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MODEL PAPER-26

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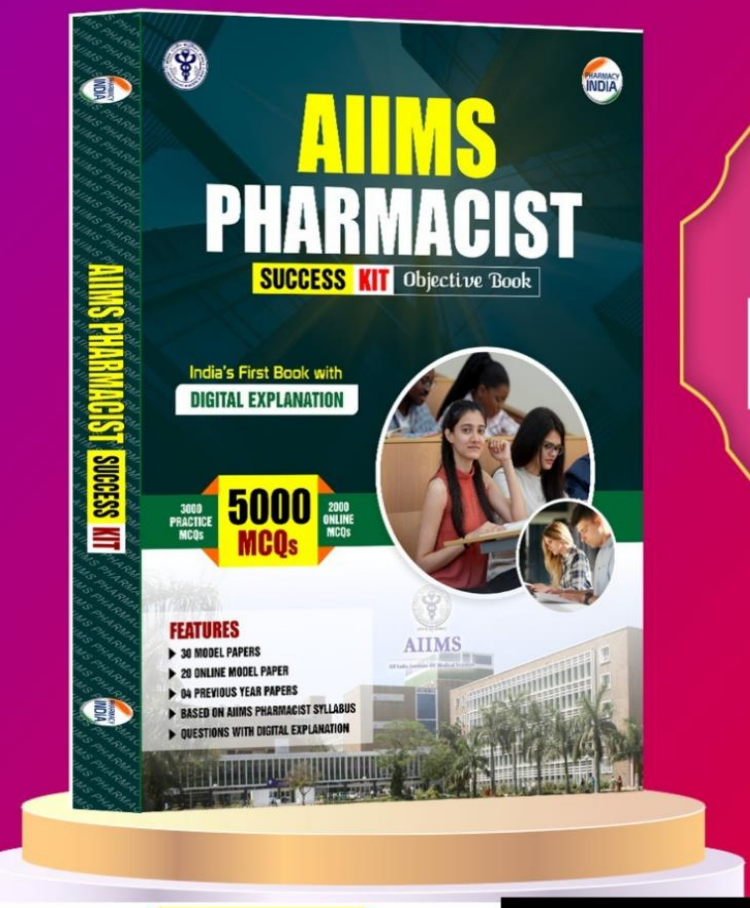

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Model Paper – 26 | Detailed Solutions

1. Rifamycin is obtained from which micro-organism?

- **Correct Answer:** (c) **Streptomyces mediterranei**

Explanation:
Rifamycin is a class of antibiotics primarily used to treat **tuberculosis** and related infections. It is derived from the microorganism **Streptomyces mediterranei**.

Reference: Goodman & Gilman's "The Pharmacological Basis of Therapeutics", 13th Edition, Page 1436.

2. Which of following source is used for DNA polymerase in PCR?

- **Correct Answer:** (c) **Thermus aquaticus**

Explanation:
The **Taq DNA polymerase**, derived from the thermophilic bacterium **Thermus aquaticus**, is used in PCR due to its ability to withstand high temperatures required for DNA denaturation.

Reference: Alberts et al., "Molecular Biology of the Cell", 6th Edition, Page 672.

3. Cannabinoid antagonist is used in:

- **Correct Answer:** (d) **All of these**

Explanation:
Cannabinoid antagonists, such as **Rimonabant**, have been explored for conditions like:

- **Obesity**: To reduce appetite.
- **Tobacco dependence**: To alleviate withdrawal symptoms.
- **Drug addiction**: To counteract cravings.

Reference: Rang & Dale's "Pharmacology", 9th Edition, Page 671.

4. The disintegration time for sugar-coated tablets is:

- **Correct Answer:** (c) **60 min**

Explanation:

Tablet/ Capsule	Liquid	Disintegration Time
Uncoated tablet	Water (19-21^{o}C)	15 minutes (USP – 30 min)
Sugar-coated tablet	Water	60 minutes
Film coated tablet	Water or 0.1N HCl	30 minutes

Dispersible and effervescent tablets	Water (19-21^{o}C)	3 minutes
Enteric coated tablet	0.1N HCl with Phosphate buffer	3 hours (2hrs in GI fluid & 1hr in intestinal fluid)
Hard gelatin capsule	Water	30 minutes
Soft gelatin capsule	Wayer	60 minutes

Reference: Indian Pharmacopoeia, Volume 2, 8th Edition, Page 1256.

5. Endogenous anticoagulant is:

- **Correct Answer:** (b) **Heparin**

Explanation:
Heparin is an endogenous anticoagulant naturally found in the body, primarily produced by **mast cells**. It inhibits thrombin and factor Xa, preventing blood clotting.

Reference: Lippincott's "Illustrated Reviews: Pharmacology", 7th Edition, Page 286.

6. The mechanism of sterilization by hot air is:

- **Correct Answer:** (b) **Oxidation**

Explanation:
Sterilization by **hot air** operates by **oxidizing microbial components**, leading to the destruction of proteins, lipids, and nucleic acids. It is used for materials that can withstand high temperatures (e.g., glassware, metals).

Reference: Ansel's "Pharmaceutical Dosage Forms and Drug Delivery Systems", 11th Edition, Page 358.

7. Pentavalent vaccine contains:

- **Correct Answer:** (d) **All of these**

Explanation:
The **pentavalent vaccine** includes:

- **DPT** (Diphtheria, Pertussis, Tetanus),
- **Hib** (Haemophilus influenzae type b),
- **Hepatitis B**.
  It is administered to protect against five diseases in a single shot.

Reference: Essentials of Medical Pharmacology, K.D. Tripathi, 8th Edition, Page 127.

8. The gum from bacterial source is:

- **Correct Answer:** (d) **Xanthan gum**

Explanation:
Xanthan gum is a polysaccharide produced by **Xanthomonas campestris** bacteria. It is widely used in pharmaceuticals as a thickener and stabilizer.

Reference: Pharmacognosy by Trease and Evans, 16th Edition, Page 469.

9. Folic acid deficiency causes:

- **Correct Answer:** (a) **Megaloblastic anemia**

Explanation:
Megaloblastic anemia is caused by a deficiency of folic acid or vitamin B12, leading to impaired DNA synthesis and abnormal red blood cell formation.

Reference: Lippincott's "Illustrated Reviews: Biochemistry", 6th Edition, Page 372.

10. Which of the following is not used as a glidant?

- **Correct Answer:** (a) **Starch**

Explanation:
Starch primarily acts as a binder or disintegrant, not as a glidant. Glidants, like **talc** and **silica**, reduce inter-particle friction to improve powder flow.

Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 805.

11. The Full form of WIPO is:

- **Correct Answer:** (c) **World Intellectual Property Organization**

Explanation:
The **World Intellectual Property Organization (WIPO)** is a United Nations agency that promotes the protection of intellectual property rights worldwide.

Reference: Intellectual Property Rights Textbook, T. Ramappa, 2nd Edition, Page 53.

12. The opposite of sublimation is called:

- **Correct Answer:** (b) **Deposition**

Explanation:
The opposite of **sublimation** (solid to gas) is **deposition** (gas to solid). Condensing refers specifically to the phase change from gas to liquid, which is a different process.

Reference: Principles of Physical Chemistry, Puri, Sharma, Pathania, 47th Edition, Page 331.

13. Lysozyme is more effective against:

- **Correct Answer:** (b) **Gram-positive bacteria**

Explanation:
Lysozyme targets the **peptidoglycan layer** in bacterial cell walls, which is thicker and more exposed in **Gram-positive bacteria**, making them more susceptible.

Reference: Medical Microbiology, Jawetz, Melnick, & Adelberg's, 28th Edition, Page 103.

14. First recombinant DNA product is:

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

Explanation:
The first recombinant DNA product, **Humulin**, is a synthetic human insulin produced using **E. coli**. It was approved for medical use in 1982.

Reference: Molecular Biology of the Gene, James Watson, 7th Edition, Page 529.

15. Pseudomonas denitrificans is a source of:

- **Correct Answer:** (b) **Vitamin B12**

Explanation:
Pseudomonas denitrificans is used in industrial fermentation processes to produce **Vitamin B12** (cobalamin), an essential nutrient.

Reference: Industrial Microbiology by Prescott & Dunn, 4th Edition, Page 212.

16. Mantoux tuberculin skin test performed for:

- **Correct Answer:** (a) **TB infection**

Explanation:
It is a common screening tool to detect if a person has been infected with the bacteria that causes tuberculosis. The test involves injecting a small amount of purified protein derivative (PPD) from the tuberculosis bacteria under the skin. [1] A positive reaction to the test indicates that the

person has been exposed to the bacteria, but it does not necessarily mean they have active TB disease.

Reference: Clinical Diagnosis of Infectious Diseases, Bailey & Scott's, 13th Edition, Page 289.

17. Hofmann elimination refers to:

- **Correct Answer:** (c) **Inactivation of the drug in the body fluid by spontaneous molecular rearrangement**

Explanation:
Hofmann elimination is a **chemical reaction** where quaternary ammonium compounds are broken down into tertiary amines and alkenes under alkaline conditions. This process occurs **spontaneously** without enzyme mediation.

Reference: Organic Chemistry, Morrison and Boyd, 7th Edition, Page 723.

18. The initial step of the citric acid cycle is:

- **Correct Answer:** (a) **Condensation of acetyl-CoA with oxaloacetate**

Explanation:
The citric acid cycle (Krebs cycle) begins with the **condensation of acetyl-CoA and oxaloacetate** to form citrate, catalyzed by the enzyme **citrate synthase**.

Reference: Biochemistry by Lehninger, 8th Edition, Page 534.

19. Rectal suppositories intended for adult use usually weigh approximately:

- **Correct Answer:** (b) **2g**

Explanation:
Rectal suppositories for adults typically weigh around **2 grams** and are formulated for appropriate absorption and therapeutic effect.

Reference: Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 5th Edition, Page 528.

20. Drug inhibiting viral DNA synthesis:

- **Correct Answer:** (d) **Acyclovir**

Explanation:
Acyclovir is a nucleoside analog that inhibits **viral DNA polymerase**, thereby halting DNA synthesis in viruses such as **herpes simplex virus (HSV)** and **varicella-zoster virus (VZV)**.

Reference: Goodman and Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1126.

21. How many ATP are consumed in urea cycle:

- **Correct Answer:** (b) **4**

Explanation:
The **urea cycle**, also called the ornithine cycle, consumes **4 ATP equivalents** (2 ATP for carbamoyl phosphate synthesis and 2 ATP equivalents in the form of AMP during argininosuccinate synthesis).

Reference: Biochemistry by Lehninger, 8th Edition, Page 662.

22. Vector used in recombinant DNA technology is:

- **Correct Answer:** (d) **All of these**

Explanation:
Plasmids, **cosmids**, and **bacteriophages** are commonly used vectors in recombinant DNA technology for carrying and propagating DNA sequences.

Reference: Molecular Biology of the Cell, Alberts et al., 6th Edition, Page 476.

23. Vitamin D2 is called:

- **Correct Answer:** (a) **Ergocalciferol**

Explanation:
Vitamin D2 (ergocalciferol) is a plant-derived form of Vitamin D, while **Vitamin D3** (cholecalciferol) is animal-derived, and **calcitriol** is the active form of Vitamin D in the body.

Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 632.

24. More content of amino acid present in gelatin is:

- **Correct Answer:** (d) **Glycine**

Explanation:
Gelatin is rich in **glycine**, which constitutes around **33%** of its amino acid composition. It also contains proline and hydroxyproline in significant amounts.

Reference: Essentials of Food Chemistry, Meyer, 2nd Edition, Page 334.

25. Which needle has the smallest diameter:

- **Correct Answer:** (d) **26 gauge, 3 inches**

Explanation:
The gauge number is inversely proportional to the diameter of the needle. A **26-gauge needle** has a smaller diameter compared to needles with lower gauge numbers.

Reference: Clinical Nursing Procedures, Pearson, 5th Edition, Page 154.

26. Name the hormone that has no role in menstruation:

- **Correct Answer:** (d) **TSH**

Explanation:

- The hormone that has no role in menstruation is TSH.
- TSH is primarily responsible for regulating the thyroid gland's production of thyroid hormones.
- It doesn't directly influence the menstrual cycle or the process of menstruation.
- The other hormones mentioned, LH (Luteinizing Hormone), FSH (Follicle-Stimulating Hormone), and GH (Growth Hormone), all play significant roles in the menstrual cycle.

Reference: Ganong's Review of Medical Physiology, 26th Edition, Page 347.

27. Liquid glucose is prepared by partial hydrolysis of starch with strong acids. It doesn't contain:

- **Correct Answer:** (d) **Sucrose**

Explanation:
Liquid glucose is a mixture of **dextrose**, **maltose**, and **dextrins**, formed during the hydrolysis of starch. It does not contain sucrose, which is a disaccharide.

Reference: Essentials of Carbohydrate Chemistry, Sinnott, 1st Edition, Page 210.

28. Which of the following substances can cure Parkinson's disease:

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

Explanation:
Parkinson's disease is caused by the loss of dopamine-producing neurons. **Dopamine** supplementation or its precursor **L-Dopa** can alleviate the symptoms of the disease.

Reference: Katzung's Basic & Clinical Pharmacology, 15th Edition, Page 493.

29. Mechanical contraceptives should bear the label as per the:

- **Correct Answer:** (a) **Schedule R**

Explanation:
Schedule R under the **Drugs and Cosmetics Act, 1940** specifies the requirements for mechanical contraceptives such as condoms and intrauterine devices.

Reference: Drugs and Cosmetics Act, 1940 and Rules, 1945, Page 156.

30. Which of the following radiopharmaceuticals can be used in skeletal imaging:

- **Correct Answer:** (b) **99mTc medronate disodium**

Explanation:

- The radiopharmaceutical used in skeletal imaging is 99mTc medronate disodium.
- It is a commonly used radiotracer in bone scintigraphy.
- It works by binding to the hydroxyapatite crystals in bone, allowing for visualization of areas of increased bone metabolism.

Reference: Textbook of Nuclear Medicine, Cherry, 2nd Edition, Page 411.

31. Double helical structure model of the DNA was proposed by:

- **Correct Answer:** (c) **Watson and Crick**

Explanation:
James Watson and Francis Crick proposed the double helical model of DNA in 1953, which described the structure of DNA as two strands coiled around each other, held together by hydrogen bonds between complementary bases.

Reference: Molecular Biology of the Gene, Watson et al., 7th Edition, Page 162.

32. Which one is a phenol glycoside:

- **Correct Answer:** (a) **Arbutin**

Explanation:
Arbutin is a phenol glycoside found in plants such as bearberry. It contains a glucose molecule attached to a phenolic compound, making it a glycoside.

Reference: Pharmacognosy by Trease and Evans, 16th Edition, Page 289.

33. Main constituent of wintergreen oil is:

- **Correct Answer:** (d) **Gualtherin**

Explanation:
Wintergreen oil contains **methyl salicylate**, which is derived from the glycoside **gualtherin**. It is responsible for the characteristic aroma and therapeutic properties of the oil.

Reference: Textbook of Pharmacognosy, C.K. Kokate, 51st Edition, Page 452.

34. Cosyntropin test is used to determine:

- **Correct Answer:** (b) **Adrenal insufficiency**

Explanation:
The **Cosyntropin test** evaluates adrenal gland function by measuring cortisol levels in response to **Cosyntropin**, a synthetic derivative of ACTH (Adrenocorticotropic Hormone).

Reference: Harrison's Principles of Internal Medicine, 20th Edition, Page 2253.

35. True Solutions size range is:

- **Correct Answer:** (a) **Less than 1nm**

Explanation:

- True solutions have a particle size range of less than 1 nanometer (nm).
- A true solution consists of solute particles less than 1 nanometer (nm) in size. These particles are evenly distributed and cannot be separated by filtration. But according to Question the right answer is 10nm to 1000nm.

Reference: Physical Chemistry by Atkins, 11th Edition, Page 256.

36. *Staphylococcus epidermidis* is microorganism used for the assay of:

- **Correct Answer:** (d) **Both (a) and (b)**

Explanation:
The microbial assay method uses *Staphylococcus epidermidis* to assess the potency of antibiotics like **Gentamicin** and **Neomycin**. This method relies on measuring zones of inhibition caused by the antibiotic against the microorganism.

Reference: Indian Pharmacopoeia, 2018 Edition, Volume 1, Page 1124.

37. Cause of Malignant tertian Malaria:

- **Correct Answer:** (b) **Plasmodium falciparum**

Explanation:
Malignant tertian malaria is caused by **Plasmodium falciparum**, characterized by severe symptoms such as cerebral malaria and high fatality if untreated.

Reference: Essentials of Medical Parasitology by Rajeshwar Reddy, 3rd Edition, Page 96.

38. Combination used in formation of effervescent tablet:

- **Correct Answer:** (a) **Citric acid & $NaHCO_3$**

Explanation:
Effervescent tablets are formulated using **citric acid** and **sodium bicarbonate**, which react in the presence of water to produce carbon dioxide, aiding tablet disintegration.

Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 1036.

39. *Rheum rhizome* is used as:

- **Correct Answer:** (d) **Purgative**

Explanation:
Rheum rhizome (commonly known as rhubarb) contains anthraquinone glycosides that exhibit **purgative** action by stimulating bowel movements.

Reference: Trease and Evans Pharmacognosy, 16th Edition, Page 372.

40. Use of DNAase is in:

- **Correct Answer:** (b) **Cystic fibrosis**

Explanation:
DNAase is used in **cystic fibrosis** to break down extracellular DNA in mucus, reducing its viscosity and improving respiratory function.

Reference: Harrison's Principles of Internal Medicine, 20th Edition, Page 1816.

41. Drug that inhibits purine or pyrimidine synthesis is:

- **Correct Answer:** (c) **Both (a) and (b)**

Explanation:
Both **Azathioprine** and **Mycophenolate mofetil** inhibit purine synthesis, thereby suppressing DNA and RNA synthesis. This action is critical for their immunosuppressive and antimetabolic effects.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1273.

42. In order to produce characteristic pharmacological action, a drug must always:

- **Correct Answer:** (c) **Achieve adequate concentration at the site of action**

Explanation:
For a drug to exert its pharmacological effect, it must reach the **site of action** at an effective concentration, irrespective of its absorption or excretion pathways.

Reference: Katzung's Basic and Clinical Pharmacology, 15th Edition, Page 48.

43. Which type of stomata are present in Senna leaves:

- **Correct Answer:** (a) **Paracytic**

Explanation:
Senna leaves possess **paracytic stomata**, where subsidiary cells are arranged parallel to the guard cells.

Reference: Trease and Evans Pharmacognosy, 16th Edition, Page 568.

44. In HPLC which technique is commonly employed:

- **Correct Answer:** (a) **Reverse phase**

Explanation:

- In HPLC, the most commonly employed technique is Reverse phase.
- In reverse phase HPLC, the stationary phase is nonpolar (often a hydrocarbon chain bonded to silica), and the mobile phase is polar (a mixture of water and organic solvents).

- This technique is widely used because it is versatile and can separate a wide range of compounds based on their polarity.

Reference: Remington: The Science and Practice of Pharmacy, 22nd Edition, Page 748.

45. Rh factor is present in:

- **Correct Answer:** (a) **Blood**

Explanation:
The **Rh factor** is a protein found on the surface of red blood cells and is used to determine blood type compatibility during transfusion.

Reference: Essentials of Medical Physiology by Sembulingam, 8th Edition, Page 188.

46. Which of the following is the inhibitor of isocitrate dehydrogenase in the Krebs cycle:

- **Correct Answer:** (a) **ATP**

Explanation:
ATP acts as an allosteric inhibitor of **isocitrate dehydrogenase** in the Krebs cycle, signaling high energy levels and reducing the activity of the cycle.

Reference: Biochemistry by Lehninger, 7th Edition, Page 537.

47. Mitochondrial DNA is inherited from:

- **Correct Answer:** (a) **Mother only**

Explanation:
Mitochondrial DNA (mtDNA) is maternally inherited because the mitochondria in the sperm are typically destroyed after fertilization.

Reference: Molecular Biology of the Cell by Alberts, 6th Edition, Page 306.

48. Western blotting is the technique for the identification of:

- **Correct Answer:** (d) **Proteins**

Explanation:
Western blotting is a technique used to detect specific **proteins** in a sample using antibodies.

Reference: Principles and Techniques of Biochemistry and Molecular Biology, 7th Edition, Page 288.

49. Infected blood products may produce serum hepatitis due to the presence of:

- **Correct Answer:** (b) **Hepatitis B virus**

Explanation:
Hepatitis B virus (HBV) is the most common cause of serum hepatitis, transmitted through infected blood and bodily fluids.

Reference: Harrison's Principles of Internal Medicine, 21st Edition, Page 1522.

50. Which of the following drugs is an antagonist of the interleukin-6 receptor used in rheumatoid arthritis:

- **Correct Answer:** (b) **Tocilizumab**

Explanation:
Tocilizumab is a monoclonal antibody that inhibits the **IL-6 receptor**, reducing inflammation in conditions like **rheumatoid arthritis**.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1123.

51. Which drug is used for the treatment of narcolepsy and acts as a central nervous system stimulant:

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

Explanation:
Drugs like **Methylphenidate**, **Modafinil**, and **Amphetamine** are central nervous system stimulants. They are used for managing **narcolepsy**, a condition characterized by excessive daytime sleepiness.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 586.

52. Which of the following is a potassium channel opener used in the treatment of severe hypertension:

- **Correct Answer:** (a) **Minoxidil**

Explanation:
Minoxidil opens potassium channels in vascular smooth muscle, leading to hyperpolarization, relaxation, and subsequent vasodilation, making it effective in treating severe hypertension.

Reference: Rang & Dale's Pharmacology, 9th Edition, Page 372.

53. Which of the following drugs inhibits the hepatitis C NS5B RNA-dependent RNA polymerase:

- **Correct Answer:** (a) **Sofosbuvir**

Explanation:
Sofosbuvir specifically inhibits the **NS5B RNA-dependent RNA polymerase**, an essential enzyme for hepatitis C virus replication.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1335.

54. Which of the following drugs is a monoclonal antibody that binds to vascular endothelial growth factor (VEGF):

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

Explanation:
Bevacizumab is an anti-VEGF monoclonal antibody that inhibits angiogenesis, making it effective in treating cancers like colorectal cancer and certain eye diseases.

Reference: K.D. Tripathi, Essentials of Medical Pharmacology, 8th Edition, Page 819.

55. Which of the following is a first-line drug for prophylaxis against malaria in pregnant women:

- **Correct Answer:** (a) **Chloroquine**

Explanation:
Chloroquine is considered safe for **malaria prophylaxis** during pregnancy, as it is well-tolerated and effective against **Plasmodium vivax** and **Plasmodium ovale**.

Reference: Harrison's Principles of Internal Medicine, 21st Edition, Page 1373.

56. Which of the following drugs is used in the treatment of myasthenia gravis:

- **Correct Answer:** (d) **Both (a) and (c)**

Explanation:
Pyridostigmine and **Neostigmine** are **cholinesterase inhibitors** that increase acetylcholine levels at the neuromuscular junction, improving muscle strength in **myasthenia gravis**.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1222.

57. Which antifungal drug targets beta-glucan synthesis in fungal cell walls:

- **Correct Answer:** (b) **Caspofungin**

Explanation:
Caspofungin inhibits **beta-(1,3)-D-glucan synthase**, a crucial enzyme in fungal cell wall synthesis, making it effective against **Candida** and **Aspergillus** species.

Reference: K.D. Tripathi, Essentials of Medical Pharmacology, 8th Edition, Page 782.

58. Which drug is a recombinant urate oxidase enzyme used to treat tumor lysis syndrome:

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

Explanation:
Rasburicase converts uric acid to **allantoin**, which is more water-soluble and easily excreted, thereby preventing **hyperuricemia** in **tumor lysis syndrome**.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1415.

59. Which anticholinergic drug is used in the treatment of irritable bowel syndrome (IBS):

- **Correct Answer:** (d) **Both (a) and (b)**

Explanation:
Dicyclomine and **Hyoscine** act as antispasmodic agents by inhibiting acetylcholine at muscarinic receptors, reducing smooth muscle spasms in **IBS**.

Reference: K.D. Tripathi, Essentials of Medical Pharmacology, 8th Edition, Page 588.

60. The anticoagulant activity of heparin sodium injection IP is estimated using:

- **Correct Answer:** (d) **Sheep**

Explanation:

- The anticoagulant activity of heparin sodium injection IP is estimated using sheep plasma.
- The sheep plasma is recalcified, meaning that calcium ions are added to it to initiate the clotting process.

- The time it takes for the sheep plasma to clot in the presence of heparin is compared to a control sample without heparin.
- This method allows for the determination of the heparin's potency and ensures its consistency and effectiveness.

Reference: Indian Pharmacopoeia, 2022, Heparin Sodium Monograph.

61. What is the chemical name of chlorpromazine?

- **Correct Answer:** (a) **2-Chloro-10-(3-dimethylaminopropyl) phenothiazine**

Explanation:
Chlorpromazine belongs to the **phenothiazine** class of antipsychotics, with the structure **2-chloro** substitution on the phenothiazine ring and a **dimethylaminopropyl** side chain attached at position 10.

Reference: Foye's Principles of Medicinal Chemistry, 7th Edition, Page 409.

62. What is the key structural feature of ACE inhibitors that binds to the active site of angiotensin-converting enzyme?

- **Correct Answer:** (a) **Sulfhydryl group (-SH)**

Explanation:
ACE inhibitors, such as **captopril**, use a **sulfhydryl group (-SH)** to bind tightly to the active site of the enzyme, mimicking the carboxyl-terminal sequence of angiotensin I.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 742.

63. What is the role of the piperazine ring in second-generation antihistamines?

- **Correct Answer:** (c) **Improves selectivity for peripheral H1 receptors**

Explanation:
The **piperazine ring** in second-generation antihistamines enhances their selectivity for **peripheral H1 receptors**, reducing central nervous system (CNS) penetration and sedation.

Reference: K.D. Tripathi, Essentials of Medical Pharmacology, 8th Edition, Page 697.

64. Which functional group in opioids is crucial for receptor binding and analgesic activity?

- **Correct Answer:** (a) **Phenolic hydroxyl group**

Explanation:
The **phenolic hydroxyl group** in opioids interacts with the opioid receptor, contributing to their **analgesic** activity and potency.

Reference: Foye's Principles of Medicinal Chemistry, 7th Edition, Page 864.

65. What is the functional group responsible for the DNA crosslinking action of cisplatin?

- **Correct Answer:** (b) **Chloride ligands**

Explanation:
Cisplatin exerts its antineoplastic effect by replacing its **chloride ligands** with DNA bases, primarily **guanine**, leading to DNA crosslinking and apoptosis.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1313.

66. What is the pharmacologically active form of the antiviral drug acyclovir?

- **Correct Answer:** (a) **Triphosphate form**

Explanation:
Acyclovir is phosphorylated in the body by viral thymidine kinase to its **triphosphate form**, which inhibits viral DNA polymerase and terminates DNA synthesis.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1342.

67. Which chemical feature of methotrexate allows it to mimic folic acid?

- **Correct Answer:** (d) **Pteridine ring system**

Explanation:
The **pteridine ring system** in methotrexate closely resembles that in folic acid, enabling it to inhibit **dihydrofolate reductase (DHFR)** and block nucleotide synthesis.

Reference: Foye's Principles of Medicinal Chemistry, 7th Edition, Page 740.

68. What is the primary chemical structure responsible for the antifungal activity of amphotericin B?

- **Correct Answer:** (a) **Polyene macrolide structure**

Explanation:
Amphotericin B's **polyene macrolide structure** allows it to bind to **ergosterol** in fungal cell membranes, forming pores and causing cell death.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 1420.

69. What is the primary functional group in sulfonamides that enables their antibacterial action?

- **Correct Answer:** (c) **Amino group (-NH_2-)**

Explanation:

- All sulfonamides may be considered to be derivatives of sulfanilamide (p-aminobenzene sulfonamide).
- Individual members differ in the nature of N1 (Sulfonamido N) substitution, which governs solubility, potency and pharmacokinetic property.
- A free amino group in the para position (N4) is required for antibacterial activity.

Reference: K.D. Tripathi, Essentials of Medical Pharmacology, 8th Edition, Page 737.

70. What functional group in tetracyclines facilitates metal ion chelation?

- **Correct Answer:** (a) **β-Diketone system**

Explanation:
The **β-diketone system** in tetracyclines forms complexes with metal ions like calcium and magnesium, influencing both activity and pharmacokinetics.

Reference: Foye’s Principles of Medicinal Chemistry, 7th Edition, Page 845.

71. Which of the following is considered a drug's official name?

- **Correct Answer:** (a) **The generic name**

Explanation:
The **generic name** of a drug is its official, nonproprietary name, assigned by regulatory agencies, such as the **International Nonproprietary Names (INN)** system. It is used universally and is not brand-specific.

Reference: Foye’s Principles of Medicinal Chemistry, 7th Edition, Page 25.

72. The most abundant amino acid found in the body is

- **Correct Answer:** (b) **Glutamine**

Explanation:
Glutamine is the most abundant amino acid in the body, particularly in the bloodstream, where it serves as a precursor for protein and nucleotide synthesis and plays a role in nitrogen metabolism.

Reference: Harper's Illustrated Biochemistry, 31st Edition, Page 120.

73. Which Guideline for stability testing is followed?

- **Correct Answer:** (c) **Both (a) and (b)**

Explanation:
Stability testing for pharmaceuticals follows both **ICH (International Council for Harmonisation)** and **WHO** guidelines, depending on regional and global requirements.

Reference: ICH Q1A(R2): Stability Testing Guidelines.

74. The nitrogenous base that is never found in the genetic code of retrovirus is

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

Explanation:
Retroviruses have an **RNA genome** where **uracil** replaces **thymine** in the genetic code. Thymine is present only in DNA, not in RNA.

Reference: Molecular Biology of the Cell, 6th Edition, Page 374.

75. Distribution of drug in the human body depends on its

- **Correct Answer:** (d) **All of these**

Explanation:
Drug distribution is influenced by:

1. **Dissociation constant (pKa):** Determines ionization and lipid solubility.
2. **Dosage form:** Impacts absorption and availability.
3. **Route of administration:** Affects initial concentration in circulation.

Reference: Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition, Page 53.

76. In Windows, which tool is used to check and fix disk errors?

- **Correct Answer:** (c) **Check Disk (CHKDSK)**

Explanation:
The **CHKDSK** tool in Windows is used to scan a disk for errors, such as file system corruption or bad sectors, and to repair them.

77. The hexadecimal number system is based on _____ digits.

- **Correct Answer:** (c) **16**

Explanation:
The **hexadecimal system** uses **16 digits**: 0–9 and A–F (where A represents 10, B represents 11, and so on).

78. In computer security, what does "Two-Factor Authentication" mean?

- **Correct Answer:** (b) **Using two methods to verify a user's identity**

Explanation:
Two-Factor Authentication (2FA) adds an extra layer of security by requiring two forms of identification, such as a password and a verification code sent to a device.

79. Which of the following is an example of system software?

- **Correct Answer:** (c) **Operating System**

Explanation:
System software, like an **Operating System (e.g., Windows, Linux, macOS)**, manages hardware and software resources and provides services for application software.

80. What is the primary function of a firewall in computer networking?

- **Correct Answer:** (b) **To block unauthorized access to a network**

Explanation:
A **firewall** acts as a barrier between a trusted network and untrusted networks, monitoring and controlling incoming and outgoing traffic based on security rules.

81. The ratio of the ages of A and B is 4:5. If the sum of their ages is 81, what is the age of B?

- **Correct Answer:** (b) **45 years**

Explanation:
The ratio of A's age to B's age is 4:5. Let their ages be 4x and 5x.

$4x + 5x = 81 \implies 9x = 81 \implies x = 94$

B's age = $5x = 5 \times 9 = 45$

82. A train running at 90 km/h crosses a bridge 150 meters long in 15 seconds. What is the length of the train?

- **Correct Answer:** (b) **225 m**

Explanation:
Convert speed to meters per second:

90 km/h = $\frac{90 \times 1000}{3600}$ = 25 m/s

Total distance covered in 15 seconds = 25 × 15 = 375 m
Length of the train = Total distance - Length of bridge: 375 – 150 = 225 m.

83. If the selling price of 16 articles is equal to the cost price of 20 articles, what is the profit percentage?

- **Correct Answer:** (b) **25%**

Explanation:
Let the cost price of each article = 1 unit
Cost price of 20 articles = 20 units
Selling price of 16 articles = 20 units
Selling price of 1 article = $\frac{20}{16}$ = 1.25 units
Profit percentage:

Profit % = $\frac{\text{Selling price} - \text{Cost price}}{1\text{Cost price}} \times 100 = \frac{1.25 - 1}{1} \times 100 = 25\%$.

84. A man takes 8 hours to walk 24 km. What is his speed in meters per second?

- **Correct Answer:** (a) **0.83 m/s**

Explanation:

Convert distance to meters:

- 24 km = 24 × 1000 meters = 24,000 meters

2. Convert time to seconds:

- 8 hours = 8 × 3600 seconds = 28,800 seconds

3. Calculate speed:

- Speed = Distance / Time
- Speed = 24,000 meters / 28,800 seconds
- Speed = 0.8333 meters/second

Therefore, the man's speed is approximately 0.83 m/s.

85. If 75% of a number is equal to 45, what is the number?

- **Correct Answer:** (a) **60**

Explanation:
Let the number be x.

75% of $x = 45 \implies \frac{75}{100}x = 45 \implies x = \frac{45 \times 100}{75} = 60$

86. What comes next in the series: 2, 6, 12, 20, ?

- **Correct Answer:** (a) **30**

Explanation:
The difference between consecutive terms increases incrementally:

6 – 2 = 4, 12 – 6 = 6, 20 – 12 = 8.

The next difference will be 10: 20 + 10=30.

87. In a certain code language, "BRAIN" is written as "CSBJO." How is "HEART" written?

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

Explanation:
Each letter in the word is shifted alternately by +1 and -1:

- B→C(+1),R→S(+1),A→B(+1),I→J(+1),N→O(+1)
  For "HEART":
- H→I(+1),E→G(+1),A→C(+1),R→S(+1),T→U(+1)
  Hence, "HEART" becomes **IFBSU**.

88. Pointing to a girl, Ravi said, "She is the mother of my father's only daughter." How is the girl related to Ravi?

- **Correct Answer:** (a) **Mother**

Explanation:

- Ravi's father's "only daughter" is Ravi's sister.
- The girl mentioned is the mother of Ravi's sister, which makes her **Ravi's mother**.

89. Choose the odd one out: Circle, Triangle, Square, Rectangle.

- **Correct Answer:** (a) **Circle**

Explanation:
The other shapes (Triangle, Square, Rectangle) have straight sides, while a **Circle** does not have any straight sides.

90. What comes next in the series: A, C, F, J, ?

- **Correct Answer:** (a) **N**

Explanation:
The difference between consecutive letters increases incrementally:

A→C(+2), C→F(+3), F→J(+4).

The next difference is +5: J→N.

91. Who was the first Indian to win a gold medal at the Olympics?

- **Correct Answer:** (b) **Abhinav Bindra**

Explanation:
Abhinav Bindra was the first Indian to win an individual gold medal at the Olympics, achieving this feat in the Men's 10m Air Rifle event at the **2008 Beijing Olympics**.

92. Who was the founder of the Gupta Empire?

- **Correct Answer:** (a) **Chandragupta I**

Explanation:
Chandragupta I laid the foundation of the Gupta Empire around **320 CE**. His marriage to Kumaradevi of the Lichchhavi clan played a key role in establishing his authority.

93. Which of the following is the smallest state in India by area?

- **Correct Answer:** (b) **Goa**

Explanation:
Goa is the smallest state in India by area, covering **3,702 square kilometers**.

94. Who among the following introduced the 'Doctrine of Lapse'?

- **Correct Answer:** (a) **Lord Dalhousie**

Explanation:
Lord Dalhousie introduced the 'Doctrine of Lapse' during his tenure as Governor-General of India (1848–1856). Under this policy, if a ruler died without a male heir, his kingdom would be annexed by the British East India Company.

95. Which Indian city hosted the first session of the Indian National Congress in 1885?

- **Correct Answer:** (d) **Bombay**

Explanation:
The first session of the **Indian National Congress** was held in **Bombay** (now Mumbai) in **1885**, presided over by **W.C. Bonnerjee**.

96. The First Five-Year Plan in India was launched in which year?

- **Correct Answer:** (b) **1951**

Explanation:
India's First Five-Year Plan was launched in **1951** under the leadership of **Prime Minister Jawaharlal Nehru**. It focused on **agriculture and irrigation** to address food shortages.

97. The largest brackish water lake in India is:

- **Correct Answer:** (b) **Chilika Lake**

Explanation:
Chilika Lake, located in **Odisha**, is the largest brackish water lake in India and a significant wetland for biodiversity.

98. The phrase "Satyameva Jayate" in the Indian national emblem is taken from which ancient text?

- **Correct Answer:** (c) **Mundaka Upanishad**

Explanation:
The phrase **"Satyameva Jayate"** means "Truth alone triumphs" and is taken from the **Mundaka Upanishad**, an ancient Indian scripture.

99. Which movement in Indian history is also known as the 'August Kranti'?

- **Correct Answer:** (c) **Quit India Movement**

Explanation:
The **Quit India Movement**, launched on **8th August 1942** by Mahatma Gandhi, is also known as the **'August Kranti'**, aimed at ending British rule in India.

100. The term 'Habeas Corpus' in the Indian Constitution refers to:

- **Correct Answer:** (b) **Safeguard against unlawful detention**

Explanation:
Habeas Corpus is a legal writ in the Indian Constitution that protects individuals from **unlawful detention** and ensures the right to liberty.