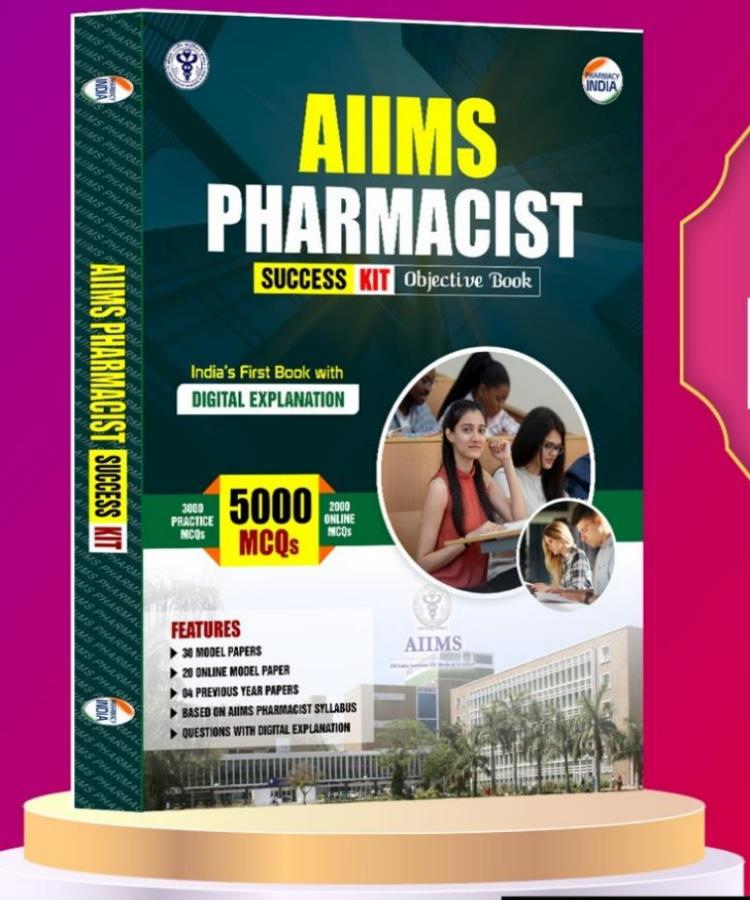
AIIMS CRE

MODEL PAPER-16

DIGITAL EXPLANATION

FOLLOW US



New Book

AIIMS PHARMACIST

SUCCESS KIT Objective Book

FOR PHARMACIST STUDENTS

CALL FOR ORDER

6395596959,
8006781759

COD AVAILABLE

Flipkart

amazon

3000 PRACTICE MCQs | 5000 MCQs | 2000 ONLINE MCQs

FEATURES

- 30 MODEL PAPERS
- BASED ON AIIMS PHARMACIST SYLLABUS
- 04 PREVIOUS YEAR PAPERS
- 20 ONLINE MODEL PAPER
- QUESTIONS WITH DIGITAL EXPLANATION

Model Paper – 16 | Detailed Solutions

1. Which of the ---------- the detection of alkaloids?

Correct Answer: (c) Nessler's reagent
Explanation:

1. **Mayer's reagent** forms a precipitate with alkaloids, making it useful for their detection.
2. **Wagner's reagent** reacts similarly, producing a reddish-brown precipitate.
3. **Dragendorff's reagent** is another classical reagent that forms an orange or red precipitate with alkaloids.
4. **Nessler's reagent** is specific to detecting ammonia or ammonium ions and is **not used for alkaloids**.

Reference:

- "Practical Pharmacognosy" by C.K. Kokate, Chapter 4, p. 32.

---

2. The use of polar ---------- in removing:

Correct Answer: (a) Pigments, sugars, and other organic secondary constituents
Explanation :

- Polar solvents like water dissolve polar impurities, such as pigments and sugars.
- Acidified aqueous solutions enhance this process by increasing solubility.
- This combination is commonly used to clean extracts, removing unwanted polar components while preserving active ingredients.

Reference:

- "Textbook of Pharmacognosy" by Trease and Evans, Chapter 3, p. 45.

---

3. What is the ---------- tops in vinca?

Correct Answer: (d) Before reaching their flowering stage
Explanation:

- **Vinca** contains alkaloids like vincristine and vinblastine, used in cancer treatment.
- These alkaloids are present in the highest concentration **just before flowering**.

- Collecting too early or after flowering reduces the alkaloid content, decreasing its medicinal value.

Reference:

- "Pharmacognosy" by C.K. Kokate, Chapter 2, p. 20.

---

4. The presence of ---------- be detected by:

Correct Answer: (c) Diels-Alder reaction
Explanation:

1. A **conjugated system of double bonds** allows for electron delocalization, making the molecule reactive in specific chemical tests.
2. The **Diels-Alder reaction** is a cycloaddition reaction between a conjugated diene and a dienophile, forming a cyclic product.
3. This reaction is specifically sensitive to conjugated double bonds, making it an ideal test for such systems in terpenoids.
4. Other reactions (e.g., ozonolysis, chromic acid oxidation) are not selective for conjugation and test for different functionalities.

Reference:

- "Advanced Organic Chemistry" by Morrison and Boyd, Chapter 8, p. 273.

---

5. Uric acid on ---------- acid gives:

Correct Answer: (c) Urea and alloxan
Explanation:

1. **Uric acid**, a purine derivative, reacts with **mild nitric acid** during oxidation.
2. This reaction cleaves specific bonds in uric acid, forming **alloxan** (a dihydroxy derivative of pyrimidine) and **urea**.
3. **Alloxan** is known for its role in experimental diabetes research, while **urea** is a common nitrogenous waste product.

Reference:

- "Textbook of Biochemistry" by U. Satyanarayana, Chapter 5, p. 94.

---

6. Theophylline ---------- is:

Correct Answer: (a) 1,3-dimethyl xanthine
Explanation:

Option	Explanation
1,3-dimethyl xanthine	Theophylline belongs to the **methylxanthine class**, acting as a bronchodilator.
1,3-dimethyl uric acid	Incorrect, as uric acid does not belong to the xanthine derivatives.
3,7-dimethyl xanthine	Describes **theobromine**, found in chocolate but different from theophylline.
1,3,7-trimethyl xanthine	Refers to **caffeine**, another methylxanthine, unrelated to theophylline.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 19, p. 283.

---

7. Which is ---------- steroidal nucleus?

Correct Answer: (c) 1,2-cyclopentano phenanthrene
Explanation:

- **Steroids** are organic compounds with a core structure known as the **cyclopentano perhydro phenanthrene nucleus**.
- This structure consists of **three cyclohexane rings** and **one cyclopentane ring** fused together.
- It forms the backbone of important biological molecules like **cholesterol**, **cortisol**, and **sex hormones**.
- Other options, such as pyridine or indole, are unrelated to steroidal compounds.

Reference:

- "Biochemistry" by Lehninger, Chapter 21, p. 345.

---

8. When oestrone is ----------does this show?

Correct Answer: (d) Presence of steroid nucleus
Explanation :

- **Oestrone**, a natural estrogen, has a steroidal structure with aromatic rings.
- When heated with **zinc dust**, it reduces to **chrysene**, confirming the presence of fused aromatic rings (steroidal nucleus).
- This test is used to verify the **steroidal backbone** of oestrone and similar compounds.

Reference:

- "Organic Chemistry" by I.L. Finar, Volume 2, Chapter 12, p. 657.

---

9. Borntrager's test ---------- detection of:

Correct Answer: (b) Anthracene glycosides
Explanation:

- **Mnemonic**: "Borntrager's Bright Anthraquinones."
    - The test detects **anthraquinone derivatives**, a key group in **anthracene glycosides**.
- Test procedure:

1. Hydrolysis of glycosides with dilute acid.
2. Extraction of anthraquinones into an organic solvent like benzene.
3. Addition of an alkali (e.g., NaOH), producing a **pink to red color**, indicating positive results.

Borntrager's test is specific for **anthracene glycosides** and their derivatives.

Reference:

- "Pharmacognosy" by Trease and Evans, Chapter 5, p. 120.

---

10. Drying quality of ---------- characterized by higher:

Correct Answer: (c) Iodine value
Explanation:

1. **Linoleic acid** and **linolenic acid** are polyunsaturated fatty acids with multiple double bonds.
2. The **iodine value** measures the degree of unsaturation in oils or fats.
3. A **high iodine value** reflects the presence of more double bonds, making the oil suitable for drying applications (e.g., paints).

Reference:

- "Principles of Biochemistry" by Nelson and Cox, Chapter 11, p. 272.

---

11. What is ---------- guggul resin?

Correct Answer: (b) Commiphora
Explanation:

- **Guggul** is a resin extracted from the plant **Commiphora mukul**.
- It is known for its medicinal uses, particularly in treating **hyperlipidemia** and **arthritis**.
- Synonyms for guggul include **Commiphora** and **Bdellium**, both used in traditional medicine.

Key Takeaway: Guggul resin is synonymously referred to as **Commiphora**.

Reference:

- "Pharmacognosy" by C.K. Kokate, Chapter 15, p. 401.

---

12. In which class ---------- anti-infective agent?

Correct Answer: (d) Furan derivatives
Explanation:

- **Furacin** (nitrofurazone) is a member of the **furan derivatives** class, known for its broad-spectrum antimicrobial properties.

- It is effective against bacteria by interfering with their enzyme systems, making it suitable for treating wounds and burns.

Example in Practice: Furacin is applied as a topical ointment for infections in burn patients, preventing bacterial growth and promoting healing.

Key Takeaway: Furacin belongs to the **furan derivatives** class, recognized for its potent anti-infective action.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 53, p. 740.

---

13. Which is the ---------- sterilizing agent?

Correct Answer: (c) Propolactone
Explanation:

1. **Propolactone** is a gaseous sterilizing agent that works by **alkylating DNA and proteins**, disrupting microbial cellular functions.
2. It is highly effective for sterilizing **heat-sensitive medical equipment**, ensuring the elimination of bacteria, viruses, and spores.
3. Other agents like dibromsalan or tribromsalan are less effective in sterilization.

Key Takeaway: Propolactone is a widely used gaseous sterilizer for medical tools and surgical instruments.

Reference:

- "Pharmaceutical Microbiology" by Hugo and Russell, Chapter 13, p. 340.

---

14. Cotrimoxazole is ---------- combination of:

Correct Answer: (a) Trimethoprim and sulphonamide
Explanation:

1. **Cotrimoxazole** is a fixed-dose combination of **sulfamethoxazole** (a sulfonamide) and **trimethoprim** (a dihydrofolate reductase inhibitor).

2. This combination exhibits **synergistic activity**, blocking two sequential steps in bacterial folate synthesis.
3. It is widely used to treat **urinary tract infections**, **respiratory tract infections**, and **Pneumocystis jirovecii pneumonia**.

Key Takeaway: Cotrimoxazole combines **sulfamethoxazole and trimethoprim** for effective antimicrobial therapy.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 49, p. 720.

---

15. Griseofulvin is ----------example of:

Correct Answer: (d) Antifungal antibiotic
Explanation :

- **Griseofulvin** is an antifungal agent obtained from **Penicillium species**.
- It works by disrupting **microtubule function**, inhibiting fungal cell division.
- It is specifically used for treating **dermatophytosis**, such as **ringworm** and **athlete's foot**.

Key Takeaway: Griseofulvin is an **antifungal antibiotic**, effective against skin and nail fungal infections.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 57, p. 785.

---

16. The primary mechanism ----------is to inhibit:

Correct Answer: (d) Viral RNA synthesis
Explanation:

1. Hydroxybenzyl benzimidazoles are antiviral agents that specifically target **viral RNA synthesis**.
2. They act by inhibiting the **RNA polymerase enzyme**, essential for the replication of viral RNA genomes.

3. This prevents the production of new viral particles, limiting the infection.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 60, p. 830.

---

17. Hodgkin's disease ---------- treated using:

Correct Answer: (c) Procarbazine
Explanation:

1. **Hodgkin's disease**, a type of lymphoma, is treated using chemotherapy.
2. **Procarbazine** is an alkylating agent that works by damaging DNA, leading to cell death.
3. It is part of the **MOPP regimen** (Mechlorethamine, Vincristine, Procarbazine, Prednisone), a standard treatment protocol for Hodgkin's disease.

Reference:

- "Textbook of Hematology" by Hoffbrand and Moss, Chapter 7, p. 128.

---

18. What does the ---------- pituitary gland release?

Correct Answer: (d) Oxytocin and antidiuretic hormone
Explanation :

- The **posterior pituitary** stores and releases **oxytocin** (stimulates uterine contraction and milk ejection) and **antidiuretic hormone (ADH)** (regulates water balance by acting on the kidneys).
- These hormones are produced by the hypothalamus and transported to the posterior pituitary for storage and release.

Reference:

- "Essentials of Medical Physiology" by Sembulingam and Sembulingam, Chapter 12, p. 156.

---

19. Ethacrynic ---------- acid is:

Correct Answer: (a) Phenoxyacetic acid derivative

Explanation:

Option	Explanation
Phenoxyacetic acid derivative	Correct classification of **ethacrynic acid**, a loop diuretic. It inhibits Na^+, K^+, and Cl^- reabsorption in the kidney.
Benzothiadiazine derivative	Refers to **thiazide diuretics** like hydrochlorothiazide, not ethacrynic acid.
Xanthine derivative	Describes drugs like theophylline, unrelated to ethacrynic acid.
Anthranilic acid derivative	Refers to **NSAIDs**, not diuretics.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 43, p. 610.

---

20. Which of the ---------- effect of heparin?

Correct Answer: (a) Protamine sulphate

Explanation:

- **Heparin** is an anticoagulant that prevents clot formation.
- **Protamine sulphate**, a positively charged protein, binds to negatively charged heparin, neutralizing its anticoagulant effect.
- It is commonly used in surgeries to reverse heparin's effects.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 36, p. 515.

---

21. Which of the ----------lactam antibiotic?

Correct Answer: (a) Amikacin

Explanation:

1. **Beta-lactam antibiotics** (e.g., penicillins, cephalosporins) contain a beta-lactam ring essential for their antibacterial activity.
2. **Amikacin** is an **aminoglycoside**, which lacks a beta-lactam ring and works by inhibiting bacterial protein synthesis.

3. The other options, such as **Tazobactam sodium**, **Sulbactam sodium**, and **Azactam**, are beta-lactam derivatives.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 45, p. 645.

---

22. Which of the ---------- human clinical use?

Correct Answer: (c) Latanoprost

Explanation:

1. **Eicosanoids** are derived from arachidonic acid and play a role in inflammation, pain, and other physiological processes.
2. **Latanoprost** is a prostaglandin analog approved for the treatment of **glaucoma** and **ocular hypertension**. It reduces intraocular pressure by increasing the outflow of aqueous humor through the uveoscleral pathway.
3. **Other options**:
    - **Unoprostone** and **Bimatoprost** are similar but not widely used as first-line therapies.
    - **Prostaglandin E2** is primarily studied in experimental settings rather than routine clinical use.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 47, p. 685.

---

23. Phenacemide is ---------- treatment of:

Correct Answer: (a) Psychomotor epilepsy

Explanation:

1. **Psychomotor epilepsy**:
    - **Phenacemide** is primarily used as a **second-line treatment** for psychomotor epilepsy.

- Psychomotor epilepsy involves **partial seizures** with complex motor activities, often originating in the temporal lobe.
- Phenacemide is reserved for refractory cases due to its **serious adverse effects**, including hematological and hepatic toxicity.

2. **Temporal lobe epilepsy**:
   - While psychomotor epilepsy can involve the temporal lobe, the term refers to a broader classification of epilepsy. First-line drugs like **carbamazepine** or **phenytoin** are preferred over phenacemide for temporal lobe epilepsy.
3. **Grand mal epilepsy**:
   - Grand mal epilepsy, also known as **generalized tonic-clonic seizures**, is treated with drugs like **valproate**, **phenobarbital**, or **phenytoin**. Phenacemide is not effective or commonly used for these seizures.
4. **Petit mal epilepsy**:
   - Also known as **absence seizures**, this condition is best managed with drugs such as **ethosuximide** or **valproate**. Phenacemide is not indicated for petit mal epilepsy.

Reference: Katzung, B. G., Trevor, A. J., & Masters, S. B. (2021). Basic & Clinical Pharmacology (15th ed., pp. 402-405). McGraw-Hill Education.

---

24. Which of the ---------- adrenergic agonist?

Correct Answer: (d) Epinephrine

Explanation:

- **Direct-acting adrenergic agonists** stimulate adrenergic receptors directly, without requiring neurotransmitter release.
- **Epinephrine** acts on **alpha- and beta-adrenergic receptors**, producing:
  - **Alpha effects**: Vasoconstriction, increased blood pressure.
  - **Beta effects**: Increased heart rate (β1) and bronchodilation (β2).
- Other drugs like **Ephedrine** act indirectly by releasing stored neurotransmitters.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 9, p. 131.

---

25. What is the ---------- dose of digoxin?

Correct Answer: (c) 0.125–0.5 mg

Explanation:

1. **Digoxin** is a cardiac glycoside used to treat **heart failure** and **atrial fibrillation**.
2. The maintenance dose depends on factors like patient age, kidney function, and body weight.
3. Typical adult maintenance dose: **0.125–0.5 mg per day**.
4. **Higher doses** can cause toxicity, leading to nausea, visual disturbances, or arrhythmias.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 33, p. 482.

---

26. Naloxone is a ---------- of opioid receptor?

Correct Answer: (b) μ, κ, and δ

Explanation:

1. **Naloxone** is a competitive opioid antagonist that binds to **μ (mu), κ (kappa), and δ (delta)** opioid receptors, preventing or reversing the effects of opioid agonists.
2. It is primarily used to counteract opioid overdose symptoms like **respiratory depression** and **sedation**.
3. While it antagonizes all three receptor types, its strongest affinity is for the **μ-opioid receptor**, responsible for most opioid effects.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 34, p. 495.

---

27. Which of the ---------- calcium channel blockers?

Correct Answer: (a) Diltiazem

Explanation:

Calcium channel blockers (CCBs) reduce calcium entry into cardiac and vascular smooth muscle cells.

1. **Diltiazem** is a non-dihydropyridine CCB that works on both:
    - **Heart**: Reduces heart rate and contractility.
    - **Vessels**: Causes vasodilation, reducing blood pressure.
2. Other options:
    - **Reserpine**: Antihypertensive by depleting neurotransmitters.
    - **Doxazosin**: Alpha-blocker for hypertension.
    - **Atenolol**: Beta-blocker for cardiovascular conditions.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 41, p. 590.

---

28. Which medicinal ---------- maintenance regimens?

Correct Answer: (d) Chlorambucil

Explanation:

1. **Azathioprine**:
    - A **purine synthesis inhibitor** used in autoimmune diseases (e.g., **rheumatoid arthritis**, **inflammatory bowel disease**) and as an adjunct for organ transplantation. However, it is not the **primary agent** in transplant maintenance regimens and is less commonly used than chlorambucil for this purpose.
2. **Methotrexate**:
    - A **folate antagonist**, primarily used for autoimmune diseases like **rheumatoid arthritis** and certain cancers. It is not typically part of transplant maintenance regimens.

3. **Cyclophosphamide**:
    - A **cytotoxic alkylating agent**, used for autoimmune conditions and cancers. It is effective in diseases like **SLE** and **glomerulonephritis**, but its toxic profile limits its use in long-term transplant regimens.
4. **Chlorambucil**:
    - A **slow-acting alkylating agent** used in **transplant maintenance regimens** and for certain autoimmune diseases. Its **immunosuppressive properties** make it effective in preventing transplant rejection, particularly in combination with other immunosuppressants. It has been used for conditions like nephrotic syndrome, where autoimmune mechanisms are involved.

Reference:

Goodman & Gilman's: The Pharmacological Basis of Therapeutics (13th ed., pp. 1170-1173). McGraw-Hill Education.

---

29. Which of the ---------- systemic aminoglycoside?

Correct Answer: (b) Neomycin

Explanation:

Systemic aminoglycosides (e.g., streptomycin, gentamicin, kanamycin) are used for infections like sepsis and endocarditis.

1. **Neomycin** is primarily used **topically** or orally for gut sterilization and is not absorbed systemically.
2. Other options (streptomycin, gentamicin, kanamycin) are true systemic aminoglycosides.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 46, p. 665.

---

30. Bioassay of ---------- performed using:

Correct Answer: (a) Straub's method

Explanation:

1. **Straub's method**:
    - This method is specifically used for the **bioassay of adrenaline**.
    - It involves the contraction of the isolated **rat vas deferens** or other smooth muscles in response to adrenaline. The degree of contraction is measured to estimate the potency of the adrenaline sample.
2. **Rabbit head-drop method**:
    - This method is used for the **bioassay of barbiturates**, not adrenaline. It measures the sedative effects of barbiturates based on the "head-drop" response in rabbits.
3. **Guinea pig method**:
    - This is used for the **bioassay of histamine**. Guinea pigs are sensitive to histamine due to bronchial muscle constriction, but it is not used for adrenaline.
4. **Pigeon method**:
    - This method is commonly used in the **bioassay of digitalis glycosides** by observing the heart rate and rhythm in pigeons, but it is unrelated to adrenaline.

Reference:

Kulkarni, S. K. (2015). *Handbook of Experimental Pharmacology* (4th ed., pp. 97-100). Vallabh Prakashan.

---

31. Which of the ---------- anti-tubercular drug?

Correct Answer: (a) Streptomycin

Explanation :

1. **First-line anti-tubercular drugs** are highly effective and form the backbone of tuberculosis (TB) treatment.
2. **Streptomycin** is an aminoglycoside antibiotic used in combination therapy to treat TB.
3. It works by inhibiting bacterial protein synthesis.
4. Other options like capreomycin, clarithromycin, and azithromycin are second-line drugs or used in special cases.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 52, p. 710.

---

32. Which of the ---------- caused by sulphonamides?

Correct Answer: (c) Kidney stone

Explanation :

- **Sulphonamides** are antibiotics that can crystallize in acidic urine, leading to the formation of **kidney stones**.
- This adverse effect can be minimized by:
    - Adequate hydration.
    - Using **alkalinizing agents** to increase urine pH.
- Other effects, like acute renal failure or ischemia, are less common.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 48, p. 735.

---

33. Which of the ----------cells in the thymus?

Correct Answer: (c) Inducer T-cells

Explanation :

- The **thymus** is the primary site for T-cell development.
- **Inducer T-cells** help in the maturation and differentiation of immature T-cells into functional immune cells.
- Other options like helper T-cells and cytotoxic T-cells are functional subsets of T-cells, not directly involved in their development.

Reference:

- "Immunology" by Abbas and Lichtman, Chapter 6, p. 134.

---

34. Cytokines are ---------- a group of:

Correct Answer: (a) Proteins

Explanation:

Cytokines are small proteins released by cells, especially immune cells, to regulate immunity, inflammation, and hematopoiesis.

1. Examples include:
    - **Interleukins (IL-1, IL-2)** for immune activation.
    - **Tumor necrosis factor (TNF)** for inflammation.
2. Cytokines are not lipids, carbohydrates, or fats.

Reference:

- "Cellular and Molecular Immunology" by Abbas, Chapter 7, p. 152.

---

35. Which of the ---------- phosphate to phosphoenolpyruvate?

Correct Answer: (b) ATP

Explanation:

ATP is the universal energy currency of the cell and donates a high-energy phosphate group to substrates.

1. **Phosphoenolpyruvate (PEP)** is involved in glycolysis, where ATP donates a phosphate group to generate energy.
2. Other molecules like ADP, AMP, and NAD are not high-energy phosphate donors.

Reference:

- "Textbook of Biochemistry" by Satyanarayana, Chapter 6, p. 97.

---

36. Dipalmitoyl lecithin ---------- component of:

Correct Answer: (a) Lung surfactant

Explanation :

- **Dipalmitoyl lecithin** (a type of phospholipid) is the key component of **lung surfactant**, which reduces surface tension in the alveoli and prevents their collapse during exhalation.
- It is critical for normal respiratory function, especially in newborns, where its deficiency leads to **respiratory distress syndrome (RDS)**.

Reference:

- "Textbook of Physiology" by Guyton and Hall, Chapter 37, p. 485.

---

37. Phenylalanine hydroxylase ----------phenylalanine to:

Correct Answer: (d) Tyrosine

Explanation :

1. **Phenylalanine hydroxylase** is an enzyme that catalyzes the hydroxylation of **phenylalanine**, converting it to **tyrosine**.
2. This reaction requires **tetrahydrobiopterin (BH4)** as a cofactor.
3. Tyrosine is a precursor for the synthesis of neurotransmitters like dopamine, norepinephrine, and epinephrine.

Reference:

- "Textbook of Biochemistry" by Satyanarayana, Chapter 5, p. 93.

---

38. What percentage ---------- Krebs cycle?

Correct Answer: (c) 65-70%

Explanation :

1. The **Krebs cycle** (or citric acid cycle) is the central pathway of energy production in the mitochondria.
2. It generates high-energy compounds like **NADH** and **$FADH_2$**, which drive ATP synthesis in the electron transport chain.

3. Approximately **65-70% of cellular ATP** is indirectly derived from the Krebs cycle intermediates.

Reference:

- "Principles of Biochemistry" by Nelson and Cox, Chapter 14, p. 325.

---

39. Which enzymes ---------- acid cycle?

Correct Answer: (a) Citrate synthase, isocitrate dehydrogenase, and alpha-ketoglutarate dehydrogenase

Explanation :

- **Citrate synthase**: Catalyzes the condensation of oxaloacetate and acetyl-CoA to form citrate.
- **Isocitrate dehydrogenase**: A rate-limiting step producing NADH.
- **Alpha-ketoglutarate dehydrogenase**: Another key enzyme generating NADH and regulating cycle flux.

Reference:

- "Textbook of Biochemistry" by Satyanarayana, Chapter 7, p. 110.

---

40. Which enzyme ---------- beta-oxidation?

Correct Answer: (d) Thiolase

Explanation :

1. **Thiolase** catalyzes the condensation of two acetyl CoA molecules to form **acetoacetyl CoA**.
2. This reaction is an early step in the pathway leading to the synthesis of ketone bodies.
3. Other enzymes like HMG CoA lyase or hydroxylase function in later steps of ketogenesis or unrelated pathways.

Reference:

- "Biochemistry" by Lehninger, Chapter 17, p. 445.

41. Estimation of blood ---------- assess renal function.

Correct Answer: (c) Serum creatinine

Explanation :

- **Blood urea** and **serum creatinine** are two primary markers for evaluating kidney function.
- Creatinine, a byproduct of muscle metabolism, is filtered by the kidneys. Elevated levels in the blood indicate impaired kidney function.
- Both tests are routinely used in diagnosing conditions like **acute kidney injury** and **chronic kidney disease**.

Reference:

- "Clinical Chemistry" by Kaplan and Pesce, Chapter 10, p. 234.

---

42. Farber's disease ---------- is due to:

Correct Answer: (b) Ceramidase

Explanation:

1. **Farber's disease** is a rare lysosomal storage disorder caused by a deficiency of the enzyme **ceramidase**.
2. This leads to the accumulation of **ceramide** in tissues, causing joint pain, hoarseness, and subcutaneous nodules.
3. It is inherited in an **autosomal recessive manner** and diagnosed through enzyme activity assays.

Reference:

- "Textbook of Biochemistry" by Satyanarayana, Chapter 15, p. 391.

---

43. What is ---------- Genetic Code?

Correct Answer: (a) It is a set of rules to determine how a nucleotide sequence is converted into an amino acid sequence of a protein.

Explanation :

- The **genetic code** consists of triplet codons in DNA and RNA that specify amino acids.
- Each codon corresponds to one of the 20 standard amino acids.
- It is **universal**, **degenerate**, and **non-overlapping**, ensuring accurate protein synthesis.

Reference:

- "Molecular Biology of the Gene" by Watson, Chapter 8, p. 221.

---

44. Which of the ---------- 200 different antibiotics?

Correct Answer: (b) Streptomyces hygroscopicus

Explanation :

- **Streptomyces hygroscopicus** is a bacterium known for producing a wide variety of antibiotics, including **tetracyclines**, **streptomycin**, and **rifamycin**.
- It is one of the most prolific antibiotic producers in the **Actinobacteria** group.

Reference:

- "Industrial Microbiology" by Casida, Chapter 12, p. 143.

---

45. On the basis ---------- are classified under:

Correct Answer: (a) CNS-depressants

Explanation :

1. **Barbiturates** enhance the effect of **gamma-aminobutyric acid (GABA)**, the primary inhibitory neurotransmitter in the central nervous system (CNS).
2. By binding to the **GABA-A receptor**, barbiturates prolong the opening of chloride channels, leading to hyperpolarization and decreased neuronal excitability.

3. This action classifies them as **CNS-depressants**, used for sedation, anesthesia, and seizure control.
4. Other options:
    - **Anticholinergic agents**: Inhibit acetylcholine and are unrelated to barbiturates.
    - **Antihistaminic agents**: Block histamine receptors, not linked to CNS depression.
    - **Protective agents**: Refers to drugs that prevent damage but does not include barbiturates.

Reference:

"Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 19, p. 289.

---

46. Which of the ---------- Williams devise?

Explanation:

1. **Oakley-Fulthorpe procedure**:
    - This method, developed by **Grabar and Williams**, is a **double diffusion technique** in a gel used to study **antigen-antibody interactions**.
    - It is used to analyze the formation of precipitin lines between antigens and antibodies, helping to determine their **specificity and interaction patterns**.
2. **Ouchterlony procedure**:
    - Although it is also a **double immunodiffusion technique**, it was not devised by Grabar and Williams but by **Orjan Ouchterlony**. This method is distinct from the Oakley-Fulthorpe procedure.
3. **Radial immunodiffusion**:
    - This technique was developed by **Mancini et al.**, and it quantifies antigens by their radial diffusion in a gel containing antibodies. It is unrelated to Grabar and Williams.
4. **Oudin procedure**:
    - The Oudin procedure is a **single diffusion technique** in which antigen diffuses into a gel containing antibodies. This was not created by Grabar and Williams.

Reference:

Tizard, I. R. (2018). *Immunology: An Introduction* (9th ed., pp. 74-76). Elsevier.

---

47. For the purification ---------- of protein can:

Correct Answer: (a) Lower the efficiency of bactericidal agent

Explanation :

1. Proteins in the lymph can interfere with the **bactericidal agents**, reducing their efficiency in killing contaminants during vaccine production.
2. Using a solvent like **trichlorotrifluoroethane** helps in removing these proteins and purifying the vaccine.
3. This step ensures the vaccine's sterility and effectiveness.

Reference:

- "Pharmaceutical Microbiology" by Hugo and Russell, Chapter 15, p. 370.

---

48. 17D strain is ---------- attenuated strain of:

Correct Answer: (d) Yellow fever virus

Explanation :

- The **17D strain** is a live attenuated vaccine strain of the **yellow fever virus**, developed for immunization.
- It provides long-term protection against yellow fever by inducing a strong immune response without causing the disease.

Reference:

- "Vaccinology" by Stanley Plotkin, Chapter 19, p. 412.

---

49. Jail fever ---------- is caused by:

Correct Answer: (b) Rickettsia prowazekii

Explanation:

- **Jail fever** (or epidemic typhus) is caused by **Rickettsia prowazekii**, a bacteria transmitted by body lice.
- Symptoms include high fever, rash, and severe headache.
- It was historically associated with crowded and unhygienic conditions, such as prisons.

Reference:

- "Textbook of Microbiology" by Ananthanarayan and Paniker, Chapter 8, p. 143.

---

50. Weil's disease ---------- known as:

Correct Answer: (c) Spirochetal jaundice

Explanation :

- **Weil's disease** is a severe form of leptospirosis caused by **Leptospira interrogans**.
- It is also called **spirochetal jaundice** due to the spirochete bacteria's involvement and symptoms like jaundice, kidney damage, and fever.

Reference:

- "Textbook of Microbiology" by Ananthanarayan and Paniker, Chapter 11, p. 188.

---

51. Which of the ---------- assay of erythromycin?

Correct Answer: (a) Micrococcus luteus

Explanation :

1. **Erythromycin** is a macrolide antibiotic tested for potency using **Micrococcus luteus** as the test organism.
2. The organism is highly sensitive to erythromycin, and its growth inhibition is used to determine the antibiotic's concentration.

Reference:

- "Pharmaceutical Microbiology" by Hugo and Russell, Chapter 12, p. 298.

52. Which assay ---------- for Neomycin?

Correct Answer: (c) Cylinder plate method

Explanation :

1. The **cylinder plate method** is used to determine the potency of antibiotics like **neomycin**.
2. The method involves:
    - Pouring an agar medium seeded with a sensitive microorganism into a petri dish.
    - Placing cylinders or wells on the agar and adding antibiotic solutions of known and unknown concentrations.
    - Measuring the **zone of inhibition** around the cylinders to calculate potency.
3. Other methods, like the pour plate or surface spread, are less accurate for such assays.

Reference:

- "Pharmaceutical Microbiology" by Hugo and Russell, Chapter 12, p. 302.

---

53. Practically all mesophilic ---------- moist heat at:

Correct Answer: (c) 60°C for 30 minutes

Explanation:

1. **Mesophilic non-sporing bacteria**:
    - These bacteria are heat-sensitive and do not produce spores, which makes them easier to kill with moist heat compared to spore-forming bacteria.
2. **Effect of moist heat**:
    - Moist heat at **60°C** for **30 minutes** is sufficient to kill **practically all mesophilic non-sporing bacteria** by denaturing their proteins and disrupting cellular structures.
    - This time-temperature combination is a widely used standard for sterilization of heat-sensitive solutions and biological samples.

3. **Options analysis**:
    - **(a) 60°C for 60 minutes**: While effective, this is an unnecessarily prolonged exposure time for non-sporing bacteria.
    - **(b) 80°C for 5 minutes**: While higher temperatures reduce the required time, 80°C is generally more than needed to kill mesophilic non-sporing bacteria.
    - **(c) 60°C for 30 minutes**: This is the optimal balance of time and temperature to effectively kill mesophilic non-sporing bacteria without excessive heat.
    - **(d) 70°C for 20 minutes**: Although effective, this temperature and time combination may not be the most practical for certain laboratory or industrial purposes.

Reference:

Pelczar, M. J., Chan, E. C. S., & Krieg, N. R. (2001). *Microbiology* (5th ed., pp. 119-121). McGraw-Hill Education.

---

54. Which of the ---------- used for sterilization?

Correct Answer: (d) Infrared radiation

Explanation:

- **Non-ionizing radiation** (e.g., infrared and ultraviolet) does not produce ionization but generates heat or energy to kill microbes.
- **Infrared radiation** sterilizes by producing intense heat, effective for glassware and metal instruments.
- Other options like cosmic rays, X-rays, and gamma rays are ionizing radiation.

Reference:

- "Pharmaceutical Microbiology" by Hugo and Russell, Chapter 13, p. 310.

---

55. Which of the ---------- for chronic hepatitis?

Correct Answer: (c) Ampicillin

Explanation:

1. **Methyl dopa**:
    - **Methyl dopa** is a known cause of **chronic hepatitis**, particularly **autoimmune-like hepatitis**, due to its effects on the immune system.
2. **Paracetamol**:
    - **Paracetamol** causes **acute liver injury**, not chronic hepatitis, as its toxicity is dose-dependent and linked to the production of **toxic metabolites (NAPQI)**. However, it is not relevant to chronic liver damage.
3. **Ampicillin**:
    - **Ampicillin**, though associated with hypersensitivity reactions or **mild liver injury**, is not recognized as a causative agent for **chronic hepatitis**. Its liver-related side effects are usually transient and cholestatic, rather than causing long-term damage.
4. **Isoniazid**:
    - **Isoniazid** is a well-established cause of **chronic hepatitis** through both **idiosyncratic reactions** and **toxic metabolites** that damage the liver over time.

Reference:

Katzung, B. G., Trevor, A. J., & Masters, S. B. (2021). *Basic & Clinical Pharmacology* (15th ed., pp. 648-650). McGraw-Hill Education.

---

56. Which of the ----------Johnson syndrome?

Correct Answer: (a) The skin becomes hemorrhagic and serious ocular lesions

Explanation:

Stevens-Johnson syndrome (SJS) is a severe immune-mediated reaction triggered by drugs like sulfonamides or NSAIDs.

1. Symptoms include:
    - **Hemorrhagic skin lesions**.
    - Severe **ocular involvement**, such as conjunctivitis and corneal damage.

2. It is a medical emergency requiring immediate discontinuation of the offending drug.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 61, p. 825.

---

57. Which adverse effect ---------- impaired renal function?

Correct Answer: (c) Ototoxicity

Explanation:

- **Ethacrynic acid**, a loop diuretic, can cause **ototoxicity** (damage to the inner ear) in patients, particularly those with renal impairment.
- The risk increases due to the accumulation of the drug, leading to hearing loss or tinnitus.
- It is more ototoxic compared to other loop diuretics like furosemide.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 43, p. 613.

---

58. The route ---------- warfarin is:

Correct Answer: (d) Oral and intravenous

Explain-All:

- **Oral**: Warfarin is primarily administered **orally** as it has excellent bioavailability and is used for long-term anticoagulation therapy.
- **Intravenous (IV)**: Warfarin can also be administered **intravenously** in specific cases, such as when rapid anticoagulation is required or when oral administration is not feasible.

Reference: **Katzung, B. G., & Trevor, A. J. (2021).** *Basic & Clinical Pharmacology* (15th ed., pp. 597-599). McGraw-Hill Education.

---

59. Which of the ---------- idiosyncratic reaction?

Correct Answer: (b) Anaphylaxis in patients receiving penicillin

Revised Explanation:

1. **(a) Vaginal adenocarcinoma in girls with prolonged use of stilboestrol**:
    - This is **not idiosyncratic** because it is a **predictable and dose-dependent** adverse effect of diethylstilbestrol (stilboestrol), resulting from its known teratogenicity.
2. **(b) Anaphylaxis in patients receiving penicillin**:
    - This is **not considered an idiosyncratic reaction**, as it is a well-characterized **allergic hypersensitivity reaction** (Type I hypersensitivity). Anaphylaxis results from immune system activation, making it **immunological in nature** rather than idiosyncratic.
3. **(c) Uterine cancer with prolonged use of oestrogen**:
    - This is a **predictable carcinogenic effect** of oestrogen due to its long-term hormonal action on uterine tissue, not idiosyncratic.
4. **(d) Lymphoid tumors in patients receiving long-term immunosuppressive therapy with azathioprine**:
    - This is also **not idiosyncratic** but a **dose-dependent and predictable adverse effect**, as it results from the immunosuppressive action of azathioprine.

Key Insight:

An **idiosyncratic reaction** is an **unpredictable** and **individual-specific adverse reaction**, often unrelated to the drug's known pharmacological effects. Anaphylaxis is a **predictable hypersensitivity reaction**, not idiosyncratic.

Reference:

Goodman & Gilman's: The Pharmacological Basis of Therapeutics (13th ed., pp. 632-634). McGraw-Hill Education.

---

60. Which of the ---------- clinical pharmacist?

Correct Answer: (d) To counsel patients on disease and the prescribed drug therapy

Explanation:

- The role of a **clinical pharmacist** includes:
    - Providing drug-related information to patients and healthcare professionals.
    - Monitoring drug therapy and ensuring safe medication use.
    - **Counseling patients** about their disease and medication to improve compliance and outcomes.

Reference:

- "Clinical Pharmacy and Therapeutics" by Roger Walker, Chapter 1, p. 5.

---

61. Grapefruit juice has ---------- therapeutic activity of:

Correct Answer: (a) Calcium channel blockers

Explanation:

- **Grapefruit juice** inhibits the enzyme **CYP3A4**, which metabolizes many drugs, including calcium channel blockers like nifedipine and amlodipine.
- This increases drug levels in the blood, enhancing their therapeutic (and sometimes toxic) effects.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 41, p. 591.

---

62. Antitussives are ---------- opioids that:

Correct Answer: (d) Depress the cough center

Explanation:

Antitussives like codeine and dextromethorphan work by **depressing the cough center** located in the medulla oblongata.

- This reduces the frequency and intensity of coughing, providing relief from persistent dry coughs.
- These drugs are most effective for **non-productive coughs**.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 50, p. 745.

---

63. Which of ---------- additive hypoprothrombinemic effects?

Correct Answer: (c) Quinidine

Explain-All:

1. **Quinidine**:
    - Quinidine, a **stereoisomer of quinine**, can interact with anticoagulants and cause **bleeding** due to an **additive hypoprothrombinemic effect**.
    - It affects the **liver metabolism of clotting factors** or interacts with medications such as warfarin, increasing the risk of bleeding.
2. **Quinine**:
    - While quinine has some antithrombotic effects, it is **not directly associated with hypoprothrombinemia** or significant interactions leading to bleeding.
3. **Cinchonine**:
    - Cinchonine is another alkaloid related to quinine but does not have documented hypoprothrombinemic effects or significant interaction with anticoagulants.
4. **Cinchonidine**:
    - Cinchonidine is similar to cinchonine and quinine but does not play a role in **causing additive hypoprothrombinemic effects**.

Reference:

Katzung, B. G., Trevor, A. J., & Masters, S. B. (2021). *Basic & Clinical Pharmacology* (15th ed., pp. 658-660). McGraw-Hill Education.

---

64. Which of the ---------- high-fat dinner?

Correct Answer: (d) Griseofulvin

Explanation:

1. **Griseofulvin**, an antifungal agent, is better absorbed in the presence of dietary fat.
2. Absorption is maximized with a **high-fat breakfast** because it stimulates bile secretion, enhancing drug solubility and uptake.
3. Administering it at other times, such as with a high-fat dinner, may reduce absorption due to altered gastric emptying and bile dynamics.

Reference:

- "Essentials of Medical Pharmacology" by K.D. Tripathi, Chapter 57, p. 784.

---

65. Which of the ---------- cholesterol-lowering foods?

Correct Answer: (a) They decrease cholesterol absorption and reduce LDL

Explain-All:

1. **Stress and cholesterol-lowering foods**:
   - These foods, such as those rich in **plant sterols/stanols**, **soluble fiber** (e.g., oats, barley), and **nuts**, work to reduce cholesterol levels.
2. **Mechanism**:
   - They **decrease cholesterol absorption** in the intestine by competing with dietary cholesterol for absorption sites, effectively lowering the amount of cholesterol that enters the bloodstream.
   - This results in a reduction of **LDL (low-density lipoprotein)** cholesterol, which is the "bad cholesterol" associated with cardiovascular risks.
3. **Options analysis**:
   - **(a) They decrease cholesterol absorption and reduce LDL**: This is correct, as these foods block cholesterol absorption and lower LDL levels.
   - **(b) They increase excretion of cholesterol and reduce LDL**: While soluble fibers can increase excretion of bile acids (indirectly helping with LDL reduction), the primary mechanism involves reducing cholesterol absorption.
   - **(c) They increase cholesterol absorption and reduce LDL**: This is incorrect because increased absorption would raise cholesterol levels, not reduce LDL.

- **(d) They increase cholesterol absorption and increase HDL**: This is incorrect; cholesterol-lowering foods focus on **reducing LDL**, and their effect on HDL is minimal.

Reference:

Brunzell, J. D., Davidson, M., Furberg, C. D., et al. (2008). *Lipoprotein management in cardiovascular disease: Guidelines and mechanisms*. JAMA.

---

66. Which analytical ---------- TDM laboratory?

Correct Answer: (d) Titrimetric method

Explanation:

1. **Therapeutic Drug Monitoring (TDM)** requires highly sensitive and specific methods to measure drug concentrations in the blood.
2. Techniques like **HPLC** and **Gas Chromatography** are ideal due to their precision.
3. **Titrimetric methods** lack sensitivity and are unsuitable for low drug concentrations typically measured in TDM.

Reference:

- "Clinical Chemistry" by Kaplan and Pesce, Chapter 15, p. 345.

---

67. What does ---------- rearrangement involve?

Correct Answer: (a) Migration of γ-hydrogen atom followed by cleavage of β bond

Explanation:

1. The **McLafferty rearrangement** is a characteristic reaction in mass spectrometry.
2. It involves:
    - **Migration of a γ-hydrogen atom** (from the third carbon away from the carbonyl group).
    - Simultaneous cleavage of the **β-carbon bond**.

3. This results in the formation of a stable **enol ion** and is often used to identify compounds with carbonyl functional groups.

Reference:

- "Organic Chemistry" by Morrison and Boyd, Chapter 19, p. 653.

---

68. What is quantum ---------- yield fluorescence?

Correct Answer: (c) Ratio of number of molecules that fluoresce to the total number of excited molecules

Explanation:

1. **Quantum yield fluorescence** is the efficiency of fluorescence emission in relation to the number of molecules excited.
2. It is calculated as:
   Quantum Yield=Number of molecules that fluoresceTotal number of excited molecules\text {Quantum Yield} = \frac {\text {Number of molecules that fluoresce}}{\text {Total number of excited molecules}}
   Quantum Yield=Total number of excited moleculesNumber of molecules that fluoresce
3. A high quantum yield indicates a highly efficient fluorescence process.

Reference:

- "Principles of Fluorescence Spectroscopy" by Lakowicz, Chapter 3, p. 85.

---

69. Atoms that are ---------- wavelengths due to:

Correct Answer: (d) Doppler shift

Explanation:

- The **Doppler shift** occurs when atoms or molecules move toward the detector, compressing the emitted light waves.
- This results in a **shorter wavelength** (blue shift) due to the relative motion of the emitting particles.

- This phenomenon is observed in spectroscopic studies.

Reference:

- "Spectroscopy" by Banwell and McCash, Chapter 4, p. 129.

---

70. Which of the ---------- absorb infrared radiation?

Correct Answer: (d) O_2

Explanation:

Infrared absorption occurs when a molecule undergoes **vibrational or rotational changes** involving dipole moment variations.

- **Oxygen (O_2)** lacks a permanent dipole moment and does not absorb infrared radiation.
- Other compounds like **SO_2** and **CO_2** have dipole moments, making them IR-active.

Reference:

- "Fundamentals of Molecular Spectroscopy" by C.N. Banwell, Chapter 6, p. 154.

---

71. Which of the following is not a double resonance technique?

Correct Answer: (c) Isotopic substitution

Explanation:

1. **Double resonance techniques** involve simultaneous application of two different frequencies to study interactions between nuclear or electronic spins.
2. Techniques like **spin decoupling**, **spin tickling**, and **nuclear Overhauser effect** fall under this category.
3. **Isotopic substitution**, however, is a technique used in structural analysis, not a double resonance method.

Reference:

- "NMR Spectroscopy: Principles and Applications" by James Keeler, Chapter 7, p. 210.

---

72. Which of the ---------- Geiger tube?

Correct Answer: (b) Methane

Explanation:

1. A **Geiger-Müller tube** detects ionizing radiation by amplifying ionization events into detectable electrical pulses.
2. **Quenching gases** like methane or argon-methane mixtures are added to:
    - Stop continuous discharge.
    - Absorb excess energy and stabilize the system after each ionization event.
3. Methane is preferred for its high efficiency and stability.

Reference:

- "Radiation Detection and Measurement" by Glenn Knoll, Chapter 6, p. 184.

---

73. To achieve 3000°---------- used should be:

Correct Answer: (d) Acetylene-oxygen

Explanation:

1. **Flame photometry** relies on the excitation of atoms in a flame to measure their emission spectrum.
2. A flame temperature of **3000°C** is achieved using **acetylene-oxygen**, which provides a highly energetic combustion.
3. Other fuel combinations, like propane-air or hydrogen-air, produce lower flame temperatures, making them unsuitable for high-energy requirements.

Reference:

- "Principles of Instrumental Analysis" by Skoog, Holler, and Crouch, Chapter 10, p. 540.

---

74. Which type of ---------- current-voltage curve?

Correct Answer: (c) Kirchhoff's current

Explanation:

- **Kirchhoff's current law** deals with the conservation of electric current at a junction and is unrelated to current-voltage curves.
- Other currents like **residual current**, **migration current**, and **kinetic current** are seen in electrochemical analyses and impact the curve.

Reference:

- "Electrochemistry: Principles and Applications" by Christopher Brett, Chapter 4, p. 125.

---

75. How can column ---------- efficiency be improved?

Correct answer: (a) By increasing the length and width ratio of the column

Explanation:

1. **Column Efficiency**:
   - Column efficiency is often expressed as the **number of theoretical plates (N)**, which reflects how well the column separates components in a mixture.
   - A high **length-to-width ratio** improves the resolution by enhancing the interactions between the mobile and stationary phases.
2. **Effect of Increasing the Length-to-Width Ratio**:
   - **Increasing the column length** increases the number of theoretical plates, allowing better separation of analytes.
   - **Reducing the width** improves efficiency by minimizing band broadening, which helps maintain sharp, well-separated peaks.
3. **Options Analysis**:
   - **(a) By increasing the length and width ratio of the column**: Correct, as increasing this ratio improves separation by enhancing efficiency while reducing peak broadening.
   - **(b) By increasing the length of the column**: While length increase improves separation, it is most effective when paired with a proportional adjustment in the width.

- **(c) By increasing the width of the column**: This increases capacity but negatively impacts efficiency by increasing band broadening.
- **(d) By decreasing the length of the column**: Reducing column length decreases the number of theoretical plates, lowering separation efficiency.

Reference:

Skoog, D. A., Holler, F. J., & Crouch, S. R. (2018). *Principles of Instrumental Analysis* (7th ed., pp. 745-750). Cengage Learning.

---

76. Which key is used to delete text to the left of the cursor?

- **Correct Answer:** (b) Backspace
- **Explanation:**
  - The **Backspace key** deletes text or characters to the left of the cursor.
  - The **Delete key**, in contrast, removes text to the right.
- **Reference:** Computer Fundamentals by P.K. Sinha, Chapter 2, Page 35.

---

77. Which part of the computer is responsible for performing calculations and logical operations?

- **Correct Answer:** (b) Arithmetic Logic Unit (ALU)
- **Explanation:**
  - The **Arithmetic Logic Unit (ALU)** performs all arithmetic (e.g., addition, subtraction) and logical (e.g., AND, OR) operations.
  - The **Control Unit** manages instructions but doesn't handle calculations.
- **Reference:** Computer Organization and Architecture by William Stallings, Chapter 1, Page 18.

---

78. Which protocol is used to send emails?

- **Correct Answer:** (c) SMTP

- **Explanation:**
  - **Simple Mail Transfer Protocol (SMTP)** is used for sending emails.
  - Other options:
    - **HTTP**: For browsing web pages.
    - **FTP**: For file transfers.
    - **IP**: For data delivery on the internet.
- **Reference:** Data Communications and Networking by Behrouz A. Forouzan, Chapter 26, Page 687.

---

79. What is the binary representation of the decimal number 5?

- **Correct Answer:** (a) 101
- **Explanation:**
  - Binary is a base-2 system.
  - Decimal 5 converts to binary as $2^2 + 0 \cdot 2^1 + 2^0 = 101$
- **Reference:** Digital Logic and Computer Design by M. Morris Mano, Chapter 3, Page 57.

---

80. Which port is commonly used for connecting printers to a computer?

- **Correct Answer:** (a) USB
- **Explanation:**
  - Modern printers typically use **USB ports** for faster and more reliable connections.
  - Older printers used **parallel ports** or **serial ports**.
- **Reference:** Computer Hardware and Networking by Dinesh Maidasani, Chapter 5, Page 102.

---

81. Find the missing number in the series: 2, 4, 8, 16, ?

- **Correct Answer:** (b) 32
- **Explanation:**
  - The series doubles each time: 2, 4, 8, 16, 32.
- **Reference:** Quantitative Aptitude by R.S. Aggarwal, Chapter 8, Page 129.

---

82. If A = 1, B = 2, C = 3, what is the value of G + D?

- **Correct Answer:** (b) 11
- **Explanation:**
  - **G = 7** and **D = 4**, so G + D = 7 + 4 = 11
- **Reference:** Logical Reasoning by Arun Sharma, Chapter 4, Page 87.

---

83. Find the odd one out: Apple, Banana, Carrot, Mango.

- **Correct Answer:** (c) Carrot
- **Explanation:**
  - **Carrot** is a **vegetable**, while the other options are **fruits**.
- **Reference:** General Knowledge Manual by Pearson, Chapter 3, Page 42.

---

84. If 5 + 3 = 28, 6 + 2 = 48, then what is 7 + 1?

- **Correct Answer:** (b) 78
- **Explanation:**
  - The pattern is x + y = x·10 + y
  - For 7 + 1: 7·10 + 1 = 78
- **Reference:** Mental Math by Abhijit Guha, Chapter 6, Page 53.

---

85. Which word will come second in a dictionary?

- **Correct Answer:** (b) Abandon
- **Explanation:**
    - Dictionary order: **Abandon, Able, Abroad, Above**.
- **Reference:** Word Power Made Easy by Norman Lewis, Appendix A.

---

86. A shopkeeper sold an item for ₹1,200 at a loss of 20%. What was the cost price?

Correct Answer: (b) ₹1,500

Explanation:

- **Calculate the Loss Amount:**
    - **Loss Percentage:** 20%
    - **Loss Amount:** (20/100) * CP
- **Set Up the Equation:**
    - **Selling Price (SP) = Cost Price (CP) - Loss Amount**
    - ₹1,200 = CP - (20/100) * CP
    - ₹1,200 = CP * (1 - 0.20)
    - ₹1,200 = CP * 0.80
- **Solve for the Cost Price (CP):**
    - CP = ₹1,200 / 0.80
    - CP = ₹1,500

Therefore, the cost price of the item was ₹1,500.

- **Reference:** Quantitative Aptitude by R.S. Aggarwal, Chapter 11, Page 210.

---

87. If a train covers 120 km in 2 hours, what is its speed?

- **Correct Answer:** (b) 60 km/h
- **Explanation:**

- Speed = Distance ÷ Time = 120/2 = 60 km/h

- **Reference:** Physics by H.C. Verma, Chapter 3, Page 26.

---

88. What is the next number in the sequence 2, 6, 12, 20, 30, ?

- **Correct Answer:** (b) 42
- **Explanation:**
  - The pattern is $n^2 + n$: $1^2 + 1, 2^2 + 2, 3^2 + 3, \ldots$.
  - Next: $6^2 + 6 = 42$
- **Reference:** Quantitative Aptitude by R.S. Aggarwal, Chapter 8, Page 135.

---

89. A man buys 5 pens for ₹50. What is the cost of 8 pens?

- **Correct Answer:** (b) ₹80
- **Explanation:**
  - Cost of one pen = 50/5 = 10
  - Cost of 8 pens = 8·10 = 80
- **Reference:** Basic Arithmetic by Dr. Ram Singh, Chapter 4, Page 90.

---

90. 75% of 240?

- **Correct Answer:** (d) 180
- **Explanation:**
  - 75% = $\frac{75}{100}$, so $\frac{75}{100} \cdot 240 = 180$
- **Reference:** Quantitative Aptitude by R.S. Aggarwal, Chapter 2, Page 40.

---

91. Which Indian state has the highest number of Lok Sabha seats?

- **Correct Answer:** (c) Uttar Pradesh
- **Explanation:**
  - Uttar Pradesh has **80 Lok Sabha seats**, which is the highest among all Indian states.
  - The number of seats is based on population and the territorial extent of the state.
- **Reference:** Indian Polity by M. Laxmikanth, Chapter 25, Page 452.

---

92. Which Article of the Indian Constitution deals with the right to equality?

- **Correct Answer:** (a) Article 14
- **Explanation:**
  - Article 14 of the Indian Constitution guarantees **equality before the law** and **equal protection of the laws** for all citizens.
  - This forms a core part of the **Fundamental Rights** under Part III.
- **Reference:** The Constitution of India by P.M. Bakshi, Part III, Page 39.

---

93. Which Indian state is the largest producer of coffee?

- **Correct Answer:** (c) Karnataka
- **Explanation:**
  - Karnataka produces over **70% of India's coffee**, primarily in regions like Chikmagalur and Coorg.
  - Kerala and Tamil Nadu are also significant producers.
- **Reference:** Indian Geography by Majid Husain, Chapter 14, Page 317.

---

94. Who was the first Indian woman to become the President of the United Nations General Assembly?

- **Correct Answer:** (b) Vijaya Lakshmi Pandit
- **Explanation:**
  - Vijaya Lakshmi Pandit served as the **President of the UNGA** in **1953**, making her the first woman to hold this prestigious position.
  - She was a diplomat and sister of Jawaharlal Nehru.
- **Reference:** Indian History by Bipan Chandra, Chapter 34, Page 412.

---

95. In which year did India adopt its national flag?

- **Correct Answer:** (b) 1947
- **Explanation:**
  - The **Indian National Flag** was adopted on **July 22, 1947**, shortly before India gained independence.
  - It was designed by Pingali Venkayya.
- **Reference:** Modern Indian History by B.L. Grover, Chapter 20, Page 290.

---

96. Which Indian state has the highest literacy rate according to the 2011 census?

- **Correct Answer:** (a) Kerala
- **Explanation:**
  - Kerala recorded a literacy rate of **93.91%**, the highest in the 2011 Census.
  - It is followed by states like Lakshadweep and Mizoram.
- **Reference:** Census of India 2011 Report, Chapter 5, Page 12.

---

97. Which dance form is associated with the state of Andhra Pradesh?

- **Correct Answer:** (c) Kuchipudi
- **Explanation:**

- **Kuchipudi** is a classical dance form originating from Andhra Pradesh, characterized by its **graceful movements** and **expressive storytelling**.

- **Reference:** Indian Dance by Sunil Kothari, Chapter 7, Page 145.

---

98. Who was the first Governor-General of independent India?

- **Correct Answer:** (b) Lord Mountbatten
- **Explanation:**
  - Lord Mountbatten served as the **first Governor-General** of independent India from **1947 to 1948**.
  - He played a key role in the partition and independence process.
- **Reference:** Freedom at Midnight by Dominique Lapierre and Larry Collins, Chapter 16.

---

99. Who was the first Indian to travel to space?

- **Correct Answer:** (a) Rakesh Sharma
- **Explanation:**
  - Rakesh Sharma became the **first Indian astronaut** in **1984** aboard the **Soyuz T-11** spacecraft.
  - His famous words to Indira Gandhi were, "Saare Jahan Se Achha."
- **Reference:** India's Space Journey by Dr. R. Aravamudan, Chapter 8, Page 85.

---

100. Which is the oldest mountain range in India?

- **Correct Answer:** (b) Aravalli Range
- **Explanation:**
  - The **Aravalli Range** is the oldest mountain range in India, dating back to **the Precambrian era**, over 2.5 billion years ago.
  - It stretches across Rajasthan, Haryana, and Gujarat.

- **Reference:** Physical Geography by Savindra Singh, Chapter 7, Page 172.
