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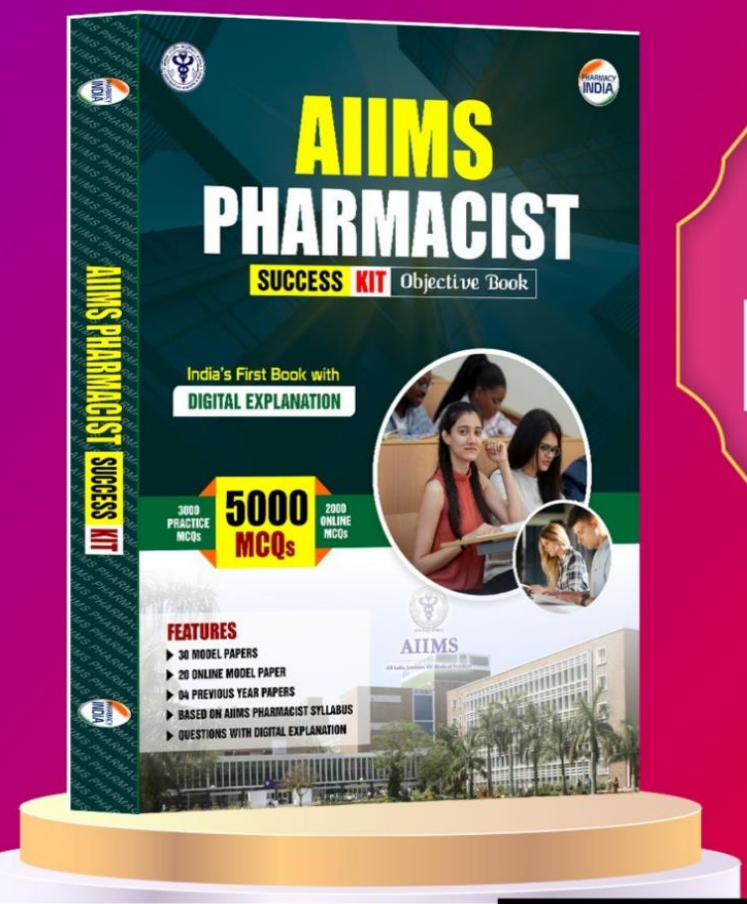

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Model Paper – 29 | Detailed Solutions

1. **Eucell _____ extraction:**

- **Answer:** (b) Volatile oil
- **Explanation:** The Eucell method is a specialized technique used for the extraction of volatile oils from plant materials. This method ensures the isolation of essential oils without significant degradation of their aromatic compounds.
- **Reference:** "Pharmacognosy" by G.E. Trease and W.C. Evans, 16th Edition, page 137.

2. **The _____chromatography:**

- **Answer:** (b) Partition
- **Explanation:** Gas chromatography (GC) operates on the principle of partition chromatography, where the separation of components in a mixture is based on their differential partitioning between a mobile gas phase and a stationary liquid phase. Components with different affinities for the stationary phase elute at different times, allowing for their separation and analysis.
- **Reference:** "Quantitative Chemical Analysis" by Daniel C. Harris, 8th Edition, page 623.

3. **Which _____mitochondria?**

- **Answer:** (a) Electron transport chain
- **Explanation:** The electron transport chain (ETC) is located in the inner mitochondrial membrane. It is a series of protein complexes that facilitate the transfer of electrons, ultimately leading to ATP production. Fat synthesis, carbohydrate synthesis, and protein synthesis occur in other parts of the cell.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 731.

4. **The _____ related:**

- **Answer:** (b) Urine formation
- **Explanation:** Diuretics are drugs that promote the excretion of water and electrolytes by the kidneys, increasing urine output. They are used to treat conditions such as hypertension and edema by acting on different segments of the nephron.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 671.

5. **Bile is _____ stored in:**

- **Answer:** (b) Gall bladder
- **Explanation:** Bile is a digestive fluid produced by the liver and stored in the gall bladder. During digestion, especially after consuming fatty foods, the gall bladder contracts to release bile into the small intestine for fat emulsification and digestion.

- **Reference:** "Guyton and Hall Textbook of Medical Physiology" by John E. Hall, 13th Edition, page 837.

6. **Scarlet _____ diagnosed:**

- **Answer:** (a) Dick Test
- **Explanation:** The Dick test was historically used to determine susceptibility to scarlet fever by injecting a small amount of scarlet fever toxin and observing for a reaction. It is now obsolete and scarlet fever is diagnosed through clinical evaluation and tests like throat cultures or rapid antigen detection.
- **Reference:** "Principles and Practice of Infectious Diseases" by Gerald L. Mandell, 8th Edition, page 2065.

7. **Methanol is _____ known as:**

- **Answer:** (c) Wood alcohol
- **Explanation:** Methanol is commonly referred to as wood alcohol because it was originally produced by the destructive distillation of wood. It is now synthesized industrially and is used as a solvent, antifreeze, and fuel.
- **Reference:** "Industrial Organic Chemistry" by Klaus Weissermel and Hans-Jürgen Arpe, 4th Edition, page 104.

8. **Which _____ test?**

- **Answer:** (b) 2-Propanol
- **Explanation:** The iodoform test detects compounds with a CH_3CO group or those that can oxidize to produce this group, such as methyl ketones and secondary alcohols with a methyl group adjacent to the hydroxyl group. 2-Propanol (isopropanol) fits this criterion.
- **Reference:** "Advanced Organic Chemistry" by Jerry March, 4th Edition, page 333.

9. **Tick _____ antibiotics:**

- **Answer:** (c) Erythromycin
- **Explanation:** Erythromycin is a macrolide antibiotic used to treat bacterial infections. Macrolides are characterized by a macrocyclic lactone ring. Other options, like Neomycin (aminoglycoside), Doxycycline (tetracycline), and Cefotaxime (cephalosporin), do not belong to this class.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 1513.

10. **Restriction _____ endonucleases:**

- **Answer:** (a) Cut DNA chains at specific locations

- **Explanation:** Restriction endonucleases are enzymes that recognize specific DNA sequences and cut the DNA at or near these sites. They are widely used in molecular biology for cloning and DNA mapping.
- **Reference:** "Molecular Biology of the Gene" by James D. Watson, 7th Edition, page 459.

11. Polyploidy is _____ defined as:

- **Answer:** (b) Multiplication of entire chromosomes
- **Explanation:** Polyploidy refers to a condition where an organism possesses more than two complete sets of chromosomes. This is a result of errors during cell division and is common in plants, leading to increased genetic variation.
- **Reference:** "Genetics: Analysis of Genes and Genomes" by Daniel L. Hartl and Maryellen Ruvolo, 8th Edition, page 129.

12. Glucose _____ form:

- **Answer:** (a) Gluconic acid
- **Explanation:** When glucose reacts with bromine water, the aldehyde group in glucose is oxidized to a carboxylic acid group, forming gluconic acid. Bromine water acts as a mild oxidizing agent, targeting the aldehyde group.
- **Reference:** "Textbook of Biochemistry with Clinical Correlations" by Thomas M. Devlin, 7th Edition, page 150.

13. Phenomenon _____ characterized:

- **Answer:** (a) High consistency → Low consistency → High consistency
- **Explanation:** Thixotropy is a reversible phenomenon where a material exhibits decreased viscosity under shear stress and regains its original viscosity upon standing. It is commonly observed in gels and certain fluids.
- **Reference:** "Rheology: Principles, Measurements, and Applications" by Christopher W. Macosko, page 220.

14. Hammett equation _____ explains the:

- **Answer:** (d) Both (a) and (b)
- **Explanation:** The Hammett equation explains how substituents on an aromatic ring influence reaction rates and equilibrium constants. It accounts for both **inductive effects** (electron-withdrawing or donating effects through sigma bonds) and **mesomeric effects** (electron delocalization via resonance). These effects are quantified by substituent constants (σ values), allowing predictions of reaction behaviors.
- **Reference:** "Physical Organic Chemistry" by Neil S. Isaacs, 2nd Edition, page 345.

15. Lichosorb _____ packing:

- **Answer:** (c) C18
- **Explanation:** Lichosorb 18 is an HPLC column packed with C18 (octadecylsilane) bonded silica particles. This reversed-phase chromatography packing is non-polar and suitable for separating hydrophobic compounds.
- **Reference:** "Practical HPLC Method Development" by Lloyd R. Snyder, Joseph J. Kirkland, and John W. Dolan, 2nd Edition, page 315.

16. Which _____ milk?

- **Answer:** (c) IgA
- **Explanation:** IgA is the primary antibody present in mucosal secretions, including milk, saliva, and tears. In milk, IgA provides immune protection to infants by neutralizing pathogens and preventing their attachment to mucosal surfaces.
- **Reference:** "Basic Immunology: Functions and Disorders of the Immune System" by Abul K. Abbas, Andrew H. H. Lichtman, 6th Edition, page 155.

17. Digestion _____ organ?

- **Answer:** (d) Stomach
- **Explanation:** Protein digestion begins in the stomach, where the enzyme pepsin (activated from pepsinogen in the acidic environment) breaks proteins into smaller peptides. The stomach's low pH, maintained by gastric acid, aids in this process.
- **Reference:** "Guyton and Hall Textbook of Medical Physiology" by John E. Hall, 13th Edition, page 877.

18. A _____reproduce?

- **Answer:** (c) Infect a cell
- **Explanation:** Viruses are obligate intracellular parasites, meaning they cannot reproduce independently. To replicate, they must infect a host cell and utilize its machinery to produce viral proteins and genetic material.
- **Reference:** "Principles of Virology" by S. J. Flint et al., 4th Edition, page 220.

19. The _____ called:

- **Answer:** (d) Epistasis
- **Explanation:** Epistasis occurs when one gene masks or modifies the effect of another gene. For example, in coat color inheritance in mice, one gene's effect on pigmentation can be overridden by another gene controlling pigment deposition.
- **Reference:** "Genetics: Analysis of Genes and Genomes" by Daniel L. Hartl and Maryellen Ruvolo, 8th Edition, page 192.

20. Which _____ motion?

- **Answer:** (a) Microvilli
- **Explanation:** Microvilli are small projections on the surface of cells that increase surface area for absorption but are not involved in cell motion. Cilia, flagella, and pseudopodia are structures associated with cell movement.
- **Reference:** "Molecular Biology of the Cell" by Alberts et al., 6th Edition, page 916.

21. Value _____ depends:

- **Answer:** (c) Both (a) and (b)
- **Explanation:** The vibrational frequency or wave number of a bond depends on the bond strength (stronger bonds vibrate at higher frequencies) and the reduced mass of the atoms involved in the bond (lighter atoms vibrate at higher frequencies).
- **Reference:** "Fundamentals of Molecular Spectroscopy" by Colin N. Banwell and Elaine M. McCash, 4th Edition, page 90.

22. Molarity _____ solution

- **Answer:** (c) 32.05
- **Explanation:** Molarity is calculated using the formula:

$$\text{Molarity} = \frac{\text{Density (g/cc)} \times 1000}{\text{Molar mass of HCl (36.5)}}$$

$$\text{Molarity} = \frac{1.17 \times 1000}{36.5} = 32.05\text{M}$$

- **Reference:** "Physical Chemistry" by Peter Atkins and Julio de Paula, 11th Edition, page 125.

23. The _____ acrylaldehyde:

- **Answer:** (a) Prop-2-enal
- **Explanation:** Acrylaldehyde, also known as acrolein, is an aldehyde with a carbon-carbon double bond at the second position. According to IUPAC naming, it is named "prop-2-enal" to indicate the presence of both an aldehyde and an alkene.
- **Reference:** "Organic Chemistry" by Paula Yurkanis Bruice, 8th Edition, page 768.

24. Membrane _____ causes:

- **Answer:** (d) All of the above

- **Explanation:** Changes in membrane fluidity can increase membrane permeability, dislocate membrane proteins, and enhance sensitivity to anesthetics. Fluidity is influenced by factors such as temperature, lipid composition, and cholesterol content.
- **Reference:** "Molecular Biology of the Cell" by Alberts et al., 6th Edition, page 612.

25. The _____ when:

- **Answer:** (b) Myosin binds and releases actin
- **Explanation:** During muscle contraction, myosin heads attach to actin filaments, perform a power stroke, and release, which allows the sliding of filaments for contraction. This process is ATP-dependent and mediated by regulatory proteins like tropomyosin and troponin.
- **Reference:** "Human Physiology: From Cells to Systems" by Lauralee Sherwood, 9th Edition, page 359.

26. Glycine _____ acids in:

- **Answer:** (d) Collagen
- **Explanation:** Glycine and proline are abundant in collagen, a structural protein found in connective tissues. Glycine accounts for about one-third of collagen's amino acid composition, and proline (and its derivative hydroxyproline) contribute to its triple-helix structure and stability.
- **Reference:** "Biochemistry" by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer, 7th Edition, page 417.

27. In _____ absorbed:

- **Answer:** (c) Radiofrequency energy
- **Explanation:** Nuclear Magnetic Resonance (NMR) spectroscopy involves the absorption of radiofrequency energy by nuclei in a magnetic field. This energy excites nuclear spin states, enabling the study of molecular structure and dynamics.
- **Reference:** "Organic Spectroscopy" by William Kemp, 3rd Edition, page 72.

28. Shock _____ anaphylaxis:

- **Answer:** (b) Heart
- **Explanation:** Anaphylaxis is a severe, potentially life-threatening allergic reaction. When a person with an allergy is exposed to an allergen, their immune system overreacts, releasing a flood of chemicals that can cause a sudden drop in blood pressure, airway constriction, and other symptoms. The heart is particularly vulnerable to these effects, which can lead to cardiovascular collapse.
- **Reference:** "Principles of Pharmacology" by David E. Golan et al., 4th Edition, page 265.

29. Pigment of _____ tomato is:

- **Answer:** (c) Lycopene
- **Explanation:** Lycopene is a red carotenoid pigment responsible for the characteristic color of ripe tomatoes. It is a powerful antioxidant with potential health benefits, including reducing the risk of certain chronic diseases.
- **Reference:** "Food Chemistry" by H.-D. Belitz, W. Grosch, and P. Schieberle, 4th Edition, page 320.

30. $CH_3(CH_2)$_____$_{16}COOH$ is:

- **Answer:** (c) Stearic acid
- **Explanation:** $CH_3(CH_2)_{16}COOH$ is the chemical formula for stearic acid, a long-chain saturated fatty acid with 18 carbon atoms. It is commonly found in animal fats and vegetable oils.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 364.

31. Alcohol _____ molecule is:

- **Answer:** (b) Glycerol
- **Explanation:** Glycerol, also known as glycerin, is an alcohol with three hydroxyl (-OH) groups attached to a three-carbon backbone. It is widely used in the pharmaceutical, food, and cosmetic industries.
- **Reference:** "Organic Chemistry" by Paula Yurkanis Bruice, 8th Edition, page 203.

32. Genetic _____ enzyme?

- **Answer:** (d) Restriction endonuclease
- **Explanation:** Restriction endonucleases are enzymes that cut DNA at specific sequences, enabling the manipulation of DNA fragments in genetic engineering for cloning, gene editing, and recombinant DNA technology.
- **Reference:** "Molecular Biology of the Gene" by James D. Watson, 7th Edition, page 459.

33. Which _____ decomposition?

- **Answer:** (c) Volatilization
- **Explanation:** Volatilization involves the physical transition of a substance from a liquid or solid state to a gaseous state without a chemical change, unlike hydrolysis, oxidation, and isomerization, which involve chemical decomposition or rearrangement.
- **Reference:** "Physical Chemistry" by Peter Atkins and Julio de Paula, 11th Edition, page 75.

34. The _____ that:

- **Answer:** (a) Two drugs combine to form an inactive compound
- **Explanation:** Chemical antagonism occurs when two substances react chemically to form an inactive compound, neutralizing each other's effects. An example is the neutralization of heparin by protamine sulfate.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 95.

35. An _____ properties is:

- **Answer:** (c) Pentazocine
- **Explanation:** Pentazocine is a mixed opioid that acts as an agonist at kappa-opioid receptors and as an antagonist or weak agonist at mu-opioid receptors. It is used for pain management with a reduced risk of respiratory depression compared to pure agonists like morphine.
- **Reference:** "Rang & Dale's Pharmacology" by Humphrey P. Rang et al., 9th Edition, page 554.

36. Which _____ foods?

- **Answer:** (d) Phenelzine
- **Explanation:** The "cheese reaction" occurs when monoamine oxidase inhibitors (MAOIs) like phenelzine are taken with foods rich in tyramine (e.g., cheese, fermented foods). Tyramine metabolism is inhibited, leading to hypertensive crises due to excessive norepinephrine release.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 417.

37. glycosidic _____ present:

- **Answer:** (a) Sucrose
- **Explanation:** Sucrose is composed of glucose and fructose linked by an (α-1 → β-2) glycosidic bond. This means the α-anomeric carbon of glucose is linked to the β-anomeric carbon of fructose.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 291.

38. Which _____ group?

- **Answer:** (d) Histidine

- **Explanation:** Histidine contains an imidazole group in its side chain, making it important for enzyme catalysis and buffering in biological systems. The imidazole ring has unique pKa properties that allow it to participate in acid-base reactions at physiological pH.
- **Reference:** "Biochemistry" by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer, 7th Edition, page 118.

39. Sertraline _____ compounds?

- **Answer:** (b) Serotonin reuptake inhibitors
- **Explanation:** Sertraline is a selective serotonin reuptake inhibitor (SSRI) used to treat depression, anxiety disorders, and other psychiatric conditions. It works by increasing serotonin levels in the synaptic cleft.
- **Reference:** "Rang & Dale's Pharmacology" by Humphrey P. Rang et al., 9th Edition, page 576.

40. Daughter _____ cycle?

- **Answer:** (c) Telophase
- **Explanation:** During telophase, the nuclear membrane reforms around each set of chromosomes, and cytokinesis (division of the cytoplasm) usually begins, resulting in the separation of daughter cells.
- **Reference:** "Molecular Biology of the Cell" by Alberts et al., 6th Edition, page 1047.

41. Podophyllotoxin _____ is a:

- **Answer:** (c) Lignan derivative
- **Explanation:** Podophyllotoxin is a lignan derivative extracted from the rhizomes of the Podophyllum species. It exhibits cytotoxic properties and serves as the basis for the development of anticancer drugs like etoposide and teniposide.
- **Reference:** "Pharmacognosy" by G.E. Trease and W.C. Evans, 16th Edition, page 201.

42. Amino _____ include:

- **Answer:** (d) All of these
- **Explanation:** Isoleucine, phenylalanine, and tryptophan are amino acids that can yield precursors for both glucose (via gluconeogenesis) and ketone bodies (via ketogenesis) during metabolism.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 655.

43. Cilastatin _____ enzyme?

- **Answer:** (b) Dehydropeptidase

- **Explanation:** Cilastatin inhibits renal dehydropeptidase I, an enzyme responsible for breaking down the antibiotic imipenem. By co-administering cilastatin with imipenem, the drug's efficacy and half-life are increased.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 1533.

44. MHC _____ of:

- **Answer:** (d) All cells
- **Explanation:** MHC class I molecules are expressed on the surface of all nucleated cells and present endogenous antigens (e.g., viral peptides) to cytotoxic T cells (CD8+). This is part of the immune surveillance mechanism.
- **Reference:** "Basic Immunology: Functions and Disorders of the Immune System" by Abul K. Abbas, Andrew H. H. Lichtman, 6th Edition, page 92.

45. The _____ by the:

- **Answer:** (a) Central Government
- **Explanation:** The Pharmacy Council of India (PCI) is established by the Central Government under the Pharmacy Act, 1948, to regulate pharmacy education and practice in India.
- **Reference:** "The Pharmacy Act, 1948," Government of India, Section 3.

46. Niosomes _____ are:

- **Answer:** (b) Non-ionic surfactant vesicles
- **Explanation:** Niosomes are vesicles formed by the self-assembly of non-ionic surfactants in an aqueous phase. They are used as drug delivery systems due to their ability to encapsulate hydrophilic and hydrophobic drugs and enhance drug bioavailability.
- **Reference:** "Novel Drug Delivery Systems" by Y.W. Chien, 2nd Edition, page 213.

47. Reye _____ with:

- **Answer:** (c) Aspirin
- **Explanation:** Reye’s syndrome is a rare but serious condition that affects children recovering from viral infections. It is associated with the use of aspirin, which can lead to liver dysfunction and encephalopathy.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 689.

48. Isoniazid _____ due to:

- **Answer:** (b) Hepatotoxicity
- **Explanation:** Isoniazid, a first-line drug for tuberculosis treatment, is known for causing hepatotoxicity, especially in older adults and patients with pre-existing liver disease. Monitoring liver function is essential during therapy.
- **Reference:** "Tuberculosis: Pathogenesis, Protection, and Control" by Barry R. Bloom, 1st Edition, page 345.

49. Cycloserine _____ of:

- **Answer:** (b) D-alanine
- **Explanation:** Cycloserine inhibits bacterial cell wall synthesis by mimicking D-alanine, a component of the peptidoglycan layer, thereby interfering with the cross-linking of the bacterial cell wall.
- **Reference:** "Antibiotics: Challenges, Mechanisms, Opportunities" by Christopher Walsh and Timothy Wencewicz, 1st Edition, page 208.

50. In _____ is:

- **Answer:** (a) 10 µm
- **Explanation:** In conventional High-Performance Liquid Chromatography (HPLC), the particle diameter of the packing material typically ranges between 3 µm and 10 µm. Smaller particles provide higher resolution but increase backpressure.
- **Reference:** "Introduction to Modern Liquid Chromatography" by Lloyd R. Snyder, Joseph J. Kirkland, and John W. Dolan, 3rd Edition, page 313.

51. Colchicine _____ from:

- **Answer:** (a) Phenylalanine and tyrosine
- **Explanation:** Colchicine, an alkaloid derived from the Colchicum species, is biosynthesized from phenylalanine and tyrosine through a series of enzymatic transformations. These precursors contribute to the aromatic ring and structural framework of colchicine.
- **Reference:** "Pharmacognosy" by G.E. Trease and W.C. Evans, 16th Edition, page 295.

52. Non_____ following:

- **Answer:** (c) Trehalose
- **Explanation:** Trehalose is a non-reducing sugar because its glycosidic bond links the anomeric carbons of two glucose molecules, preventing it from reducing other compounds. In contrast, glucose, fructose, and lactose are reducing sugars.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 291.

53. Tropane _____ from:

- **Answer:** (a) Ornithine
- **Explanation:** Tropane alkaloids, such as atropine and scopolamine, are biosynthesized from ornithine. Ornithine undergoes a series of reactions, including decarboxylation and condensation, to form the tropane ring system characteristic of these alkaloids.
- **Reference:** "Biochemistry of Alkaloids" by Trevor Robinson, 1st Edition, page 189.

54. β-lactam _____ by:

- **Answer:** (c) Inhibiting bacterial cell wall synthesis
- **Explanation:** β-lactam antibiotics (e.g., penicillins and cephalosporins) inhibit bacterial cell wall synthesis by targeting penicillin-binding proteins (PBPs), which are involved in peptidoglycan cross-linking. This weakens the cell wall, leading to bacterial lysis.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 1479.

55. Which _____ disadvantage?

- **Answer:** (c) Dose dumping
- **Explanation:** Dose dumping is a major disadvantage of controlled-release formulations. It occurs when the drug is released rapidly due to a failure in the delivery system, leading to potential toxicity. While controlled-release systems minimize dose frequency and improve efficacy-dose relationships, dose dumping poses a significant risk.
- **Reference:** "Drug Delivery Systems" by Vasant V. Ranade and Mannfred A. Hollinger, 2nd Edition, page 224.

56. Aromatic _____ include:

- **Answer:** (d) All of these
- **Explanation:** Aromatic amino acids, including phenylalanine, tyrosine, and tryptophan, contain aromatic rings in their side chains. These amino acids are involved in protein synthesis and serve as precursors for various biomolecules.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 118.

57. Which _____ blocker?

- **Answer:** (b) Vecuronium
- **Explanation:** Vecuronium is a non-depolarizing neuromuscular blocker that competes with acetylcholine at nicotinic receptors, preventing muscle contraction. It is used during surgeries to induce muscle relaxation.

- **Reference:** "Rang & Dale's Pharmacology" by Humphrey P. Rang et al., 9th Edition, page 469.

58. Cyclodextrins _____ as:

- **Answer:** (d) All of these
- **Explanation:** Cyclodextrins are cyclic oligosaccharides used as complexing agents to improve drug solubility, as solubilizing agents to enhance drug dissolution, and as odor-masking agents in formulations.
- **Reference:** "Drug Delivery and Targeting" by Anya M. Hillery et al., 2nd Edition, page 245.

59. Karl _____ determine:

- **Answer:** (c) Moisture
- **Explanation:** The Karl Fischer analyzer is a widely used method for determining water content (moisture) in solids, liquids, and gases with high accuracy, based on the reaction of water with iodine.
- **Reference:** "Modern Methods of Pharmaceutical Analysis" by Roger E. Schirmer, 2nd Edition, page 155.

60. Chloroquine _____ class of:

- **Answer:** (a) 4-Aminoquinoline
- **Explanation:** Chloroquine is a 4-aminoquinoline derivative used as an antimalarial drug. It works by interfering with heme detoxification in the malaria parasite, leading to its death.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 1261.

61. Higher _____ is:

- **Answer:** (b) CPCSEA
- **Explanation:** The Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) is the apex regulatory authority in India overseeing animal experimentation. It ensures ethical practices and compliance with animal welfare guidelines.
- **Reference:** "The Drugs and Cosmetics Act, 1940," Government of India, Section 41.

62. ICH _____ represents:

- **Answer:** (a) Analytical validation

- **Explanation:** The ICH Q2 guideline focuses on validation of analytical methods, including parameters like accuracy, precision, specificity, linearity, and robustness, ensuring reliability of data for regulatory submissions.
- **Reference:** "ICH Quality Guidelines," International Council for Harmonisation (ICH), Q2(R1) guideline.

63. Drugs _____ include:

- **Answer:** (d) Both (a) and (b)
- **Explanation:** Both methyl DOPA and carbidopa inhibit DOPA decarboxylase, reducing the conversion of levodopa to dopamine in the periphery. This enhances levodopa's availability in the central nervous system, improving the management of Parkinson's disease.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 514.

64. The _____ indicates:

- **Answer:** (b) Lowest solubility
- **Explanation:** The isoelectric point (pI) of an amino acid is the pH at which it carries no net electric charge. At this point, amino acids have the lowest solubility in water due to minimal electrostatic repulsion between molecules.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 108.

65. Norepinephrine _____ by:

- **Answer:** (b) Transmethylation
- **Explanation:** Norepinephrine is converted to epinephrine by the enzyme **phenylethanolamine-N-methyltransferase (PNMT)**, which adds a methyl group through transmethylation, using S-adenosylmethionine (SAM) as the methyl donor.
- **Reference:** "Biochemistry" by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer, 7th Edition, page 694.

66. Which _____muscle?

- **Answer:** (c) Amlodipine
- **Explanation:** Amlodipine is a dihydropyridine calcium channel blocker that selectively acts on vascular smooth muscle, causing vasodilation. Unlike verapamil and diltiazem, which also affect the heart, amlodipine primarily targets blood vessels.
- **Reference:** "Rang & Dale's Pharmacology" by Humphrey P. Rang et al., 9th Edition, page 329.

67. Which _____ synthesis?

- **Answer:** (b) Isoniazid
- **Explanation:** Isoniazid inhibits the synthesis of mycolic acids, essential components of the mycobacterial cell wall. This mechanism is specific to Mycobacterium species and makes it a key drug in tuberculosis treatment.
- **Reference:** "Goodman & Gilman's: The Pharmacological Basis of Therapeutics" by Laurence L. Brunton, 12th Edition, page 1544.

68. Racemic _____ to:

- **Answer:** (a) Internal compensation
- **Explanation:** Racemic tartaric acid consists of equal amounts of dextrorotatory and levorotatory isomers. Internal compensation occurs because the optical activities of the two isomers cancel each other, rendering the mixture optically inactive.
- **Reference:** "Organic Chemistry" by Paula Yurkanis Bruice, 8th Edition, page 189.

69. In _____ molecules is:

- **Answer:** (a) 6
- **Explanation:** α-Cyclodextrin is a cyclic oligosaccharide composed of six glucose units linked by α-1,4-glycosidic bonds. It forms a ring structure commonly used in drug delivery and molecular encapsulation.
- **Reference:** "Cyclodextrins in Pharmacy" by Karl-Heinz Frömming and J. Szejtli, 1st Edition, page 25.

70. Sunflower_____ by:

- **Answer:** (a) Maltose
- **Explanation:** Maltose, a disaccharide, forms characteristic sunflower-shaped osazone crystals when treated with phenylhydrazine. This test helps in differentiating sugars based on their crystalline structures.
- **Reference:** "Textbook of Biochemistry" by Thomas M. Devlin, 7th Edition, page 208.

71. Interaction _____ with:

- **Answer:** (d) Quaternary structure
- **Explanation:** The quaternary structure of a protein involves the interaction and assembly of multiple polypeptide chains (subunits) into a functional protein complex. Examples include hemoglobin and immunoglobulins.
- **Reference:** "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox, 7th Edition, page 146.

72. The _____ by:

- **Answer:** (a) DSC
- **Explanation:** Differential Scanning Calorimetry (DSC) is used to determine the melting point of substances by measuring the heat flow associated with phase transitions, such as melting or crystallization.
- **Reference:** "Thermal Analysis of Pharmaceuticals" by Duncan Q.M. Craig, 1st Edition, page 34.

73. Agents _____ include:

- **Answer:** (b) Topkat
- **Explanation:** TOPKAT (Toxicity Prediction by Computer-Assisted Technology) is a computational tool used for predicting the toxicity of chemical compounds. Other tools like Tripos and Autodock focus on molecular modeling and docking studies.
- **Reference:** "In Silico Drug Discovery and Design" by Claudio N. Cavasotto, 1st Edition, page 222.

74. Aspartame _____ is:

- **Answer:** (c) Hygroscopic in nature
- **Explanation:**
    - The use of sweeteners is primarily limited to chewable tablets. E.g. Sugar
        - Mannitol– 72% as sweet as sugar, cooling & mouth filling effect.
        - Saccharin– Artificial sweetener, 500 times sweeter than sucrose Disadvantages (i) it has a bitter after taste and (ii) carcinogenic.
        - Cyclamate– either alone or with saccharin– it is banned.
        - Aspartame (Searle) – widely replacing saccharin. Disadvantage – lack of stability in presence of moisture.
- **Reference:** "Food Additives" by A. Larry Branen et al., 2nd Edition, page 450.

75. The _____ is:

- **Answer:** (d) Escherichia
- **Explanation:** Escherichia coli (E. coli), particularly enteropathogenic and enterotoxigenic strains, is a major causative agent of diarrhea. Other bacteria like Shigella and Salmonella can also cause diarrhea, but E. coli is the most common.
- **Reference:** "Medical Microbiology" by Patrick R. Murray, Ken S. Rosenthal, and Michael A. Pfaller, 9th Edition, page 322.

76. In _____ do?

- **Answer:** (a) Combines text from two or more cells into one

- **Explanation:** The CONCATENATE function in Excel combines text strings from multiple cells into a single text string. For example, `=CONCATENATE(A1, B1)` will join the values in cells A1 and B1. (In newer Excel versions, CONCAT replaces CONCATENATE.)

77. What _____ Windows?

- **Answer:** (a) To view and manage running processes and applications
- **Explanation:** The Task Manager provides information about running processes, system performance, and resource usage. It allows users to end unresponsive programs and manage startup items.

78. Which _____ them?

- **Answer:** (c) Ransomware
- **Explanation:** Ransomware encrypts a user's files or locks their device and demands a ransom payment to restore access. It is a severe cyber threat that often spreads via phishing emails or malicious downloads.

79. Which _____ Linux?

- **Answer:** (b) cp
- **Explanation:** The `cp` command in Linux is used to copy files or directories. For example, `cp file1.txt file2.txt` creates a copy of `file1.txt` named `file2.txt`.

80. In _____ screen?

- **Answer:** (a) Slide Sorter View
- **Explanation:** Slide Sorter View in PowerPoint displays all slides in a presentation as thumbnails on a single screen. This view is useful for reordering slides or applying transitions.

81. A _____now?

- **Answer:** (d) South
- **Explanation:**
  - Facing south initially.
  - 90° clockwise → Faces west.
  - 180° counterclockwise → Faces east.
  - 90° clockwise → Faces south.

82. Find _____ 125.

- **Answer:** (c) 100
- **Explanation:** All numbers except 100 are perfect cubes:
  - $8=2^3$, $27=3^3$, $64=4^3$, $125=5^3$
  - 100 is not a perfect cube.

83. What _____ 26,

- **Answer:** (c) 37
- **Explanation:** The differences between consecutive terms are:
  5−2=3, 10−5=5, 17−10=7, 26−17=9
  Next difference: 9+2=11
  26+11=37

84. If _____ coded?

- **Answer:** (a) CSBUF
- **Explanation:** Each letter in "SMART" is shifted one step forward in the alphabet:
  S→T, M→N, A→B, Q→R, T→U (+1, +1, +1,-1,+1)
- Following the same rule for "BRAVE":
  B→C, R→S, A→B, U→V, E→F

85. Pointing _____ Sita?

- **Answer:** (a) Father
- **Explanation:**
  - "My son's mother" refers to Sita herself.
  - "Only brother" refers to Sita's brother.
  - "Father of Sita's brother" is Sita's father.

86. A _____percentage?

- **Answer:** (b) 10%
- **Explanation:**
  - Marked price = Cost Price×1.4\text{Cost Price} \times 1.4Cost Price×1.4
  - Selling price =
    Marked Price×0.75=Cost Price×1.4×0.75=Cost Price×1.05\text{Marked Price} \times 0.75 = \text{Cost Price} \times 1.4 \times 0.75 = \text{Cost Price} \times 1.05Marked Price×0.75=Cost Price×1.4×0.75=Cost Price×1.05.
  - Profit percentage = 1.05−1.00=0.051.05 - 1.00 = 0.051.05−1.00=0.05 or **5%**.

87. A _____ number?

- **Answer:** (a) 100

- **Explanation:**
  Let the original number be x.
  After a 10% decrease: x × 0.9
  After a 20% increase: x × 0.9 × 1.2 = 108
  Simplifying: x × 1.08 = 108 ⇒ x = $\frac{108}{1.08}$ ⇒ x = $\frac{108}{108}$ × 100 = 100

88. A _____ water?

- **Answer:** (c) 5 km/h
- **Explanation:**
  - Downstream speed = 48/6=8 km/h
  - Upstream speed = 48/12=4 km/h
  - Speed of the boat in still water = (8+4)/2=6 km/h

89. The _____ number?

- **Answer:** (c) 72
- **Explanation:**
  - Total of 8 numbers = 8×56=4488 \times 56 = 4488×56=448.
  - Total of 7 numbers after exclusion = 7×54=3787 \times 54 = 3787×54=378.
  - Excluded number = 448−378=72448 - 378 = 72448−378=72.

90. The _____ number?

- **Answer:** (b) 60
- **Explanation:**

- **LCM (Least Common Multiple):** The smallest number that both given numbers divide evenly.
- **HCF (Highest Common Factor) or GCD (Greatest Common Divisor):** The largest number that divides both given numbers evenly.

- **Product of two numbers = LCM × HCF**

- Let the other number be 'x'.
- Given:
  - One number = 24
  - LCM = 120
  - HCF = 12
- Using the formula:
  - 24 * x = 120 * 12
  - x = (120 * 12) / 24
  - x = 60

Therefore, the other number is 60.

91. Which _____ Saint?

- **Answer:** (d) Aurangzeb
- **Explanation:** Aurangzeb was called 'Zinda Pir' (Living Saint) due to his simple lifestyle, piety, and adherence to Islamic principles. He avoided luxuries and led a life of religious devotion.
- **Reference:** "The Mughal Empire" by R.C. Majumdar, page 412.

92. The _____date?

- **Answer:** (b) July 18, 1947
- **Explanation:** The Indian Independence Act was passed on July 18, 1947, granting independence to India and Pakistan on August 15, 1947. It marked the end of British rule in the Indian subcontinent.
- **Reference:** "History of Modern India" by Bipan Chandra, page 358.

93. Which _____ silk?

- **Answer:** (d) Karnataka
- **Explanation:** Karnataka is the largest producer of raw silk in India, contributing over 70% of the country's total production, primarily in the districts of Ramanagara, Mysuru, and Kolar.
- **Reference:** "Sericulture in India" by K. Venkateshwarlu, page 122.

94. Who _____Constitution'?

- **Answer:** (b) Dr. B.R. Ambedkar
- **Explanation:** Dr. B.R. Ambedkar, as the chairman of the drafting committee, played a key role in framing the Indian Constitution. His vision for social justice, equality, and democracy is reflected in the document.
- **Reference:** "The Constitution of India: A Political-Legal Perspective" by Subhash C. Kashyap, page 64.

95. The _____ following?

- **Answer:** (b) Afghan forces led by Ahmad Shah Durrani
- **Explanation:** The Third Battle of Panipat was fought on January 14, 1761, between the Marathas and the Afghan forces led by Ahmad Shah Durrani (also known as Ahmad Shah Abdali). It was one of the largest battles fought in the 18th century.
- **Reference:** "A History of India" by Romila Thapar, page 278.

96. Which _____ India'?

- **Answer:** (b) Cauvery delta
- **Explanation:** The Cauvery delta in Tamil Nadu is known as the 'Granary of South India' due to its fertile soil and extensive irrigation system, which supports the cultivation of rice as a major crop.
- **Reference:** "Geography of India" by Majid Husain, page 234.

97. Who _____ 1878?

- **Answer:** (a) Lord Lytton
- **Explanation:** The Vernacular Press Act was introduced by Lord Lytton in 1878 to curb the freedom of the Indian-language press. It aimed to suppress criticism of British policies in vernacular newspapers.
- **Reference:** "History of Modern India" by Bipan Chandra, page 291.

98. The _____ up at:

- **Answer:** (a) Tarapur
- **Explanation:** The Tarapur Atomic Power Plant (TAPP) in Maharashtra, established in 1969, was India's first nuclear power plant. It marked the beginning of India's nuclear energy program.
- **Reference:** "Nuclear Power in India" by Homi N. Sethna, page 102.

99. Who _____ Lapse'?

- **Answer:** (a) Lord Dalhousie
- **Explanation:** Lord Dalhousie introduced the Doctrine of Lapse, a policy allowing the British to annex Indian princely states if the ruler died without a direct male heir. This policy was a significant factor in the annexation of several states.
- **Reference:** "India's Struggle for Independence" by Bipan Chandra, page 75.

100. Which _____ Gujarat'?

- **Answer:** (b) Narmada
- **Explanation:** The Narmada River is called 'the lifeline of Madhya Pradesh and Gujarat' as it provides water for drinking, irrigation, and hydroelectric power in both states. It flows through the Narmada valley, supporting agriculture and industry.
- **Reference:** "Rivers of India" by R. K. Saxena, page 182.

Model Paper – 29 | Detailed Solutions