TS PGECET Pharmacy 10th June 2024 Shift 1 Question Paper with Solutions

Time Allowed :2 hoursMaximum Marks :120Total Questions :120

Pharmacy

1. Increase in the solubility of the aqueous systems by adding large amount of additives is known as......

- (1) Solubilization
- (2) Hydrotrophy
- (3) Co solvency
- (4) Solid dispersion

Correct Answer: (2) Hydrotrophy

Solution: Hydrotrophy is a phenomenon where the solubility of poorly water-soluble compounds is enhanced by the addition of large amounts of additives known as hydrotropic agents. These agents increase solubility by forming weak interactions with the solute without forming micelles, as is the case with surfactants.

This is distinct from solubilization (which involves micelles), co-solvency (which involves miscible solvents), and solid dispersion (which is a solid-state method to enhance solubility).

Quick Tip

Hydrotrophy involves using large quantities of hydrotropic agents (like sodium benzoate) to increase drug solubility without forming micelles.

- 2. Clark's formula.....
- (1) Dose for the child = Child's weight in kg / 70 * Adult dose
- (2) Dose for the child = Age in years /20 * Adult dose
- (3) Dose for the child = Child's weight in mg / 70 * Adult dose

(4) Dose for the child = Age in months / 20 * Adult dose

Correct Answer: (1) Dose for the child = Child's weight in kg / 70 * Adult dose

Solution: Clark's formula is a widely used method to calculate the pediatric dose of a medication based on the weight of the child. The formula is:

Child's Dose =
$$\left(\frac{\text{Weight of child in } \text{kg}}{70}\right) \times \text{Adult Dose}$$

This method ensures a weight-based adjustment of the adult dose, assuming the average adult weight is 70 kg. It is more accurate than age-based formulas for children, as weight correlates more directly with drug distribution and metabolism.

Quick Tip

Clark's formula is weight-based: always divide the child's weight in kg by 70 and multiply by the adult dose.

- 3. One of the following is used as a key ingredient in hair conditioning product
- (1) Cetyl trimethyl ammonium chloride
- (2) Benzyl cinnamate
- (3) Ethanol
- (4) Glycerine

Correct Answer: (1) Cetyl trimethyl ammonium chloride

Solution: Cetyl trimethyl ammonium chloride is a key conditioning agent widely used in hair care products. It is a quaternary ammonium compound that serves as a cationic surfactant, helping to soften hair, reduce frizz, and improve manageability. It binds to the negatively charged hair strands and provides a conditioning effect.

Other substances listed, like benzyl cinnamate (used in perfumes), ethanol (a solvent), and glycerine (a humectant), do not have the same targeted conditioning properties.

Look for quaternary ammonium compounds such as cetyl trimethyl ammonium chloride in hair conditioners—they help smoothen and detangle hair effectively.

4. Empty capsule has moisture content in the range of

- (1) 2-3%
- (2) 20–30%
- (3) 12–15%
- (4) 40 45%

Correct Answer: (3) 12–15%

Solution: Hard gelatin capsules typically contain a moisture content in the range of 12–15%. This level is essential for maintaining their mechanical strength and integrity. Lower moisture can make them brittle, while higher moisture may lead to microbial growth or deformation.

Quick Tip

Remember: the ideal moisture content for hard gelatin capsules is between 12–15% to ensure stability and usability.

5. Aerosol container must withstand pressures as high as 140–180 psi at

- (1) 100°F
- (2) 110°F
- (3) 120°F
- (4) $130^{\circ}F$

Correct Answer: (4) 130°F

Solution: Aerosol containers are designed to withstand internal pressures ranging from 140 to 180 psi at a high temperature of 130°F. This standard ensures safety under extreme storage

conditions and prevents rupture due to pressure buildup from volatile components inside the container.

Quick Tip

130°F is the standard temperature for testing aerosol container pressure tolerance—critical for safety compliance.

6. Which polymer is used in the sealing step of sugar coating?

- (1) Poly acrylic acid
- (2) Shellac
- (3) Poly caprolactone
- (4) Chitin

Correct Answer: (2) Shellac

Solution: Shellac is commonly used in the sealing step of the sugar coating process in tablet formulation. It acts as a moisture barrier and provides a glossy finish. The sealing layer is applied before sub-coating and is critical to maintaining tablet integrity by protecting the core from moisture.

Quick Tip

In sugar coating, Shellac is the go-to sealing agent for its moisture resistance and filmforming properties.

7. Slugging process is also known as.....

- (1) Wet granulation
- (2) Direct compression
- (3) Dry granulation
- (4) Melt granulation

Correct Answer: (3) Dry granulation

Solution: The slugging process is a type of dry granulation method where powders are compressed into large tablets or slugs under high pressure. These slugs are then milled to form granules. It is preferred when the formulation is moisture- or heat-sensitive, eliminating the need for water or heat in granule formation.

Quick Tip

Slugging = Dry granulation. Use when your formulation can't tolerate moisture or heat.

- 8. What temperature ranges are typically used to destroy Pyrogens in Parenterals?
- (1) 50°C for 10 minutes
- (2) 1000° C for 15 minutes
- (3) 150°C for 20 minutes
- (4) 250° C for 45 minutes

Correct Answer: (4) 250°C for 45 minutes

Solution: Dry heat sterilization at 250°C for 45 minutes is the standard method for destroying pyrogens (endotoxins) in parenteral preparations. Pyrogens are heat-stable and cannot be removed by regular sterilization techniques like autoclaving, making high-temperature dry heat the preferred method.

Quick Tip

Remember: 250°C for 45 minutes is the key condition for pyrogen destruction by dry heat.

9. What is the net ATP synthesis during glycolysis under anaerobic conditions?

(1) 4 ATP

(2) 8 ATP

(3) 2 ATP

(4) 6 ATP

Correct Answer: (3) 2 ATP

Solution: During anaerobic glycolysis, glucose is broken down into pyruvate (or lactate in animals), generating 4 ATP molecules, but 2 ATP are consumed during the initial steps. Therefore, the **net ATP gain** is:

Net ATP = 4 - 2 = 2 ATP

This process does not involve oxygen and is the primary source of energy in anaerobic conditions.

Quick Tip

Anaerobic glycolysis yields a net gain of 2 ATP per glucose molecule—remember the 2 ATP are consumed early in the process.

- **10.** Major substrates for gluconeogenesis are.....
- (1) Pyruvate
- (2) Fructose
- (3) Glucose
- (4) Malate

Correct Answer: (1) Pyruvate

Solution: Gluconeogenesis is the metabolic process of generating glucose from non-carbohydrate sources. Pyruvate is a key starting substrate in this process. It is converted to oxaloacetate and then to phosphoenolpyruvate, eventually forming glucose. While other intermediates like malate may be involved, pyruvate is the principal substrate.

Pyruvate is the main precursor for gluconeogenesis—it's the entry point to synthesize glucose when carbohydrate levels are low.

- 11. Lipase is an example for the class of enzyme namely
- (1) Oxidoreductases
- (2) Transferases
- (3) Hydrolases
- (4) Ligases

Correct Answer: (3) Hydrolases

Solution: Lipases catalyze the hydrolysis of ester bonds in lipids, converting triglycerides into glycerol and free fatty acids. This class of enzymes is known as **hydrolases**, which function by breaking chemical bonds through the addition of water.

Quick Tip

Lipase = lipid breakdown = hydrolysis \rightarrow belongs to **hydrolases**.

- **12.** What is the final product of purine metabolism in humans?
- (1) Xanthine
- (2) Uric acid
- (3) Urea
- (4) Alanine

Correct Answer: (2) Uric acid

Solution: In humans, purines (adenine and guanine) are ultimately broken down into **uric acid**, which is excreted in urine. Xanthine is an intermediate in this pathway. Uric acid accumulation in the body may lead to gout.

Remember: Purine \rightarrow Xanthine \rightarrow **Uric acid** (end product).

- **13.** Triacylglycerol on lipolysis gives
- (1) Glycerol and free fatty acids
- (2) Glucose and free fatty acids
- (3) Urea
- (4) Uric acid

Correct Answer: (1) Glycerol and free fatty acids

Solution: Lipolysis is the breakdown of triglycerides (triacylglycerols) stored in adipose tissue. This process yields **glycerol** and **free fatty acids**. These products can be used for energy production, gluconeogenesis, or -oxidation.

Quick Tip

Lipolysis: Triacylglycerol \rightarrow Glycerol + Free fatty acids.

14. In type 2 diabetes mellitus, pancreatic beta cells initially respond to insulin resistance by.....

- (1) Enhancing glucose uptake by peripheral tissues
- (2) Decreasing insulin secretion
- (3) Suppressing glucagon secretion
- (4) Increasing insulin secretion

Correct Answer: (4) Increasing insulin secretion

Solution: In the early stages of type 2 diabetes, pancreatic beta cells try to compensate for insulin resistance by **increasing insulin secretion**. This hyperinsulinemia helps maintain normoglycemia initially, but over time, beta-cell function declines.

Early response to insulin resistance = Increased insulin secretion by beta cells.

- **15.** Underlying mechanism for variant angina is.....
- (1) Atherosclerosis
- (2) Aortic stenosis
- (3) Coronary artery spasm
- (4) Cardiomyopathy

Correct Answer: (3) Coronary artery spasm

Solution: Variant angina, also called Prinzmetal's angina, is caused by **coronary artery spasm**. Unlike stable angina, it occurs at rest and is due to transient vasoconstriction of coronary arteries, not necessarily related to physical exertion or plaque buildup.

Quick Tip

Variant (Prinzmetal's) angina = episodic chest pain at rest due to **coronary artery spasm**.

16. Which lipoprotein plays major role in development of Atherosclerosis?

- (1) HDL-C
- (2) LDL-C
- (3) VLDL
- (4) Chylomicrons

Correct Answer: (2) LDL-C

Solution: Low-density lipoprotein cholesterol (LDL-C) is known as "bad cholesterol" because it contributes to plaque formation in the arteries, leading to atherosclerosis. Elevated LDL-C levels are a major risk factor for cardiovascular diseases.

- LDL-C = "bad" cholesterol = leads to atherosclerosis.
- 17. The physiologic effect of PGF2-ALFA
- (1) Bronchodilator
- (2) Vasodilator
- (3) Bronchoconstrictor
- (4) Platelet aggregation

Correct Answer: (3) Bronchoconstrictor

Solution: Prostaglandin F2-alpha (PGF2-) is a naturally occurring prostaglandin that causes bronchoconstriction. It is involved in the regulation of reproductive functions but can also affect airway tone, especially in asthmatic conditions.

Quick Tip PGF2- \rightarrow think "F" for **forceful contraction**, including bronchoconstriction.

18. Which gene is associated with autosomal dominant Parkinsonism?

- (1) UCHL1
- (2) LRRK2
- (3) TIMP2
- (4) UCHL3

Correct Answer: (2) LRRK2

Solution: Mutations in the **LRRK2** gene (Leucine-rich repeat kinase 2) are known to cause autosomal dominant forms of Parkinson's disease. It is the most common genetic cause of familial Parkinsonism and also occurs in sporadic cases.

LRRK2 mutation \rightarrow most common cause of inherited (autosomal dominant) Parkinson's disease.

19. If a researcher mistakenly concludes that there is a significant effect when, in fact, there is none, what type of error is committed?

- (1) Measurement error
- (2) Type II error
- (3) Sampling error
- (4) Type I error

Correct Answer: (4) Type I error

Solution: A **Type I error** occurs when the null hypothesis is wrongly rejected—meaning we conclude there is an effect or difference when in reality, there isn't. This is also known as a "false positive" result.

Quick Tip

Type I error = False positive = Rejected a true null hypothesis.

- **20.** Example of Amphiprotic solvent
- (1) Water
- (2) Formic acid
- (3) Benzene
- (4) Chloroform

Correct Answer: (1) Water

Solution: An **amphiprotic** solvent can both donate and accept a proton. Water is the classic example of such a solvent—it can act as an acid (donating H) and as a base (accepting H), making it amphiprotic.

Water = amphiprotic = can donate **and** accept H.

21. Which functional groups or specific types of compounds can be determined using diazotization titration?

- (1) Alkyl halides
- (2) Primary alcohols
- (3) Primary aromatic amines
- (4) Carboxylic acids

Correct Answer: (3) Primary aromatic amines

Solution: Diazotization titration is a specific analytical technique used to quantify **primary aromatic amines**. The amine reacts with nitrous acid to form a diazonium salt, which is the basis for the titration endpoint.

Quick Tip

Diazotization titration = for **primary aromatic amines**, not aliphatic compounds.

22. Karl Fischer titration is based on the reaction between the iodine and sulphur dioxide.

- (1) Reduction
- (2) Oxidation
- (3) Hydrolysis
- (4) Condensation

Correct Answer: (2) Oxidation

Solution: Karl Fischer titration, used for water content determination, is based on the **oxidation** of sulfur dioxide by iodine in the presence of water. This reaction helps quantify trace amounts of moisture in pharmaceutical substances.

Karl Fischer = Oxidation reaction involving iodine and sulfur dioxide to measure water.

- 23. is the measure of how close a measurement comes to the true value
- (1) Accuracy
- (2) Precision
- (3) Standard deviation
- (4) Robustness

Correct Answer: (1) Accuracy

Solution: **Accuracy** indicates how close the observed value is to the actual or true value. It reflects the correctness of a measurement, while precision relates to repeatability.

Quick Tip

Accuracy = closeness to truth; Precision = repeatability of results.

- 24. Cinchona is well grown in soil.
- (1) Acidic
- (2) Basic
- (3) Neutral
- (4) Non-porous

Correct Answer: (1) Acidic

Solution: Cinchona, a plant known for producing quinine, thrives in **acidic soil** with well-drained conditions. Soil pH plays a vital role in nutrient availability for its optimal growth.

Quick Tip

Cinchona prefers **acidic soil** for optimal alkaloid yield.

25. Which plant growth regulator is commonly used in tissue culture for promoting cell division and callus formation?

- (1) Gibberellins
- (2) Abscisic acid
- (3) Cytokinins
- (4) Ethylene

Correct Answer: (3) Cytokinins

Solution: **Cytokinins** are essential in plant tissue culture as they promote cell division and initiate callus formation. They also work in conjunction with auxins to regulate organogenesis.

Quick Tip

Cytokinins = cell division callus initiation in plant tissue culture.

26. The number of milligrams of KOH required to neutralize the fatty acids obtained by complete hydrolysis of 1 gram of an oil sample is

- (1) Iodine value
- (2) Saponification value
- (3) Hydroxyl value
- (4) Acetyl value

Correct Answer: (2) Saponification value

Solution: The **saponification value** represents the number of milligrams of potassium hydroxide (KOH) required to saponify one gram of fat or oil. It reflects the average molecular weight of all the fatty acids present.

Quick Tip

Saponification value = mg KOH needed to hydrolyze 1g fat/oil.

27. Libermann test is used for the identification of

- (1) Glycosides
- (2) Alkaloids
- (3) Tannins
- (4) Triterpenoid saponins

Correct Answer: (4) Triterpenoid saponins

Solution: The **Libermann-Burchard test** is a colorimetric test used to detect **triterpenoid saponins** and steroids. A characteristic color change occurs due to the reaction between acetic anhydride and concentrated sulfuric acid with the compounds.

Quick Tip

Libermann-Burchard test = identification of triterpenoids and steroids.

- **28.** Biological source of pale catechu
- (1) Terminalia arjuna
- (2) Uncaria gambier
- (3) Acacia catechu
- (4) Pterocarpus marsupium

Correct Answer: (2) Uncaria gambier

Solution: **Pale catechu** is obtained from the leaves of **Uncaria gambier**. It contains catechin and is used as an astringent. It differs from **black catechu**, which is derived from Acacia catechu.

Quick Tip

Pale catechu \rightarrow Uncaria gambier; Black catechu \rightarrow Acacia catechu.

29. South American arrow poison is the synonym of the drug

- (1) Datura
- (2) Curare
- (3) Cinchona
- (4) Coca

Correct Answer: (2) Curare

Solution: **Curare** is a term for various plant-derived poisons traditionally used on arrows by South American indigenous tribes. It acts as a neuromuscular blocker and is derived mainly from **Chondrodendron tomentosum**.

Quick Tip

Curare = South American arrow poison \rightarrow muscle relaxant/neuromuscular blocker.

- **30.** The family of fennel
- (1) Umbelliferae
- (2) Cucurbitaceae
- (3) Zygophyllaceae
- (4) Araliaceae

Correct Answer: (1) Umbelliferae

Solution: **Fennel (Foeniculum vulgare)** belongs to the **Umbelliferae** (Apiaceae) family. This family is characterized by umbel-shaped flowers and includes many aromatic herbs such as coriander, cumin, and dill.

Quick Tip

Fennel = Umbelliferae family = think "umbrella" flower clusters.

- 31. Cucurbitacins are the plant bitters present in
- (1) Spirulina
- (2) Stevia
- (3) Garlic
- (4) Colocynth

Correct Answer: (4) Colocynth

Solution: **Cucurbitacins** are highly oxygenated tetracyclic triterpenoids found mainly in plants of the Cucurbitaceae family. They impart bitterness and are known for their cytotoxic properties. **Colocynth** (Citrullus colocynthis) is rich in cucurbitacins.

Quick Tip

Colocynth = source of bitter cucurbitacins (from Cucurbitaceae family).

- **32.** Which of the following is used as a rat poison?
- (1) Liquorice
- (2) Thevetia
- (3) Digitalis
- (4) European squill

Correct Answer: (4) European squill

Solution: **European squill** (Urginea maritima) contains cardiac glycosides like scillaren, which are toxic and used as rat poisons. It causes cardiac arrest in rodents and is effective due to its rapid action.

Quick Tip

European squill \rightarrow cardiac glycoside \rightarrow rat poison.

- 33. Which of the following contains sesquiterpenoids?
- (1) Saffron
- (2) Fennel
- (3) Clove
- (4) Caraway

Correct Answer: (3) Clove

Solution: **Clove** (Syzygium aromaticum) contains volatile oils with **sesquiterpenoids**, in addition to eugenol, its principal compound. These sesquiterpenoids contribute to the medicinal and aromatic properties of clove.

Quick Tip

Clove = rich in sesquiterpenoids eugenol (aromatic compound).

34. Which of the following describes the mechanism of action of metoclopramide as an antiemetic?

- (1) H₁ and H₂-receptor blocking effect
- (2) M-cholino receptor stimulating effect
- (3) D₂-dopamine and 5-HT₃-serotonin receptor blocking effect
- (4) M-cholino receptor blocking effect

Correct Answer: (3) D₂-dopamine and 5-HT₃-serotonin receptor blocking effect

Solution: **Metoclopramide** exerts its antiemetic effect primarily by **blocking D₂ receptors** in the chemoreceptor trigger zone (CTZ) and **5-HT₃ receptors** in the GI tract and CNS. This dual action reduces nausea and vomiting.

Quick Tip

 $Metoclopramide = D_2 \ 5\text{-}HT_3 \ antagonist \rightarrow antiemetic.$

- **35.** Class II antiarrhythmic drugs are blockers.
- (1) Sodium channel
- (2) Calcium channel
- (3) Potassium channel
- (4) Beta adrenergic receptor

Correct Answer: (4) Beta adrenergic receptor

Solution: Class II antiarrhythmic drugs are **beta-blockers**. They act by inhibiting beta-adrenergic receptors, reducing heart rate and myocardial contractility, and are useful in controlling supraventricular arrhythmias.

Quick Tip

Class II = Beta blockers = reduce sympathetic stimulation to the heart.

36. is drug of choice for acute iron poisoning

- (1) Aspirin
- (2) Clopidogrel
- (3) Deferoxamine
- (4) Ezetimibe

Correct Answer: (3) Deferoxamine

Solution: **Deferoxamine** is a chelating agent that binds to free iron, forming ferrioxamine, which is excreted in urine. It is the treatment of choice in cases of **acute iron poisoning**, especially when serum iron levels are significantly elevated.

Quick Tip

Iron overdose \rightarrow Deferoxamine chelates iron \rightarrow renal excretion.

37. Mechanism of action of propyl thiouracil

- (1) Inhibition of thyroid peroxidase
- (2) Activation of thyroid peroxidase
- (3) Inhibition of thyroid oxidase
- (4) Activation of thyroid oxidase

Correct Answer: (1) Inhibition of thyroid peroxidase

Solution: **Propylthiouracil (PTU)** inhibits **thyroid peroxidase**, thereby blocking the iodination of tyrosine residues in thyroglobulin, an essential step in thyroid hormone synthesis. It also inhibits peripheral conversion of T4 to T3.

Quick Tip

PTU blocks thyroid hormone synthesis via thyroid peroxidase inhibition.

- 38. The drug that cause Stevens-Johnson syndrome is
- (1) Clarithromycin
- (2) Cimetidine
- (3) Azithromycin
- (4) Sulfamethoxazole

Correct Answer: (4) Sulfamethoxazole

Solution: **Sulfamethoxazole**, a sulfonamide antibiotic, is known to cause severe hypersensitivity reactions including **Stevens-Johnson syndrome** (SJS), a potentially life-threatening skin reaction.

Quick Tip

SJS risk = Sulfa drugs (e.g., sulfamethoxazole) \rightarrow skin/mucosal toxicity.

39. What mechanism underlies the gastrointestinal discomfort induced by macrolides?

- (1) Histamine receptor agonist
- (2) Adrenergic receptor agonist
- (3) Motilin receptor agonist
- (4) Binding to 50 S ribosomal subunit

Correct Answer: (3) Motilin receptor agonist

Solution: **Macrolides** (e.g., erythromycin) act as **motilin receptor agonists**, which increase gastrointestinal motility. This stimulation of gut smooth muscle contributes to the common side effect of **GI discomfort**.

Quick Tip

Macrolides stimulate motilin receptors \rightarrow increased GI motility \rightarrow cramping.

- 40. Choose the drug which is topical aminoglycoside
- (1) Neomycin
- (2) Kanamycin
- (3) Amikacin
- (4) Gentamicin

Correct Answer: (1) Neomycin

Solution: **Neomycin** is an aminoglycoside antibiotic commonly used topically in creams, ointments, and ear drops. Due to its nephrotoxicity and ototoxicity, it is rarely used systemically.

Quick Tip

Neomycin = topical aminoglycoside (skin/ear infections), not for systemic use.

41. Which diuretic is known for its significant ototoxicity?

- (1) Torsemide
- (2) Ethacrynic acid
- (3) Azosemide
- (4) Indacrinone

Correct Answer: (2) Ethacrynic acid

Solution: **Ethacrynic acid** is a loop diuretic that is especially known for causing **ototoxicity**, more than other loop diuretics like furosemide. It can lead to hearing loss, particularly when administered in high doses or with other ototoxic drugs.

Quick Tip

Ethacrynic acid = loop diuretic with high ototoxic risk.

- **42.** Lorazepam is used in the treatment of
- (1) UTI
- (2) Glaucoma
- (3) Status epilepticus
- (4) Schizophrenia

Correct Answer: (3) Status epilepticus

Solution: **Lorazepam**, a benzodiazepine, is a first-line treatment for **status epilepticus** due to its rapid onset and long duration of action. It enhances GABAergic transmission in the CNS, providing anticonvulsant effects.

Quick Tip

Lorazepam = benzodiazepine used in **status epilepticus**.

43. H_1 antihistaminic having anti-anxiety activity is

- (1) Alprazolam
- (2) Hydroxyzine
- (3) Meprobamate
- (4) Zopiclone

Correct Answer: (2) Hydroxyzine

Solution: **Hydroxyzine** is a first-generation H₁ antihistamine that also exhibits **anxiolytic** (anti-anxiety) properties. It is often used in generalized anxiety disorder and preoperative sedation.

Quick Tip

Hydroxyzine = dual role \rightarrow antihistamine + anxiolytic.

- 44. Pilocarpine is used in the treatment of
- (1) Alzheimer
- (2) Paralytic ileus
- (3) Myasthenia gravis
- (4) Glaucoma

Correct Answer: (4) Glaucoma

Solution: **Pilocarpine** is a muscarinic agonist that increases the outflow of aqueous humor, thereby lowering intraocular pressure. It is primarily used in the management of **glaucoma**.

Quick Tip

 $Pilocarpine = muscarinic agonist \rightarrow lowers IOP in glaucoma.$

45. Captopril inhibits

- (1) Carbonic anhydrase
- (2) Angiotensin converting enzyme
- (3) Topoisomerase
- (4) Fumarate reductase

Correct Answer: (2) Angiotensin converting enzyme

Solution: **Captopril** is an ACE inhibitor that blocks the conversion of angiotensin I to angiotensin II. This leads to vasodilation, reduced aldosterone secretion, and decreased blood pressure.

Quick Tip

Captopril = ACE inhibitor \rightarrow treats hypertension heart failure.

46. Sumatriptan is selective agonist.

(1) 5HT₃

(2) 5HT₄

(3) 5HT_{1B/1D}

(4) $5HT_{2A}$

Correct Answer: (3) 5HT_{1B/1D}

Solution: **Sumatriptan** is a selective agonist at **5 $HT_{1B/1D}$ receptors**, used primarily in the treatment of acute migraine attacks. Activation of these receptors leads to vasoconstriction of cranial blood vessels and inhibition of pro-inflammatory neuropeptide release.

Quick Tip

Sumatriptan = 5HT_{1B/1D} agonist \rightarrow treats migraines.

- 47. is a prodrug of terbutaline
- (1) Bambuterol
- (2) Salbutamol
- (3) Theophylline
- (4) Montelukast

Correct Answer: (1) Bambuterol

Solution: **Bambuterol** is a long-acting beta-2 adrenergic agonist and a **prodrug** of **terbutaline**. It undergoes enzymatic conversion in the body, providing prolonged bronchodilation for asthma and COPD management.

Quick Tip

Bambuterol \rightarrow prodrug of terbutaline \rightarrow longer action in asthma therapy.

- 48. What are the long-term side effects associated with chronic isoniazid use?
- (1) Cardiotoxicity
- (2) Hepatotoxicity, peripheral neuropathy
- (3) Loss of hair
- (4) Immunotoxicity

Correct Answer: (2) Hepatotoxicity, peripheral neuropathy

Solution: **Isoniazid**, used in tuberculosis treatment, may cause **hepatotoxicity** and **peripheral neuropathy** with long-term use. Pyridoxine (vitamin B6) is co-administered to prevent neuropathy.

Quick Tip

Isoniazid \rightarrow supplement with B6 to prevent peripheral neuropathy.

49. Which type of transitions are responsible for the R-band?

- (1) $\pi \to \pi^*$
- (2) $n \rightarrow \pi^*$
- (3) $\sigma \rightarrow \sigma^*$
- (4) $n \rightarrow \sigma^*$

Correct Answer: (2) $n \rightarrow \pi^*$

Solution: The **R-band** (or n to π^* transition) arises when a non-bonding electron is excited to an antibonding π^* orbital. It is commonly observed in carbonyl-containing compounds and is characteristic of UV-visible spectra.



50. What is the maximum absorption (λ_{max}) for a homo-annular conjugated diene according to the Woodward-Fieser Rules?

- (1) 253 nm
- (2) 217 nm
- (3) 5 nm
- (4) 215 nm

Correct Answer: (1) 253 nm

Solution: According to **Woodward-Fieser Rules**, the λ_{max} for a **homo-annular diene** (conjugated double bonds within the same ring) is around **253 nm**. Substituents and auxochromes can further shift this value.

Quick Tip

Homo-annular diene \rightarrow Woodward-Fieser λ_{max} 253 nm.

51. How many vibrational modes are possible for H_2O ?

- (1) 2
- (2) 0
- (3) 1
- (4) 3

Correct Answer: (4) 3

Solution: For a non-linear molecule like $**H_2O**$, the number of vibrational modes is given by:

$$3N - 6 = 3(3) - 6 = 3$$

Hence, H₂O has three vibrational modes: symmetric stretching, asymmetric stretching, and bending.

Quick Tip

Non-linear molecules: Vibrational modes = 3N - 6

52. Which of the following is the disadvantage of nitrogen, which can be used as carrier gas in gas chromatography?

- (1) Dangerous to use
- (2) Expensive
- (3) Reduced sensitivity
- (4) Highly reactive

Correct Answer: (3) Reduced sensitivity

Solution: Although **nitrogen** is commonly used as a carrier gas in gas chromatography due to its inertness and availability, it has a major disadvantage: **reduced sensitivity** and slower analysis time compared to helium or hydrogen.

Nitrogen = safe cheap, but reduces sensitivity in GC.

- 53. What is the nature of mobile phase in normal phase chromatography?
- (1) Polar
- (2) Non-polar
- (3) Mixture of polar and non-polar
- (4) Can be polar and non-polar, it depends on the nature of analyte

Correct Answer: (2) Non-polar

Solution: In **normal phase chromatography**, the stationary phase is polar (e.g., silica), and the mobile phase is **non-polar** (e.g., hexane). This setup separates analytes based on increasing polarity.

Quick Tip

Normal phase: polar stationary + **non-polar mobile** phase.

- 54. One of the detectors used in HPLC is
- (1) Bolometer
- (2) Thermal conductivity detector
- (3) Refractive index detector
- (4) Geiger Muller counter

Correct Answer: (3) Refractive index detector

Solution: **Refractive index detectors (RID)** are commonly used in **HPLC** for detecting compounds that lack UV absorption. RID is universal but less sensitive and not compatible with gradient elution.

HPLC \rightarrow RID is used for analytes with no UV absorption.

- 55. The mobility of ion in electrophoresis does not depend upon
- (1) Shape of ion
- (2) Size of ion
- (3) Molecular weight
- (4) Stationary phase

Correct Answer: (4) Stationary phase

Solution: In **electrophoresis**, the mobility of ions is influenced by their **charge, size, and shape**, but **not** by the stationary phase, as this technique doesn't involve one like chromatography does.

Quick Tip

Electrophoresis chromatography \rightarrow no stationary phase involved.

56. Among these, which is used as stationary phase in gel electrophoresis?

- (1) Inorganic polymers
- (2) Polyacrylamide gel
- (3) Chromium gel
- (4) Momoner gel

Correct Answer: (2) Polyacrylamide gel

Solution: In **gel electrophoresis**, the stationary phase is commonly **polyacrylamide gel**. It forms a porous matrix that separates molecules based on size and charge, particularly proteins and nucleic acids.

Polyacrylamide gel = stationary phase in PAGE (protein separation).

- **57.** ELISA is widely used in
- (1) Clinical diagnostics
- (2) Food preservation
- (3) Structural engineering
- (4) Automotive manufacturing

Correct Answer: (1) Clinical diagnostics

Solution: **ELISA** (Enzyme-Linked Immunosorbent Assay) is a widely used analytical technique in **clinical diagnostics** for detecting antigens or antibodies in blood samples. It is vital in disease diagnosis such as HIV, hepatitis, and COVID-19.

Quick Tip

ELISA = diagnostic tool for detecting **antigens/antibodies**.

58. Example of organic molecular complexes

- (1) Quinhydrone type complexes
- (2) Chelates
- (3) Clatharates
- (4) Layer type complexes

Correct Answer: (1) Quinhydrone type complexes

Solution: **Quinhydrone complexes** are examples of **organic molecular complexes**.

They involve interactions between electron donors and acceptors like quinone and hydroquinone, forming charge-transfer complexes.

Organic molecular complexes = Quinhydrone (quinone + hydroquinone).

59. Liquid dispersions of tragacanth, sodium alginate, methylcellulose and sodium carboxymethyl cellulose exhibit

- (1) Plastic flow
- (2) Bingham flow
- (3) Dilatant flow
- (4) Pseudoplastic flow

Correct Answer: (4) Pseudoplastic flow

Solution: These polysaccharide-based dispersions (e.g., tragacanth, sodium alginate) show **pseudoplastic flow**—a type of non-Newtonian flow where viscosity decreases with increasing shear rate.

Quick Tip

Pseudoplastic = shear-thinning; flow becomes easier with stirring.

60. Andreasen pipette method is used over the size range of

- (1) 0.01–0.1 µm
- (2) 0.1–300 µm
- (3) 0.01–50 µm
- (4) $0.01 1000 \ \mu m$

Correct Answer: (2) 0.1–300 µm

Solution: The **Andreasen pipette method** is used to determine the particle size distribution in suspensions within the ** $0.1-300 \mu m^{**}$ range. It works on the sedimentation principle governed by Stoke's Law.

And reasen pipette = sedimentation method for $0.1-300 \mu m$ particles.

- 61. Example of cationic surface active agent
- (1) Methyl cellulose
- (2) Bentonite
- (3) Benzalkonium chloride
- (4) Magnesium hydroxide

Correct Answer: (3) Benzalkonium chloride

Solution: **Benzalkonium chloride** is a **cationic surfactant** commonly used as a preservative and antimicrobial agent in pharmaceutical formulations. It contains a positively charged quaternary ammonium group.

Quick Tip

Cationic surfactants = quaternary ammonium compounds like benzalkonium chloride.

- **62.** Chemically nitrogen mustards are
- (1) Bis alpha halo alkyl amines
- (2) Tris beta halo alkyl amines
- (3) Bis beta halo alkyl amines
- (4) Tris alpha halo alkyl amines

Correct Answer: (3) Bis beta halo alkyl amines

Solution: **Nitrogen mustards** are **bis(-haloalkyl)amines**, known for their alkylating properties. They form aziridinium ions that react with DNA, making them potent cytotoxic agents used in cancer chemotherapy.

Nitrogen mustards = Bis -halo alkyl amines \rightarrow DNA alkylating agents.

- **63.** What is strongest H₁ Antihistamines?
- (1) Cetrizine
- (2) Fexofinadine
- (3) Loratidine
- (4) Astemizole

Correct Answer: (1) Cetrizine

Solution: **Cetirizine** is a potent **second-generation H_1 antihistamine**. It provides strong and long-lasting anti-allergic effects with minimal sedative action due to poor penetration of the blood-brain barrier.

Quick Tip

Cetirizine = strong H_1 blocker with less sedation.

64. Histamine contains heterocyclic ring

- (1) Pyrrole
- (2) Pyridine
- (3) Thiazole
- (4) Imidazole

Correct Answer: (4) Imidazole

Solution: **Histamine** contains an **imidazole ring**, a five-membered ring with two nitrogen atoms. This structure is responsible for its biological activity, particularly in allergic and inflammatory responses.

Histamine = imidazole ring + ethylamine chain \rightarrow biological activity.

- 65. Coumarin based anti-coagulant drug
- (1) Phenindione
- (2) Anisindione
- (3) Heparin
- (4) Warfarin

Correct Answer: (4) Warfarin

Solution: **Warfarin** is a **coumarin-derived anticoagulant** that inhibits vitamin K epoxide reductase, impairing the synthesis of clotting factors II, VII, IX, and X. It is widely used in thromboembolic disorders.

Quick Tip

Warfarin = coumarin anticoagulant \rightarrow inhibits vitamin K-dependent clotting.

- 66. Mechanism of action of digoxin
- (1) Inhibition of sodium-potassium pump
- (2) Increasing cGMP
- (3) Decreasing cGMP
- (4) Decreasing calcium levels

Correct Answer: (1) Inhibition of sodium-potassium pump

Solution: **Digoxin** exerts its action by inhibiting the **Na⁺/K⁺-ATPase** pump in myocardial cells. This leads to an increase in intracellular Na⁺, which subsequently increases intracellular Ca²⁺ via the Na⁺/Ca²⁺ exchanger, enhancing cardiac contractility.

 $Digoxin \rightarrow inhibits Na^+/K^+ pump \rightarrow more Ca^{2+} \rightarrow stronger heart contraction.$

- 67. What impact does replacing the decalin ring with a cyclohexane ring have on the activity
- of HMG-CoA reductase inhibitors?
- (1) 10000 fold increase in the activity
- (2) 10000 fold decrease in the activity
- (3) No changes in the activity
- (4) Increase in the activity

Correct Answer: (2) 10000 fold decrease in the activity

Solution: The **decalin ring** in statins is crucial for their interaction with HMG-CoA reductase. Replacing it with a **cyclohexane ring** significantly reduces hydrophobic binding and leads to a **10000-fold decrease** in inhibitory activity.

Quick Tip

Statins: decalin ring \rightarrow high affinity; cyclohexane \rightarrow major activity drop.

- 68. Angiotensin-II is a peptide
- (1) Decapeptide
- (2) Heptapeptide
- (3) Octapeptide
- (4) Tripeptide

Correct Answer: (3) Octapeptide

Solution: **Angiotensin-II** is an **octapeptide** (composed of 8 amino acids). It is a potent vasoconstrictor involved in the renin-angiotensin-aldosterone system, playing a key role in blood pressure regulation.

Angiotensin-II = 8 amino acids = **octapeptide**

69. Replacement of 6-methoxy group of quinine with a 7-chloro substituent results in formation of

- (1) Cinchonine
- (2) Chloroquine
- (3) Amodiaquine
- (4) Mefloquine

Correct Answer: (2) Chloroquine

Solution: **Chloroquine**, a synthetic antimalarial, is structurally derived from **quinine** by replacing the **6-methoxy group** with a **7-chloro substituent**, which enhances its antimalarial activity and oral efficacy.

Quick Tip

6-methoxy \rightarrow 7-chloro switch in quinine \rightarrow chloroquine synthesis.

- 70. Chloramphenicol is synthesized from
- (1) 4-Nitro acetophenone
- (2) 4-Chloro acetophenone
- (3) 3-Chloro acetophenone
- (4) 2-Chloro acetophenone

Correct Answer: (1) 4-Nitro acetophenone

Solution: **Chloramphenicol**, a broad-spectrum antibiotic, is **synthesized from 4-nitro acetophenone** via a multistep process involving nitro group reduction and further derivatization.

Chloramphenicol synthesis starts from **4-nitro acetophenone**.

71. Azithromycin has a membered lactone ring.

(1) 12

(2) 13

(3) 14

(4) 15

Correct Answer: (4) 15

Solution: **Azithromycin**, a macrolide antibiotic, contains a **15-membered lactone ring**. This expanded ring (compared to erythromycin's 14-membered ring) improves its acid stability and enhances tissue penetration.

Quick Tip

Azithromycin = 15-membered macrolide ring \rightarrow better absorption and stability.

- 72. Which mechanism is involved in the absorption of propranolol in the body?
- (1) Ion pair transport
- (2) Pinocytosis
- (3) Phagocytosis
- (4) Passive diffusion

Correct Answer: (1) Ion pair transport

Solution: **Propranolol**, a basic drug, is absorbed by **ion pair transport**, a process in which the drug forms a neutral complex with an oppositely charged ion to facilitate absorption through the lipid membrane.

Basic drugs like propranolol \rightarrow ion pair transport enhances lipid solubility.

73. Select the probable mechanism of absorption of a hydrophilic drug of molecular weight 80 dalton.

- (1) Active transport
- (2) Filtration
- (3) Passive diffusion
- (4) Endocytosis

Correct Answer: (2) Filtration

Solution: Hydrophilic drugs with low molecular weight (like 80 Da) are typically absorbed through **filtration** (also known as paracellular transport), where they pass through water-filled pores between cells.

Quick Tip

Small, hydrophilic drugs \rightarrow filtration across capillary membranes.

74. Which of the following represents the total integrated area under the plasma level time profile and expresses the total amount of drug that comes into systemic circulation after its administration?

- $(1) C_{max}$
- (2) t_{max}
- (3) MRT
- (4) AUC

Correct Answer: (4) AUC

Solution: **AUC (Area Under Curve)** represents the total drug exposure over time. It

quantifies the **extent of drug absorption** into systemic circulation and is critical in bioavailability and bioequivalence studies.

Quick Tip

AUC = total drug absorbed into systemic circulation over time.

- **75.** In the equation $dX/dt = -K_EX$, what does X stand for?
- (1) First order elimination rate constant
- (2) Distribution exponent
- (3) Amount of drug in the body at any time
- (4) Elimination exponent

Correct Answer: (3) Amount of drug in the body at any time

Solution: In the first-order elimination equation $**dX/dt = -K_EX**$, **X** denotes the **amount of drug in the body at any time**. The rate of elimination is directly proportional to this amount.

Quick Tip

In first-order kinetics: X = drug amount; $K_E = elimination$ rate constant.

76. Dose dependent pharmacokinetics is also known as

- (1) Non linear pharmacokinetics
- (2) Linear pharmacokinetics
- (3) Pseudo order kinetics
- (4) Third order kinetics

Correct Answer: (1) Non linear pharmacokinetics

Solution: **Non-linear pharmacokinetics** refers to drug kinetics where parameters like clearance or half-life change with dose due to saturation of processes such as metabolism or

transport. This results in disproportionate changes in drug concentration with increasing dose.

Quick Tip

Non-linear = dose-dependent \rightarrow saturation of metabolic or transport systems.

77. Which term describes the drug substance in two or more identical dosage forms reaches the systemic circulation at the same relative rate and to the same relative extent without significant statistical differences?

- (1) Chemical equivalence
- (2) Bioequivalence
- (3) Bioinequivalence
- (4) Therapeutic equivalence

Correct Answer: (2) Bioequivalence

Solution: **Bioequivalence** is the term used when two or more identical pharmaceutical products show **no significant difference in rate and extent of absorption** when administered in the same molar dose under similar conditions.

Quick Tip

 $\label{eq:Bioequivalence} \mbox{Bioequivalence} = \mbox{same drug release rate and extent} \rightarrow \mbox{statistically similar AUC and} C_{max}.$

78. What role does the P-glycoprotein efflux pump play in drug absorption?

- (1) Enhances metabolism
- (2) Inhibits absorption
- (3) Facilitates absorption
- (4) Has no effect on absorption

Correct Answer: (2) Inhibits absorption

Solution: **P-glycoprotein (P-gp)** is an **efflux transporter** found in intestinal epithelium that pumps drugs back into the intestinal lumen, thereby reducing their absorption and bioavailability.

Quick Tip

P-gp = drug efflux pump \rightarrow reduces absorption \rightarrow lowers bioavailability.

- **79.** What is the unit of measurement for clearance?
- (1) L/hour
- (2) L/min
- (3) %/day
- (4) mL/hour
- Correct Answer: (1) L/hour

Solution:

Clearance, often used in pharmacokinetics and physiology, measures the rate at which a substance (like a drug or waste) is removed from the body, typically by organs like the kidneys or liver. It is defined as the volume of plasma cleared of a substance per unit of time. The standard unit for clearance is liters per hour (L/hour), as it reflects the volume of fluid (in liters) cleared over a period of time (in hours).

Thus, the correct answer is L/hour.

Quick Tip

Clearance is a key concept in understanding how the body processes drugs, often used to calculate dosages in medical settings.

80. Zidovudine is an analogue of

- (1) Thymidine
- (2) Cytidine
- (3) Purine
- (4) Guanosine

Correct Answer: (1) Thymidine

Solution:

Zidovudine, also known as AZT, is a nucleoside analogue used as an antiretroviral drug to treat HIV. It mimics the structure of thymidine, a nucleoside that is a building block of DNA. Zidovudine is incorporated into viral DNA by HIV's reverse transcriptase enzyme, but it lacks a functional 3'-hydroxyl group, which prevents further DNA chain elongation, thus inhibiting viral replication. It is specifically an analogue of thymidine, not cytidine, purine, or guanosine.

Thus, the correct answer is Thymidine.

Quick Tip

Zidovudine was one of the first drugs approved for HIV treatment and works by interfering with the virus's ability to replicate its genetic material.

- 81. An example of Imidazole containing antifungal drug is
- (1) Ketoconazole
- (2) Itraconazole
- (3) Fluconazole
- (4) Griseofulvin

Correct Answer: (1) Ketoconazole

Solution:

Imidazole-containing antifungal drugs are a class of antifungals that have an imidazole ring in their chemical structure. Ketoconazole is a well-known example of an imidazole antifungal, used to treat fungal infections by inhibiting ergosterol synthesis, a key component of fungal cell membranes. Itraconazole and Fluconazole are triazole antifungals, which contain a triazole ring instead. Griseofulvin is not related to imidazoles or triazoles; it works by inhibiting fungal mitosis.

Thus, the correct answer is Ketoconazole.

Quick Tip

Imidazole antifungals like Ketoconazole are often used for topical or systemic fungal infections, but they may have more side effects compared to triazoles.

- 82. Drug used to treat Amoebiasis is
- (1) Tolnaftate
- (2) Mefloquine
- (3) Tinidazole
- (4) Verapamil

Correct Answer: (3) Tinidazole

Solution:

Amoebiasis is a parasitic infection caused by Entamoeba histolytica. Tinidazole is an antiprotozoal drug commonly used to treat amoebiasis by targeting the parasite and disrupting its DNA synthesis, leading to its death. Tolnaftate is an antifungal, Mefloquine is used for malaria, and Verapamil is a calcium channel blocker used for cardiovascular conditions, none of which are effective against amoebiasis.

Thus, the correct answer is Tinidazole.

Quick Tip

Tinidazole is often preferred over metronidazole for amoebiasis treatment due to its longer half-life and fewer side effects.

- 83. Prontosil is a prodrug of _____
- (1) Sulfamethoxazole
- (2) Sulfanilamide
- (3) Nalidixic acid
- (4) Sulfadoxine

Correct Answer: (2) Sulfanilamide

Solution:

Prontosil is historically significant as one of the first synthetic antibacterial drugs. It is a prodrug, meaning it is inactive until metabolized in the body into its active form, sulfanilamide. Sulfanilamide inhibits bacterial growth by interfering with folic acid synthesis, a process essential for bacterial survival. Sulfamethoxazole and Sulfadoxine are other sulfonamides but are not derived from Prontosil, and Nalidixic acid is a quinolone antibiotic, unrelated to this mechanism.

Thus, the correct answer is Sulfanilamide.

Quick Tip

Prontosil, discovered in the 1930s, marked the beginning of the era of sulfonamide antibiotics, revolutionizing bacterial infection treatment.

- 84. Which of the following is a precursor of nitroglycerin synthesis?
- (1) Glycerol
- (2) Glycol
- (3) Glucose
- (4) Glucitol

Correct Answer: (1) Glycerol

Solution:

Nitroglycerin, a vasodilator used to treat angina, is synthesized through the nitration of glycerol. Glycerol, a triol, reacts with nitric acid in the presence of sulfuric acid to form

glyceryl trinitrate (nitroglycerin). Glycol, glucose, and glucitol are not suitable precursors for this reaction due to their different chemical structures and functional groups. Thus, the correct answer is Glycerol.

Quick Tip

Nitroglycerin is highly explosive in its pure form, but in medical use, it is diluted to ensure safety while treating heart conditions.

- **85.** What is the chemical nomenclature of Procaine?
- (1) 2-(dimethylamino)ethyl 4-aminobenzoate
- (2) 2-(triethylamino)ethyl 4-aminobenzoate
- (3) 2-(dipropylamino)ethyl 4-aminobenzoate
- (4) 2-(diethylamino)ethyl 4-aminobenzoate

Correct Answer: (4) 2-(diethylamino)ethyl 4-aminobenzoate

Solution:

Procaine is a local anesthetic commonly known as Novocain. Its chemical structure consists of a 4-aminobenzoic acid ester with a diethylaminoethyl group. The IUPAC name for Procaine is 2-(diethylamino)ethyl 4-aminobenzoate, reflecting the diethylamino group attached to the ethyl chain and the 4-aminobenzoate core. The other options contain incorrect substituents, such as dimethyl, triethyl, or dipropyl groups. Thus, the correct answer is 2-(diethylamino)ethyl 4-aminobenzoate.

Quick Tip

Procaine is often used in dentistry and minor surgeries due to its fast-acting local anesthetic properties.

86. Which of the following antibiotics possesses a β -lactam ring in its structure?

- (1) Erythromycin
- (2) Vancomycin
- (3) Ciprofloxacin
- (4) Amoxicillin

Correct Answer: (4) Amoxicillin

Solution:

A β -lactam ring is a four-membered lactam ring in the structure of certain antibiotics, which inhibits bacterial cell wall synthesis. Amoxicillin, a penicillin-class antibiotic, contains a β -lactam ring in its structure, making it effective against a wide range of bacteria. Erythromycin (a macrolide), Vancomycin (a glycopeptide), and Ciprofloxacin (a fluoroquinolone) do not have a β -lactam ring in their structures. Thus, the correct answer is Amoxicillin.

Quick Tip

The β -lactam ring in antibiotics like Amoxicillin is the target of bacterial resistance mechanisms, such as β -lactamase enzymes.

- 87. Cephalosporin nucleus consists of ...
- (1) Beta-lactam ring + Thiazolidine ring
- (2) Beta-lactam ring + Oxazolidine ring
- (3) Beta-lactam ring + Dihydrothiazine ring
- (4) Beta-lactam ring + Pyrrole ring

Correct Answer: (3) Beta-lactam ring + Dihydrothiazine ring

Solution:

The cephalosporin nucleus is a core structure of cephalosporin antibiotics, which consists of a β -lactam ring fused to a six-membered dihydrothiazine ring. The β -lactam ring is responsible for the antibacterial activity by inhibiting cell wall synthesis, while the dihydrothiazine ring distinguishes cephalosporins from penicillins (which have a thiazolidine ring). The other options, such as oxazolidine or pyrrole rings, are not part of the cephalosporin structure.

Thus, the correct answer is Beta-lactam ring + Dihydrothiazine ring.

Quick Tip

Cephalosporins are often used as an alternative to penicillins in patients with mild penicillin allergies, though cross-reactivity can occur.

- 88. What is the chemical class of Zaleplon?
- (1) Imidobenzene
- (2) Imidopyrimidine
- (3) Pyrazolopyrimidine
- (4) Cycloppyrolone

Correct Answer: (3) Pyrazolopyrimidine

Solution:

Zaleplon is a non-benzodiazepine hypnotic drug used to treat insomnia. It belongs to the chemical class of pyrazolopyrimidines, characterized by a pyrazole ring fused to a pyrimidine ring in its structure. This class is distinct from imidopyrimidines, imidobenzenes, or cyclopyrrolones, which have different ring systems and are not associated with Zaleplon's structure.

Thus, the correct answer is Pyrazolopyrimidine.

Quick Tip

Zaleplon is often used for short-term insomnia treatment due to its rapid onset and short duration of action.

89. Diazepam is synthesized from

(1) Diphenyl methane

- (2) 2-Amino-5-chloro benzophenone
- (3) 3-Chloro acetophenone
- (4) Phenothiazine

Correct Answer: (2) 2-Amino-5-chloro benzophenone

Solution:

Diazepam, a benzodiazepine used for anxiety and sedation, is synthesized starting from 2-amino-5-chloro benzophenone. This compound undergoes a series of reactions, including condensation with chloroacetyl chloride and cyclization, to form the benzodiazepine ring structure of Diazepam. Diphenyl methane, 3-chloro acetophenone, and phenothiazine are not precursors in this synthesis pathway.

Thus, the correct answer is 2-Amino-5-chloro benzophenone.

Quick Tip

Diazepam's synthesis involves forming a seven-membered diazepine ring, which is key to its pharmacological activity.

- 90. In the microbial bioassay of Amikacin, the strain used is ...
- (1) Bacillus pumilus
- (2) Saccharomyces cerevisiae
- (3) Bacillus subtilis
- (4) Staphylococcus aureus

Correct Answer: (4) Staphylococcus aureus

Solution:

Amikacin is an aminoglycoside antibiotic, and its potency is often assessed using a microbial bioassay. In this assay, Staphylococcus aureus is commonly used as the test organism because it is sensitive to Amikacin, allowing for accurate measurement of the drug's antibacterial activity through inhibition zones. Bacillus pumilus, Saccharomyces cerevisiae (a yeast), and Bacillus subtilis are not typically used for Amikacin bioassays.

Thus, the correct answer is Staphylococcus aureus.

Quick Tip

Microbial bioassays measure antibiotic potency by observing the growth inhibition of a sensitive bacterial strain.

91. Which of the following comes under chemical method of sterilization?

- (1) Ethylene oxide treatment
- (2) Radiation
- (3) Moist heat sterilization
- (4) Filtration

Correct Answer: (1) Ethylene oxide treatment

Solution: **Ethylene oxide (EtO) sterilization** is a chemical method used to sterilize heatand moisture-sensitive medical equipment and pharmaceuticals. It works by alkylating the DNA and proteins of microorganisms, leading to their death.

Other methods listed (radiation, moist heat, and filtration) are **physical** methods of sterilization.

Quick Tip

Chemical sterilization \rightarrow think **ethylene oxide** for heat-sensitive tools.

92. helps bacteria to grow by providing nitrogenous compounds, carbon,

B-complex vitamins and other growth factors for microorganisms.

- (1) Agar
- (2) Yeast extract
- (3) Peptone
- (4) Agar–Agar

Correct Answer: (2) Yeast extract

Solution: **Yeast extract** is a rich source of **nitrogenous compounds**, **carbon**, **vitamins (especially B-complex)**, and **growth factors** essential for microbial growth. It is commonly used in culture media to support the proliferation of a wide variety of bacteria and fungi.

Quick Tip

Yeast extract = microbial multivitamin \rightarrow supports robust bacterial growth.

- 93. Which of the following substances is used as an inactivating agent for sulfonamides?
- (1) PABA (Para Amino Benzoic Acid)
- (2) Penicillinase
- (3) Acetyl Transferase
- (4) Penicillamine

Correct Answer: (1) PABA (Para Amino Benzoic Acid)

Solution: **PABA** competes with sulfonamides for incorporation into folic acid synthesis in bacteria. Because sulfonamides act as PABA analogs, an excess of PABA can inactivate or reduce the effectiveness of sulfonamides.

Quick Tip

Sulfonamides mimic PABA \rightarrow PABA excess = sulfonamide inactivation.

94. Hybridoma technology was developed by.....

- (1) Kohler & Milstein
- (2) Khorana and Korenberg
- (3) Khorana and Nirenberg
- (4) Beedle and Tautum

Correct Answer: (1) Kohler & Milstein

Solution: **Georges Kohler and Cesar Milstein** developed hybridoma technology, which is used to produce **monoclonal antibodies** by fusing antibody-producing B cells with myeloma cells.

Quick Tip

Monoclonal antibodies \rightarrow Hybridoma \rightarrow Kohler & Milstein.

95. Which of the following is an example of passive immunity?

(1) Skin acting as a physical barrier to pathogens

(2) IgG Antibodies passed from mother to fetus through the placenta

(3) Immune response to a specific antigen after vaccination

(4) Production of interferons in response to a viral infection

Correct Answer: (2) IgG Antibodies passed from mother to fetus through the placenta

Solution: **Passive immunity** involves the transfer of pre-formed antibodies, like **IgG** from mother to fetus via the placenta. It provides immediate, short-term immunity without activating the recipient's immune system.

Quick Tip

Passive = pre-formed antibodies (e.g. maternal IgG across placenta).

96. BCG vaccine contains which of the following strain?

- (1) Ebola virus
- (2) Herpes virus
- (3) Mycobacterium bovis
- (4) Variola virus

Correct Answer: (3) Mycobacterium bovis

Solution: The **BCG (Bacillus Calmette–Guérin)** vaccine is derived from a live, attenuated strain of **Mycobacterium bovis** and is used primarily against **tuberculosis**.

Quick Tip

 $BCG \rightarrow Tuberculosis \rightarrow Live attenuated Mycobacterium bovis.$

97. Which of the following is a common method for inactivating or attenuating pathogens in vaccine production?

- (1) Pasteurization
- (2) Filtration
- (3) Lyophilization
- (4) Polymerization

Correct Answer: (1) Pasteurization

Solution: Pasteurization is a widely used method to inactivate or attenuate pathogens, especially in the production of certain vaccines. It involves controlled heating that kills pathogenic microorganisms while preserving the efficacy of the vaccine. This process ensures that the pathogens cannot cause disease while retaining their immunogenic properties needed to stimulate an immune response.

Other methods like filtration and lyophilization have their roles in vaccine production, but they are not primarily used for inactivating pathogens. Polymerization is a chemical process unrelated to vaccine attenuation.

Quick Tip

Pasteurization is a heat-based method commonly used to weaken or kill pathogens without completely destroying their structure, making them ideal for vaccine formulation. **98.** Dibenzodiazepine derivative atypical neuroleptic drug is

- (1) Loxapine
- (2) Haloperidol
- (3) Ziprasidone
- (4) Clozapine

Correct Answer: (4) Clozapine

Solution: Clozapine is classified as an atypical antipsychotic drug and is chemically a dibenzodiazepine derivative. It is used in the treatment of resistant schizophrenia and has a distinct mechanism of action compared to typical neuroleptics. Other options listed are not dibenzodiazepine derivatives, and haloperidol is a typical antipsychotic.

Quick Tip

Clozapine is a second-generation antipsychotic that is especially effective in treatmentresistant schizophrenia and is structurally a dibenzodiazepine.

- 99. Which one of the following is sulphonyl urea derivative hypoglycemic drug?
- (1) Repaglinide
- (2) Nateglinide
- (3) Glipizide
- (4) Metformin

Correct Answer: (3) Glipizide

Solution: Glipizide is a second-generation sulfonylurea used to treat type 2 diabetes. It stimulates insulin secretion from pancreatic beta cells. The other drugs listed—repaglinide and nateglinide—are meglitinides, and metformin is a biguanide, which works by reducing hepatic glucose production.

Sulfonylureas like Glipizide lower blood sugar by stimulating insulin release; they are different from meglitinides and biguanides.

100. Which is selective β_1 adrenergic antagonist?

- (1) Propranolol
- (2) Atenolol
- (3) Nadolol
- (4) Timolol

Correct Answer: (2) Atenolol

Solution: Atenolol is a cardioselective beta-blocker that selectively blocks β_1 adrenergic receptors. It is used in managing hypertension and angina. The other drugs listed (propranolol, nadolol, timolol) are non-selective beta-blockers that act on both β_1 and β_2 receptors.

Quick Tip

Attenolol is selective for β_1 receptors, making it safer in patients with asthma or COPD compared to non-selective beta-blockers.

101. The structural feature which is essential for both glucocorticoids and mineralocorticoids activity is

- (1) 6- α substitution on ring B
- (2) 3-keto group on ring A
- (3) Double bond in the 1,2 position of ring A
- (4) Without 17α hydroxy group

Correct Answer: (2) 3-keto group on ring A

Solution: The 3-keto group on ring A is a fundamental structural requirement for both glucocorticoid and mineralocorticoid activity. This group plays a crucial role in the binding of these hormones to their respective receptors. Alteration or removal of this group significantly diminishes hormonal activity.

Quick Tip

Both glucocorticoids and mineralocorticoids require a 3-keto group for receptor binding and activity.

- **102.** Which of the following antibiotics is a tetracycline?
- (1) Chloramphenicol
- (2) Streptomycin
- (3) Erythromycin
- (4) Doxycycline

Correct Answer: (4) Doxycycline

Solution: Doxycycline is a broad-spectrum antibiotic that belongs to the tetracycline class. It inhibits bacterial protein synthesis by binding to the 30S ribosomal subunit. The other antibiotics belong to different classes: chloramphenicol (amphenicol), streptomycin (aminoglycoside), and erythromycin (macrolide).

Quick Tip

Tetracyclines like doxycycline act by inhibiting the 30S ribosomal subunit and are used to treat a wide range of infections.

103. GMP is scheduled as in drugs cosmetics act.

(1) N

(2) O

(3) M (4) P

Correct Answer: (3) M

Solution: According to the Drugs and Cosmetics Act of India, Good Manufacturing Practices (GMP) are covered under Schedule M. It outlines the necessary factory conditions, documentation, and quality control measures required for manufacturing pharmaceuticals.

Quick Tip

Schedule M of the Drugs and Cosmetics Act deals with GMP standards for pharmaceutical manufacturing units.

104. ISO 14001 refers to

- (1) Environmental management
- (2) Quality system
- (3) Risk management
- (4) Energy management

Correct Answer: (1) Environmental management

Solution: ISO 14001 is an internationally accepted standard that outlines the requirements for an effective environmental management system (EMS). It helps organizations improve their environmental performance through more efficient use of resources and reduction of waste.

Quick Tip

ISO 14001 = Environmental Management System standard, focused on sustainability and reducing environmental impact.

105. ICH Q9 refers to
(1) GMP guidelines
(2) Quality risk management
(3) Clinical safety
(4) Specifications

Correct Answer: (2) Quality risk management

Solution: ICH Q9 guideline is focused on quality risk management in the pharmaceutical industry. It provides principles and tools for risk-based decision-making in quality systems, development, and manufacturing, ensuring better product quality and compliance.

Quick Tip

ICH Q9 emphasizes quality risk management—essential for improving product safety and regulatory compliance.

106. The requirement and guidelines for clinical trials, import and manufacture of new drugs as per the drugs cosmetics rules is given under schedule

(1) N

(2) Y

(3) A

(4) B

Correct Answer: (2) Y

Solution: Schedule Y of the Drugs and Cosmetics Rules, 1945, outlines the requirements and guidelines for clinical trials and the import and manufacture of new drugs in India. It ensures that clinical research is conducted in a scientifically and ethically sound manner.

Quick Tip

Schedule Y is crucial for regulating clinical trials and new drug approvals in India.

107. List of substances that should be sold by retail only on prescription of registered medical practitioner comes under

- (1) Schedule P
- (2) Schedule H
- (3) Schedule G
- (4) Schedule J

Correct Answer: (2) Schedule H

Solution: Schedule H drugs are prescription drugs that must be sold by retail only on the prescription of a registered medical practitioner. These include antibiotics, hormones, and other potent medications.

Quick Tip

Drugs under Schedule H require a valid prescription for sale to prevent misuse.

108. The following form under Schedule A of the Drug and Cosmetic Act is utilized for applying license "Application to Import drugs for personal use"

(1) Form 8

(2) Form 24 C

- (3) Form 19
- (4) Form 12A

Correct Answer: (4) Form 12A

Solution: Form 12A, under Schedule A of the Drugs and Cosmetics Rules, is used to apply for the import of drugs for personal use. It is specifically meant for individuals, not for commercial or institutional importation.

Quick Tip

Form 12A = Import license form for personal use of drugs under Indian regulation.

109. Blood bank comes under the following schedule

(1) Schedule B

- (2) Schedule D
- (3) Schedule F
- (4) Schedule G

Correct Answer: (3) Schedule F

Solution: Schedule F of the Drugs and Cosmetics Rules specifies the standards for blood banks, including procedures, equipment, and facilities required to collect, store, and supply blood safely.

Quick Tip

Schedule F outlines the rules for operation and maintenance of blood banks in India.

110. Spurious drug comes under

(1) Section 17

(2) Section 17A

(3) Section 17B

(4) Section 3B

Correct Answer: (3) Section 17B

Solution: Section 17B of the Drugs and Cosmetics Act defines and deals with spurious drugs. These are drugs that are deliberately mislabeled or misrepresented with the intention to deceive, and pose serious health hazards.

Quick Tip

Spurious drugs are addressed under Section 17B—these are fake or deceptive medicines.

111. Dried aluminium hydroxide gel contains NLT 47% of

- (1) Aluminium carbonate
- (2) Aluminium oxide
- (3) Aluminium citrate
- (4) Aluminium silicate

Correct Answer: (2) Aluminium oxide

Solution: Dried aluminium hydroxide gel is required to contain not less than 47% of aluminium oxide (Al_2O_3) to ensure its efficacy as an antacid. This percentage indicates the active component responsible for its neutralizing properties.

Quick Tip

Aluminium hydroxide gel must contain at least 47% Al₂O₃ to be pharmaceutically effective.

- **112.** is produced in limit test for chlorides
- (1) Turbidity
- (2) Opalescence
- (3) Precipitate
- (4) Pink colour

Correct Answer: (2) Opalescence

Solution: In the limit test for chlorides, opalescence is produced when chloride ions react with silver nitrate in the presence of nitric acid. This visual change is compared against a standard to determine compliance.

Quick Tip

Opalescence is the characteristic visual indicator in the chloride limit test.

113. IP limit for heavy metals is.....

- (1) 10 ppm
- (2) 15 ppm
- (3) 5 ppm
- (4) 20 ppm

Correct Answer: (4) 20 ppm

Solution: The Indian Pharmacopoeia prescribes a permissible limit of not more than 20 parts per million (ppm) for heavy metals in pharmaceutical substances to ensure safety and avoid toxicity.

Quick Tip

Heavy metal contamination should not exceed 20 ppm as per IP standards.

- 114. limit test is a pharmacopoeia method based on Gutzeit test
- (1) Arsenic
- (2) Iron
- (3) Sulphur
- (4) Chlorides

Correct Answer: (1) Arsenic

Solution: The Gutzeit test is a sensitive method for detecting arsenic in pharmaceutical substances. It involves converting arsenic into arsine gas and reacting it with mercuric chloride paper to produce a yellow to brown color.

Quick Tip

The Gutzeit method is the standard test for arsenic in pharmacopoeias.

115. Which of the following is used as an adsorbent for bacterial toxoids in preparation of vaccines?

- (1) Calcium carbonate
- (2) Magnesium oxide
- (3) Aluminium phosphate
- (4) Sodium bicarbonate

Correct Answer: (3) Aluminium phosphate

Solution: Aluminium phosphate is commonly used as an adsorbent in vaccines to enhance immune response by slowly releasing the toxoid and maintaining its stability. It is particularly used in diphtheria, tetanus, and pertussis vaccines.

Quick Tip

Aluminium phosphate binds toxoids to act as a depot, enhancing vaccine efficacy.

- 116. The diagnostic test for myocardial infarction is
- (1) Creatinine kinase test
- (2) Haematocrit
- (3) Total blood count
- (4) Urine test

Correct Answer: (1) Creatinine kinase test

Solution: Creatinine kinase (CK), specifically the CK-MB isoenzyme, is released into the blood when there is damage to cardiac muscle, making it a key diagnostic marker for myocardial infarction (heart attack). Other options are not specific indicators for cardiac injury.

Quick Tip

CK-MB is the cardiac-specific enzyme measured in suspected myocardial infarction.

117. A heart rate of 90 bpm (beats per minute) means the duration of one cardiac cycle is about seconds.

(1) 0.67

(2) 1.0

- (3) 1.5
- (4) 1.8

Correct Answer: (1) 0.67

Solution: Heart rate of 90 bpm implies 90 beats in 60 seconds. So, the duration of one cardiac cycle is:

$$\frac{60}{90} = 0.67 \text{ seconds}$$

Quick Tip

Cardiac cycle duration = $\frac{60}{\text{heart rate in bpm}}$

118. The hypertensive drug used in pregnancy is.....

- (1) Propranalol
- (2) Metaprolol
- (3) Diuretics
- (4) Methyldopa

Correct Answer: (4) Methyldopa

Solution: Methyldopa is the preferred antihypertensive agent in pregnancy due to its safety profile for both mother and fetus. It centrally reduces sympathetic tone without causing significant fetal harm, unlike some beta-blockers or diuretics.

Quick Tip

Methyldopa is safe and effective for managing hypertension in pregnant women.

119. Which medication is added to prolong the activity of L-DOPA in the case of motor fluctuation development?

- (1) MAO-B inhibitors
- (2) Catechol-O-methyl transferase inhibitor
- (3) Dopamine inhibitors
- (4) Anti-cholinergic

Correct Answer: (2) Catechol-O-methyl transferase inhibitor

Solution: Catechol-O-methyl transferase (COMT) inhibitors, like entacapone, reduce the peripheral metabolism of L-DOPA, thereby extending its half-life and effectiveness in managing motor fluctuations in Parkinson's disease.

Quick Tip

COMT inhibitors are adjuncts to L-DOPA that enhance and prolong its therapeutic effect.

120. Therapeutic drug monitoring is advised in all except

- (1) Tacrolimus
- (2) Cyclosporine
- (3) Metformin
- (4) Phenytoin

Correct Answer: (3) Metformin

Solution: Therapeutic drug monitoring (TDM) is not routinely required for metformin as it has a wide therapeutic index and predictable pharmacokinetics. In contrast, drugs like tacrolimus, cyclosporine, and phenytoin have narrow therapeutic windows and require regular monitoring.

Metformin does not require TDM due to its low toxicity risk at therapeutic doses.