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MODEL PAPER-23

DIGITAL EXPLANATION

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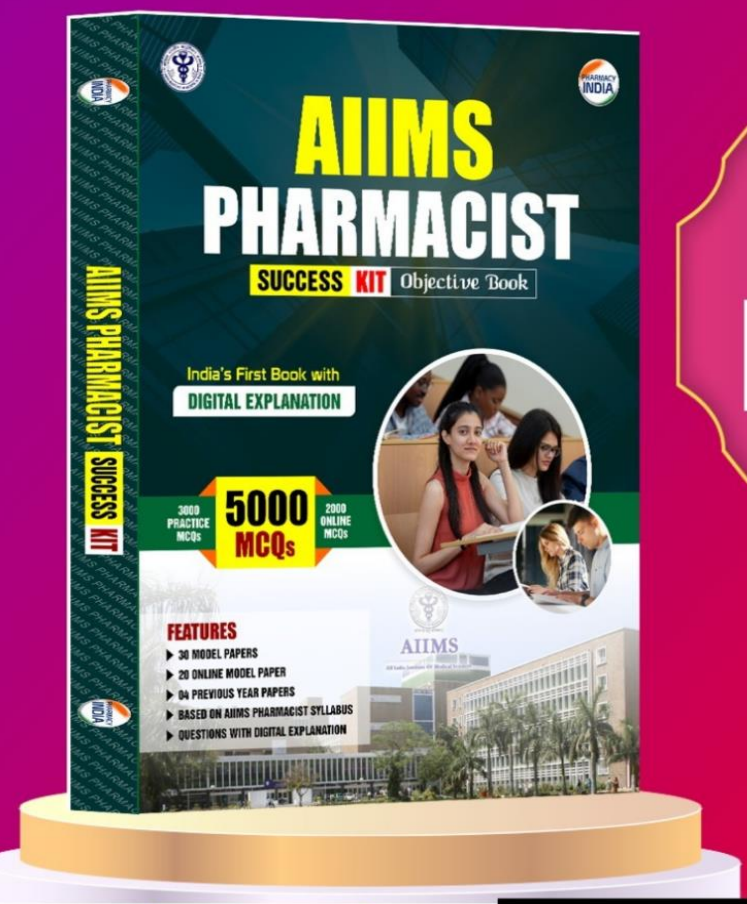

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Model Paper – 23 | Detailed Solutions

1. Plasmids are ----------cloning as:

Correct Answer: (a) They are self-replicating within the bacterial cell
Explanation:

- **Plasmids** are small, circular DNA molecules that can replicate independently within a host bacterial cell.
- They are widely used as vectors in **gene cloning** due to their ability to carry foreign DNA and replicate along with the host genome.
  Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 524.

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2. Separation of ---------- based on:

Correct Answer: (b) Adsorption
Explanation:

- Thin Layer Chromatography (TLC) is a type of adsorption chromatography, where the different components of a mixture are separated based on their differential adsorption onto the surface of a stationary phase (like silica gel).

  Reference: Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Page 345.

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3. Ruff ----------used for:

Correct Answer: (d) For decreasing carbon number during synthesis
Explanation:

- **Ruff degradation** involves the oxidative removal of a **carbon atom** from **aldoses**. It reduces the chain length by one carbon.
- It is commonly used in carbohydrate chemistry.
  Reference: Carbohydrate Chemistry by David E. Levy, 2nd Edition, Page 217.

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4. Absorption of ---------- transport follows:

Correct Answer: (c) Mixed order kinetics
Explanation:

- **Carrier-mediated transport** involves saturable mechanisms:

  - At low drug concentrations, it follows **first-order kinetics**.
  - At high concentrations, it saturates and follows **zero-order kinetics**.
- Thus, it exhibits **mixed-order kinetics** overall.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 112.

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5. An important ---------- co-factor:

Correct Answer: (d) Pyridoxal phosphate
Explanation:

- **Pyridoxal phosphate (PLP)** is a coenzyme derived from vitamin B6.
- It is essential for **transamination reactions**, where an amino group is transferred from one molecule to another, a key step in amino acid synthesis.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 273.

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6. Which of ---------- as "steroid"?

Correct Answer: (d) Cholesterol
Explanation:

- **Cholesterol** is a steroid with a characteristic four-ring structure.
- It is an essential component of cell membranes and a precursor for steroid hormones, bile acids, and vitamin D.
- Other options (phospholipid, glycerol, wax) are lipids but not steroids.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 328.

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7. Dichlorocarbene ---------- reaction?

Correct Answer: (c) Haloform
Explanation:

- In the **haloform reaction**, dichlorocarbene (CCl_2) is formed as an intermediate during the reaction of chloroform with a base.
- It reacts with alkenes or nucleophiles, but its primary application is in halogenation.
  Reference: Organic Chemistry by Morrison and Boyd, 7th Edition, Page 511.

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8. Which of the ---------- vitamin A activity?

Correct Answer: (d) Both (a) and (b)
Explanation:

- **Vitamin A** activity is attributed to its **conjugated double bond system** (responsible for light absorption) and the **ionone ring**, which is critical for biological activity.
- Catechol ring is not a part of vitamin A's structure.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 318.

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9. According to Drugs ----------included in schedule:

Correct Answer: (b) S
Explanation:

- **Schedule S** of the Drugs and Cosmetics Act outlines the standards for **cosmetics**.
- Other schedules:
  - **P**: Standards for life period of drugs.
  - **W**: List of drugs to be marketed under generic names only.
  - **Y**: Clinical trials guidelines.
    Reference: Drugs and Cosmetics Act, India, 2022 Edition, Page 178.

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10. A mosquito ---------- obtained from:

Correct Answer: (b) Cymbopogon nardus
Explanation:

- **Cymbopogon nardus** (citronella grass) produces **citronella oil**, a natural mosquito repellent.
- Other options:
  - **Artemisia brevifolia**: Produces essential oils but not a mosquito repellent.
  - **Trachyspermum ammi**: Ajwain oil, used as a spice.
  - **Cymbopogon flexuosus**: Produces lemongrass oil, not primarily a mosquito repellent.
    Reference: Pharmacognosy by C.K. Kokate, 53rd Edition, Page 397.

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11. All of the ---------- problems except:

Correct Answer: (a) Roughness
Explanation:

- Common tablet processing problems include:
  - **Sticking & Picking:** Adhesion of material to the punch surface.
  - **Capping & Lamination:** Splitting or separation of layers in tablets.
  - **Double Impression:** Duplicate markings on tablets due to free rotation of punches.
- **Roughness** is not a specific tablet processing issue; it may arise from granule properties or coating.
  Reference: Pharmaceutical Dosage Forms: Tablets by Lieberman, 3rd Edition, Page 456.

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12. National Institute ---------- located in:

Correct Answer: (c) Noida
Explanation:

- The **National Institute of Biologicals (NIB)**, established under the Ministry of Health and Family Welfare, is located in **Noida**, Uttar Pradesh.
- It ensures the quality and safety of biological products like vaccines and blood products.
  Reference: Government of India: National Institute of Biologicals Official Website.

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13. In the DNA ---------- appears at every:

Correct Answer: (b) 3.4 A
Explanation:

- In **B-DNA**, the major and minor grooves form as the DNA helix completes one full turn every **3.4 angstroms (A)**.
- This spacing corresponds to the distance between adjacent base pairs.
  Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 208.

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14. Which of the ---------- of the kidney?

Correct Answer: (b) Defecation
Explanation:

- **Defecation** is the process of eliminating undigested waste through the gastrointestinal tract, not the kidney.
- Functions of the kidney include:
  - **Excretion of urea.**
  - **Regulation of fluids and electrolytes.**
  - **Elimination of toxic substances.**
    Reference: Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page 322.

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15. Vaccine rotavirus ---------- following route:

Correct Answer: (d) Oral
Explanation:

- The **rotavirus vaccine** is administered **orally** to infants. It protects against rotavirus infections that cause severe diarrhea.
- Other vaccines (e.g., DPT, MMR) are administered intramuscularly (IM) or subcutaneously (SC).
  Reference: CDC: Vaccine Administration Guidelines.

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16. Which vitamin ---------- vitamin?

Correct Answer: (a) A
Explanation:

- **Vitamin A** (particularly in its retinoid form) is **teratogenic** in high doses during pregnancy. It can cause **congenital defects** like craniofacial, heart, and neural tube abnormalities.
- Other vitamins (B, C, D) are not teratogenic.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 310.

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17. Subcutaneous route ---------- following vaccines?

Correct Answer: (d) Both (a) and (b)
Explanation:

- **Measles** and **Yellow Fever** vaccines are administered via the **subcutaneous route** to enhance immune response and minimize local irritation.

- **DPT** is given intramuscularly.
  Reference: CDC Vaccine Administration Guidelines, Online Documentation.

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18. Liposome is ---------- incorporate drug:

Correct Answer: (c) Both (a) and (b)
Explanation:

- **Liposomes** are versatile drug delivery systems that can encapsulate:
  - **Hydrophilic drugs** in their aqueous core.
  - **Lipophilic drugs** in their lipid bilayer.
    Reference: Drug Delivery Systems by Vyas and Khar, 2nd Edition, Page 356.

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19. Absorption rate ---------- determined by:

Correct Answer: (c) Loo-Rigelman
Explanation:

- The **Loo-Rigelman method** is used to calculate the absorption rate for drugs following **multiple-compartment kinetics**.
- **Wagner-Nelson** method is used for single-compartment models.
  Reference: Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi, 4th Edition, Page 276.

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20. Harshness of ---------- expressed in:

Correct Answer: (c) ppm
Explanation:

- Water hardness is measured in **parts per million (ppm)** of calcium carbonate or other minerals.
- It indicates the concentration of dissolved minerals in water.
  Reference: Vogel's Quantitative Inorganic Analysis, 6th Edition, Page 465.

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21. Sterilization of ---------- done by:

Correct Answer: (c) Radiation sterilization
Explanation:

- **Radiation sterilization** (e.g., gamma rays or electron beams) is commonly used for sterilizing packed food like milk and meat products. It kills microorganisms without significantly affecting the quality of food.
- Other methods:
  - **Gaseous sterilization**: Used for medical devices.
  - **Moist heat sterilization**: Not suitable for packaged food.
  - **Dry heat sterilization**: Primarily for non-food items.
    Reference: Principles of Food Science by Potter & Hotchkiss, 5th Edition, Page 271.

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22. Chlorophyll ---------- positive in:

Correct Answer: (a) Male fern
Explanation:

- The **chlorophyll test** detects the presence of chlorophyll, which is found in green plants like **male fern**.
- Other options (clove, rhubarb, pale catechu) do not have significant chlorophyll content.
  Reference: Pharmacognosy by C.K. Kokate, 53rd Edition, Page 412.

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23. Ketone bodies ---------- following organ?

Correct Answer: (c) Liver
Explanation:

- **Ketone bodies** (e.g., acetoacetate, β-hydroxybutyrate, acetone) are synthesized in the **liver** from acetyl-CoA during fatty acid oxidation.
- They serve as an energy source for tissues like the brain during fasting.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 212.

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24. Sickle cell ---------- are both:

Correct Answer: (c) Congenital disorders
Explanation:

- Both are **genetic disorders**:
  - **Sickle cell anemia**: Caused by a mutation in the HBB gene, leading to abnormal hemoglobin.
  - **Huntington's chorea**: Caused by a mutation in the HTT gene, leading to progressive neurological degeneration.
- They are not caused by viruses, bacteria, or deficiencies.
  Reference: Robbins and Cotran Pathologic Basis of Disease, 10th Edition, Page 145.

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25. Which of the ---------- parasympathetic system?

Correct Answer: (b) It is the fight or flight system
Explanation:

- The **parasympathetic system** is the **rest and digest system**, responsible for reducing heart rate, increasing digestive actions, and promoting relaxation.
- The **sympathetic system** is the **fight or flight system**.
  Reference: Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page 651.

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26. What ions ---------- of a nerve?

Correct Answer: (d) Sodium and potassium
Explanation:

- The **resting potential** of a nerve is established by the **unequal distribution of sodium (Na^+) and potassium (K^+) ions** across the cell membrane.
- **Potassium ions** have higher permeability and move out, while **sodium ions** are actively pumped out, maintaining the negative resting potential.
  Reference: Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page 677.

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27. In biopharmaceutical ---------- are with:

Correct Answer: (a) Low solubility and high permeability
Explanation:

- **Class II drugs** in the Biopharmaceutics Classification System (BCS) are characterized by **low solubility** but **high membrane permeability**, requiring enhanced solubilization techniques for absorption.

Reference: Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi, 4th Edition, Page 276.

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28. Half-life ---------- reaction is:

Correct Answer: (a) A/2k
Explanation:

- For a **zero-order reaction**, the half-life $t_{1/2} = \frac{A}{2k}$

  where A is the initial concentration and k is the rate constant.

- Other formulas are for first-order reactions.
  Reference: Chemical Kinetics by Laidler, 3rd Edition, Page 89.

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29. The number ---------- carotene is/are:

Correct Answer: (b) 2
Explanation:

- **β-Carotene** has a structure consisting of **two β-ionone rings** at each end of its polyene chain.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 318.

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30. After the birth ---------- to the infant?

Correct Answer: (d) All of these
Explanation:

- After birth, the following vaccines are administered:
  - **BCG**: For tuberculosis.
  - **OPV zero**: Oral polio vaccine.
  - **Hepatitis B-1**: For hepatitis B prevention.
    Reference: WHO Immunization Guidelines, Online Documentation.

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31. Drug protein ---------- determined by:

Correct Answer: (b) Dialysis
Explanation:

- **Dialysis** is a commonly used method to determine drug-protein binding by separating free drug from protein-bound drug across a semi-permeable membrane.
- Other options:
  - **Chromatography**: Used for separation but not specific to protein binding.
  - **Phase separation**: Not applicable for this purpose.
  - **Langmuir's method**: Related to adsorption studies, not drug-protein binding.
    Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 148.

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32. Submerged culture ---------- difficult for:

Correct Answer: (c) Filamentous fungi
Explanation:

- Submerged culture requires homogeneity, and **filamentous fungi** form clumps or mycelial mats, which make their growth and handling difficult in such cultures.
- Bacteria and yeast adapt better to submerged cultures.
  Reference: Industrial Microbiology by Prescott and Dunn, 4th Edition, Page 317.

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33. Modern ---------- discovered

Correct Answer: (d) Paul Ehrlich
Explanation:

- **Paul Ehrlich** is considered the father of modern chemotherapy. He introduced the concept of a **"magic bullet"** to target specific pathogens without harming the host.
- He developed **arsphenamine** (Salvarsan) for syphilis treatment.
  Reference: History of Medicine by Roy Porter, 5th Edition, Page 312.

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34. Vehicle for ---------- gelatin capsule:

Correct Answer: (d) All of these
Explanation:

- **Soft gelatin capsules** can incorporate a variety of vehicles:
  - **PEG (Polyethylene Glycol):** For water-soluble drugs.
  - **Mineral oils and vegetable oils:** For lipophilic drugs.
- The choice depends on the solubility and stability of the active ingredient.
  Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 880.

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35. Three ---------- present

Correct Answer: (b) Tetrapeptide
Explanation:

- A **tetrapeptide** contains **four amino acids** joined by **three amide (peptide) bonds**.
  - Example: Ala-Gly-Leu-Val.
- Other options:
  - **Dipeptide**: 1 bond.
  - **Tripeptide**: 2 bonds.
  - **Decapeptide**: 9 bonds.
    Reference: Biochemistry by Lehninger, 7th Edition, Page 123.

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36. Which ---------- crystals?

Correct Answer: (a) Glucose
Explanation:

- Glucosazone (from glucose, fructose or mannose) forms broomstick or needle-shaped crystals.
  Reference: Carbohydrate Chemistry by David E. Levy, 2nd Edition, Page 95.

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37. The two ----------covalently by:

Correct Answer: (c) Hydrogen bonds between bases
Explanation:

- **Hydrogen bonds** between complementary nitrogenous bases (**A-T and G-C**) stabilize the two strands of DNA.
- Other bonds (ionic, covalent, polar charges) are not involved in this interaction.
  Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 208.

38. A source ---------- drug is:

Correct Answer: (c) Vinca rosea
Explanation:

- **Vinca rosea** (Catharanthus roseus) is the source of **vincristine** and **vinblastine**, alkaloids used in cancer chemotherapy.
- Other options (belladonna, nux vomica, cascara) do not produce anticarcinogenic drugs.
  Reference: Pharmacognosy by C.K. Kokate, 53rd Edition, Page 412.

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39. 5,5 Diethyl ---------- name of:

Correct Answer: (b) Barbitone
Explanation:

- **Barbitone** is chemically known as **5,5-diethyl barbituric acid**, a barbiturate derivative with sedative and hypnotic properties.
- Other options:
  - **Phenobarbital:** A long-acting barbiturate.
  - **Thiopental:** A short-acting barbiturate.
  - **Pentobarbital:** An intermediate-acting barbiturate.
    Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 284.

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40. One of the ---------- dicarboxylic acid:

Correct Answer: (d) Aspartic acid
Explanation:

- **Aspartic acid** contains two carboxylic acid groups in its side chain, making it a **dicarboxylic amino acid**.
- Other options:
  - **Glycine:** Neutral amino acid.
  - **Ornithine and Citrulline:** Basic amino acids involved in the urea cycle.
    Reference: Biochemistry by Lehninger, 7th Edition, Page 112.

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41. IR sample ---------- which form:

Correct Answer: (d) All of these
Explanation:

- Samples for **Infrared (IR) spectroscopy** can be in **solid, liquid, or gas forms**, as long as they allow the IR radiation to pass through.
- Preparation depends on the physical state:
  - **Solid:** Pressed into KBr pellets.
  - **Liquid:** Sandwiched between IR-transparent plates.
  - **Gas:** Placed in a gas cell.
    Reference: Spectrometric Identification of Organic Compounds by Silverstein, 8th Edition, Page 72.

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42. Which among ---------- amino acid:

Correct Answer: (b) Leucine
Explanation:

- **Leucine** is an **essential amino acid**, meaning it must be obtained through the diet because the body cannot synthesize it.
- Other options:
  - **Cysteine and Tyrosine:** Non-essential, as they can be synthesized.
  - **Aspartic acid:** Also non-essential.
    Reference: Biochemistry by Lehninger, 7th Edition, Page 113.

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43. Which of ---------- water-soluble:

Correct Answer: (a) Amylose
Explanation:

- **Starch** is a polymer of **α-glucose** and consists of two components— **Amylose** and **Amylopectin**.
- **Amylose** is the water-soluble component that constitutes about **15-20% of starch**.
- Chemically, amylose is a long unbranched chain with 200–1000 **α-D-(+)-glucose units** held together by **C1–C4 glycosidic linkage**.

- **Amylopectin** is insoluble in water and constitutes about **80-85% of starch**.
- It is a branched-chain polymer of **α-D-glucose units** in which the chain is formed by **C1–C4 glycosidic linkage**, whereas branching occurs by **C1–C6 glycosidic linkage**.

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44. M-2 protein ---------- which drug:

Correct Answer: (a) Amantadine
Explanation:

- **Amantadine** blocks the **M2 proton channel** of influenza A viruses, inhibiting viral uncoating and replication.
- Other options:
  - **Interferon and Ribavirin:** Work by different antiviral mechanisms.
  - **Cilastatin:** Protects renal dehydropeptidase enzymes, not viral proteins.
    Reference: Katzung's Basic and Clinical Pharmacology, 15th Edition, Page 674.

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45. Syrup ---------- USP is:

Correct Answer: (d) 85% w/v of sucrose
Explanation:

- **Syrup USP** contains **85% w/v sucrose** as a concentrated solution, which acts as a preservative and sweetener in pharmaceutical preparations.
- The other percentages listed are not correct for Syrup USP.
  Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 907.

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46. Which of ---------- chromosomes?

Correct Answer: (a) Mitochondria
Explanation:

- **Mitochondria** contain their own **circular DNA** and chromosomes, allowing them to replicate and transcribe independently of nuclear DNA.
- Other options:
  - **ER and Golgi body**: Do not contain chromosomes.
  - **Cytoplasm**: Does not inherently have chromosomes, as they are located in the nucleus (except in prokaryotes).
    Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 804.

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47. The study of ---------- time is called:

Correct Answer: (c) Chronopharmacology
Explanation:

- **Chronopharmacology** studies how drug responses vary according to biological rhythms, such as circadian rhythms.
- Other terms:
  - **Pharmacodynamics:** Effects of drugs on the body.
  - **Pharmacokinetics:** Movement of drugs in the body.
  - **Pharmacogenetics:** Genetic factors influencing drug responses.
    Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 56.

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48. Select ---------- NMR:

Correct Answer: (d) Both (b) & (c)
Explanation:

- Common solvents in **Nuclear Magnetic Resonance (NMR)** spectroscopy include:
  - Chloroform (CDCl3), dimethyl sulfoxide (DMSO-d6), and deuterium oxide (D2O) are all solvents used in nuclear magnetic resonance (NMR).
  - Substitution of D for H in organic compounds frequently provides a means of eliminating the unwanted H signal.

Reference: Spectrometric Identification of Organic Compounds by Silverstein, 8th Edition, Page 216.

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49. Which of the ---------- cell membrane?

Correct Answer: (a) Fibronectin
Explanation:

- Peripheral proteins: These proteins are loosely attached to the surface of the cell membrane, not embedded within it, and can be easily detached.
- Fibronectin: This protein is a key component of the extracellular matrix and interacts with the cell membrane through specific receptors, making it a peripheral membrane protein.
- Glycoprotein: While glycoproteins can be peripheral membrane proteins, they can also be integral proteins depending on their structure, where they span the entire membrane..
  Reference: Molecular Cell Biology by Lodish, 8th Edition, Page 282.

50. Which one ---------- form except:

Correct Answer: (a) Amorphous
Explanation:

- **Amorphous forms** do not have a defined crystal lattice or crystalline structure.
- Other options (hydrates, polymorphs, pseudopolymorphs) are crystalline forms with varying molecular arrangements.
  Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 112.

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51. The major ---------- mammals is:

Correct Answer: (b) Collagen
Explanation:

- **Collagen** is the primary protein in connective tissues such as **skin, tendons, bones, and teeth**, contributing to their strength and structure.
- Other options:
  - **Elastin**: Provides elasticity to tissues.
  - **Keratin**: Found in hair and nails.
  - **Fatty acids**: Not proteins.
    Reference: Biochemistry by Lehninger, 7th Edition, Page 345.

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52. Marketed formulations ---------- Welfare include:

Correct Answer: (d) All of these
Explanation:

- **Cures**, **Phensedyl**, and **Vicks Action-500** have been banned due to safety concerns or inappropriate combinations of ingredients.
- These bans aim to minimize potential misuse and adverse effects.
  Reference: Drugs Controller General of India (DCGI) Notifications, Online Documentation.

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53. DNA is ---------- cell in:

Correct Answer: (a) Nucleus
Explanation:

- In eukaryotic cells, **DNA** is primarily located in the **nucleus**, where it forms chromosomes.
- It is also found in **mitochondria** as mitochondrial DNA (mtDNA).
- Other options:
  - **Membrane**: Contains lipids and proteins, not DNA.
  - **Ribosome**: Site of protein synthesis, contains RNA but no DNA.
    Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 120.

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54. Sibutramine is ---------- used as:

Correct Answer: (c) Both (a) and (b)
Explanation:

- **Sibutramine** acts as an **anti-obesity** drug by suppressing appetite (**anorexiant**) and increasing satiety.
- It inhibits the reuptake of serotonin and norepinephrine.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 1206.

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55. The maximum ---------- present in:

Correct Answer: (d) Inner wall of fruits
Explanation:

- **Capsaicin**, the active component responsible for the pungency of capsicum, is predominantly concentrated in the **inner walls** of the fruit, near the placenta.
- Seeds and other parts have much lower concentrations.
  Reference: Pharmacognosy by C.K. Kokate, 53rd Edition, Page 362.

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56. Which one ---------- imino acid?

Correct Answer: (b) Proline
Explanation:

- **Proline** is an **imino acid**, meaning its amino group is part of a cyclic structure, which gives it unique structural properties compared to other amino acids.
- Other options:
  - **Pepsin and Resin**: Not amino acids.
  - **Cysteine**: A sulfur-containing amino acid, not an imino acid.
    Reference: Biochemistry by Lehninger, 7th Edition, Page 112.

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57. The main ---------- bacteria is:

Correct Answer: (b) Cell Wall
Explanation:

- **Gram-positive bacteria** have a thick **peptidoglycan layer** in their cell wall, while **Gram-negative bacteria** have a thin peptidoglycan layer and an outer membrane with lipopolysaccharides.
- Other options (cell membrane, ribosome, mitochondria) are not distinguishing factors.
  Reference: Prescott's Microbiology, 10th Edition, Page 215.

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58. Electric potential ---------- recorded by:

Correct Answer: (d) EEG
Explanation:

- **Electroencephalography (EEG)** records the brain's electrical activity using electrodes placed on the scalp.
- Other options:
  - **CT Scan**: Produces images of the brain.
  - **Sphygmomanometer**: Measures blood pressure.
  - **ECG**: Measures electrical activity of the heart.
    Reference: Principles of Neural Science by Kandel, 5th Edition, Page 305.

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59. Which function ---------- occipital lobe?

Correct Answer: (c) Vision
Explanation:

- The **occipital lobe** is primarily responsible for **visual processing**. Damage to it can result in vision loss or visual disturbances.

- Other functions:
  - **Hearing**: Processed in the temporal lobe.
  - **Speech and memory**: Processed in other regions like the frontal and temporal lobes.
    Reference: Gray's Anatomy for Students, 4th Edition, Page 296.

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60. Meissner's ---------- in the:

Correct Answer: (c) Skin
Explanation:

- **Meissner's corpuscles** are mechanoreceptors found in the **dermis of the skin**, particularly in areas sensitive to light touch (e.g., fingertips, palms).
- They are not found in the brain, nerve cells, or tongue.
  Reference: Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page 647.

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61. Histones are ---------- present in:

Correct Answer: (d) Both (a) and (b)
Explanation:

- **Histones** are basic proteins that are an integral part of **nucleosomes**, the structural units of chromatin.
- They are tightly associated with **DNA** to help in packaging and regulation of gene expression.
  Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 120.

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62. The main ---------- budgeting is:

Correct Answer: (d) All of these
Explanation:

- **Budgeting** serves multiple objectives, including:
  - **Planning:** Allocating resources effectively.
  - **Coordination:** Aligning activities of different departments.
  - **Control:** Monitoring financial performance and ensuring compliance with targets.
    Reference: Financial Management by I.M. Pandey, 12th Edition, Page 98.

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63. Ptyalin is ---------- known as:

Correct Answer: (d) HCl
Explanation:

- **Ptyalin (salivary amylase)** is inactivated in the stomach due to the **acidic environment created by HCl**, which denatures the enzyme.
- Other components like pepsin and mucus do not inactivate ptyalin.
  Reference: Guyton and Hall Textbook of Medical Physiology, 14th Edition, Page 623.

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64. How to extract ---------- from plants:

Correct Answer: (c) Shaking with water containing mineral acid
Explanation:

- Alkaloids, which are basic in nature, can be extracted by **shaking plant material with an aqueous solution of mineral acid**, converting them into water-soluble alkaloid salts.
- Other methods (e.g., heating with organic solvents) are used for free alkaloids.
  Reference: Pharmacognosy by C.K. Kokate, 53rd Edition, Page 267.

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65. Each amino ---------- another in the:

Correct Answer: (d) Nature of the side chain
Explanation:

- The **side chain (R-group)** determines the chemical and physical properties of each amino acid, such as polarity, charge, and size.
- The amino and carboxyl groups and central carbon atom are common to all amino acids.
  Reference: Biochemistry by Lehninger, 7th Edition, Page 113.

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66. In which ---------- chromatids formed?

Correct Answer: (c) Pachytene
Explanation:

- During the **pachytene** stage of prophase I in meiosis, homologous chromosomes are fully synapsed, and sister chromatids are clearly visible.
- Other stages:
    - **Leptotene:** Chromosomes start condensing.
    - **Zygotene:** Synapsis begins between homologous chromosomes.

    Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 312.

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67. Which of the ---------- present in DNA?

Correct Answer: (d) Uracil
Explanation:

- **Uracil** is present in RNA, replacing **thymine** in base pairing with adenine.
- DNA bases include **adenine (A)**, **guanine (G)**, **thymine (T)**, and **cytosine (C)**.

  Reference: Biochemistry by Lehninger, 7th Edition, Page 297.

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68. The use of ---------- HPLC because:

Correct Answer: (b) Siliceous bonded phases are not stable at pH above 8
Explanation:

- In **HPLC**, silica-based stationary phases degrade at pH levels above 8, leading to column instability.
- Alternative phases are used for applications requiring higher pH.

  Reference: Practical HPLC Method Development by Snyder et al., 2nd Edition, Page 156.

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69. Cocaine ---------- is:

Correct Answer: (c) Soluble Surface anesthetic
Explanation:

- Local Anaesthetic: Cocaine is a local anesthetic, meaning it numbs a specific area of the body.
- Surface Anaesthetic: It's applied directly to the surface of tissues, like the mucous membranes of the nose or throat, to provide localized numbness.
- Soluble: Cocaine is soluble, allowing it to dissolve in the fluids of the mucous membranes and effectively numb the area.

- While cocaine does have some vasoconstrictive properties, its primary function in this context is as a surface anesthetic.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 208.

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70. Leukopenia occurs ---------- due to:

Correct Answer: (a) Reduced number of WBC
Explanation:

- **Leukopenia** refers to a decrease in **white blood cell (WBC)** count, which compromises the immune system and increases infection risk.
- Other options:
  - **RBC reduction** causes anemia.
  - **Platelet reduction** leads to thrombocytopenia.
    Reference: Harrison's Principles of Internal Medicine, 20th Edition, Page 872.

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71. Impurity can ---------- following procedure:

Correct Answer: (c) TGA
Explanation:

- **Applications of TGA**
  - Automatic TGA
  - Evaluation of Gravimetric precipitates
  - Testing of purity of samples
  - Curie point determination
    Reference: Principles of Thermal Analysis by Simon Gaisford, 2nd Edition, Page 158.

---

72. Amino acid ---------- is present in:

Correct Answer: (b) Nerve impuse
Explanation:

  - Amino acids are the building blocks of proteins.
  - Neurotransmitters: Many neurotransmitters, the chemical messengers that transmit signals between neurons, are derived from amino acids.

- Examples include:
- Glutamate: An excitatory neurotransmitter.
- GABA (Gamma-aminobutyric acid): An inhibitory neurotransmitter.
- Dopamine: A neurotransmitter involved in pleasure, motivation, and movement.
- Serotonin: A neurotransmitter that plays a role in mood, sleep, and appetite.
  Reference: Biochemistry by Lehninger, 7th Edition, Page 120.

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73. In Influenza ---------- stands for:

Correct Answer: (c) Neuraminidase
Explanation:

- **H (Hemagglutinin)** and **N (Neuraminidase)** are surface glycoproteins of the influenza virus.
- **Neuraminidase** helps the virus spread by cleaving sialic acids on host cells.
  Reference: Medical Microbiology by Murray et al., 9th Edition, Page 450.

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74. Codons are ---------- present in:

Correct Answer: (b) mRNA
Explanation:

- **Codons** are triplet sequences of nucleotides in **mRNA** that encode specific amino acids during protein synthesis.
- Other options:
  - **Template strand of DNA:** Contains complementary sequences, not codons.
  - **tRNA:** Contains anticodons.
  - **rRNA:** Structural component of ribosomes, does not carry codons.
    Reference: Molecular Biology of the Cell by Alberts et al., 6th Edition, Page 323.

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75. Degradation ---------- is/are:

Correct Answer: (a) Uric acid
Explanation:

- **Purines** (adenine and guanine) degrade to **uric acid**, excreted by the body.
- Other options:
  - **Urea:** Product of amino acid metabolism, not purine degradation.

- **Hypoxanthine:** Intermediate in purine metabolism, not a final product.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 220.

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76. Which storage ---------- write data?

Correct Answer: (b) CD-ROM
Explanation:

- **CD-ROM (Compact Disc Read-Only Memory)** uses **optical technology** to read and write data using a laser.
- Other options:
  - **SSD (Solid State Drive):** Uses flash memory.
  - **Hard Drive:** Uses magnetic storage.
  - **Flash Drive:** Uses flash memory as well.
    Reference: Computer Organization and Architecture by William Stallings, 10th Edition, Page 298.

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77. The shortcut ---------- applications is

Correct Answer: (d) Ctrl + Z
Explanation:

- **Ctrl + Z** is the universal shortcut for **undoing the last action** in most applications across Windows and Mac operating systems.
- Other shortcuts:
  - **Ctrl + Y:** Redo.
  - **Ctrl + X:** Cut.
  - **Ctrl + U:** Underline in some applications.
    Reference: Windows User Guide by Microsoft, Online Documentation.

---

78. What is the _____Private Network)?

Correct Answer: (b) To provide a secure connection over a public network
Explanation:

- A **VPN** encrypts internet connections, ensuring privacy and security when using public or untrusted networks.
- Other options:

- **Increasing internet speed** is not a VPN function.
- **Creating local networks**: Handled by LAN configurations.
- **Monitoring web traffic**: Performed by network monitoring tools.
  Reference: Networking Essentials by Jeffrey Beasley, 6th Edition, Page 456.

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79. In computing, _____volatile memory?

Correct Answer: (a) RAM
Explanation:

- **RAM (Random Access Memory)** is **volatile**, meaning it loses data when power is turned off.
- Other options:
  - **ROM, Hard Disk, and SSD** are non-volatile storage devices, retaining data without power.
    Reference: Computer Architecture and Organization by John L. Hennessy, 6th Edition, Page 197.

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80. Which tool _____Windows?

Correct Answer: (a) WinRAR
Explanation:

- **WinRAR** is a widely used tool for **compressing and decompressing files** in Windows.
- Other options:
  - **Notepad**: Text editing.
  - **Task Manager**: Manages system processes.
  - **Paint**: Basic graphic editing.
    Reference: Windows User Guide by Microsoft, Online Documentation.

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81. A man covers _____ the entire journey?

Correct Answer: (a) 7.2 km/h
Explanation:

1. Calculate the time taken for the first part of the journey:

- Time = Distance / Speed

- Time taken for the first part = 18 km / 6 km/h = 3 hours

2. Calculate the time taken for the return journey:

- Time = Distance / Speed
- Time taken for the return journey = 18 km / 9 km/h = 2 hours

3. Calculate the total time:

- Total time = Time for the first part + Time for the return journey
- Total time = 3 hours + 2 hours = 5 hours

4. Calculate the total distance:

- Total distance = Distance for the first part + Distance for the return journey
- Total distance = 18 km + 18 km = 36 km

5. Calculate the average speed:

- Average speed = Total distance / Total time
- Average speed = 36 km / 5 hours = 7.2 km/h

Therefore, the correct answer is (a) 7.2 km/h.

---

82. A man invests _____after 2 years?

Correct Answer: (b) ₹9,680
Explanation:

- Amount = Principal * $(1 + (Rate/100)^{Time}$

Given:

- Principal (P) = ₹8,000
- Rate (R) = 10% per annum
- Time (T) = 2 years

Calculation:

1. Substitute the given values into the formula: Amount = 8000 * $(1 + (10/100)^2$

   Amount = 8000 * $(1 + 0.1)^2$

Amount = 8000 * $(1.1)^2$

Amount = 8000 * 1.21

2. Calculate the amount: Amount = ₹9,680

Therefore, the amount after 2 years will be ₹9,680.

---

83. The perimeter of _____is its area?

Correct Answer: (a) 200 m²
Explanation:

1. Find the width of the rectangle:

- Perimeter of a rectangle = 2 * (length + width)
- 60 m = 2 * (20 m + width)
- 30 m = 20 m + width
- Width = 30 m - 20 m = 10 m

2. Calculate the area of the rectangle:

- Area of a rectangle = length * width
- Area = 20 m * 10 m = 200 m²

Therefore, the area of the rectangle is (a) 200 m².

---

84. The LCM _____other number?

Correct Answer: (b) 60
Explanation:

1. Understand the Relationship:

- **LCM (Least Common Multiple):** The smallest number that is a multiple of both given numbers.
- **HCF (Highest Common Factor):** The largest number that divides both given numbers evenly.

2. Use the Formula:

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

3. Apply the Formula:

- Let the other number be 'x'.
- Given:
  - One number = 24
  - LCM = 120
  - HCF = 12
- Using the formula:
  - 24 * x = 120 * 12
  - 24x = 1440

4. Solve for 'x':

- x = 1440 / 24
- x = 60

Therefore, the other number is (b) 60.

---

85. The difference between _____of its digits?

Correct Answer: (a) 14
Explanation:

1. Let the two-digit number be represented as:

- 10x + y
  - Where:
    - x is the tens digit
    - y is the units digit

2. Represent the number obtained by reversing the digits:

- 10y + x

3. Set up the equation based on the given information:

- (10x + y) - (10y + x) = 36
- 10x + y - 10y - x = 36
- 9x - 9y = 36
- x - y = 4

- Divide both sides of the equation by 9

4. Find the possible values for x and y:

- Since x and y are digits (integers between 0 and 9), let's try some possible values for x and y that satisfy the equation x - y = 4:
  - x = 9, y = 5
    - 9 - 5 = 4

5. Calculate the sum of the digits:

- Sum of digits = x + y = 9 + 5 = 14

Therefore, the sum of the digits of the original number is (d) 14.

---

86. If "STORM" _____CLOUD" coded?

Correct Answer: (a) BKNTC
Explanation:

- The coding involves shifting each letter backward by 1 position in the alphabet.
  - **S → R, T → N, O → L, R → Q, M → L.**
- For "CLOUD":
  - **C → B, L → K, O → N, U → T, D → C.**
    Coded word: **BKNTC.**

---

87. Pointing to a woman_____related to Ravi?

Correct Answer: (a) Sister
Explanation:

- **"Grandfather's only son"** refers to Ravi's **father**.
- The woman is the **daughter** of Ravi's father, making her Ravi's **sister**.

---

88. Find the odd _____Tiger, Leopard.

Correct Answer: (b) Elephant
Explanation:

- **Elephant** is a **herbivore**, whereas **Lion, Tiger, and Leopard** are carnivores.

---

89. What comes _____ the series:

Correct Answer: (c) O
Explanation:

- The sequence represents increasing gaps in alphabetical order:
  - A → C (skip 1), C → F (skip 2), F → J (skip 3).
  - J → O (skip 4).
- Next letter: **O.**

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90. In a certain _____ "CHAIR" coded?

Correct Answer: (c) RIAHC
Explanation:

- The code reverses the letters of the word.
- For "CHAIR":
  - Reversed: **RIAHC.**

---

91. The idea of _____ from which country?

Correct Answer: (c) Ireland
Explanation:

- The concept of **Directive Principles of State Policy (DPSP)** was inspired by the **Irish Constitution**, which in turn had borrowed it from **Spanish Constitution**.
- It aims to establish social and economic democracy.
  Reference: Indian Polity by M. Laxmikanth, 6th Edition, Page 6.3.

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92. Which was the _____ launched into space?

Correct Answer: (a) Aryabhata
Explanation:

- **Aryabhata**, named after the famous Indian mathematician, was the first satellite built by India and launched on **April 19, 1975**, from the Soviet Union.
  Reference: ISRO Official Website.

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93. The Vijayanagara _____ which year?

Correct Answer: (b) 1336
Explanation:

- The **Vijayanagara Empire** was founded by **Harihara I** and **Bukka Raya I** in **1336**.
- It became a prominent South Indian empire and resisted invasions from the Delhi Sultanate.
  Reference: A History of South India by K.A. Nilakanta Sastri, Page 281.

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94. What is the _____ repatriation of Tamils?

Correct Answer: (d) Sirimavo-Shastri Pact
Explanation:

- The **Sirimavo-Shastri Pact** (1964) was an agreement between India and Sri Lanka to address the repatriation of Indian Tamils in Sri Lanka.
- The **Indo-Sri Lanka Accord** (1987) focused on the Tamil conflict.
  Reference: Modern Indian History by Bipan Chandra, Page 422.

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95. Which Indian _____ of Destiny'?

Correct Answer: (b) Visakhapatnam
Explanation:

- **Visakhapatnam**, a major port city in Andhra Pradesh, is called the **'City of Destiny'** for its strategic location, industrial growth, and natural beauty.
  Reference: Andhra Pradesh Tourism Development Corporation Guide.

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96. Who established _____ Muslim University?

Correct Answer: (a) Sir Syed Ahmed Khan
Explanation:

- **Sir Syed Ahmed Khan** established the **Mohammedan Anglo-Oriental College** in 1875 to promote modern education among Muslims.
- It later became **Aligarh Muslim University** in 1920.
  Reference: Modern Indian History by Bipan Chandra, Page 191.

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97. Which Indian _____ forest cover?

Correct Answer: (b) Madhya Pradesh
Explanation:

- **Madhya Pradesh** has the largest area under forest cover in India, followed by Arunachal Pradesh and Chhattisgarh.
- It contributes significantly to the total forest area of the country.
  Reference: India State of Forest Report 2021.

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98. Who presided over _____ Congress in 1885?

Correct Answer: (b) W.C. Bonnerjee
Explanation:

- **W.C. Bonnerjee** (Womesh Chunder Bonnerjee) was the first president of the **Indian National Congress** during its inaugural session in **Bombay** in 1885.
  Reference: Modern Indian History by Bipan Chandra, Page 237.

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99. Which Indian _____ rift valley?

Correct Answer: (c) Narmada
Explanation:

- The **Narmada River** flows through a **rift valley** between the Vindhya and Satpura ranges.
- It is one of the few rivers in India that flows westward.
  Reference: Geography of India by Majid Husain, 7th Edition, Page 221.

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100. Which event marked _____ Movement in India?

Correct Answer: (a) Partition of Bengal
Explanation:

- The **Partition of Bengal** in 1905 by **Lord Curzon** triggered the **Swadeshi Movement**, which aimed at promoting indigenous goods and boycotting British products.
  Reference: Modern Indian History by Bipan Chandra, Page 246.