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MODEL PAPER-25

DIGITAL EXPLANATION

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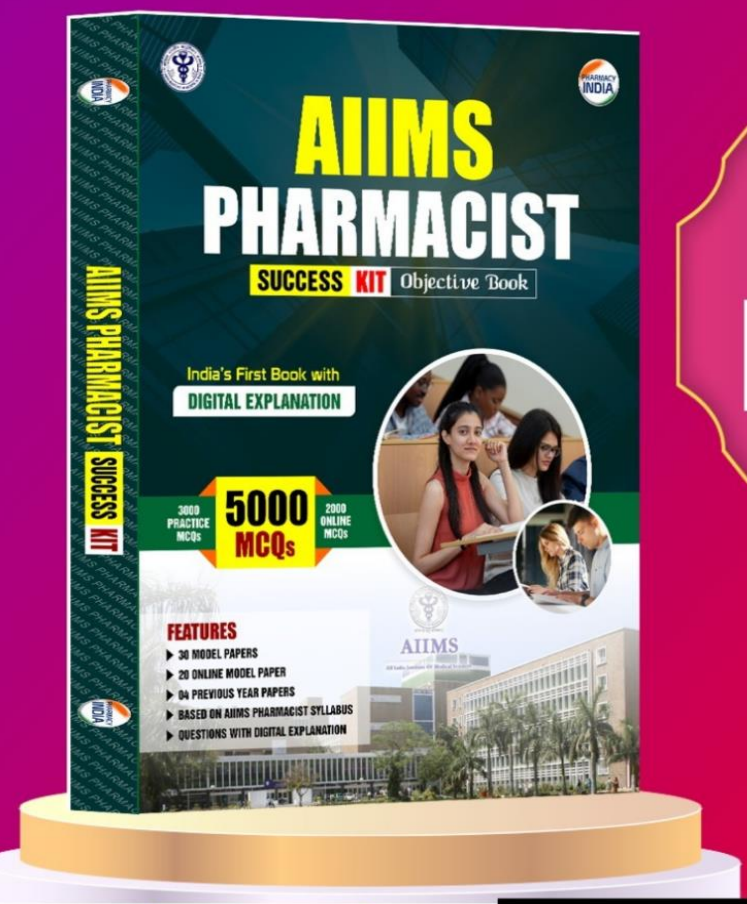

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Model Paper – 25 | Detailed Solutions

1. Association---------- in:

Correct Answer: (b) **Cerebral white matter**

- **Explanation:**
  - **Association fibers** connect different parts of the same hemisphere.
  - **Commissural fibers** connect corresponding areas in opposite hemispheres, such as the corpus callosum.
  - **Projection fibers** connect the cerebral cortex to lower brain structures and the spinal cord.
  - These tracts are composed of **myelinated axons**, which make up the **white matter** in the brain.

Reference:

- "Neuroanatomy through Clinical Cases" by Hal Blumenfeld, 3rd Edition, Page 62.

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2. Groups ---------- as:

Correct Answer: (d) **Peyer's patches**

- **Explanation:**
  - Peyer's patches are clusters of **lymphatic nodules** located in the mucosa of the ileum.
  - They are part of the **gut-associated lymphoid tissue (GALT)** and play a critical role in immune surveillance of the intestinal lumen.

Reference:

- "Textbook of Medical Physiology" by Guyton and Hall, 14th Edition, Page 851.

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3. The ---------- with:

Correct Answer: (b) **Henderson-Hasselbalch equation**

- **Explanation:**

- The **Henderson-Hasselbalch equation** is used to calculate the pH of a buffer:
- **pH = pKa + log $\frac{[A-]}{[HA]}$**
- Where [A−] is the concentration of the conjugate base and [HA] is the concentration of the weak acid.

Reference:

- "Principles of Biochemistry" by Lehninger, 7th Edition, Page 100.

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4. According ---------- its:

Correct Answer: (c) **30 parts are soluble in 100 parts of the given solvent**

- **Explanation:**
  - The **Indian Pharmacopoeia (IP)** defines solubility ranges. A substance is:

Descriptive term	Approximate volume of solvent in ml per gram of solute
Very soluble	Less than 1 part
Freely soluble	1 to 10 parts
Soluble	10 to 30 parts
Sparingly soluble	30 to 100 parts
Slightly soluble	100 to 1000 parts
Very slightly soluble	1000 to 10,000 parts
Practically insoluble	More than 10,000

Reference:

- "Indian Pharmacopoeia", Volume I, 2022 Edition, Page 19.

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5. Enteric---------- with:

Correct Answer: (c) **Cellulose acetate phthalate**

- **Explanation:**
  - **Enteric coatings** are designed to resist the acidic environment of the stomach and dissolve in the alkaline environment of the intestine.

- **Cellulose acetate phthalate (CAP)** is a commonly used polymer due to its acid resistance and intestinal solubility.

Reference:

- "Pharmaceutics: The Science of Dosage Form Design" by Aulton and Taylor, 3rd Edition, Page 517.

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6. The ---------- of:

Correct Answer: (d) **Noyes-Whitney equation**

- **Explanation:**
  - The **Noyes-Whitney equation** describes the rate of dissolution of a solid in a solvent: $\frac{dC}{dt} = \frac{DA\,(Cs-C)}{h}$
  - Where dC/dt is the dissolution rate, DDD is the diffusion coefficient, A is the surface area, Cs is the saturation concentration, C is the concentration at time ttt, and h is the diffusion layer thickness.

Reference:

- "Martin's Physical Pharmacy and Pharmaceutical Sciences" by Patrick J. Sinko, 7th Edition, Page 442.

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7. Non---------- to:

Correct Answer: (c) **Both (i) and (ii) are true**

- **Explanation:**
  - **Enzyme induction** can increase drug metabolism, leading to non-linear pharmacokinetics.
  - **Active secretion**, such as saturation of renal or biliary excretion pathways, can also result in non-linearity.

Reference:

- "Clinical Pharmacokinetics and Pharmacodynamics" by Malcolm Rowland and Thomas N. Tozer, 5th Edition, Page 324.

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8. Which ---------- incorrect?

Correct Answer: (a) **Emulsifiers with HLB value of 1.5 to 3.7 have high water dispersibility**

- **Explanation:**
  - Emulsifiers with an **HLB value of 1.5 to 3.7** are more **lipophilic** and have **low water dispersibility**, making them suitable for water-in-oil emulsions.
  - Emulsifiers with an **HLB value of 13 to 20** are **hydrophilic** and have high water dispersibility, making them suitable for oil-in-water emulsions.

Reference:

- "Pharmaceutical Dosage Forms and Drug Delivery Systems" by Howard C. Ansel, 10th Edition, Page 236.

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9. Reversible ---------- as:

Correct Answer: (c) **Flocculation**

- **Explanation:**
  - **Flocculation** occurs when droplets of the internal phase come together to form loose aggregates, which are reversible and do not lead to complete coalescence.
  - **Creaming** refers to the upward movement of dispersed droplets.
  - **Coalescence** is the irreversible merging of droplets.
  - **Phase separation** indicates the complete separation of the two phases.

Reference:

- "Pharmaceutics: The Science of Dosage Form Design" by Aulton and Taylor, 3rd Edition, Page 322.

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10. Which ---------- surfactant?

Correct Answer: (a) **Polyoxyethylene sorbitan monooleate**

- **Explanation:**

- Non-ionic surfactants, like **Polyoxyethylene sorbitan monooleate (Tween 80)**, do not ionize in aqueous solutions and are commonly used in pharmaceuticals for stabilizing emulsions.
- The other options are ionic surfactants:
  - **Dioctyl sulphosuccinate** (anionic).
  - **Sodium pareth sulphate** (anionic).
  - **Dioctadecyldimethyl ammonium bromide** (cationic).

Reference:

- "Martin's Physical Pharmacy and Pharmaceutical Sciences" by Patrick J. Sinko, 7th Edition, Page 563.

11. Leaker ---------- for:

Correct Answer: (b) **Parenteral products**

- **Explanation:**
  - **Leaker test** ensures the integrity of ampoules and vials, preventing contamination.
  - **Clarity test** checks for particulate matter or visible contamination.
  - **Pyrogen test** ensures the absence of fever-inducing substances.
  - These tests are critical for **parenteral products** as they are administered directly into the bloodstream.

Reference:

- "Pharmaceutical Microbiology" by Hugo and Russell, 8th Edition, Page 405.

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12. Major ---------- are:

Correct Answer: (b) **Over-flexible joints which easily get dislocated and highly elastic skin that easily gets bruised**

- **Explanation:**
  - **Ehlers-Danlos syndrome (EDS)** results from defective collagen synthesis.
  - Symptoms include **hypermobile joints**, **fragile, elastic skin**, and a tendency to bruise easily due to weak connective tissues.

Reference:

- "Principles of Biochemistry" by Lehninger, 7th Edition, Page 251.

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13. Phospholipids ---------- have:

Correct Answer: (a) **Both polar and non-polar groups**

- **Explanation:**
  - Phospholipids have a **hydrophilic (polar) head** and **hydrophobic (non-polar) tails**, enabling them to form **bilayers** in cell membranes.
  - This amphipathic property is critical for maintaining the structural integrity of the membrane.

Reference:

- "Molecular Cell Biology" by Lodish et al., 8th Edition, Page 437.

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14. Rieske ---------- ETC.

Correct Answer: (c) **Complex III**

- **Explanation:**
  - **Rieske iron-sulfur proteins** are part of **Complex III** (cytochrome bc1 complex) in the electron transport chain.
  - They play a role in transferring electrons from ubiquinol to cytochrome c.

Reference:

- "Biochemistry" by Jeremy M. Berg et al., 8th Edition, Page 743.

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15. The ---------- equivalent

Correct Answer: (b) 2**1 IU of vitamin D**

- **Explanation:**
- **Conversion Factor:** 1 microgram (µg) of cholecalciferol is equivalent to 40 International Units (IU) of vitamin D.
- **Calculation:** To find the equivalent IU for 0.05 µg of cholecalciferol, we can use the following calculation: 0.05 µg cholecalciferol * (40 IU / 1 µg cholecalciferol) = 2 IU vitamin D

- Therefore, the biological activity of 0.05 µg of cholecalciferol is equivalent to **2 IU of vitamin D**.

Reference:

- "Textbook of Biochemistry for Medical Students" by Vasudevan et al., 9th Edition, Page 362.

16. The ----------due to:

Correct Answer: (b) β-methyl malonic acid

Explanation:

- **Pernicious anemia** is caused by **vitamin B12 deficiency**, leading to impaired conversion of methylmalonyl-CoA to succinyl-CoA in the citric acid cycle.
- This results in the accumulation of **β-methyl malonic acid**, which disrupts **myelin sheath formation** and causes neurological symptoms, including peripheral neuropathy and cognitive dysfunction.

Reference:

- "Textbook of Medical Physiology" by Guyton and Hall, 14th Edition, Page 922.

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17. An ----------if:

Correct Answer: (a) **Dielectric constant of solution is less than that of pure water**

- **Explanation:**
  - **Salting out** occurs when the **dielectric constant** of the solution decreases due to the addition of salts, reducing the solubility of organic substances in water.

Reference:

- "Physical Chemistry" by P.W. Atkins, 11th Edition, Page 345.

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18. Milk ---------- as:

Correct Answer: (d) **Antacid**

- **Explanation:**
  - **Milk of magnesia** (magnesium hydroxide) neutralizes stomach acid, providing relief from heartburn and indigestion. It also acts as a laxative in higher doses.

Reference:

- "Remington: The Science and Practice of Pharmacy," 22nd Edition, Page 1123.

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19. A mixture ---------- column?

Correct Answer: (a) **(i) > (iv) > (iii) > (ii) > (v)**

- **Explanation:**
  - Silica gel is polar, and adsorption tendency depends on compound polarity:
    - **Acidic groups (i)** are most polar.
    - **Alcoholic groups (iv)** are next.
    - **Carbonyl groups (iii)** follow due to dipole interactions.
    - **Esters (ii)** are less polar.
    - **Hydrocarbons (v)** are non-polar.

Reference:

- "Chromatographic Methods" by A. Braithwaite and F.J. Smith, 5th Edition, Page 230.

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20. Lag phase, ---------- found in:

Correct Answer: (a) **Suspension culture**

- **Explanation:**
  - These growth phases are characteristic of **suspension cultures**, where cells grow in a liquid medium:
    - **Lag phase:** Cells adapt to the environment.
    - **Exponential phase:** Rapid cell division.
    - **Stationary phase:** Nutrient depletion halts growth.
    - **Declined growth phase:** Cell death exceeds division.

Reference:

- "Plant Tissue Culture: Theory and Practice" by S.S. Bhojwani and M.K. Razdan, 2nd Edition, Page 312.

21. To ---------- used:

Correct Answer: (c) **Ethidium bromide**

- **Explanation:**
  - **Ethidium bromide (EtBr)** intercalates between DNA bases and fluoresces under UV light, allowing DNA bands to be visualized in gel electrophoresis.

Reference:

- "Molecular Biology of the Cell" by Alberts et al., 6th Edition, Page 337.

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22. Good ---------- under:

Correct Answer: (c) **Schedule T**

- **Explanation:**
  - **Schedule T** under the **Drugs and Cosmetics Act, 1940** specifies guidelines for the manufacture of **AYUSH** (Ayurveda, Yoga, Unani, Siddha, and Homeopathy) drugs, including requirements for premises, equipment, and documentation.

Reference:

- "Drugs and Cosmetics Act and Rules" by Government of India, Latest Edition, Page 198.

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23. Optical ---------- mixture:

Correct Answer: (a) **10%**

- **Explanation:**

To determine the **optical purity**, the difference between the proportions of the two enantiomers is divided by the total proportion, then multiplied by 100.

1. **Step 1: Define proportions of enantiomers**

- Let the proportion of the **levorotatory enantiomer** (major) = x.
- The proportion of the **dextrorotatory enantiomer** (minor) is x−0.1x=0.9x (10% less).

2. **Step 2: Calculate the enantiomeric excess (EE)**
   - EE = x−0.9x = 0.1x
3. **Step 3: Calculate optical purity**
   - Optical purity (%) = $\frac{EE}{\text{total enantiomers}} \times 100 = \frac{0.1x}{x} \times 100 = 10\%$.
4. The major enantiomer constitutes 90%, while the minor is 10%. The optical purity represents the percentage of the mixture that contributes to optical activity, given that only the excess enantiomer contributes to the specific rotation.

Reference:

- "Organic Chemistry" by Morrison and Boyd, 7th Edition, Page 526.

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24. Match ---------- alkaloids:

Correct Answer: (b) **(i)–Q, (ii)–P, (iii)–S, (iv)–R**

- **Explanation:**
  - (i) Tropane → **Scopolamine (Q)**
  - (ii) Indole → **Reserpine (P)**
  - (iii) Quinoline → **Cinchonine (S)**
  - (iv) Phenanthrene → **Codeine (R)**

Reference:

- "Pharmacognosy" by C.K. Kokate, 16th Edition, Page 453.

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25. The ---------- nucleus of:

Correct Answer: (b) Flavanone

- **Explanation:**
  - The given structure represents the **flavanone** nucleus, characterized by a 15-carbon skeleton with a flavonoid backbone that includes a ketone group.

Reference:

- "Natural Products Chemistry" by Gurdeep R. Chatwal, 2nd Edition, Page 224.

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26. The ---------- factor

Correct Answer: (b) Biotin
Explanation
Biotin is often termed the **"intrinsic white injury factor"** because its deficiency in animals leads to white skin lesions, brittle hair, and other symptoms. This term comes from studies on nutritional deficiencies.
Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 1625.

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27. Bicuculline ---------- is

Correct Answer: (a) Competitive Antagonist
Explanation

- **Competitive Antagonist**: Bicuculline is a well-known competitive antagonist of **GABA-A receptors**, blocking the inhibitory action of GABA.
- **Competitive Agonist**: Bicuculline does not activate receptors.
- **Inverse Agonist**: Bicuculline does not produce effects opposite to GABA.
- **None of the above**: Incorrect, as Bicuculline has a clear mechanism.
  Reference: Katzung's Basic and Clinical Pharmacology, 15th Edition, Page 390.

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28. World ---------- established

Correct Answer: (d) 1995
Explanation

- The WTO replaced the General Agreement on Tariffs and Trade (GATT) in 1995.
- It was formed to oversee international trade laws.
  Reference: Essentials of Economics by Paul Krugman, 5th Edition, Page 255.

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29. Purity ---------- with

Correct Answer: (a) Melting point
Explanation

1. **Melting point** is a quick method to assess purity; pure compounds have sharp melting points.
2. Impurities lower and broaden the melting point range.
3. Other parameters like molecular weight or density are not primary tests for purity.
   Reference: Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Page 143.

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30. Hepatotoxic ----------paracetamol

Correct Answer: (a) NABQI
Explanation

- **NABQI**: N-acetyl-p-benzoquinone imine is the hepatotoxic metabolite formed via **CYP2E1-mediated metabolism** of paracetamol. It depletes **glutathione**, leading to liver damage.
- **CYP2E1 Inhibitor**: Incorrect as it refers to enzymes that inhibit NABQI formation.
- **N-Acetylcysteine**: This is an antidote that replenishes glutathione.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 1231.

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31. GABA ---------- the

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

- **Bicuculline**: A competitive antagonist of the **GABA-A receptor**.
- **Saclofen**: A selective antagonist of the **GABA-B receptor**.
- Both are GABA receptor antagonists but target different receptor subtypes.
  Reference: Rang & Dale's Pharmacology, 9th Edition, Page 583.

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32. Yeast ---------- of

Correct Answer: (d) Alcohol
Explanation

- Yeast ferments sugars to produce alcohol (ethanol).
- This is the basis of alcoholic beverage production.
- Yeast is not involved in forming curd, ammonia, or petrol.
  Reference: Biotechnology by B.D. Singh, 1st Edition, Page 154.

---

33. Digitalis ---------- as

Correct Answer: (c) Cardiotonic
Explanation

1. Digitalis (e.g., digoxin) enhances the force of cardiac muscle contraction by inhibiting the **Na+/K+-ATPase pump**.
2. It is not a laxative or hepatoprotective agent.
3. "All of these" is incorrect as its primary use is as a cardiotonic.
   Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 859.

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34. Thiamine ---------- by

Correct Answer: (a) Active transport
Explanation

- Thiamine absorption primarily occurs in the **duodenum** and **proximal jejunum** via **active transport** when intake is low.
- At higher concentrations, passive diffusion occurs.
- Pore transport is not applicable.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 193.

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35. Fish ---------- bases

Correct Answer: (c) Omega-3-fatty acids
Explanation

- Fish oils are high in **Omega-3 fatty acids** such as **EPA (eicosapentaenoic acid)** and **DHA (docosahexaenoic acid)**, which are essential for cardiovascular and brain health.
- Omega-1, Omega-2, and Omega-5 fatty acids are not commonly found or significant in fish oil.
  Reference: Modern Nutrition in Health and Disease by A. Catharine Ross, 11th Edition, Page 522.

36. Pure ---------- antagonist

Correct Answer: (d) All of these
Explanation

- **Nalmefene**, **Naltrexone**, and **Naloxone** are pure opioid antagonists that competitively bind to opioid receptors (mu, kappa, and delta) without activating them.
- They are primarily used to reverse opioid overdose or dependence.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 643.

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37. Principle ---------- chromatography

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

1. **Partition**: Separation is based on solubility differences between the mobile phase (solvent) and the stationary phase (paper).
2. **Adsorption**: Molecules adhere to the stationary phase.
3. Both mechanisms contribute to separation.
   Reference: Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Page 769.

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38. Detector ---------- spectrophotometer

Correct Answer: (a) Photo multiplier tube
Explanation

- The **photo multiplier tube** detects photons by amplifying weak light signals, making it highly sensitive.
- Thermistors and thermocouples are not used in light detection.
  Reference: Principles of Instrumental Analysis by Skoog, 7th Edition, Page 259.

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39. Alkylating ---------- radical

Correct Answer: (a) Procarbazine
Explanation

- **Procarbazine** generates free radicals that damage DNA.
- Lomustine and Dacarbazine act differently, primarily by alkylation or methylation of DNA.
  Reference: Katzung's Basic and Clinical Pharmacology, 15th Edition, Page 993.

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40. Resolution ---------- the

Correct Answer: (b) Wavelength of the light
Explanation

- Resolution depends on the wavelength of light used; shorter wavelengths provide better resolution.
- Lens curvature, light intensity, and aberrations affect image quality but are not the ultimate limit.
  Reference: Essentials of Medical Physiology by Sembulingam, 8th Edition, Page 110.

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41. Humans ---------- because

Correct Answer: (d) Humans lack the proper enzymes
Explanation

- Cellulose is composed of **β-1,4-glycosidic bonds**, which humans cannot break down due to the absence of the enzyme **cellulase**.
- While cellulose is made of glucose (monosaccharides), humans can't access it as energy.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 197.

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42. The ---------- known

Correct Answer: (a) AV node
Explanation

- The **SA node** is the primary pacemaker.
- The **AV node** takes over as the secondary pacemaker if the SA node fails.
- Purkinje fibers and the Bundle of His are conduction pathways, not pacemakers.
  Reference: Essentials of Medical Physiology by Sembulingam, 8th Edition, Page 122.

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43. Coagulase ---------- for

Correct Answer: (a) Staphylococcus
Explanation

- The **coagulase test** differentiates **Staphylococcus aureus** (coagulase-positive) from other coagulase-negative staphylococci.

- Salmonella, Bordetella, and Pneumococcus are identified using different tests.
  Reference: Microbiology by Prescott, 10th Edition, Page 795.

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44. All ---------- prophylaxis

Correct Answer: (d) Serum albumin
Explanation

- **Antitoxins**, **antivenoms**, and **globulin serum** provide passive immunity for prophylaxis.
- **Serum albumin** is a plasma protein used for volume expansion, not for disease prevention.
  Reference: Immunology by Riot, 13th Edition, Page 414.

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45. Mechanical ---------- by

Correct Answer: (d) Creep Test
Explanation

1. **Creep Test** measures deformation under a constant load over time, reflecting mechanical properties.
2. **DSC** measures thermal properties.
3. **XRD** analyzes crystallinity.
4. **AFM** examines surface morphology, not mechanical behavior.
   Reference: Polymer Science by Fred W. Billmeyer, 3rd Edition, Page 158.

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46. Antidote ---------- is

Correct Answer: (b) Protamine Sulphate
Explanation

- **Protamine sulfate** neutralizes the anticoagulant effects of heparin by forming an inactive complex.
- Warfarin, aspirin, and ticlopidine have no role in reversing heparin.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 655.

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47. Reduction ----------due to

Correct Answer: (b) Receptor down regulation
Explanation

- **Beta-2 adrenergic receptors** are down-regulated with prolonged salbutamol use, leading to decreased drug efficacy.
- Upregulation or sensitization would enhance activity, and desensitization is closely related to downregulation.
  Reference: Katzung's Basic and Clinical Pharmacology, 15th Edition, Page 186.

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48. Vit A ---------- contains

Correct Answer: (c) Tween + Lanolin + Ether
Explanation

1. **Tween** acts as an emulsifier.
2. **Lanolin** is used for its moisturizing properties.
3. **Ether** aids in solubilizing active ingredients like salicylic acid.
   Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 1285.

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49. Which ---------- purposes

Correct Answer: (a) Seed
Explanation

- **Plantago seeds**, also known as psyllium, are used as a natural laxative and for treating irritable bowel syndrome.
- Root, bark, and fruit are not used therapeutically in this plant.
  Reference: Pharmacognosy by C.K. Kokate, 50th Edition, Page 421.

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50. Increase in lipase levels is the indication of

Correct Answer: (c) Pancreatitis
Explanation

- Lipase levels rise in **acute pancreatitis** as the pancreas releases excess enzymes into the bloodstream.

- It is not associated with stomatitis, colonic cancer, or hepatitis.
  Reference: Essentials of Medical Biochemistry by Lieberman and Marks, 3rd Edition, Page 365.

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51. DNA ---------- contains

Correct Answer: (b) 5'-3' Polymerase & 3'-5' Exonuclease
Explanation

- **DNA Polymerase II** in prokaryotes has **5'-3' polymerase activity** for DNA synthesis and **3'-5' exonuclease activity** for proofreading.
- It lacks **5'-3' exonuclease** or endonuclease activity.
  Reference: Molecular Biology of the Gene by James Watson, 7th Edition, Page 234.

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52. Which ---------- Schizophrenia

Correct Answer: (b) Anhedonia
Explanation

- **Positive symptoms** include hallucinations, delusions, and disorganized speech or behavior.
- **Anhedonia** (inability to feel pleasure) is a **negative symptom**, not a positive one.
  Reference: Kaplan and Sadock's Synopsis of Psychiatry, 12th Edition, Page 402.

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53. Mannitol ---------- is

Correct Answer: (a) Polyhydroxy alcohol
Explanation

- **Polyhydroxy Alcohols:** These are organic compounds that contain multiple hydroxyl (-OH) groups.
- **Mannitol's Structure:** Mannitol has the chemical formula C6H14O6, indicating six carbon atoms and six hydroxyl groups.
- While mannitol is related to sugars, it's not a monosaccharide. Monosaccharides are simple sugars that cannot be further hydrolyzed into smaller sugars. Mannitol, on the other hand, is a sugar alcohol derived from the reduction of the sugar mannose.
  Reference: Pharmacology by Rang & Dale, 9th Edition, Page 652.

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54. Patent ---------- form

Correct Answer: (a) Elixir

Explanation

- Elixirs are clear, sweetened, aromatic, hydroalcoholic liquids intended for oral use.
- The main ingredients of elixirs are ethyl alcohol (5-40%), water, glycerin or propylene glycol, flavoring agent, coloring agent and some suitable preservative.
- The medicated elixirs usually contain a potent drug such as antibiotics, antihistamines or sedatives. The flavored elixirs are non-medicated and are used as flavors and vehicles.
  Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 878.

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55. Presence ---------- by

Correct Answer: (a) Rothera test
Explanation

1. **Rothera test** detects acetoacetic acid and acetone (ketone bodies) in urine using sodium nitroprusside.
2. Benzidine and Schiff tests detect different compounds, and heat coagulation tests protein.
   Reference: Clinical Biochemistry by Marshall & Bangert, 7th Edition, Page 275.

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56. All ---------- EXCEPT

Correct Answer: (d) Blood volume
Explanation

- Drug distribution depends on **pKa value**, **plasma protein binding**, and **lipid solubility** as they influence permeability, binding, and partitioning.
- Blood volume is not a direct determinant of distribution but affects circulation.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 109.

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57. Copper ---------- is

Correct Answer: (c) d-Penicillamine
Explanation

- **d-Penicillamine** is a chelating agent used to treat **Wilson's disease**, where copper accumulates in tissues.
- BAL (Dimercaprol) is for arsenic and lead toxicity, while Topiramate and Auranofin are unrelated.
  Reference: Katzung's Basic and Clinical Pharmacology, 15th Edition, Page 1106.

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58. Advantage ---------- Chloramphenicol

Correct Answer: (b) Lack of bitter taste
Explanation

1. Chloramphenicol palmitate is a prodrug form with **reduced bitterness**, enhancing patient compliance.
2. It does not improve solubility, lipid solubility, or bioavailability significantly.
   Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 1293.

---

59. HIV ---------- by

Correct Answer: (b) Enveloped RNA virus
Explanation

- HIV is an **enveloped RNA virus** of the **retrovirus family**.
- It uses reverse transcriptase to integrate into the host genome.
  Reference: Medical Microbiology by Patrick R. Murray, 9th Edition, Page 450.

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60. Triterpenes ---------- from

Correct Answer: (d) Six isoprene units
Explanation

S. No.	Class	No. Of isoprene units $(C_5H_8)n$	Molecular formula	Examples
1.	Hemiterpene or isoprene	1	C_5H_8	Isoprene
2.	Monoterpenes or terpenes	2	$C_{10}H_{16}$	Cital, Camphor, Menthol, Limonine, α- Pinene, Nerol
3.	Sesquiterpenes	3	$C_{15}H_{24}$	Farnesol, Zingiberene, Acorone, Eremophilone
4.	Diterpenes	4	$C_{20}H_{32}$	Abietic acid, Phytol
5.	Triterpenes	6	$C_{30}H_{48}$	Amyrin, Squalene

6.	Tetraterpenes or carotenoids	8	$C_{40}H_{64}$	Caratenoid

- **Reference:** Pharmacognosy by C.K. Kokate, 50th Edition, Page 129.

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61. Palmitoleic ---------- acid

Correct Answer: (b) Monounsaturated
Explanation

- **Palmitoleic acid** is a 16-carbon fatty acid with **one double bond** (16:1), making it **monounsaturated**.
- Saturated fatty acids lack double bonds, and polyunsaturated fatty acids have multiple double bonds.
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 194.

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62. The ---------- produce

Correct Answer: (c) Leukotriene E
Explanation

- The **cyclooxygenase (COX) pathway** produces **prostaglandins (PGH, PGI)** and **thromboxanes (TXA)**.
- **Leukotrienes** are produced by the **lipoxygenase pathway**, not the COX pathway.
  Reference: Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th Edition, Page 1050.

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63. As ---------- Schedule

Correct Answer: (d) M
Explanation

1. **Schedule M** of the Drugs and Cosmetics Act prescribes **Good Manufacturing Practices (GMP)** for pharmaceuticals.
2. It includes requirements for premises, equipment, hygiene, and manufacturing practices.
   Reference: Drugs and Cosmetics Act and Rules (India), 2022 Edition, Page 78.

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64. ABC ---------- of

Correct Answer: (c) Carrier proteins
Explanation

- **ABC (ATP-Binding Cassette)** and **SLC (Solute Carrier)** superfamilies are groups of **carrier proteins** responsible for active and facilitated transport across membranes.
- They are not enzymes, receptors, or histones.
  Reference: Molecular Cell Biology by Lodish et al., 8th Edition, Page 324.

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65. Causative ---------- is

Correct Answer: (c) Treponema pallidum
Explanation

- **Treponema pallidum** is a **spirochete bacterium** responsible for **syphilis**, a sexually transmitted infection.
- Other organisms listed cause unrelated diseases.
  - **Trichuris trichuri**: Whipworm (intestinal parasite)
  - **Trichomonas dimanuto**: Incorrect organism name (likely Trichomonas vaginalis, causing trichomoniasis).
  - **Trypanosoma gambiense**: Causes African sleeping sickness.
    Reference: Medical Microbiology by Patrick R. Murray, 9th Edition, Page 463.

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66. 21st ----------acid is

Correct Answer: (a) Selenocysteine
Explanation

- **Selenocysteine** is known as the **21st amino acid** because it is genetically encoded and incorporated into proteins via a special tRNA.
- It contains selenium instead of sulfur (as in cysteine).
  Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 63.

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67. Semi---------- is

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

1. **Arginine** and **Histidine** are considered **semi-essential amino acids** as they are required in greater amounts during periods of rapid growth (e.g., childhood).
2. **Proline** is a non-essential amino acid.
   Reference: Lehninger Principles of Biochemistry, 8th Edition, Page 320.

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68. Cyanobacteria ---------- color

Correct Answer: (a) Blue
Explanation

- Cyanobacteria are also called **blue-green algae** due to their **bluish pigmentation**, which comes from **phycocyanin** and **chlorophyll-a**.
  Reference: Prescott's Microbiology, 10th Edition, Page 416.

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69. At ---------- is

Correct Answer: (c) Immobile
Explanation

- At the **isoelectric point (pI)**, a protein's net charge is **zero**, causing it to remain **stationary** in an electric field as it does not migrate toward either electrode.
  Reference: Biochemistry by Voet & Voet, 4th Edition, Page 765.

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70. Test ---------- is

Correct Answer: (d) All of these
Explanation

- **Icterus index**: Measures the yellowing of plasma due to bilirubin.
- **Van den Bergh reaction**: Differentiates between direct (conjugated) and indirect (unconjugated) bilirubin.
- **Bromosulphalein test**: Evaluates liver function and bilirubin metabolism.
- All tests are used clinically for bilirubin assessment.
  Reference: Clinical Chemistry by Bishop, 7th Edition, Page 265.

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71. Substrate ---------- in

Correct Answer: (b) Glycolysis and Krebs cycle
Explanation

1. **Substrate-level phosphorylation** directly generates ATP during glycolysis and the Krebs cycle by transferring a phosphate group from a substrate to ADP.
2. It does not occur in the **ETC** or the **transition reaction**.
   Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 102.

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72. Which ---------- estimation

Correct Answer: (c) Folin Wu method
Explanation

- **Folin Wu method** is a classical method for blood glucose estimation using a protein-free filtrate and chemical reactions.
- The other methods mentioned are not standard for glucose estimation.
  Reference: Clinical Chemistry by Bishop, 7th Edition, Page 345.

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73. Wikon ---------- of

Correct Answer: (d) selective media
Explanation

- **Selective Media:** These media are specifically designed to inhibit the growth of certain microorganisms while allowing the growth of others. They achieve this by incorporating substances that are toxic or inhibitory to specific groups of microbes.
- **Wilson and Blair Media:** This medium is specifically used to isolate *Salmonella* species, particularly *Salmonella Typhi*. It contains ingredients like brilliant green dye, which inhibits the growth of most Gram-positive bacteria and many other Gram-negative bacteria. Therefore, Wilson and Blair media falls under the category of **selective media**.
- **Reference:** Microbiology by Prescott, 10th Edition, Page 650.

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74. The ---------- A is

Correct Answer: (b) Single strand RNA
Explanation

- Hepatitis A virus (HAV) is a **single-stranded RNA virus** of the Picornaviridae family.
- DNA viruses are not involved in Hepatitis A.
  Reference: Medical Microbiology by Patrick R. Murray, 9th Edition, Page 456.

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75. highly ---------- fluid

Correct Answer: (a) Counter immune electrophoresis
Explanation

- **Counter immune electrophoresis** is used for rapid, sensitive, and semi-quantitative detection of antigens and antibodies in biological fluids.
- Other options are either unrelated or less commonly used for this purpose.
  Reference: Essentials of Immunology by Roitt, 13th Edition, Page 135.

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76. Which ---------- Windows?

Correct Answer: (d) All of the above
Explanation

- **Ctrl + Print Screen**: Captures the entire screen (on some systems).
- **Alt + Print Screen**: Captures the active window.
- **Windows + Print Screen**: Captures the entire screen and saves it directly as a file in the Screenshots folder.
  Reference: Windows 11 User Manual, 2023 Edition, Page 72.

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77. What ---------- computing?

Correct Answer: (b) Starting a computer system
Explanation

- **Booting** is the process of starting a computer, including loading the operating system into memory.
- It involves a sequence of steps like POST (Power-On Self-Test) and initializing hardware.
  Reference: Computer Science Illuminated by Nell Dale, 7th Edition, Page 87.

78. Which ---------- permanently?

Correct Answer: (b) ROM
Explanation

1. **RAM** is volatile, meaning it loses data when power is off.
2. **ROM (Read-Only Memory)** stores data permanently and is used for firmware.
3. Cache and virtual memory are temporary storage mechanisms.
   Reference: Computer Organization and Design by David A. Patterson, 5th Edition, Page 132.

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79. What ---------- networking?

Correct Answer: (b) To connect multiple networks and direct data packets
Explanation

- A **router** connects multiple networks, such as a local network to the internet, and routes data packets to their destinations based on IP addresses.
- It does not store data or act as a server or backup device.
  Reference: Data Communications and Networking by Behrouz A. Forouzan, 5th Edition, Page 431.

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80. The ---------- versions

Correct Answer: (d) Calibri
Explanation

- **Calibri** is the default font in Microsoft Word starting from **Word 2007** to recent versions. It replaced **Times New Roman** as the default font.
  Reference: Microsoft Word User Guide, 2023 Edition, Page 45.

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81. The ---------- number?

Correct Answer: (b) 35
Explanation

1. If the average is 33, the sum of the 5 numbers is: 33×5=165.
2. Let the numbers be x−2,x−1,x,x+1,x+2. Their sum is 5x=165, so x=33.

3. The largest number is x+2=33+2=35.

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82. If ---------- number?

Correct Answer: (c) 400
Explanation

1. Let the original number be x.
2. After a 25% increase, x × 1.25=1.25x
3. After a 20% decrease, 1.25x × 0.8 = 1x. The result is 360.
4. Solving x=360, the original number is x=400.

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83. A man ---------- current?
Correct Answer: (b) 2 km/h
Explanation

1. Find the downstream speed:
- Distance downstream = 12 km
- Time taken downstream = 2 hours
- Downstream speed = Distance / Time = 12 km / 2 hours = 6 km/h

2. Find the upstream speed:
- Distance upstream = 12 km
- Time taken upstream = 3 hours
- Upstream speed = Distance / Time = 12 km / 3 hours = 4 km/h

3. Let:
- Speed of the boat in still water = 'b' km/h
- Speed of the current = 'c' km/h

4. Form equations:
- Downstream speed: b + c = 6
- Upstream speed: b - c = 4

5. Solve the equations:
- Add the two equations: (b + c) + (b - c) = 6 + 4 2b = 10 b = 5 km/h
- Substitute the value of 'b' in either equation: 5 + c = 6 c = 1 km/h

Therefore, the speed of the current is 1 km/h.

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84. The ----------number?

Correct Answer: (b) 72
Explanation

1. The product of two numbers = HCF×LCM
2. 54 × Other number = 18×216
3. Other number = $\frac{18 \times 216}{54}$=72.

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85. A man ---------- income?

Correct Answer: (c) ₹30,000
Explanation

1. Let the income be x. Savings = 40% of x.
2. 0.4x = 12,0000. Solving for xxx:
   x = $\frac{12,000}{0.4}$ = 30,000

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86. If ---------- coded?

Correct Answer: (c) OUNBCK
Explanation

1. Each letter is replaced with the corresponding letter two positions ahead in the alphabet:
   D → D, E → G, L → L, H → J, I → K.
2. Applying the same rule to "MUMBAI":
   M → O, U → U, M → N, B → B, A → C, I → K.
3. The code becomes **OUNBCK**.

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87. A man ---------- now?

Correct Answer: (c) East
Explanation

1. Starting facing **East**:
   - Turning 90° clockwise → **South**.
   - Turning 180° counterclockwise → **North**.
   - Turning 90° clockwise → **East**.

88. What ---------- 19, 29, ?

Correct Answer: (b) 41
Explanation

1. The differences between consecutive numbers are: 6,8,106, 8, 106,8,10.
2. The next difference increases by 2, so 29+12=4129 + 12 = 4129+12=41.
   Reference: Logical Reasoning Concepts by R.S. Aggarwal, 10th Edition, Page 145.

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89. Pointing ---------- Rahul?

Correct Answer: (b) Sister
Explanation

1. Rahul's **grandmother's only daughter** is his **mother**.
2. The girl is the daughter of Rahul's mother, making her his **sister**.
   Reference: Logical Puzzles by Shakuntala Devi, 3rd Edition, Page 78.

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90. Choose ---------- Circle.

Correct Answer: (d) Circle
Explanation

- **Circle** has no sides or angles, while the other shapes (Square, Triangle, Rectangle) have straight sides and angles.
  Reference: Basic Geometry by NCERT, Class 6, Page 34.

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91. The ---------- event?

Correct Answer: (a) Salt March
Explanation

- The **Salt March**, also known as the **Dandi March** (March 12–April 6, 1930), marked the beginning of the **Civil Disobedience Movement**, where Gandhi protested against the British salt tax.
- Other events, like the Quit India Resolution or Bardoli Satyagraha, are associated with different movements.
  Reference: India's Struggle for Independence by Bipan Chandra, Page 265.

92. Which ---------- Prize?

Correct Answer: (a) C.V. Raman
Explanation

- **C.V. Raman** discovered the **Raman Effect** in 1928, which explains the inelastic scattering of light by molecules.
- He received the **Nobel Prize in Physics in 1930**, making him the first Indian to win in science.
  Reference: Modern Physics by Arthur Beiser, 8th Edition, Page 124.

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93. The ---------- India?

Correct Answer: (b) Madras
Explanation

1. The **Ryotwari System** was introduced in **Madras Presidency** by **Thomas Munro**.
2. Land revenue was directly collected from farmers (ryots), bypassing zamindars.
   Reference: A History of Modern India by Bipan Chandra, Page 194.

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94. Who ---------- India?

Correct Answer: (c) Justice Fathima Beevi
Explanation

- **Justice Fathima Beevi** became the first woman judge of the Supreme Court of India in 1989.
- Other judges like Justice Leila Seth and Justice Ruma Pal served in different capacities.
  Reference: Indian Judiciary: Structure and Reforms by P.M. Bakshi, Page 87.

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95. Which ---------- Empire?

Correct Answer: (c) Third Anglo-Maratha War
Explanation

- The **Third Anglo-Maratha War (1817–1818)** led to the **defeat of the Marathas** by the British East India Company, marking the end of their sovereignty.
- Other battles, like Panipat (1761), affected the Marathas but did not signify the empire's end.
  Reference: A History of Modern India by Bipan Chandra, Page 234.

96. Which ---------- 'Untouchability'?

Correct Answer: (d) Article 17
Explanation

- **Article 17** of the Indian Constitution abolishes **untouchability** and forbids its practice in any form.
- Articles 14, 15, and 19 address other fundamental rights like equality and freedom but do not relate to untouchability.
  Reference: The Constitution of India by D.D. Basu, 25th Edition, Page 120.

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97. The ---------- deity?

Correct Answer: (b) Krishna
Explanation

- **Mirabai** was a 16th-century saint-poet deeply devoted to **Lord Krishna**.
- Her compositions express her love and devotion toward Krishna.
  Reference: Bhakti Movement in India by R.N. Sahu, Page 88.

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98. Which ---------- India'?

Correct Answer: (a) Coimbatore
Explanation

- **Coimbatore** is called the **'Manchester of South India'** due to its extensive textile industry and favorable climatic conditions for spinning cotton.
- Tiruppur is famous for knitwear, but Coimbatore holds the title.
  Reference: Indian Economy by Ramesh Singh, 15th Edition, Page 432.

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99. Who ---------- Kanpur?

Correct Answer: (a) Nana Sahib
Explanation

- **Nana Sahib**, the adopted son of Peshwa Baji Rao II, led the **1857 revolt** in Kanpur against the British.

- Tantia Tope was his military associate, while Rani Lakshmibai led the rebellion in Jhansi.
  Reference: History of Modern India by Bipan Chandra, Page 176.

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100. Which ---------- effect?

Correct Answer: (c) Carbon dioxide
Explanation

1. **Carbon dioxide (CO2)** traps heat in the Earth's atmosphere, contributing to the **greenhouse effect**.
2. Other gases like oxygen, nitrogen, and argon are not significant greenhouse gases.
   Reference: Environmental Science by Daniel D. Chiras, 10th Edition, Page 312.