing sub-unit located within a specific care wing or floor of a hospital.

Step 2: Determine its clinical purpose. Large, multi-story hospital complexes can experience delivery delays if all medications must travel from a single central basement pharmacy.

Step 3: Analyze how decentralization improves service. By storing commonly used medications, emergency drugs, and specialized supplies closer to the wards, a satellite pharmacy enables faster delivery to nursing staff and patients.

Step 4: This setup also allows clinical pharmacists to remain closer to patient care areas, supporting closer medication oversight and better integration with the healthcare team.

Final Answer:

To decentralize drug distribution and provide rapid services directly to specific nursing wards

Answer: (B)

[Go Back to Question 83](#)



Q84.

Solution**Concept:**

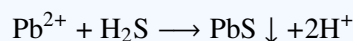
Official pharmacopoeias mandate standardized limit tests to control heavy metal contamination in pharmaceutical raw materials and finished products. These impurities can enter chemicals from manufacturing equipment or environmental sources, posing potential toxicity risks if not monitored.

Solution:

Step 1: Identify the objective of the limit test for heavy metals. The test is designed to identify trace levels of metallic impurities, such as lead, copper, or bismuth, that react with sulfide ions under controlled pH conditions.

Step 2: Review the chemical basis of the test. The assay uses hydrogen sulfide (H₂S) or sodium sulfide reagent in a buffered solution.

Step 3: Analyze the visible reaction. The heavy metal ions react with the sulfide reagent to form insoluble metal sulfide colloidal particles, producing a characteristic brown or black color matching this equation:



Step 4: Compare this with the alternative options. Limit tests for chlorides and sulfates identify those specific anions using silver nitrate and barium chloride, respectively. Therefore, the sulfide reagent test is the correct method for monitoring heavy metals like lead.

Final Answer:

Answer: (A)

[Go Back to Question 84](#)



Q85.

Solution**Concept:**

Stereochemistry studies the three-dimensional spatial arrangement of atoms within molecular structures. Isomers are molecules that share the same molecular formula but exhibit different structural layouts or spatial orientations. Stereoisomers are further divided based on their mirror-image relationships.

Solution:

Step 1: Analyze the specific definition provided in the prompt. The stereoisomers must be non-superimposable mirror images of each other.

Step 2: Define enantiomers. Enantiomers are pairs of chiral molecules that relate to each other like a left and right hand; they are mirror images but cannot be perfectly overlaid on top of one another.

Step 3: Examine their physical properties. Enantiomers share identical melting points, boiling points, and solubilities, but they rotate plane-polarized light in opposite directions (dextrorotatory and levorotatory forms).

Step 4: Contrast this with diastereomers, which are stereoisomers that are not mirror images of each other. Therefore, the description matches the definition of enantiomers.

Final Answer:

Answer: (B)

[Go Back to Question 85](#)



Q86.

Solution**Concept:**

Public health interventions are designed to disrupt the transmission pathways of infectious diseases within communities. Fecal-oral diseases, such as cholera, typhoid fever, and hepatitis A, spread when pathogens from the stool of an infected individual contaminate food or water sources consumed by others.

Solution:

Step 1: Analyze the transmission pathway of fecal-oral pathogens. These infections spread through contaminated water supplies, poor sanitation facilities, and inadequate hand hygiene.

Step 2: Identify effective prevention strategies. To break this transmission cycle, public health interventions must focus on separating human waste from community water sources.

Step 3: Determine the key objective. This is achieved by building sewage disposal systems, enforcing water treatment standards, and ensuring access to safe drinking water sanitation.

Step 4: Contrast this with other options. Insecticide sprays target vector-borne diseases like malaria, while personal protective masks are used to block airborne respiratory droplets. Thus, water sanitation is the correct intervention for fecal-oral diseases.

Final Answer: Ensuring safe drinking water sanitation and sewage disposal

Answer: (C)

[Go Back to Question 86](#)



Q87.

Solution**Concept:**

Clinical pharmacy practice utilizes laboratory monitoring to balance the efficacy and safety of high-risk medications with narrow therapeutic indexes. Warfarin is an oral anticoagulant that works by inhibiting vitamin K epoxide reductase, which reduces the synthesis of clotting factors II, VII, IX, and X.

Solution:

Step 1: Identify the laboratory monitoring metric used for warfarin. The International Normalized Ratio (INR) is a standardized measurement calculated from a patient's prothrombin time.

Step 2: Analyze the risks of an incorrect warfarin dosage. If the dose is too low, the INR drops below the target therapeutic range, increasing the risk of thromboembolic events like deep vein thrombosis or stroke.

Step 3: Analyze the risks of an excessive dosage. If the dose is too high, the INR rises significantly, indicating a prolonged clotting time that increases the risk of internal bleeding or hemorrhage.

Step 4: Determine the primary purpose of monitoring INR. Regular testing helps clinicians adjust the warfarin dosage to maintain the INR within a safe therapeutic window (2.0 – 3.0), preventing both clotting complications and bleeding risks.

Final Answer: Fatal thromboembolic events or excessive internal hemorrhage

Answer: (B)

[Go Back to Question 87](#)



Q88.

Solution**Concept:**

The human respiratory tract uses sequential defense mechanisms to filter inhaled air and protect delicate alveolar tissues from airborne particulate matter. These defenses include physical, mechanical, and cellular barriers distributed along the respiratory tract.

Solution:

Step 1: Trace the path of entering air. Inhaled air first passes through the anterior nares of the nasal cavity.

Step 2: Identify the primary mechanical filter in this region. The nasal vestibule contains a network of short, coarse hairs called vibrissae, which are lined with a ciliated, mucus-secreting epithelium layer.

Step 3: Analyze how they work. The sticky mucus layer traps entering dust, pollen, and large particulate contaminants, while the synchronous beating of the cilia moves the trapped particles up toward the pharynx to be swallowed or cleared.

Step 4: Contrast this with deeper defenses. Alveolar macrophages handle tiny microscopic particles that reach the deep lungs, and the epiglottis serves to protect the airway during swallowing. Therefore, nasal hairs and ciliated membranes form the primary entry filter.

Final Answer: Nasal hairs and ciliated mucous membranes

Answer: (C)

[Go Back to Question 88](#)



Q89.

Solution**Concept:**

Pharmaceutical storage parameters are designed to protect peptide-based medications from environmental factors that can cause structural denaturation and a loss of therapeutic potency. Maintaining proper storage conditions helps ensure product shelf-life and patient safety.

Solution:

Step 1: Identify the biochemical nature of the medication. Insulin is a polypeptide hormone composed of two amino acid chains linked by disulfide bonds, making it susceptible to thermal degradation.

Step 2: Analyze the effects of extreme temperatures. Storing insulin in a deep freezer can freeze the solution, breaking the peptide bonds and irreversibly destroying its therapeutic activity. Conversely, exposure to ambient heat can accelerate protein denaturation.

Step 3: State the compendial storage standards. Unopened insulin vials must be stored in a refrigerator at a controlled temperature range between 2°C and 8°C.

Step 4: This storage range preserves the structural stability of the peptide hormone without risking damage from freezing, making refrigerator storage the correct professional choice.

Final Answer: Storing in a refrigerator at a controlled temperature between 2°C and 8°C

Answer: (C)

[Go Back to Question 89](#)



Q90.

Solution**Concept:**

Pharmacokinetics tracks the processes of drug elimination from the systemic circulation using quantitative parameters. These metrics include the elimination half-life, the elimination rate constant, the volume of distribution, and organ clearance rates.

Solution:

Step 1: Analyze the specific mathematical definition given in the prompt. The parameter represents the volume of plasma fluid that is completely cleared of a drug per unit of time by the kidneys.

Step 2: Identify this pharmacokinetic parameter. This description matches the definition of renal clearance (Cl_r), which is typically expressed in milliliters per minute (mL/min).

Step 3: State its relationship to elimination. Renal clearance measures the efficiency of the kidneys in removing a drug from the blood, reflecting the combined processes of glomerular filtration, active tubular secretion, and passive reabsorption.

Step 4: Contrast this with the elimination half-life, which measures the time required for the plasma concentration to decrease by half. Therefore, renal clearance is the correct volumetric parameter.

Final Answer: Renal clearance (Cl_r)

Answer: (C)

[Go Back to Question 90](#)



Q91.

Solution**Concept:**

Thin Layer Chromatography (TLC) is a planar chromatographic technique used to separate, identify, and evaluate components within a chemical mixture. The separation relies on the differential distribution of analytes between a stationary phase and a moving mobile phase.

Solution:

Step 1: Identify the components of a standard TLC setup. The system consists of a solid backing plate coated with a stationary phase, which is placed inside a chamber containing a liquid mobile phase.

Step 2: Examine the composition of the stationary phase. In standard normal-phase TLC, the stationary phase consists of a thin, uniform layer of an adsorbent material, typically silica gel (SiO_2) or alumina, bound to a glass or aluminum support plate.

Step 3: Analyze the separation mechanism. As the mobile phase travels up the plate via capillary action, analytes separate based on their relative affinities; polar compounds interact more strongly with the adsorbent stationary phase and move more slowly.

Step 4: This shows that the stationary phase is defined as a thin layer of adsorbent material coated onto a solid plate.

Final Answer: A thin layer of adsorbent material (like silica gel) coated on a solid plate

Answer: (B)

[Go Back to Question 91](#)



Q92.

Solution**Concept:**

The human eye contains structural layers designed to focus entering light onto a specialized neurosensory tissue layer. This internal tissue layer converts light energy into electrical signals that can be processed by the central nervous system.

Solution:

Step 1: Review the structural layers of the eye. The outer fibrous layer includes the protective sclera and the transparent cornea. The middle vascular layer consists of the choroid, ciliary body, and iris.

Step 2: Identify the innermost layer of the eye. The retina forms the internal sensory tunic of the ocular globe.

Step 3: Analyze the cellular composition of the retina. The retina contains specialized neural photoreceptor cells known as rods and cones.

Step 4: Examine their physiological role. Rods manage vision in dim light, while cones handle color vision and sharp visual acuity. These cells absorb entering photons and trigger a biochemical cascade that generates nerve impulses, which travel via the optic nerve to the visual cortex. This makes the retina the correct tissue layer.

Final Answer:

Answer: (D)

[Go Back to Question 92](#)



Q93.

Solution**Concept:**

Purine metabolism breaks down nucleic acids into uric acid, which is normally excreted by the kidneys. Disruptions in this metabolic pathway can cause a rise in serum uric acid levels (hyperuricemia), leading to structural deposition in peripheral tissues.

Solution:

Step 1: Trace the pathogenesis described in the prompt. Sustained hyperuricemia can cause the extracellular fluid to become supersaturated, leading to the precipitation of needle-like monosodium urate crystals.

Step 2: Identify the primary site of deposition. These crystals collect within the avascular matrix of synovial joints, frequently targeting the first metatarsophalangeal joint of the big toe.

Step 3: Analyze the inflammatory response. The presence of these crystalline deposits triggers an immune response, attracting neutrophils that release inflammatory mediators and cause acute, painful arthritic episodes.

Step 4: Identify the name of this condition. This specific metabolic joint disorder is known as gout. It is distinct from osteoarthritis, which is a degenerative wear-and-tear condition, and rheumatoid arthritis, which is an autoimmune disease.

Final Answer:

Answer: (C)

[Go Back to Question 93](#)



Q94.

Solution**Concept:**

Humoral immunity relies on specialized plasma proteins called immunoglobulins (antibodies) to recognize and neutralize foreign antigens. The human immune system produces five distinct structural classes of immunoglobulins: IgM, IgG, IgA, IgE, and IgD, each serving specific roles in protective immunity.

Solution:

Step 1: Evaluate the abundance of the antibody classes. Immunoglobulin G (IgG) is a monomeric antibody that constitutes approximately 75 – 80% of the total circulating antibody pool in human blood plasma.

Step 2: Examine the structural transport properties of IgG. Due to its monomeric structure, IgG is the only class of immunoglobulin capable of binding to neonatal Fc receptors on the placental trophoblast.

Step 3: Determine the functional consequence. This binding allows IgG to readily cross the placental barrier during pregnancy, transferring maternal antibodies into the fetal circulation to provide passive immunity that protects the newborn during its first months of life.

Step 4: Contrast this with IgM, which has a larger pentameric structure that cannot cross the placenta. Thus, IgG is the correct immunoglobulin class.

Final Answer: Immunoglobulin G (IgG)

Answer: (B)

[Go Back to Question 94](#)



Q95.

Solution**Concept:**

The legal framework of the Drugs and Cosmetics Act of 1940 includes administrative enforcement mechanisms to monitor compliance across the pharmaceutical supply chain. The act authorizes specialized officers to inspect facilities, collect samples, and enforce manufacturing and retail standards.

Solution:

Step 1: Identify the enforcement officer described in the prompt. The officer is appointed under Section 21 of the act by either the central or state government.

Step 2: Review the legal duties of this position. A Drug Inspector is empowered to enter and inspect pharmaceutical manufacturing plants and retail pharmacy shops, review operational records, and seize non-compliant stocks.

Step 3: Differentiate this from alternative roles. A Government Analyst is a laboratory specialist who tests samples sent by inspectors but does not perform field inspections. The Licensing Authority handles the administrative issuance of permits.

Step 4: Therefore, the field officer responsible for inspecting premises to ensure compliance with the law is the Drug Inspector.

Final Answer: Drug Inspector

Answer: (B)

[Go Back to Question 95](#)



Q96.

Solution**Concept:**

Pharmacognosy uses specific post-harvest processing steps to preserve the quality and active constituents of harvested medicinal plants. Freshly collected plant tissues contain high moisture levels that can support microbial growth and activate internal enzymes.

Solution:

Step 1: Analyze the physiological state of a freshly harvested plant. The cells contain active endogenous enzymes, such as hydrolases, glycosidases, or oxidases, along with a high water content.

Step 2: Examine the consequences of delayed processing. If the material is left undried, these internal enzymes can begin to break down active secondary metabolites, reducing the therapeutic value of the drug. High moisture also promotes the growth of molds and bacteria.

Step 3: Determine the purpose of immediate drying at controlled temperatures. Drying removes water, which halts these enzymatic degradation pathways and prevents microbial spoilage, stabilizing the active phytochemical profile of the crude drug.

Step 4: Therefore, this processing step serves to stop enzymatic degradation reactions and prevent microbial spoilage.

Final Answer: Stop enzymatic degradation reactions and prevent microbial spoilage

Answer: (B)

[Go Back to Question 96](#)



Q97.

Solution**Concept:**

Human cardiovascular physiology tracks systemic arterial pressure to monitor hemodynamic performance and evaluate cardiovascular health. Blood pressure readings record the forces exerted against the arterial walls during different phases of the cardiac cycle.

Solution:

Step 1: Review the components of a standard blood pressure reading. The measurement reports systolic blood pressure (the peak pressure during ventricular contraction) over diastolic blood pressure (the baseline pressure during ventricular relaxation).

Step 2: State the standard reference values for a healthy adult human. Clinical guidelines define normal baseline blood pressure as a systolic reading of exactly 120 mm Hg and a diastolic reading of 80 mm Hg.

Step 3: Evaluate the alternative options. A reading of 140/90 mm Hg indicates stage 2 systemic hypertension, while 100/60 mm Hg points toward a hypotensive state.

Step 4: Consequently, the standard reference reading for a healthy adult is 120/80 mm Hg.

Final Answer: 120/80 mm Hg

Answer: (B)

[Go Back to Question 97](#)



Q98.

Solution**Concept:**

Inventory control and store management utilize specific operational metrics to maintain adequate stock levels and prevent supply disruptions. Tracking the timelines of the procurement cycle helps determine optimal reorder points for stored materials.

Solution:

Step 1: Define the inventory term "Lead Time."

Step 2: Identify the boundaries of this time interval. Lead time begins the moment the procurement department places a formal order with a supplier to replenish a stock item.

Step 3: Track the interval to its completion. The interval concludes when the shipment arrives at the facility, passes quality inspection, and is officially logged into the inventory database.

Step 4: Understand its importance in inventory management. Knowing the lead time allows managers to set reorder levels that ensure existing stock can cover demand while waiting for the new order to arrive. Thus, it represents the interval between placing an order and its receipt.

Final Answer:

Answer: (A)

[Go Back to Question 98](#)



Q99.

Solution**Concept:**

Clinical biochemistry uses specific diagnostic laboratory tests to evaluate glucose metabolism and monitor treatment efficacy in patients with diabetes mellitus. While daily tests provide snapshots of immediate blood sugar levels, long-term monitoring requires assessing stable glycosylated proteins.

Solution:

Step 1: Review the limitations of standard blood glucose tests. Fasting blood sugar (FBS) and post-prandial blood sugar (PPBS) measurements reflect glucose levels only at the specific time of sample collection, which can vary based on recent meals or stress.

Step 2: Analyze the biochemistry of the glycosylated hemoglobin test (HbA_{1c}). Circulating glucose binds spontaneously and irreversibly to hemoglobin molecules inside red blood cells via a non-enzymatic glycation process.

Step 3: Connect this with the lifespan of erythrocytes. Human red blood cells circulate in the bloodstream for an average lifespan of approximately 120 days (3 to 4 months).

Step 4: Determine the clinical value of the test. Measuring the percentage of glycosylated hemoglobin (HbA_{1c}) provides a stable estimate of a patient's average blood glucose control over the preceding 2 to 3 months, making it the standard test for monitoring long-term glycemic control.

Final Answer: Glycosylated Hemoglobin Test (HbA_{1c})

Answer: (C)

[Go Back to Question 99](#)



Q100.

Solution**Concept:**

The human digestive system uses mechanical processing and chemical secretions to break down dietary macromolecules for absorption. Lipids are hydrophobic molecules that tend to coalesce into large droplets in aqueous environments, reducing the surface area available for enzymatic digestion.

Solution:

Step 1: Identify the source and composition of bile. Bile is synthesized by hepatocytes in the liver, stored and concentrated in the gallbladder, and released into the duodenum in response to dietary fats. It contains amphipathic bile salts, such as sodium glycocholate and sodium taurocholate.

Step 2: Analyze the physical effect of bile salts on lipids. The hydrophobic regions of the bile salts dissolve into the large fat droplets, while their hydrophilic regions face outward toward the aqueous chyme.

Step 3: Define emulsification. This orientation lowers the surface tension of the fat droplets, allowing mechanical agitation to break them apart into tiny stable droplets called micelles.

Step 4: Determine the digestive benefit. This emulsification significantly increases the total surface area available for pancreatic lipase enzymes to bind and hydrolyze the triglycerides into absorbable monoglycerides and fatty acids. Therefore, the primary role of bile salts is emulsifying large dietary lipid droplets.

Final Answer: Emulsifying large dietary lipid droplets to facilitate their digestion and absorption

Answer: (B)

[Go Back to Question 100](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	B	3	B	4	C	5	B
6	B	7	A	8	C	9	A	10	B
11	B	12	A	13	A	14	B	15	C
16	B	17	C	18	B	19	B	20	A
21	B	22	A	23	B	24	A	25	B
26	B	27	B	28	C	29	C	30	C
31	B	32	B	33	C	34	A	35	B
36	A	37	B	38	C	39	A	40	B
41	B	42	B	43	B	44	A	45	B
46	C	47	B	48	C	49	B	50	B
51	C	52	A	53	A	54	C	55	B
56	B	57	B	58	B	59	B	60	B
61	B	62	B	63	B	64	C	65	A
66	B	67	A	68	C	69	B	70	B
71	B	72	B	73	C	74	A	75	C
76	C	77	B	78	C	79	A	80	B
81	C	82	B	83	B	84	A	85	B
86	C	87	B	88	C	89	C	90	C
91	B	92	D	93	C	94	B	95	B
96	B	97	B	98	A	99	C	100	B

