AP PGECET Pharmacy 2025

Question Paper with Solution

Time Allowed :2 hours	**Maximum Marks :**120	**Total questions :**120

Pharmacy

1. The drug 'Pectin' belongs to the category of _____.

(1) polyuronide

(2) disaccharide

(3) alkaloid

(4) Monosaccharide

Correct Answer: (1) polyuronide

Solution: Pectin is a naturally occurring polysaccharide substance found in the cell walls of plants. It is categorized under polyuronides, which are polymers made up of uronic acid units. These substances have gelling properties and are used in pharmaceuticals as well as food products.

Quick Tip

Pectin, due to its gel-forming ability, is used widely in jellies and also in drug delivery systems; remember, it's a polyuronide, not a simple sugar.

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2. Source of *pale catechu* is _____.

(1) Eucalyptus rostrata

(2) Uncaria gambir

(3) Terminalia chebula

(4) Punica granatum

Correct Answer: (2) Uncaria gambir

Solution: Pale catechu is a tannin-rich extract derived from the leaves and young shoots of the plant *Uncaria gambir*. It is used traditionally in medicine for its astringent properties and in the preparation of betel quid. It differs from black catechu, which is obtained from *Acacia catechu*.

Quick Tip

Remember: Pale catechu comes from *Uncaria gambir*, while black catechu is from *Acacia catechu*. Don't confuse the two!

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3. Trichomes with quadracellular head & sessible stalk are seen in ___.

(1) Digitalis

(2) Belladonna

(3) Hyoscyamus

(4) Vasaka

Correct Answer: (4) Vasaka

Solution: Vasaka (*Adhatoda vasica*) is known to possess distinctive trichomes with a quadracellular head and sessile stalk. These microscopic features are used for identification in pharmacognosy and are important taxonomic characteristics of the plant.

Quick Tip

To identify Vasaka microscopically, look for quadracellular trichomes with sessile stalks — a key diagnostic feature.

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4. Which of the following crude drug is obtained from mineral origin?

(1) Digitalis

(2) Sandalwood

(3) Nux vomica

(4) Kaolin

Correct Answer: (4) Kaolin

Solution: Kaolin is a naturally occurring clay mineral composed mainly of kaolinite. It is a mineral-origin drug used medicinally for treating diarrhea and as a pharmaceutical excipient due to its adsorptive properties.

Quick Tip

Crude drugs from mineral origin include substances like Kaolin and Talc. They are inorganic, unlike most plant- and animal-derived drugs.

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5. The natural oil of winter green majorly contains ____.

(1) methyl salicylate

(2) salicylic acid

(3) phenol

(4) α-napthol

Correct Answer: (1) methyl salicylate

Solution: Wintergreen oil primarily contains methyl salicylate, which gives it its characteristic odor and is used topically for its analgesic and anti-inflammatory properties. It is commonly used in liniments and ointments for musculoskeletal pain.

Quick Tip

Methyl salicylate is the key component of wintergreen oil—commonly used in topical pain relief formulations.

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6. *Mangifera indica* belongs to the family:

(1) Phyllanthaceae

(2) Combretaceae

(3) Meliaceae

(4) Anacardiaceae

Correct Answer: (4) Anacardiaceae

Solution: *Mangifera indica*, commonly known as mango, belongs to the family Anacardiaceae. This family also includes cashew, poison ivy, and pistachio. Plants in this family are known for producing resins and aromatic compounds.

Quick Tip

Remember that mango (*Mangifera indica*) belongs to the Anacardiaceae family, which also includes cashew and pistachio.

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7. Steroidal saponins are biosynthesized via ____.

(1) shikimic acid pathway

(2) mevalonic acid pathway

(3) aceto-acetate pathway

(4) Calvin's cycle

Correct Answer: (2) mevalonic acid pathway

Solution: Steroidal saponins are biosynthesized through the mevalonic acid pathway. This pathway is responsible for the synthesis of isoprenoids, which serve as precursors for the formation of steroidal saponins and other terpenoid compounds.

Quick Tip

Mevalonic acid pathway is key for steroidal saponin biosynthesis—think "M for Mevalonic and Metabolites."

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8. The swelling index of a crude drug is used to evaluate the ____.

(1) presence of alkaloids

(2) moisture content

(3) mucilage content

(4) presence of volatile oils

Correct Answer: (3) mucilage content

Solution: The swelling index is an important parameter used to assess the mucilage content of a crude drug. Mucilage absorbs water and swells, hence this index reflects the amount of mucilage present—important for quality control of demulcent drugs.

Quick Tip

Swelling index = mucilage measure—used in assessing drugs like isabgol and linseed.

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9. The biological source of cotton fiber is _____.

(1) Cyamopsis tetragonolobus

(2) Gossypium barbadense

(3) Saraca indica

(4) Arachis hypogaea

Correct Answer: (2) Gossypium barbadense

Solution: Cotton fiber is obtained from the plant *Gossypium barbadense*, a species of cotton known for producing extra-long staple fibers used in fine-quality textiles.

Quick Tip

Remember: Cotton = *Gossypium* genus; *G. barbadense* for superior fiber!

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10. Number of isoprene units present in diterpenes are ____.

(1) 2

(2) 3

(3) 4

(4) 5

Correct Answer: (3) 4

Solution: Diterpenes are made up of 4 isoprene units, each having 5 carbon atoms, making a total of 20 carbon atoms in the diterpene structure.

Quick Tip

Di = 2 (terpenes) $\rightarrow$ 2 $\times$ 10C = 20C $\rightarrow$ 4 isoprene units (5C each)

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11. Which is the specific test for the identification of cardiac glycoside?

(1) Baljet's test

(2) Legal test

(3) Keller – kiliani test

(4) 3,5–dinitro benzoic acid test

Correct Answer: (4) 3,5–dinitro benzoic acid test

Solution: The 3,5–dinitro benzoic acid test is specific for cardiac glycosides and detects the presence of aglycone portions in their structure.

Quick Tip

Cardiac glycosides = 3,5–dinitro benzoic acid test; Keller–Kiliani is general, not specific.

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12. Match the following correctly.

A) Goldbeater skin test	1) Carbohydrates
B) Molisch test	2) Terpenoids
C) Mayer's test	3) Tannins
D) Salkowski test	4) Alkaloids

(1) A–2; B–3; C–4; D–1

(2) A–4; B–1; C–2; D–1

(3) A–3; B–1; C–4; D–2

(4) A–1; B–4; C–2; D–3

Correct Answer: (3) A–3; B–1; C–4; D–2

Solution:

- A) Goldbeater skin test → Tannins (3)
- B) Molisch test → Carbohydrates (1)
- C) Mayer's test → Alkaloids (4)
- D) Salkowski test → Terpenoids (2)

Quick Tip

Use Mnemonics: GMAS → TCAK: Goldbeater–Tannins, Molisch–Carbs, Mayer's–Alkaloids, Salkowski–Terpenoids.

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13. Glass wool is primarily used in pharmaceutical applications for ___.

(1) drug formulation

(2) insulation and filtration

(3) textile production

(4) capsule coating

Correct Answer: (2) insulation and filtration

Solution: Glass wool is widely utilized for insulation and filtration in pharmaceutical environments due to its fibrous structure, which offers effective thermal resistance and particle filtration.

Quick Tip

Remember: Glass wool insulation material; not involved in drug or capsule formulation directly.

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14. An alkaloid containing one of the nitrogen atoms as quaternary nitrogen is:

(1) Atropine

(2) Ephedrine

(3) Tubocurarine

(4) Mescaline

Correct Answer: (3) Tubocurarine

Solution: Tubocurarine is a bis-quaternary ammonium compound, meaning it contains nitrogen atoms in quaternary form. This property is significant for its neuromuscular blocking action.

Quick Tip

Quaternary nitrogen $\rightarrow$ Always charged $\rightarrow$ Think of neuromuscular blockers like Tubocurarine.

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15. Which of the following plant cell culture technique is generally regarded as a "closed system" technique?

(1) Continuous cultures

(2) Batch suspension cultures

(3) Semi continuous cultures

(4) Petri plate cultures

Correct Answer: (2) Batch suspension cultures

Solution: Batch suspension cultures are considered a closed system because the culture is grown in a fixed volume of nutrient medium and no additional medium is added during the process.

Quick Tip

"Closed system" → no fresh medium added → Think of batch suspension cultures.

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16. Rasburicase is a newer drug used in gout. It acts by _____.

(1) decreasing urate synthesis

(2) increasing urate oxidation

(3) decreasing intestinal absorption of uric acid

(4) increasing renal excretion of uric acid

Correct Answer: (2) increasing urate oxidation

Solution: Rasburicase is a recombinant urate oxidase enzyme that catalyzes the oxidation of uric acid into allantoin, a more soluble compound, thereby reducing uric acid levels in patients with gout or tumor lysis syndrome.

Quick Tip

Rasburicase → urate oxidase enzyme → promotes urate oxidation to allantoin.

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17. 1-[(5-methylpyrazin-2-yl-carboxamide) ethyl phenyl sulphonyl]-3-cyclohexyl urea is _____.

(1) Glimepiride

(2) Glipizide

(3) Glyburide

(4) Repaglinide

Correct Answer: (2) Glipizide

Solution: Glipizide is a second-generation sulfonylurea used in the treatment of type 2 diabetes, and its IUPAC name includes the pyrazinyl-carboxamide moiety described in the question.

Quick Tip

Look for the pyrazinyl and cyclohexyl groups to identify Glipizide in structural questions.

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18. Select the INCORRECT statement with respect to the SAR of adrenergic agonists with specific reference to 3',5'-dihydroxy ring substitution pattern.

(1) Increases the drug distribution

(2) Increases resistance to metabolism by COMT

(3) Provides selectivity for β_2-receptors

(4) Orally active bronchodilator

Correct Answer: (1) Increases the drug distribution

Solution: The 3',5'-dihydroxy substitution on the aromatic ring leads to rapid metabolism by COMT and poor oral bioavailability. Therefore, it limits drug distribution rather than increasing it, making option (1) incorrect.

Quick Tip

3',5'-dihydroxy $\rightarrow$ rapid metabolism $\rightarrow$ reduced oral activity and distribution.

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19. The term "bioisosterism" in drug design aims to maintain or improve the molecule's biological activity by:

(1) Replacement of a functional group with another that enhances lipophilicity

(2) Replacement of a chemical group in a molecule with another that has similar physical and chemical properties

(3) Structural modification to increase water solubility

(4) Conversion of a drug into a salt form

Correct Answer: (2) Replacement of a chemical group in a molecule with another that has similar physical and chemical properties

Solution: Bioisosterism involves the substitution of an atom or group in a molecule with another that has similar physical or chemical properties to achieve similar biological effects. This approach helps in improving the pharmacokinetic or pharmacodynamic profile of a drug without altering its core activity.

Quick Tip

Bioisosterism = similar properties $\rightarrow$ retained or enhanced biological activity.

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20. Pharmacophore modelling involves _____.

(1) Identifying excipients for formulation development with enhanced bioavailability

(2) Monitoring plasma levels of drugs for better pharmacodynamics

(3) Predicting half-life of drugs

(4) Creating a 3D model of the necessary features to interact with a target

Correct Answer: (4) Creating a 3D model of the necessary features to interact with a target

Solution: Pharmacophore modelling is a computational approach used in drug design to identify the spatial arrangement of features in a molecule that are necessary to ensure optimal interactions with a specific biological target. It helps in virtual screening and lead optimization.

Quick Tip

Pharmacophore = 3D model of interaction features $\rightarrow$ helps predict active compounds.

21. IUPAC name of aspirin is _____.

(1) Salicylic anhydride

(2) 2-ethyl salicylate

(3) 2-acetoxybenzoic acid

(4) 4-hydroxybenzoic acid

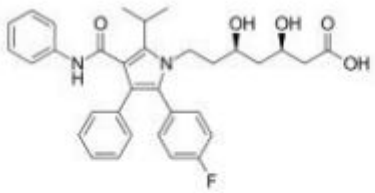
Correct Answer: (3) 2-acetoxybenzoic acid

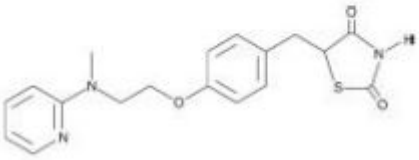
Solution: Aspirin, a widely used analgesic and antipyretic, is chemically known as 2-acetoxybenzoic acid. It is synthesized by esterifying the hydroxyl group of salicylic acid with acetic anhydride.

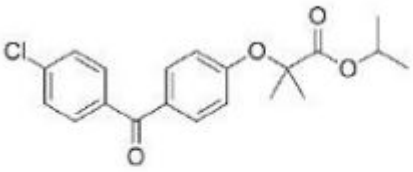
Quick Tip

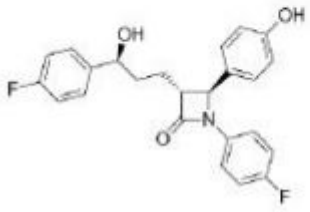
Aspirin = Acetyl (acetoxy) + Salicylic acid $\rightarrow$ 2-acetoxybenzoic acid.

22. Which of the following drugs act via PPAR-α activation?









Correct Answer: (3) Structure C

Solution: PPAR-α (Peroxisome Proliferator-Activated Receptor Alpha) activation is a key mechanism of action for fibrates such as **Fenofibrate**, which is structurally represented in option 3. These agents help regulate lipid metabolism and are primarily used for lowering triglyceride levels.

Quick Tip

Fibrates (e.g., Fenofibrate) $\rightarrow$ activate PPAR-α $\rightarrow$ lipid-lowering action.

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23. What does "QSAR" stand for in drug design?

(1) Qualitative Selective-Activity Response

(2) Quick Structure-Activity Response

(3) Quantitative Structure-Activity Relationship

(4) Quantitative Selective-Activity Relationship

Correct Answer: (3) Quantitative Structure-Activity Relationship

Solution: QSAR stands for Quantitative Structure-Activity Relationship. It is a computational modeling method that relates a compound's chemical structure to its biological activity using statistical tools. QSAR models are used to predict the activities of new compounds and optimize drug design.

Quick Tip

QSAR = Quantitative + Structure + Activity + Relationship $\rightarrow$ predictive tool in drug design.

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24. What is the primary function of dental abrasives?

(1) Removing plaque and stains

(2) Enhancing digestion

(3) Neutralizing stomach acid

(4) Regulating blood pressure

Correct Answer: (1) Removing plaque and stains

Solution: Dental abrasives are key ingredients in toothpaste formulations. They work by physically scrubbing the surface of teeth to remove plaque, stains, and food debris, thereby

contributing to oral hygiene and aesthetics.

Quick Tip

Dental abrasives = Mechanical cleaners $\rightarrow$ help remove stains and plaque from teeth.

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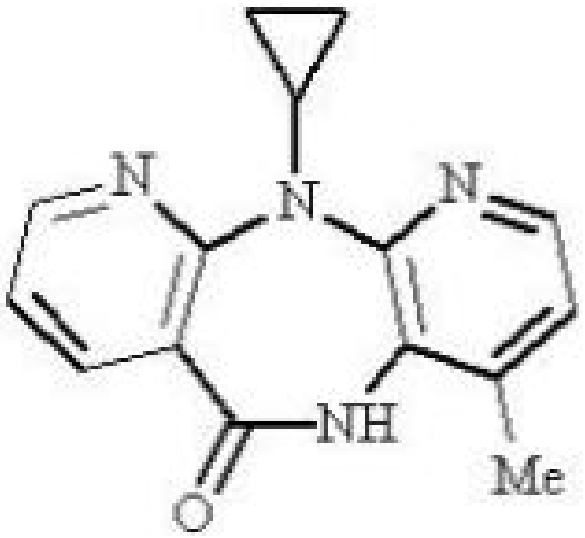
25. Which of the following statements is true regarding the following structure (nevirapine)?



(1) It is a nucleoside reverse transcriptase inhibitor (NRTI).

(2) It binds to an allosteric binding site next to the substrate binding site of reverse transcriptase

(3) It is an achiral molecule

(4) It is an example of a second-generation drug of its class

Correct Answer: (2) It binds to an allosteric binding site next to the substrate binding site of reverse transcriptase

Solution: Nevirapine is a non-nucleoside reverse transcriptase inhibitor (NNRTI). Unlike NRTIs, it does not mimic nucleosides. Instead, it binds to a distinct allosteric site on the HIV-1 reverse transcriptase enzyme, causing conformational changes that inhibit its activity. This mechanism classifies it clearly as an NNRTI, not an NRTI.

Quick Tip

NNRTIs like nevirapine target an allosteric site on reverse transcriptase — distinct from the active site used by NRTIs.

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26. When 6-OH of morphine is replaced by 6-O-acetyl group, then the activity will ____.

(1) increase

(2) decrease

(3) no effect

(4) Antagonistic

Correct Answer: (1) increase

Solution: Replacing the 6-hydroxy group in morphine with a 6-O-acetyl group increases the lipophilicity of the molecule, enhancing its ability to cross the blood-brain barrier. This results in increased potency and activity of the molecule, as seen in compounds like heroin (diacetylmorphine).

Quick Tip

Increased lipophilicity due to acetylation enhances blood-brain barrier penetration, increasing drug activity.

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27. Which of the following drugs causes severe birth defects due to stereochemical differences in its enantiomers?

(1) Tamoxifen

(2) Methamphetamine

(3) Thalidomide

(4) Paclitaxel

Correct Answer: (3) Thalidomide

Solution: Thalidomide exists as two enantiomers: one has sedative effects, while the other is teratogenic (causes birth defects). Due to racemization in the body, administering a single enantiomer does not prevent harmful effects, making it a tragic example of the significance of stereochemistry in drug design.

Quick Tip

Always consider the pharmacological and toxicological profiles of all enantiomers in chiral drugs.

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28. The antihypertensive drug with a tetrazole nucleus that binds to AT1 receptor with high affinity is _____.

(1) diazoxide

(2) valsartan

(3) talupidine

(4) fosinopril

Correct Answer: (2) valsartan

Solution: Valsartan is an angiotensin II receptor blocker (ARB) that contains a tetrazole ring, which enhances binding affinity to the AT1 receptor. This feature contributes to its efficacy in lowering blood pressure.

Quick Tip

Tetrazole rings in ARBs like valsartan mimic the carboxyl group of angiotensin II and improve receptor binding.

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29. The E/Z nomenclature is used to describe _____ isomerism.

(1) optical

(2) geometrical

(3) chain

(4) functional group

Correct Answer: (2) geometrical

Solution: E/Z nomenclature is used for alkenes and other compounds where cis-trans naming becomes ambiguous. It is based on the Cahn-Ingold-Prelog priority rules to distinguish the relative positions of substituents on a double bond.

Quick Tip

E (entgegen) = opposite sides; Z (zusammen) = same side, based on higher priority groups around the double bond.

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30. Which enzyme is targeted by beta-lactam antibiotics?

(1) DNA gyrase

(2) Transpeptidase

(3) Reverse transcriptase

(4) Topoisomerase

Correct Answer: (2) Transpeptidase

Solution: Beta-lactam antibiotics, such as penicillins and cephalosporins, inhibit the enzyme transpeptidase, which is crucial for bacterial cell wall synthesis. Blocking this enzyme weakens the cell wall, leading to bacterial lysis.

Quick Tip

Transpeptidase is also known as penicillin-binding protein (PBP) — the main target of beta-lactam antibiotics.

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31. Lipinski's rule of five is linked with _____.

(1) drug's metabolic pathway

(2) potency of drug-receptor binding

(3) drug-likeness for oral bioavailability

(4) stability under acidic conditions

Correct Answer: (3) drug-likeness for oral bioavailability

Solution: Lipinski's rule of five predicts the oral bioavailability of a drug candidate based on molecular properties. The rule suggests that good oral drugs generally have no more than one violation among these: not more than 5 hydrogen bond donors, 10 hydrogen bond acceptors, molecular weight under 500 Da, and logP not greater than 5.

Quick Tip

Lipinski's rule helps filter drug candidates early in the development process based on oral absorption potential.

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32. Which of the following is not the category of cardiotonic agents?

(1) Calcium sensitizers

(2) Phosphodiesterase III inhibitors

(3) Beta-adrenergic antagonists

(4) Cardiac glycosides

Correct Answer: (3) Beta-adrenergic antagonists

Solution: Cardiotonic agents are drugs that increase the efficiency and improve the contraction of the heart muscle, typically used in heart failure. Beta-adrenergic antagonists (beta blockers) actually reduce heart rate and contractility, which is contrary to the action of cardiotonic agents.

Quick Tip

Cardiotonic agents enhance cardiac output; beta blockers do the opposite by decreasing sympathetic activity.

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33. SAR studies of sulfonamides suggest that antibacterial activity is not lost when the _____.

(1) sulfonamide group is acetylated

(2) amine group is replaced with halogens

(3) aromatic ring is replaced with a non-aromatic moiety

(4) sulfonyl group is replaced by a carboxyl group

Correct Answer: (1) sulfonamide group is acetylated

Solution: Structure-Activity Relationship (SAR) of sulfonamides reveals that the antibacterial activity is retained when the sulfonamide group is acetylated. The acetylation improves pharmacokinetic properties without affecting binding to the bacterial enzyme dihydropteroate synthase.

Quick Tip

Acetylated sulfonamides (e.g., acetylsulfamethoxazole) are still active because in vivo they are often hydrolyzed back to the active form.

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34. What is the role of ethanol in the preparation of barium sulphate reagent?

(1) To provide an acidic medium

(2) To oxidize barium

(3) To precipitate barium

(4) To prevent super-saturation

Correct Answer: (4) To prevent super-saturation

Solution: In the preparation of barium sulphate reagent, ethanol is added to prevent super-saturation. This helps in forming a fine precipitate by reducing the solubility of the product and thus controlling crystal growth.

Quick Tip

Ethanol reduces solubility and ensures fine particle formation by preventing supersaturation during precipitation reactions.

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35. Identify the key step in the synthesis of beta-blockers.

(1) Condensation of amines with aromatic rings

(2) Hydrolysis of esters

(3) Oxidation of alcohols

(4) Reduction of ketones

Correct Answer: (1) Condensation of amines with aromatic rings

Solution: The synthesis of beta-blockers typically involves the condensation of amines with aromatic rings. This forms the essential aryloxypropanolamine structure present in most beta-blockers.

Quick Tip

The aryloxypropanolamine skeleton in beta-blockers results from a condensation between aromatic alcohols and amino compounds.

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36. As compared to unfractionated heparin, low molecular weight heparins _____:

(1) are absorbed more uniformly when given subcutaneously

(2) require more frequent laboratory monitoring

(3) can be given to patients with heparin induced thrombocytopenia

(4) predispose to a higher risk of osteopenia

Correct Answer: (1) are absorbed more uniformly when given subcutaneously

Solution: Low molecular weight heparins (LMWHs) are better absorbed subcutaneously and

exhibit more predictable pharmacokinetics than unfractionated heparin. This uniform absorption reduces the need for frequent monitoring.

Quick Tip

LMWHs are ideal for outpatient settings due to consistent absorption and less monitoring compared to unfractionated heparin.

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37. Anxiolytic drugs like lorazepam primarily act on _____ receptors.

(1) serotonin

(2) NMDA

(3) GABA-A

(4) dopamine

Correct Answer: (3) GABA-A

Solution: Lorazepam, a benzodiazepine, enhances the effect of the inhibitory neurotransmitter GABA by binding to GABA-A receptors. This action produces anxiolytic, sedative, and muscle-relaxant effects.

Quick Tip

Most benzodiazepines, including lorazepam, act on GABA-A receptors to exert calming effects.

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38. Which of the following is used as anticaries agent?

(1) Calcium carbonate

(2) Sodium lauryl sulphate

(3) Zinc chloride

(4) Sodium fluoride

Correct Answer: (4) Sodium fluoride

Solution: Sodium fluoride is widely used as an anticaries agent. It enhances the remineralization of enamel and inhibits the growth of cariogenic bacteria, making it effective in the prevention of dental caries.

Quick Tip

Fluoride compounds like sodium fluoride are key ingredients in most toothpaste due to their proven anticaries effect.

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39. The locally acting antacid(s) known for its constipation effect is/are:

(1) Sodium bicarbonate

(2) Aluminium hydroxide

(3) Magnesium hydroxide

(4) Sucralose

Correct Answer: (2) Aluminium hydroxide

Solution: Aluminium hydroxide is a commonly used antacid that neutralizes stomach acid. However, it often leads to constipation as a side effect, especially with prolonged use.

Quick Tip

Aluminium hydroxide causes constipation, while magnesium hydroxide causes diarrhea—these are often combined to balance GI effects.

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40. Match the following limit test reagents correctly.

A) Arsenic	1) Dithizone
B) Lead	2) Thioglycolic acid
C) Iron	3) Barium chloride
D) Barium	4) Mercuric chloride

(1) A-4; B-1; C-2; D-3

(2) A-3; B-2; C-4; D-1

(3) A-2; B-1; C-4; D-3

(4) A-3; B-4; C-2; D-1

Correct Answer: (1) A-4; B-1; C-2; D-3

Solution:

Each metal ion has a specific reagent used in its limit test:

- Arsenic is tested using mercuric chloride.
- Lead is tested using dithizone.
- Iron is detected with thioglycolic acid.
- Barium is identified using barium chloride in the test.

Quick Tip

Matching reagents to their respective limit tests is key in analytical chemistry. Use mnemonics or tables for quick recall.

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41. In general, Kraft point phenomenon is generally not exhibited by which of the following surfactant?

(1) Tweens

(2) Sodium lauryl sulphate

(3) Calcium oleate

(4) Sodium stearate

Correct Answer: (1) Tweens

Solution: Kraft point is the temperature at which the solubility of a surfactant sharply increases due to micelle formation. Nonionic surfactants like Tweens typically do not exhibit a Kraft point, unlike ionic surfactants such as sodium lauryl sulphate.

Quick Tip

Remember: Kraft point is mainly associated with ionic surfactants; nonionic ones like Tweens usually don't show this phenomenon.

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42. The angle of repose is primarily used to determine _____.

(1) particle density

(2) flowability of powders

(3) surface charge

(4) particle solubility

Correct Answer: (2) flowability of powders

Solution: The angle of repose is the steepest angle at which a pile of unconsolidated powder remains stable. It indicates how easily a powder flows—lower angles suggest better flow properties.

Quick Tip

A small angle of repose means better flow. This parameter is critical in tablet manufacturing and powder filling.

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43. A first-order reaction has a half-life of 24 hours. What is its rate constant (k)?

(1) 0.0289 hr^{-1}

(2) 0.693 hr^{-1}

(3) 0.5 hr^{-1}

(4) 1.2 hr^{-1}

Correct Answer: (1) 0.0289 hr^{-1}

Solution: For a first-order reaction, the rate constant is calculated using the formula:

$$k = \frac{0.693}{t_{1/2}} = \frac{0.693}{24} = 0.0289\,\text{hr}^{-1}$$

Quick Tip

For first-order kinetics, use $k = \frac{0.693}{t_{1/2}}$ to find the rate constant from half-life.

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44. What is water number?

(1) Maximum amount of water that can be added to 100 g of a base at a given temperature

(2) Minimum amount of water that can be added to 100 g of a base at a given temperature

(3) Minimum amount of water that can be added to 5 g of a base at a given temperature

(4) Minimum amount of water that can be added to 40 g of a base at a given temperature

Correct Answer: (1) Maximum amount of water that can be added to 100 g of a base at a given temperature

Solution: Water number refers to the maximum quantity of water (in mL) that can be added to 100 g of a base without causing phase separation or affecting its physical properties at a defined temperature.

Quick Tip

Water number is an indicator of a base's water-holding capacity; higher values mean better absorption.

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45. What is a molecular phenomenon where by adding a second solute results in an increase in aqueous solubility of poorly soluble solute?

(1) Peptization

(2) Hydrotrophy

(3) Eutectic mixture formation

(4) Levigation

Correct Answer: (2) Hydrotrophy

Solution: Hydrotrophy is a solubilization process where a large amount of second solute (hydrotrope) increases the aqueous solubility of another poorly soluble compound without forming micelles, unlike surfactants.

Quick Tip

Hydrotropes improve drug solubility without needing emulsifiers or co-solvents—distinct from surfactants.

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46. If pKa of a weak electrolyte is 4.2, how much percentage of it will be ionized at pH of 5.2?

(1) 50%

(2) >50%

(3) <50%

(4) Cannot be predicted

Correct Answer: (2) >50%

Solution: Using the Henderson-Hasselbalch equation:

$$\text{pH} = \text{pKa} + \log\left(\frac{[\text{A}^-]}{[\text{HA}]}\right) \Rightarrow 5.2 = 4.2 + \log\left(\frac{[\text{A}^-]}{[\text{HA}]}\right) \Rightarrow \log\left(\frac{[\text{A}^-]}{[\text{HA}]}\right) = 1 \Rightarrow \frac{[\text{A}^-]}{[\text{HA}]} = 10$$

This implies that >90% of the drug exists in ionized form. Hence, more than 50% is ionized.

Quick Tip

If pH > pKa, the drug is more ionized; if pH < pKa, it's less ionized.

---

47. The distance between two tangents on opposite sides of the particle parallel to some fixed direction is called as _____ diameter.

(1) Martin diameter

(2) Feret diameter

(3) Projected area diameter

(4) Projected number diameter

Correct Answer: (2) Feret diameter

Solution: Feret diameter, also called caliper diameter, is the distance between two parallel tangents on opposite sides of the particle in a fixed direction. It is widely used in image analysis and particle shape studies.

Quick Tip

Feret diameter is helpful when measuring irregularly shaped particles using image analysis methods.

---

48. The density that is determined by displacement of helium is known as _____ density.

(1) True

(2) Intrinsic

(3) Granule

(4) Bulk

Correct Answer: (1) True

Solution: True density is measured by gas displacement methods, typically using helium pycnometry, because helium can penetrate even the smallest pores, giving an accurate measurement of the volume occupied by solid material only.

Quick Tip

Helium gas is preferred for true density determination as it diffuses into fine pores and gives precise solid volume.

---

49. Which sterilization method is suitable for heat-labile parenteral solutions?

(1) Autoclaving

(2) Dry heat

(3) Filtration

(4) UV radiation

Correct Answer: (3) Filtration

Solution: Heat-labile substances such as parenteral solutions that cannot withstand high temperatures are best sterilized using membrane filtration. This method ensures removal of microorganisms without exposing the substance to heat.

Quick Tip

Always use filtration for sterilizing heat-sensitive solutions to maintain their stability and efficacy.

---

50. The solubility of the drug will be high when it is in its _____ form.

(1) stable

(2) metastable

(3) unstable

(4) crystalline

Correct Answer: (2) metastable

Solution: Metastable forms of a drug possess higher energy and tend to have greater solubil-

ity than their stable or crystalline counterparts, making them preferable for enhanced bioavailability in formulations.

Quick Tip

Metastable forms dissolve faster, which can improve the drug's absorption rate.

---

51. In a suspension, the purpose of a flocculating agent is to _____.

(1) increase viscosity

(2) prevent caking

(3) enhance solubility

(4) reduce particle size

Correct Answer: (2) prevent caking

Solution: Flocculating agents promote the formation of loose aggregates (flocs) in suspensions, preventing hard sediment (caking) and making redispersion easier.

Quick Tip

Remember: Flocculating agents help maintain suspension stability by avoiding compact sedimentation.

---

52. Which suppository base is water-soluble?

(1) Cocoa butter

(2) PEG

(3) Gelatin

(4) Witepsol

Correct Answer: (2) PEG

Solution: Polyethylene glycol (PEG) is a water-soluble base commonly used in suppositories where a slow and consistent release of the drug is desired.

Quick Tip

PEG-based suppositories dissolve in body fluids, making them ideal for non-melting environments.

---

53. Vanishing cream is an example of _____.

(1) w/o emulsion

(2) o/w

(3) w/o/w

(4) Microemulsion

Correct Answer: (2) o/w

Solution: Vanishing creams are oil-in-water (o/w) emulsions where water is the continuous phase. They spread easily and leave a non-greasy feel after application.

Quick Tip

Remember: o/w emulsions feel lighter and are often used in cosmetic products like vanishing creams.

---

54. Bulking agent used for parenteral preparation is _____.

(1) sodium metabisulphite

(2) benzyl alcohol

(3) carboxylic acid

(4) Sorbitol

Correct Answer: (4) Sorbitol

Solution: Sorbitol is used as a bulking agent in parenteral formulations to provide sufficient mass for lyophilization and to improve reconstitution characteristics.

Quick Tip

Sorbitol = bulking agent, Benzyl alcohol = preservative, Sodium metabisulphite = antioxidant.

---

55. The disintegration time for sugar coated tablet is _____ minutes.

(1) 30

(2) 45

(3) 60

(4) 75

Correct Answer: (3) 60

Solution: According to pharmacopoeial standards, the maximum disintegration time for sugar-coated tablets is 60 minutes, ensuring the tablet breaks down properly in the gastrointestinal tract.

Quick Tip

Uncoated tablets: 15 min; Film-coated: 30 min; Sugar-coated: 60 min.

---

56. Which of the following tablet problems cannot be eliminated by pre-compression?

(1) Mottling

(2) Lamination

(3) Double impression

(4) Capping

Correct Answer: (1) Mottling

Solution: Mottling is a tablet defect related to color variation and is typically caused by improper dye distribution or instability. It cannot be corrected through pre-compression processes.

Quick Tip

Pre-compression helps reduce mechanical defects (like capping), not color-related issues like mottling.

---

57. Which of the following is not used for the enteric coating of the tablets?

(1) Cellulose acetate phthalate

(2) Hydroxy propyl methyl cellulose

(3) Shellac

(4) Eudragit L

Correct Answer: (2) Hydroxy propyl methyl cellulose

Solution: Hydroxy propyl methyl cellulose (HPMC) is commonly used as a film-forming agent but not specifically for enteric coating. In contrast, cellulose acetate phthalate, shellac, and Eudragit L are used in enteric formulations to resist dissolution in the stomach.

Quick Tip

Enteric coating materials: Cellulose acetate phthalate, Shellac, Eudragit. HPMC is mainly for sustained or controlled release, not enteric protection.

---

58. Study of adverse effects of drugs and toxic substances in the body is _____.

(1) Clinical Toxicology

(2) Biopharmaceutics

(3) Clinical Pharmacokinetics

(4) Toxicokinetics

Correct Answer: (1) Clinical Toxicology

Solution: Clinical toxicology involves the diagnosis and treatment of poisoning and the adverse effects of drugs and chemicals in the body. It focuses on the harmful impact of substances and how to manage exposure.

Quick Tip

Toxicology = study of poisons. Clinical Toxicology = treating human exposure. Pharmacokinetics = movement of drugs, not effects.

---

59. LAL test is used as an in-process control in parenteral preparation to examine presence of _____.

(1) pyrogens

(2) endotoxins

(3) exotoxins

(4) proteinaceous matter

Correct Answer: (2) endotoxins

Solution: The Limulus Amebocyte Lysate (LAL) test is specifically designed to detect bacterial endotoxins, which are a subset of pyrogens. It is a crucial test in quality control of parenteral products.

Quick Tip

LAL test = Endotoxin detection using horseshoe crab blood components.

---

60. If the plasma half-life of a drug is 1.386 h and the volume of distribution is 10 L, the total body clearance of the drug without any unit conversion will be _____.

(1) 5

(2) 20

(3) 13.86

(4) 6.93

Correct Answer: (1) 5

Solution: Clearance (CL) is calculated using the formula:

$$CL = \frac{0.693 \times V_d}{t_{1/2}} = \frac{0.693 \times 10}{1.386} = 5$$

Quick Tip

Use $CL = \frac{0.693 \times V_d}{t_{1/2}}$ for drug clearance calculations.

---

61. The best explanation for the absorption of salicylic acid from intestine, despite being ionized is:

(1) High surface area of the drug molecules

(2) Dissolution of drug

(3) Availability of 1% of the un-ionized form

(4) Availability of receptors

Correct Answer: (3) Availability of 1% of the un-ionized form

Solution: Only the un-ionized form of a weak acid like salicylic acid is absorbed effectively across the lipid membrane. Even though the majority is ionized in the intestine, a small fraction (1%) remains un-ionized and allows for absorption.

Quick Tip

Drug absorption depends on lipid solubility of the un-ionized form — even 1% can be enough if the surface area is high.

---

62. The area under the serum concentration time curve represents the _____.

(1) biological half-life of the drug

(2) amount of drug absorbed

(3) amount of drug excreted in the urine

(4) amount of drug in the original dosage form

Correct Answer: (2) amount of drug absorbed

Solution: The area under the curve (AUC) in a serum concentration-time plot indicates the extent of drug absorption — it quantifies the total exposure of the body to the drug over time.

Quick Tip

AUC = total drug exposure = total amount absorbed systemically.

---

63. Fumaric acid is used in gelatin capsule shell is used as _____.

(1) plasticizer

(2) antioxidant

(3) solubilizer

(4) opacifier

Correct Answer: (3) solubilizer

Solution: Fumaric acid is added in gelatin capsule formulations to enhance the solubility of the drug by acting as a solubilizer, improving the dissolution profile of poorly soluble drugs.

Quick Tip

Think: Fumaric acid $\rightarrow$ enhances solubility $\rightarrow$ solubilizer.

---

64. Wurster's process is also better known as _____.

(1) rotary plate process

(2) air suspension coating

(3) coacervation process

(4) pan coating

Correct Answer: (2) air suspension coating

Solution: Wurster's process refers to air suspension coating, where particles are suspended in an upward moving air stream and a coating solution is sprayed. It's widely used for uniform coating of granules or pellets.

Quick Tip

Wurster = Air suspension coating (fluidized bed processor).

---

65. What is the ideal particle size for topical powders?

(1) 50 to 100 µm

(2) 150 to 250 µm

(3) 250 to 500 µm

(4) Above 1000 µm

Correct Answer: (1) 50 to 100 µm

Solution: Topical powders must have a particle size small enough to avoid irritation and ensure uniform distribution. 50 to 100 µm is considered ideal for skin application.

Quick Tip

Smaller particle size (50–100 µm) = better spreadability and skin feel in topical powders.

---

66. A super disintegrant in tablet formulation is _____.

(1) sodium starch glycolate

(2) starch

(3) PVP

(4) Mg-aluminium silicate

Correct Answer: (1) sodium starch glycolate

Solution: Sodium starch glycolate is a superdisintegrant that rapidly swells when in contact with water, promoting the breakup of tablets into smaller fragments for faster drug release.

Quick Tip

Superdisintegrants like sodium starch glycolate = rapid swelling = quick tablet disintegration.

---

67. The creatinine clearance in normal 70 kg individuals is typically in the range of ____ mL/min.

(1) 100–120

(2) 200–250

(3) 50–100

(4) 120–200

Correct Answer: (1) 100–120

Solution: Normal creatinine clearance for healthy adults (especially in a 70 kg individual) typically falls between 100–120 mL/min, reflecting normal kidney function.

Quick Tip

Creatinine clearance (100–120 mL/min) is a key indicator of renal function.

---

68. A co-solvent used in the preparation of parenteral products is ____.

(1) benzyl alcohol

(2) methyl alcohol

(3) dimethyl acetamide

(4) phenol

Correct Answer: (3) dimethyl acetamide

Solution: Dimethyl acetamide (DMA) is commonly used as a co-solvent in parenteral formulations due to its ability to dissolve poorly water-soluble drugs.

Quick Tip

Dimethyl acetamide = co-solvent; Benzyl alcohol = preservative; Phenol = antimicrobial.

---

69. If zeta potential of a suspension is high, then the system will be considered as _____.

(1) deflocculated

(2) flocculated

(3) emulsion

(4) sedimentation

Correct Answer: (1) deflocculated

Solution: High zeta potential indicates that the repulsive forces between particles are strong, preventing aggregation and keeping them dispersed—hence, the system is deflocculated.

Quick Tip

High zeta potential = repulsion = deflocculated suspension.

---

70. Non-linear pharmacokinetics is most likely due to _____.

(1) first-pass metabolism

(2) saturation of metabolic enzymes

(3) renal excretion

(4) high plasma protein binding

Correct Answer: (2) saturation of metabolic enzymes

Solution: Non-linear pharmacokinetics often arises when drug concentrations saturate enzymes responsible for metabolism, resulting in a disproportionate increase in drug levels with dose.

Quick Tip

Saturation of enzymes → metabolism can't keep up → non-linear kinetics.

---

71. Match the following:

A) Schedule Y	1) List of minimum equipment for efficient running of a pharmacy
B) Schedule G	2) Life period of drugs
C) Schedule N	3) Requirements and guidelines on clinical trials for import and manufacture of new drugs
D) Schedule P	4) List of drugs to be used under medical supervision

(1) A–2; B–3; C–4; D–1

(2) A–4; B–1; C–2; D–3

(3) A–3; B–4; C–1; D–2

(4) A–2; B–4; C–2; D–3

Correct Answer: (3) A–3; B–4; C–1; D–2

Solution:

- **Schedule Y** – Deals with clinical trial requirements for new drugs (matches 3).
- **Schedule G** – Includes drugs that must be used under medical supervision (matches 4).

- **Schedule N** – Lists the minimum equipment required for a pharmacy (matches 1).
- **Schedule P** – Mentions the life period of drugs (matches 2).

Quick Tip

Remember: Y = Trials, G = Medical supervision, N = Equipment, P = Expiry (Life period).

---

72. The first schedule of the Drugs and Cosmetics Act, 1940 deals with _____.

(1) standards to be complied with by imported drugs and by drugs manufactured for sale, stocked or exhibited for sale, sold or distributed

(2) standard to be complied for cosmetics

(3) authoritative books of Ayurvedic, Siddha and Unani Tibb system

(4) standards to be complied for medical devices

Correct Answer: (3) authoritative books of Ayurvedic, Siddha and Unani Tibb system

Solution: The First Schedule lists the authoritative texts for Ayurvedic, Siddha, and Unani medicines under the Drugs and Cosmetics Act, 1940. These texts form the legal standard for quality control and regulatory compliance in traditional systems of medicine in India.

Quick Tip

Schedules under the Drugs and Cosmetics Act specify regulatory requirements. Schedule I is related to ASU (Ayurveda, Siddha, Unani) systems.

---

73. The Drugs Controller General of India (DCGI) can issue an order to ban a drug on the recommendations of _____.

(1) Indian Council of Medical Research

(2) Pharmacy Council of India

(3) Drugs Technical Advisory Board

(4) National Pharmaceutical Pricing Authority

Correct Answer: (3) Drugs Technical Advisory Board

Solution: The DCGI operates under the Central Drugs Standard Control Organization (CDSCO) and relies on the advice of the Drugs Technical Advisory Board (DTAB) for decisions regarding the banning of drugs. DTAB is the highest statutory decision-making body under the D&C Act.

Quick Tip

DTAB is the key advisory body on technical matters related to drugs and cosmetics under the Drugs and Cosmetics Act, 1940.

---

74. _____ is a psychotropic substance under the Narcotics and Psychotropic Substances Act.

(1) Barbital

(2) Ampicillin

(3) Albendazole

(4) Chloroquine

Correct Answer: (1) Barbital

Solution: Barbital is a barbiturate and classified as a psychotropic substance under the Narcotic Drugs and Psychotropic Substances (NDPS) Act in India. It affects the central nervous system and has sedative properties. Other listed drugs such as ampicillin, albendazole, and chloroquine are not classified under this category.

Quick Tip

Psychotropic substances affect brain function. Under NDPS Act, barbiturates like barbital are regulated.

---

75. Who is the Ex-officio Member of Pharmacy Council of India?

(1) Director, Central Drugs Research Laboratory

(2) Director General of Health Services

(3) President, Medical Council of India

(4) Director, Central Research Institute

Correct Answer: (2) Director General of Health Services

Solution: The Director General of Health Services (DGHS) is an ex-officio member of the Pharmacy Council of India (PCI), as per the Pharmacy Act, 1948. This position ensures representation of public health administration in pharmacy regulation.

Quick Tip

Ex-officio members are included by virtue of their office. In PCI, DGHS is one such mandatory member.

---

76. Which drug acts as a selective serotonin reuptake inhibitor (SSRI)?

(1) Amitriptyline

(2) Fluoxetine

(3) Diazepam

(4) Phenelzine

Correct Answer: (2) Fluoxetine

Solution: Fluoxetine is a selective serotonin reuptake inhibitor (SSRI) commonly prescribed for depression and anxiety disorders. SSRIs work by blocking the reabsorption (reuptake) of serotonin in the brain, increasing its availability. Other options such as amitriptyline (a tricyclic antidepressant), diazepam (a benzodiazepine), and phenelzine (a monoamine oxidase inhibitor) do not belong to the SSRI class.

Quick Tip

SSRIs like fluoxetine increase serotonin levels and are typically used to treat depression, anxiety, and related mood disorders.

---

77. Atropine blocks the effects of acetylcholine at _____ receptors.

(1) nicotinic

(2) muscarinic

(3) alpha-1

(4) beta-2

Correct Answer: (2) muscarinic

Solution: Atropine is a competitive antagonist of muscarinic acetylcholine receptors. It inhibits parasympathetic nerve impulses by selectively blocking the binding of acetylcholine to muscarinic receptors. It does not act on nicotinic, alpha-1, or beta-2 receptors.

Quick Tip

Remember: Atropine is an antimuscarinic agent used to treat bradycardia and reduce salivation during surgery.

---

78. Levothyroxine is a synthetic analogue of _____.

(1) Triiodothyronine (T_3)

(2) Thyroxine (T_4)

(3) TSH

(4) Calcitonin

Correct Answer: (2) Thyroxine (T_4)

Solution: Levothyroxine is a synthetic form of the thyroid hormone thyroxine (T_4). It is commonly used to treat hypothyroidism and is structurally identical to the naturally occurring

T_4 hormone produced by the thyroid gland.

Quick Tip

Levothyroxine = synthetic T_4. It helps restore normal hormone levels in thyroid deficiency.

---

79. Penicillins act by inhibiting _____.

(1) cell membrane synthesis

(2) DNA gyrase

(3) cell wall synthesis

(4) protein synthesis

Correct Answer: (3) cell wall synthesis

Solution: Penicillins are β-lactam antibiotics that inhibit bacterial cell wall synthesis by targeting the transpeptidase enzyme involved in cross-linking peptidoglycan layers. This weakens the cell wall, leading to cell lysis and bacterial death.

Quick Tip

Penicillins block bacterial cell wall formation—specifically peptidoglycan cross-linking.

---

80. Which of the following antidiabetic agent primarily enhances insulin sensitivity in target tissues?

(1) Sulfonylureas

(2) Biguanides

(3) Thiazolidinediones

(4) Alpha-glucosidase inhibitors

Correct Answer: (3) Thiazolidinediones

Solution: Thiazolidinediones (like pioglitazone) are antidiabetic drugs that work by enhancing insulin sensitivity in muscle, adipose tissue, and the liver. They activate PPAR-γ receptors, improving glucose uptake and utilization.

Quick Tip

Thiazolidinediones = insulin sensitizers. They act via PPAR-γ activation to reduce insulin resistance.

---

81. Which local anaesthetic is commonly used for spinal anaesthesia due to its long duration of action?

(1) Lidocaine

(2) Bupivacaine

(3) Procaine

(4) Mepivacaine

Correct Answer: (2) Bupivacaine

Solution: Bupivacaine is an amide-type local anaesthetic commonly used in spinal and epidural anaesthesia. It provides prolonged sensory and motor blockade, making it ideal for long-duration procedures.

Quick Tip

Bupivacaine has a long duration of action, making it the preferred choice for spinal anaesthesia.

---

82. Development of drug resistance is not generally associated with overexpression of which of the following transporters?

(1) BCRP

(2) ABCB1

(3) MDR1

(4) Folate receptors

Correct Answer: (4) Folate receptors

Solution: While transporters like BCRP, ABCB1, and MDR1 are commonly overexpressed in drug-resistant cancer cells and are involved in efflux of drugs, folate receptors are mainly involved in nutrient uptake and are not typically associated with drug resistance mechanisms.

Quick Tip

Folate receptors are not part of the typical efflux transporter family linked to drug resistance.

---

83. Which of the following cellular transport requires energy?

(1) Active transport

(2) Passive transport

(3) Facilitated transport

(4) Pinocytosis

Correct Answer: (1) Active transport

Solution: Active transport is a cellular mechanism where substances move against their concentration gradient with the help of energy in the form of ATP. This is in contrast to passive and facilitated transport, which do not require energy.

Quick Tip

Active transport needs ATP to move substances against the concentration gradient.

---

84. Which of the following is not correct for the H_1 receptor antagonists?

(1) Strongly block the increased capillary permeability caused by histamine

(2) Suppress the flare and itching caused by intradermal injection

(3) Always suppress the gastric secretion

(4) Relieve the allergic reactions

Correct Answer: (3) Always suppress the gastric secretion

Solution: H_1 receptor antagonists primarily act on allergic responses such as capillary permeability, flare, and itching. Gastric acid secretion is regulated by H_2 receptors, not H_1. Thus, they do not suppress gastric acid secretion.

Quick Tip

H_1 antagonists are involved in allergic symptom relief, not gastric secretion control.

---

85. Absorption of oral iron preparations can be facilitated by co-administering ____.

(1) calcium carbonate

(2) calcium phosphate

(3) ascorbic acid

(4) casein

Correct Answer: (3) ascorbic acid

Solution: Ascorbic acid (vitamin C) enhances the absorption of non-heme iron by reducing it to its ferrous form (Fe^{2+}), which is more readily absorbed in the intestine. Other substances like calcium compounds can actually inhibit iron absorption.

Quick Tip

Ascorbic acid enhances iron absorption by maintaining iron in its absorbable ferrous state.

---

86. The weight ratio of T4 and T3 in the combination preparations is ____.

(1) 1:3

(2) 3:1

(3) 1:4

(4) 4:1

Correct Answer: (4) 4:1

Solution: Thyroid hormone combination therapy uses a T4:T3 weight ratio of 4:1 to mimic the physiological secretion by the thyroid gland. This ratio balances the longer half-life of T4 and the higher potency of T3.

Quick Tip

A 4:1 T4:T3 ratio is used to simulate natural thyroid hormone secretion.

---

87. The antiplatelet action of aspirin involves _____ inhibition.

(1) arachidonic acid pathway

(2) ADP pathway

(3) glycoprotein IIb/IIIa receptor

(4) phosphodiesterase

Correct Answer: (1) arachidonic acid pathway

Solution: Aspirin irreversibly inhibits cyclooxygenase (COX-1), an enzyme in the arachidonic acid pathway, preventing the formation of thromboxane A2, a potent promoter of platelet aggregation.

Quick Tip

Aspirin blocks COX-1 in the arachidonic acid pathway to reduce platelet aggregation.

---

88. The drug that is not metabolized using hydrolysis reaction is _____.

(1) aspirin

(2) lidocaine

(3) morphine

(4) procaine

Correct Answer: (3) morphine

Solution: Morphine is primarily metabolized in the liver via conjugation (glucuronidation), not hydrolysis. In contrast, drugs like aspirin and procaine undergo hydrolysis reactions.

Quick Tip

Morphine avoids hydrolysis; it is metabolized mainly through conjugation reactions.

---

89. Which receptor type is primarily involved in the ”fight or flight” response?

(1) alpha-1 adrenergic

(2) beta-2 adrenergic

(3) Muscarinic

(4) Nicotinic

Correct Answer: (1) alpha-1 adrenergic

Solution: The ”fight or flight” response is mediated by the sympathetic nervous system, primarily through alpha-1 adrenergic receptors that cause vasoconstriction and increase blood pressure.

Quick Tip

Alpha-1 adrenergic receptors drive the ”fight or flight” responses like vasoconstriction.

---

90. Find the direct oral anticoagulant drug from the following.

(1) Heparin

(2) Dabigatran

(3) Warfarin

(4) Aspirin

Correct Answer: (2) Dabigatran

Solution: Dabigatran is a direct thrombin inhibitor and is classified as a direct oral anticoagulant (DOAC). Heparin and warfarin are traditional anticoagulants, with warfarin being an oral vitamin K antagonist. Aspirin is an antiplatelet drug.

Quick Tip

Dabigatran is a direct oral anticoagulant; unlike warfarin, it does not require INR monitoring.

---

91. Which of the following is true regarding the purpose of taking a medication history of patient?

(1) To identify potential drug interactions and allergies

(2) To know the cost of medications

(3) Both a and b are correct

(4) Both a and b are incorrect

Correct Answer: (1) To identify potential drug interactions and allergies

Solution: Taking a patient's medication history is essential to identify potential drug interactions, allergies, and ensure safe pharmacotherapy. It is not primarily focused on medication costs.

Quick Tip

Medication history is mainly used to prevent adverse drug interactions and allergic reactions.

---

92. Which of the following is acting as an antidiarrheal agent?

(1) Bisacodyl

(2) Docusate

(3) Loperamide

(4) Lactulose

Correct Answer: (3) Loperamide

Solution: Loperamide is an opioid receptor agonist used to slow intestinal movement, thereby reducing diarrhea. Bisacodyl, docusate, and lactulose are used as laxatives or stool softeners.

Quick Tip

Loperamide is commonly used for symptomatic relief in acute and chronic diarrhea.

---

93. For the emergency treatment of severe hypoglycaemia, which of the following is administered?

(1) Pramlintide

(2) Glucagon

(3) Rosiglitazone

(4) Metformin

Correct Answer: (2) Glucagon

Solution: Glucagon is used as an emergency treatment in cases of severe hypoglycaemia, especially when the patient is unconscious or unable to take oral glucose. It promotes the breakdown of glycogen to glucose in the liver.

Quick Tip

Glucagon is a life-saving hormone used in unconscious hypoglycaemic patients when IV glucose is not available.

---

94. Identify the drug used in androgen replacement therapy.

(1) Cortisol

(2) Estrogen

(3) Progesterone

(4) Testosterone enanthate

Correct Answer: (4) Testosterone enanthate

Solution: Testosterone enanthate is a synthetic derivative of testosterone and is commonly used in androgen replacement therapy, especially in male patients with low testosterone levels. Cortisol, estrogen, and progesterone are not androgens and are not used for this purpose.

Quick Tip

Testosterone enanthate helps restore normal testosterone levels in hypogonadal males.

---

95. The primary action of diuretics in hypertension management is _____.

(1) reducing urine output

(2) reducing volume of blood

(3) inhibiting calcium channels

(4) increasing heart rate

Correct Answer: (2) reducing volume of blood

Solution: Diuretics increase the excretion of sodium and water, which reduces the total blood volume. This decrease in blood volume helps lower blood pressure, making diuretics effective in managing hypertension.

Quick Tip

Lowering blood volume reduces cardiac output, which helps control blood pressure.

---

96. When absorption energy is increased, then the shift is called _____.

(1) Hypochromic shift

(2) Hyperchromic shift

(3) Bathochromic shift

(4) Hypsochromic shift

Correct Answer: (4) Hypsochromic shift

Solution: A hypsochromic shift, also known as a blue shift, occurs when the absorption maximum shifts to a shorter wavelength (higher energy). This typically happens due to changes in the electronic environment or solvent polarity.

Quick Tip

Hypsochromic = higher energy = shorter wavelength (blue shift).

---

97. What is the wavelength of fingerprint region?

(1) 100–500 cm^{-1}

(2) 500–1500 cm^{-1}

(3) 1700–2000 cm^{-1}

(4) 400–800 cm^{-1}

Correct Answer: (2) 500–1500 cm^{-1}

Solution: The fingerprint region in IR spectroscopy lies in the range of 500–1500 cm^{-1}. This region contains complex absorption patterns unique to each compound, which helps in compound identification.

Quick Tip

The fingerprint region is vital in IR spectra for distinguishing between similar molecules.

---

98. Beer Lambert's law indicates _____.

(1) absorbance is directly proportional to concentration

(2) absorbance is indirectly proportional to concentration

(3) absorbance is indirectly proportional to path length

(4) absorbance is indirectly proportional to molar absorptivity

Correct Answer: (1) absorbance is directly proportional to concentration

Solution: Beer Lambert's law states that absorbance (A) is directly proportional to the concentration (c) of the absorbing species and the path length (l), expressed as $A = \varepsilon cl$, where ε is the molar absorptivity.

Quick Tip

Absorbance increases linearly with concentration under Beer Lambert's law.

---

99. In HPLC analysis, what type of column is preferred?

(1) A column with high HETP and high number of plates

(2) A column with low HETP and low number of plates

(3) A column with high HETP and low number of plates

(4) A column with low HETP and high number of plates

Correct Answer: (4) A column with low HETP and high number of plates

Solution: In HPLC, the efficiency of a column is determined by the height equivalent to a theoretical plate (HETP) and the number of theoretical plates. A low HETP and high number of plates indicate high column efficiency and better separation capability.

Quick Tip

Low HETP + High number of plates = High resolution in HPLC.

---

100. Following are the desirable properties of the liquid phase used in GLC EXCEPT for one of the following. Identify the same.

(1) It should be inert to the analytes

(2) It should have high viscosity at operating temperature

(3) It should have low vapour pressure at the operating temperature

(4) It should have a high resolving power

Correct Answer: (2) It should have high viscosity at operating temperature

Solution: In GLC (Gas-Liquid Chromatography), the stationary phase (liquid) should have low viscosity to ensure good coating and efficient separation. High viscosity can hinder flow and reduce efficiency.

Quick Tip

Desirable GLC liquid phases should be inert, have low vapor pressure, and low viscosity.

---

101. Which of the following is a primary function of GLP?

(1) To ensure the safety of consumers by testing the quality of food products.

(2) To establish a framework for conducting non-clinical studies, ensuring the quality, integrity, and reproducibility of the data generated.

(3) To certify the quality of pharmaceutical products after they have been manufactured.

(4) To ensure the proper storage and disposal of hazardous waste generated in a laboratory.

Correct Answer: (2) To establish a framework for conducting non-clinical studies, ensuring the quality, integrity, and reproducibility of the data generated.

Solution: Good Laboratory Practice (GLP) is a set of principles intended to assure the quality and integrity of non-clinical laboratory studies. It is mainly focused on research and regulatory studies, not directly on product manufacturing or consumer safety testing.

Quick Tip

GLP ensures data integrity and reproducibility in non-clinical research settings.

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102. The electrode potentials are calculated by _____.

(1) Ilkovic equation

(2) Stokes equation

(3) Nernst equation

(4) Ohm's Law

Correct Answer: (3) Nernst equation

Solution: The Nernst equation relates the reduction potential of a half-cell to the standard electrode potential, temperature, and activities (or concentrations) of the chemical species involved. It is fundamental to electrochemical calculations.

Quick Tip

Remember: Nernst equation = electrode potential + concentration effect.

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103. ICH stands for _____.

(1) International Committee on Harmonisation

(2) International Conference on Harmonisation

(3) International Council for Harmonisation

(4) International Council of Harmony

Correct Answer: (3) International Council for Harmonisation

Solution: ICH refers to the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use. It aims to bring together regulatory authorities and the pharmaceutical industry to discuss scientific and technical aspects of drug registration.

Quick Tip

ICH = Global body for harmonising pharmaceutical regulations.

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104. Resolution of HPLC can not be modified by _____.

(1) decreasing particle size

(2) decreasing column diameter

(3) changing flow rate

(4) changing detector

Correct Answer: (4) changing detector

Solution: HPLC resolution is primarily affected by factors such as particle size, flow rate, and column dimensions. The detector type does not influence the chromatographic separation or resolution but only affects detection sensitivity.

Quick Tip

Remember: Resolution in HPLC is about separation, not detection.

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105. The errors arising due to use of un-calibrated or improperly calibrated weights are known as:

(1) Operational and personal errors

(2) Instrumental and reagent errors

(3) Errors of methods

(4) Additive and proportional errors

Correct Answer: (2) Instrumental and reagent errors

Solution: Instrumental and reagent errors arise when the instruments or reagents (including weights, balances, etc.) are not properly calibrated or maintained, directly affecting accuracy.

Quick Tip

Uncalibrated weights = Instrumental error, not human or method-based.

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106. For the pH range of 2.8 to 4.6, which indicator should be preferred?

(1) Phenolphthalein

(2) Methyl red

(3) Thymol blue

(4) Bromophenol blue

Correct Answer: (4) Bromophenol blue

Solution: Bromophenol blue has a pH transition range of approximately 3.0 to 4.6, making it ideal for detecting pH changes in the 2.8 to 4.6 range. Other indicators like phenolphthalein and methyl red operate in different pH ranges.

Quick Tip

Choose indicators whose pH range overlaps the solution's expected pH.

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107. The phenomenon called "levelling effect" for weak acids will be observed in _____ solvents.

(1) aprotic

(2) protophilic

(3) protogenic

(4) amphiprotic

Correct Answer: (2) protophilic

Solution: Protophilic solvents (like water, ammonia) accept protons readily, leading to the levelling effect where all strong acids appear equally strong because they donate protons to the solvent and form the same conjugate acid.

Quick Tip

Levelling effect = acid strength appears same in proton-accepting solvents.

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108. To obtain the best results in any of the quantitative TLC methods, the spots being used should have R_f values between _____.

(1) 0.01 to 0.3

(2) 0.3 to 0.7

(3) 0.7 to 1.0

(4) ¿ 1.0

Correct Answer: (2) 0.3 to 0.7

Solution: For optimal separation and quantification in TLC, the R_f values of the spots should ideally lie between 0.3 and 0.7. This range provides a clear distance between origin and solvent front, allowing precise measurement and minimizing overlap.

Quick Tip

Choose solvents that give clear R_f values in the 0.3–0.7 range for best TLC results.

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109. As per the Indian Pharmacopoeia, the test organism for the microbiological assay of amikacin is _____.

(1) Saccharomyces cerevisiae

(2) Micrococcus luteus

(3) Klebsiella pneumoniae

(4) Staphylococcus aureus

Correct Answer: (4) Staphylococcus aureus

Solution: According to the Indian Pharmacopoeia, *Staphylococcus aureus* is the official test organism used in the microbiological assay of amikacin due to its known sensitivity to this aminoglycoside antibiotic.

Quick Tip

Always refer to pharmacopeial standards for correct test organisms in bioassays.

110. Subpart C of Good Laboratory Practice (GLP) regulations, specifically under 21 CFR Part-58, focuses on _____.

(1) test and control articles

(2) organisational and personnel

(3) testing facilities operations

(4) Facilities

Correct Answer: (4) Facilities

Solution: Subpart C of the GLP regulations (21 CFR Part 58) outlines requirements specifically related to the physical aspects of the testing facility — such as design, maintenance, and location — to ensure proper environmental conditions for conducting reliable non-clinical studies.

Quick Tip

GLP Subpart C is dedicated to ”Facilities” to ensure valid and reproducible lab conditions.

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111. The relationship between the atoms present in their ground-state and excited-state in flame photometry is given by _____ equation.

(1) Arrhenius

(2) Nernst

(3) Boltzmann

(4) de Broglie

Correct Answer: (3) Boltzmann

Solution: The Boltzmann equation expresses the population of atoms in excited states relative to ground states at thermal equilibrium — a key factor in flame photometry where emission intensity is directly related to the number of atoms in the excited state.

Quick Tip

Use the Boltzmann equation in flame photometry to calculate excited atom populations.

---

112. Which of the following functional group(s) does not show two absorption peaks in IR spectroscopy:

(1) Anhydride

(2) Primary amine

(3) Nitro

(4) Secondary amine

Correct Answer: (4) Secondary amine

Solution: Functional groups like anhydrides, nitro compounds, and primary amines typically show two absorption bands due to symmetric and asymmetric stretching vibrations. Secondary amines, on the other hand, usually show only one N–H stretching peak in the IR spectrum.

Quick Tip

Secondary amines show a single N–H stretch, unlike primary amines or nitro groups.

---

113. If 10 mL of 0.1 M sulphuric acid solution requires 20 mL of NaOH solution, then the normality of NaOH solution is:

(1) 0.1 N

(2) 0.05 N

(3) 0.2 N

(4) 0.4 N

Correct Answer: (1) 0.1 N

Solution: Sulphuric acid (H_2SO_4) is diprotic, so:

$$\text{Normality of } H_2SO_4 = 2 \times 0.1 = 0.2 \text{ N}$$

Using the neutralization formula:

$$N_1V_1 = N_2V_2 \Rightarrow 0.2 \times 10 = N_2 \times 20 \Rightarrow N_2 = 0.1 \text{ N}$$

Quick Tip

Use $N_1V_1 = N_2V_2$ for acid-base titrations; remember H_2SO_4 gives 2 equivalents.

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114. During titration of strong acid with a weak base, which one is correct with respect to conductance?

(1) It increases till the end point

(2) It decreases till the end point

(3) End point cannot be determined using conductimetry

(4) Conductance not altered

Correct Answer: (2) It decreases till the end point

Solution: In the titration of a strong acid with a weak base, the highly conductive hydrogen ions are gradually replaced by less conductive ammonium or other weak base ions. Hence, the conductance decreases till the end point.

Quick Tip

In acid-base titrations involving strong acids and weak bases, conductance usually decreases due to replacement of highly mobile H^+ ions.

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115. Which substance is commonly used titrant in iodometric titrations?

(1) Potassium iodide

(2) Sodium thiosulfate

(3) Iodine solution

(4) Potassium permanganate

Correct Answer: (2) Sodium thiosulfate

Solution: In iodometric titrations, iodine is produced during the reaction and then titrated with a standard solution of sodium thiosulfate. Sodium thiosulfate acts as the titrant because it reduces iodine back to iodide ions.

Quick Tip

Sodium thiosulfate is the standard titrant in iodometric titrations, reducing I_2 to I^-.

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116. Which of the following is correct about robustness and ruggedness in method validation?

(1) Robustness evaluates inter-laboratory variations, while ruggedness evaluates small changes in method parameters

(2) Ruggedness evaluates inter-laboratory variations, while robustness evaluates small changes in method parameters

(3) Robustness focuses on analyst variations, while ruggedness evaluates intra-laboratory changes

(4) Ruggedness focuses on temperature changes, while robustness focuses on pressure changes

Correct Answer: (2) Ruggedness evaluates inter-laboratory variations, while robustness evaluates small changes in method parameters

Solution:

In method validation:

- Ruggedness refers to the degree of reproducibility of test results under varied conditions such as different laboratories, analysts, or instruments.

- Robustness refers to the capacity of a method to remain unaffected by small, deliberate variations in method parameters, thus indicating its reliability during normal usage.

Quick Tip

Remember: Ruggedness = inter-lab consistency; Robustness = resistance to small deliberate changes.

---

117. Which of the following is a primary standard used in the calibration of spectrophotometers?

(1) Sodium dichromate

(2) Sodium chloride

(3) Potassium dichromate

(4) Potassium chloride

Correct Answer: (3) Potassium dichromate

Solution: Potassium dichromate is a commonly used primary standard for calibrating UV-Vis spectrophotometers because it exhibits stable absorbance peaks at specific wavelengths, making it reliable for validation.

Quick Tip

Primary standards like potassium dichromate offer high purity and stability, ideal for calibration purposes in spectrophotometry.

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118. Find the correct sentence from the following about accuracy and precision in pharmaceutical analysis.

(1) Accuracy refers to reproducibility, while precision refers to closeness to the true value

(2) Accuracy refers to closeness to the true value, while precision refers to reproducibility

(3) Both accuracy and precision refers to the same concept

(4) Accuracy is related to random errors, while precision is related to systematic errors

Correct Answer: (2) Accuracy refers to closeness to the true value, while precision refers to

reproducibility

Solution: In pharmaceutical analysis: - Accuracy measures how close the result is to the actual (true) value. - Precision refers to how consistently the measurement can be repeated under unchanged conditions.

Quick Tip

Accuracy = closeness to true value; Precision = repeatability or consistency of results.

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119. Which guideline is commonly referred to for method validation in pharmaceutical analysis?

(1) ICH Q3A

(2) ICH Q2 (R1)

(3) ICH Q1B

(4) ICH Q4A

Correct Answer: (2) ICH Q2 (R1)

Solution: The ICH Q2 (R1) guideline is the internationally accepted standard for method validation in pharmaceutical analysis. It outlines parameters such as accuracy, precision, specificity, detection limit, quantitation limit, linearity, and robustness.

Quick Tip

ICH Q2 (R1) is the go-to guideline for validating analytical methods in pharmaceutical settings.

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120. What will be change observed in liquid chromatography with increased mobile phase flow rate?

(1) Decreased pressure

(2) Increased resolution

(3) Increased sensitivity

(4) Reduced retention times

Correct Answer: (4) Reduced retention times

Solution: When the mobile phase flow rate increases in liquid chromatography, analytes move through the column more quickly. This leads to **reduced retention times**, although it may compromise resolution and sensitivity.

Quick Tip

Higher flow rate = faster elution = shorter retention time (but potentially lower resolution).
