AP PGECET 2025 Pharmacy Question Paper with Solutions

Time Allowed :2 Hour	Maximum Marks :120	Total Questions :120

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 2 hour duration.
2. The question paper consists of 120 questions. The maximum marks are 120.
3. The questions are from Pharmacy.

Q1. The drug 'Pectin' belongs to the category of _____

(1) polyuronide
(2) disaccharide
(3) alkaloid
(4) Monosaccharide

Correct Answer: (1) polyuronide

Solution:
Pectin is a polymeric substance found in plant cell walls.
It is classified as a polyuronide due to its high content of galacturonic acid units.
It is commonly used as a gelling agent in foods and pharmaceuticals.

Quick Tip

Pectin = polyuronide → rich in galacturonic acid.
Remember: It is not a simple sugar or alkaloid.

Q2. 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 obtained from the heartwood of Uncaria gambir.
It is used as an astringent and in traditional medicine preparations.

Quick Tip

Catechu → Uncaria gambir.
Dark catechu comes from Acacia catechu.

Q3. Trichomes with quadracellular head sessile stalk are seen in _____

(1) Digitalis
(2) Belladonna
(3) Hyoscyamus
(4) Vasaka

Correct Answer: (3) Hyoscyamus

Solution:
Hyoscyamus shows multicellular glandular trichomes with quadracellular head and sessile stalk.
These trichomes are important for secreting alkaloids.

Quick Tip

Trichomes with 4-celled head → Hyoscyamus.
Key identifier in pharmacognostic studies.

Q4. 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 an inert clay obtained from minerals.

It is used as an adsorbent and in pharmaceutical preparations.

Quick Tip

Mineral drugs → Kaolin, Talc, etc.
Plant drugs are not included here.

Q5. The natural oil of winter green majorly contains _____

(1) methyl salicylate
(2) salicylic acid
(3) phenol
(4) a-napthol

Correct Answer: (1) methyl salicylate

Solution:
Wintergreen oil is extracted from Gaultheria species.
Its main component is methyl salicylate, responsible for analgesic properties.

Quick Tip

Wintergreen oil = methyl salicylate.
Salicylic acid is present only as a precursor in plants.

Q6. Mangifera indica belongs to the family _____

(1) Phyllanthaceae
(2) Combretaceae
(3) Meliaceae
(4) Anacardiaceae

Correct Answer: (4) Anacardiaceae

Solution:
Mangifera indica (Mango) belongs to the Anacardiaceae family.
This family includes several resinous plants and economically important fruit trees.

Quick Tip

Mango → Anacardiaceae.
Other members: cashew, pistachio.

Q7. 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 triterpenoid glycosides synthesized via the mevalonate pathway.
The pathway provides the C5 isoprene units needed for triterpene formation.

Quick Tip

Steroidal saponins → mevalonic acid pathway.
Shikimic pathway → aromatic compounds.

Q8. The swelling index of a crude drug is used to evaluate _____

(1) presence of alkaloids
(2) moisture content
(3) mucilage content
(4) presence of volatile oils

Correct Answer: (3) mucilage content

Solution:
The swelling index measures the ability of a drug to swell in water.
It indicates the presence and quantity of mucilage in the drug.

Quick Tip

Swelling index → mucilage content.
Higher swelling indicates more polysaccharides.

Q9. 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 seed hairs of Gossypium species.
Gossypium barbadense is a commercially cultivated species.

Quick Tip

Cotton fiber → Gossypium species.
Remember: barbadense hirsutum are main cultivated types.

Q10. Number of isoprene units present in diterpenes are _____

(1) 2
(2) 3
(3) 4
(4) 5

Correct Answer: (3) 4

Solution:
Diterpenes are composed of 4 isoprene units.
Each isoprene unit has 5 carbon atoms, giving diterpenes 20 carbons.

Quick Tip

Diterpenes → 4 isoprene units → 20 carbons.
Use isoprene count to identify terpenoid class.

Q11. 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: (3) Keller - kiliani test

Solution:
Keller-Kiliani test is a specific chemical test for cardiac glycosides, especially for detecting deoxy sugars attached to glycone part.
It produces a characteristic color reaction with the glycoside.

Quick Tip

Cardiac glycoside test → Keller-Kiliani.
Always look for deoxy sugar detection.

Q12. Match the following correctly: A) Goldbeater skin test B) Molisch test C) Mayer's test D) Salkowski test _____

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

Quick Tip

Match key tests with class: Goldbeater = tannins, Molisch = carbs.
Mayer's for alkaloids, Salkowski = terpenoids.

Q13. 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 a fibrous material used for filtration of liquids and air, and also as insulation in pharmaceutical equipment.

Quick Tip

Glass wool → filtration insulation.
Not used as drug or capsule material.

Q14. 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 quaternary ammonium alkaloid.
It contains one nitrogen atom permanently positively charged, making it polar and affecting absorption.

Quick Tip

Quaternary N → polar alkaloids like Tubocurarine.
Atropine/Ephedrine are tertiary alkaloids.

Q15. 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 closed systems where nutrients are supplied at the start and products are harvested at the end without continuous addition.

Quick Tip

Closed system = Batch culture.
Continuous → open system with nutrient feed.

Q16. 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 an enzyme that catalyzes oxidation of uric acid to allantoin, which is more soluble and easily excreted.

Quick Tip

Rasburicase → uric acid → allantoin (oxidation).
Helps rapid urate clearance in gout.

Q17. 1-[(5-methylpyrazin-2-yl-carboxamide) ethyl phenyl sulphonyl]-3-cyclohexyl urea is _____

(1) Glimepiride
(2) Glipizide
(3) Glyburide
(4) Repaglinide

Correct Answer: (4) Repaglinide

Solution:
Repaglinide is a meglitinide-class oral hypoglycemic agent with the given chemical structure.

Quick Tip

Repaglinide → rapid onset insulin secretagogue.
Recognize by chemical name patterns.

Q18. 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 2-receptors
(4) Orally active bronchodilator

Correct Answer: (1) Increases the drug distribution

Solution:
3',5'-dihydroxy substitution increases 2-selectivity and COMT resistance, but does not significantly affect drug distribution.

Quick Tip

Remember: COMT resistance 2-selectivity are SAR effects.
Distribution is unrelated.

Q19. 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 replaces a functional group with a similar one to maintain activity while improving stability or reducing toxicity.

Quick Tip

Bioisosterism → preserve activity by chemical similarity.
Common in lead optimization.

Q20. 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 identifies essential molecular features required for target binding, aiding drug design.

Quick Tip

Pharmacophore → 3D arrangement of features for target binding.
Not about excipients or PK monitoring.

Q21. IUPAC name of aspirin is _____

(1) salicylic anhydride
(2) 2-ethyl salicylate
(3) 2-acetoxybenzoic acid
(4) 4-hydroxybenzoic acid

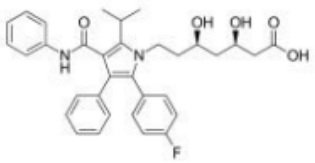
Correct Answer: (3) 2-acetoxybenzoic acid

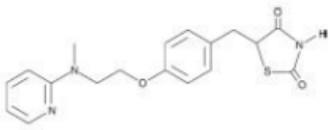
Solution:
Aspirin is chemically acetylsalicylic acid.
Its systematic IUPAC name is 2-acetoxybenzoic acid.

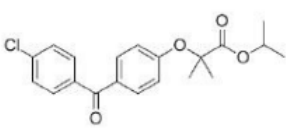
Quick Tip

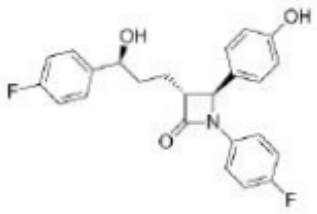
Remember: Aspirin = acetylsalicylic acid → 2-acetoxybenzoic acid.

Q22. Which of the following drugs act via PPAR-α activation?

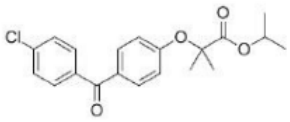
(A) 

(B) 

(C) 



(D)



Correct Answer: (C)

Solution:

Step 1: Understanding the Question:
The question asks to identify the drug from the given chemical structures that exerts its therapeutic effect by activating the Peroxisome Proliferator-Activated Receptor alpha (PPAR-α).

Step 3: Detailed Explanation:
First, let's identify the drugs corresponding to the given structures and their mechanisms of action.

- **Structure (A) is Atorvastatin:** This is a statin drug. Statins act by inhibiting the enzyme HMG-CoA reductase, which is a key enzyme in the cholesterol synthesis pathway. They are primarily used to lower LDL cholesterol. Their mechanism is not PPAR-α activation.

- **Structure (B) is Rosiglitazone:** This is a thiazolidinedione (TZD) class of drug. TZDs are agonists of PPAR-γ (gamma), not PPAR-α. They are used as anti-diabetic drugs as they increase insulin sensitivity.

- **Structure (C) is Fenofibrate:** This drug belongs to the fibrate class. Fibrates are well-known agonists (activators) of **PPAR-α**. Activation of PPAR-α leads to an increase in the synthesis of lipoprotein lipase and a decrease in the production of apolipoprotein C-III. This enhances the clearance of triglyceride-rich lipoproteins, making fibrates effective in lowering high triglyceride levels. Therefore, this is the correct option.

- **Structure (D) is Ezetimibe:** This is a cholesterol absorption inhibitor. It acts at the brush border of the small intestine to inhibit the absorption of cholesterol, leading to a decrease in the delivery of intestinal cholesterol to the liver. Its mechanism is independent of PPAR-α activation.

Step 4: Final Answer:
Based on the analysis of the mechanisms of action, Fenofibrate (Structure C) is the drug that

acts via PPAR-α activation.

Quick Tip

For pharmacology questions, it's crucial to remember the major drug classes and their primary mechanisms. For lipid-lowering agents:
- **Statins** -¿ HMG-CoA reductase inhibitors.
- **Fibrates** -¿ PPAR-α activators.
- **Ezetimibe** -¿ Cholesterol absorption inhibitor.
- **TZDs** (like Rosiglitazone) are anti-diabetic drugs that are PPAR-γ activators.

Q23. 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 is a method to relate chemical structure quantitatively to biological activity.
Used extensively in medicinal chemistry to optimize drug design.

Quick Tip

QSAR → Quantitative, not qualitative.
Connects structure → activity numerically.

Q24. What is the primary function of dental abrasives? _____

(1) Removing plaque and stains
(2) Enhancing digestion
(3) Neutralizing stomach acid
(4) Regulating blood pressure

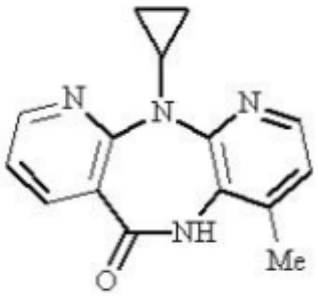
Correct Answer: (1) Removing plaque and stains

Solution:
Dental abrasives mechanically clean teeth by removing stains and plaque without affecting enamel.

Quick Tip

Dental abrasives → mechanical cleaning of teeth.
Not related to systemic functions.

Q25. 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).
It binds allosterically near the RT active site, inhibiting HIV replication.

Quick Tip

NNRTI → allosteric binding; NRTI → substrate mimic.

Q26. 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:
6-O-acetylmorphine is more lipophilic than morphine, allowing faster CNS penetration and stronger analgesic effect.

Quick Tip

Acetylation at 6-OH → increased activity (e.g., heroin).

Q27. 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's R-enantiomer is sedative, while the S-enantiomer is teratogenic.
Leads to severe birth defects when given to pregnant women.

Quick Tip

Stereochemistry → critical in teratogenicity.
Thalidomide = classic example.

Q28. The antihypertensive drug with a tetrazole nucleus that binds to AT1 receptor is _____

(1) Lisinopril
(2) Losartan
(3) Captopril
(4) Enalapril

Correct Answer: (2) Losartan

Solution:
Losartan is an angiotensin II receptor antagonist (ARB) with a tetrazole ring that enhances receptor binding.

> Quick Tip
>
> Tetrazole → common in ARBs (e.g., Losartan).
> ACE inhibitors have -pril suffix.

Q29. The drug Nifedipine is chemically classified as a _____

(1) Diuretic
(2) Beta blocker
(3) Calcium channel blocker
(4) ACE inhibitor

Correct Answer: (3) Calcium channel blocker

Solution:
Nifedipine is a dihydropyridine calcium channel blocker that reduces vascular smooth muscle contraction, lowering BP.

> Quick Tip
>
> Nifedipine → DHP CCB; remember suffixes: -dipine → CCB.

Q30. In the synthesis of local anesthetics, the formation of the _____ bond is a critical step.

(1) ether
(2) amide
(3) ester

(4) acetal

Correct Answer: (2) amide

Solution:
Local anesthetics are generally esters or amides; modern stable anesthetics are mostly amides. Amide bond formation is key in synthesis.

Quick Tip

Modern anesthetics → amide linkage (e.g., lidocaine).

Q31. A compound containing _____ functional group is a characteristic feature of barbiturates.

(1) Hydantoin
(2) Pyrimidine
(3) Thiazolidine
(4) Oxazolidine

Correct Answer: (1) Hydantoin

Solution:
Barbiturates are derivatives of barbituric acid which contains the hydantoin functional group. This functional group is key for their CNS depressant activity.

Quick Tip

Hydantoin → hallmark functional group in barbiturates.

Q32. The primary mechanism of action of Penicillins is _____

(1) inhibition of protein synthesis
(2) inhibition of cell wall synthesis
(3) disruption of cell membrane
(4) inhibition of DNA replication

Correct Answer: (2) inhibition of cell wall synthesis

Solution:
Penicillins inhibit bacterial cell wall synthesis by blocking transpeptidase enzymes, leading to cell lysis.

Quick Tip

Penicillins → beta -lactam antibiotics → inhibit cell wall synthesis.

Q33. The stability of a drug molecule to light is measured in terms of _____

(1) Hydrolytic stability
(2) Photolytic stability
(3) Thermal stability
(4) Oxidative stability

Correct Answer: (2) Photolytic stability

Solution:
Photolytic stability refers to how a drug resists degradation when exposed to light.
It is critical for storage and packaging considerations.

Quick Tip

Photolytic = light stability; check packaging if drug is photosensitive.

Q34. 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:
Ethanol is added to prevent super-saturation of barium sulphate during precipitation.
It ensures uniform and controlled crystal formation.

Quick Tip

Ethanol → control crystal growth, prevents precipitation errors.

Q35. 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:
Beta-blockers are synthesized via condensation of amines with aromatic epoxides or halides, forming the amino alcohol side chain.

Quick Tip

Amines + aromatic rings → key intermediate for beta-blockers.

Q36. 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:
LMWH has more predictable pharmacokinetics than UFH, allowing uniform subcutaneous absorption and less frequent monitoring.

Quick Tip

LMWH → predictable absorption, less monitoring, lower HIT risk.

Q37. Anxiolytic drugs like lorazepam primarily act on _____ receptors.

(1) serotonin
(2) NMDA
(3) GABA-A
(4) dopamine

Correct Answer: (3) GABA-A

Solution:
Lorazepam is a benzodiazepine that enhances GABA-A receptor activity, increasing inhibitory neurotransmission in the CNS.

Quick Tip

Benzodiazepines → GABA-A agonists → anxiolytic and sedative effects.

Q38. 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 strengthens enamel and prevents dental caries by promoting remineralization.

Quick Tip

Fluoride → anticaries; Calcium carbonate → abrasive.

Q39. 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 neutralizes gastric acid but can cause constipation due to its low solubility.

Quick Tip

Aluminium hydroxide → constipation; Magnesium hydroxide → laxative.

Q40. 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:
Arsenic → Mercuric chloride, Lead → Dithizone, Iron → Thioglycolic acid, Barium → Barium chloride.
Limit tests use these reagents to detect trace metals.

Quick Tip

Memorize standard reagents for limit tests of common metals.

Q41. Which is the official source of water in the preparation of parenteral products? _____

(1) Purified water
(2) Water for injection
(3) Sterile water for injection
(4) Distilled water

Correct Answer: (2) Water for injection

Solution:
Water for injection (WFI) is the official source for parenteral preparations because it is pyrogen-free and suitable for injection after sterilization.

Quick Tip

WFI → pyrogen-free water required for parenterals.

Q42. The glass type commonly used for parenteral products is _____

(1) Type I
(2) Type II
(3) Type III
(4) Type IV

Correct Answer: (1) Type I

Solution:
Type I glass is borosilicate glass with high chemical resistance and thermal stability, suitable for parenteral packaging.

Quick Tip

Parenterals → always use Type I borosilicate glass for safety.

Q43. Which of the following is a physical hazard during the handling of hazardous materials? _____

(1) Skin exposure to chemicals
(2) Exposure to a radioactive material
(3) Consumption of contaminated food
(4) Inhalation of chemical vapors

Correct Answer: (2) Exposure to a radioactive material

Solution:
Physical hazards are environmental or mechanical hazards like radiation, heat, or mechanical injury.
Chemical exposure and inhalation are considered chemical hazards.

Quick Tip

Radioactive exposure → physical hazard; chemical contact → chemical hazard.

Q44. Schedule _____ deals with the requirement of factory premises for the manufacture of drugs.

(1) M
(2) Y
(3) P
(4) C

Correct Answer: (1) M

Solution:
Schedule M of the Drugs and Cosmetics Act specifies requirements for factory premises, equipment, and personnel for manufacturing drugs.

Quick Tip

Schedule M → GMP standards for drug manufacturing facilities.

Q45. 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 is measured as the distance between two parallel tangents on opposite sides of a particle in a given direction.

Quick Tip

Feret diameter → "caliper measurement" along a chosen direction.

Q46. _____ is the method of choice for determining the size distribution of powders for inhalation products.

(1) Sedimentation
(2) Light scattering
(3) Sieving
(4) Microscopy

Correct Answer: (2) Light scattering

Solution:
Laser light scattering (e.g., Malvern) provides accurate particle size distribution for fine powders, especially inhalation products.

Quick Tip

Inhalation powders → use laser light scattering for PSD.

Q47. _____ is a method used for the size reduction of heat-sensitive materials.

(1) Fluid energy mill
(2) Cryogenic grinding
(3) Ball mill

(4) Roller mill

Correct Answer: (2) Cryogenic grinding

Solution:
Cryogenic grinding uses low temperatures (liquid nitrogen) to prevent heat generation, ideal for heat-sensitive drugs.

Quick Tip

Heat-sensitive → cryogenic; general milling → ball/roller.

Q48. 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 helium pycnometry, which fills all pores, giving actual material density.

Quick Tip

True density = density of the solid material excluding pores.

Q49. 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 solutions cannot withstand autoclaving. Sterile filtration using 0.22 m filters is the preferred method.

Quick Tip

Heat-sensitive → filter sterilization; heat-stable → autoclave.

Q50. 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 (amorphous or less stable polymorphs) have higher solubility than stable crystalline forms.

Quick Tip

Metastable → high solubility, rapid dissolution; crystalline → lower solubility.

Q51. In a suspension the purpose of flocculating agent is _____

(1) increase viscosity
(2) prevent caking
(3) enhance solubility
(4) reduce particle size

Correct Answer: (2) prevent caking

Solution:
Flocculating agents help particles form loose aggregates (flocs) in suspensions, preventing compact sedimentation (caking) and making redispersion easier.

Quick Tip

Flocculation → prevents caking; deflocculation → fine uniform suspension.

Q52. Which suppository base is water-soluble? _____

(1) Cocoa butter
(2) PEG
(3) Gelatin
(4) Witepsol

Correct Answer: (2) PEG

Solution:
Polyethylene glycol (PEG) is water-soluble and commonly used as a suppository base for hydrophilic drugs.

Quick Tip

PEG → water-soluble base; cocoa butter/Witepsol → fat-soluble base.

Q53. 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 cream is an oil-in-water (O/W) emulsion, where oil droplets are dispersed in water and easily washable.

Quick Tip

O/W emulsion → washable cream; W/O → greasy cream.

Q54. Bulking agent used for parenteral preparation is _____

(1) sodium metabisulphite
(2) benzyl alcohol
(3) carboxylic acid
(4) Sorbitol

Correct Answer: (4) Sorbitol

Solution:
Sorbitol acts as a bulking agent in parenteral solutions, providing isotonicity and stabilizing the formulation.

Quick Tip

Bulking agent → stabilizes concentration; sorbitol common in injections.

Q55. The disintegration time for sugar coated tablet is _____ minutes.

(1) 30
(2) 60
(3) 15
(4) 5

Correct Answer: (2) 60

Solution:
Sugar-coated tablets have an additional coating layer, increasing disintegration time to about 60 minutes compared to uncoated tablets.

Quick Tip

Sugar coating → delays disintegration; film coating → faster.

Q56. The technique that involves measuring the angle of repose is employed to determine the _____ of powders.

(1) Density
(2) Flow property
(3) Hygroscopicity
(4) Porosity

Correct Answer: (2) Flow property

Solution:
Angle of repose is used to assess the flowability of powders; lower angles indicate better flow.

Quick Tip

Flow property → angle of repose; ¡30° → free-flowing.

Q57. The term 'bloom' in pharmaceutical compounding is associated with _____

(1) Tablet coating
(2) Hard gelatin capsule
(3) Suppositories
(4) Syrup formulation

Correct Answer: (2) Hard gelatin capsule

Solution:
Bloom value measures the gel strength of gelatin used for hard capsules; higher bloom → stronger gel.

Quick Tip

Bloom → gelatin strength; important for capsule integrity.

Q58. To prevent the growth of molds and fungi in oral liquid formulations, which of the following is commonly used? _____

(1) Benzoic acid
(2) Chlorbutol
(3) Benzalkonium chloride

(4) Cresol

Correct Answer: (1) Benzoic acid

Solution:
Benzoic acid is a common preservative for oral liquids, inhibiting mold and fungal growth.

Quick Tip

Benzoic acid → antifungal preservative; pH-dependent activity.

Q59. The primary role of LAL (Limulus Amebocyte Lysate) test is to detect _____

(1) pyrogens
(2) exotoxins
(3) proteinaceous matter
(4) DNA contamination

Correct Answer: (1) pyrogens

Solution:
LAL test detects bacterial endotoxins (pyrogens) in parenteral drugs to prevent febrile reactions.

Quick Tip

LAL → pyrogen detection; based on clotting reaction with endotoxins.

Q60. If the plasma half-life of a drug is 1.386 h and the volume of distribution is 40 L, then the total body clearance in L/h will be _____

(1) 40
(2) 20
(3) 10
(4) 5

Correct Answer: (2) 20

Solution:
Clearance $Cl = \frac{0.693 \times V_d}{t_{1/2}} = \frac{0.693 \times 40}{1.386} = 20\ L/h$

> Quick Tip
>
> Cl = 0.693 × Vd / t1/2; plug values carefully.

Q61. 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(4) Availability of receptors

Correct Answer: (3) Availability of 1

Solution:
Even though salicylic acid is mostly ionized in the intestine (pH 7.4), a small fraction (about 1This un-ionized portion is lipid-soluble and can cross the intestinal membrane, allowing absorption.

> Quick Tip
>
> Only the un-ionized form of weak acids/bases is absorbed through lipid membranes.

Q62. 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) from plasma concentration-time plot is proportional to the total drug absorbed systemically.

Quick Tip

AUC → measures systemic exposure → directly reflects drug absorption.

Q63. Fumaric acid is used in gelatin capsule shell as _____

(1) plasticizer
(2) antioxidant
(3) solubilizer
(4) Opacifier

Correct Answer: (1) plasticizer

Solution:
Fumaric acid acts as a plasticizer in gelatin capsules, improving flexibility and preventing brittleness of the shell.

Quick Tip

Plasticizers → make gelatin capsules flexible; fumaric acid is commonly used.

Q64. 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 is an air suspension coating technique used to coat particles or granules uniformly with film-forming agents.

Quick Tip

Air suspension coating → Wurster process → perfect for pellets or beads.

Q65. What is the ideal particle size for topical powders?

(A) 50 to 100 µm
(B) 150 to 250 µm
(C) 250 to 500 µm
(D) Above 1000 µm

Correct Answer: (A) 50 to 100 µm

Solution:

Step 1: Understanding the Question:
The question asks for the ideal particle size range for powders that are intended for topical (external) application on the skin.

Step 3: Detailed Explanation:
The particle size of a topical powder is a critical parameter that affects its physical properties, therapeutic efficacy, and patient comfort.

- **Patient Comfort and Feel:** The powder should feel smooth and non-gritty upon application. Particles larger than 100-150 µm tend to feel gritty and can cause mechanical irritation to the skin. Therefore, options (B), (C), and (D) are incorrect as they would result in a coarse, uncomfortable powder.

- **Adhesion and Coverage:** The particle size should be optimal for the powder to adhere to the skin and provide good coverage over the application area.

- **Safety Concerns:** Very fine particles (e.g., less than 10 µm) pose a risk of inhalation, which can be harmful to the respiratory system. They can also be absorbed through the skin into the systemic circulation, which is generally undesirable for a topical preparation intended for local action.

- **Ideal Range:** The range of **50 to 100 µm** is considered ideal. Particles in this range are "impalpable," meaning they are not felt as individual gritty particles when rubbed on the skin. This size provides a smooth feel and good adhesion without the risks associated with very fine or very coarse powders.

Step 4: Final Answer:
The ideal particle size for topical powders is 50 to 100 µm, as this ensures a smooth, non-gritty feel and good skin adhesion without posing an inhalation hazard.

Quick Tip

For topical powders, the key is "impalpability" - the powder should not feel gritty. A general rule in pharmaceutics is that particles above 100-150 µm start to feel gritty on the skin. This helps in quickly eliminating options with larger particle sizes.

Q66. A super disintegrant in tablet formulation is _____.

(A) sodium starch glycolate
(B) starch
(C) lactose
(D) talc

Correct Answer: (A) sodium starch glycolate

Solution:
Sodium starch glycolate is a superdisintegrant that swells upon contact with water to break tablets.
It has high swelling capacity (up to 300 times its weight).
Added at 2-8Other options: starch is regular disintegrant, lactose is diluent, talc is glidant.
Superdisintegrants: croscarmellose, crospovidone.
Mechanism: wicking and swelling.

Quick Tip

Superdisintegrant: sodium starch glycolate (2-8Swells 300x, wicks water. Faster than regular starch.

Q67. Creatinine clearance in normal 70 kg individuals is typically in the range of _____ mL/min.

(A) 100-120
(B) 200-250
(C) 50-100
(D) 120-200

Correct Answer: (D) 120-200

Solution:
Normal creatinine clearance for adult males (70 kg) is 97-137 mL/min.

For females: 88-128 mL/min.
Average range: 120-130 mL/min.
Used to estimate glomerular filtration rate (GFR).
Formula: (140-age) × weight (kg) × 0.85 (female) / 72.
Decreases with age, increases with muscle mass.

Quick Tip

Normal CrCl: 120-130 mL/min. Cockcroft-Gault formula for estimation. Used for drug dose adjustment.

Q68. A co-solvent used in the preparation of parenteral products is _____.

(A) benzyl alcohol
(B) methyl alcohol
(C) dimethyl acetamide
(D) phenol

Correct Answer: (C) dimethyl acetamide

Solution:
Dimethyl acetamide (DMA) is a polar aprotic solvent used as co-solvent in injectables.
It enhances solubility of poorly water-soluble drugs.
Used in 10-50Benzyl alcohol is preservative; methyl alcohol toxic.
Phenol is preservative.
DMA is biocompatible, low toxicity.

Quick Tip

DMA: co-solvent for injectables. Polar aprotic, enhances solubility. 10-50

Q69. If zeta potential of a suspension is high, then the system will be considered as _____.

(A) deflocculated
(B) flocculated
(C) emulsion
(D) sedimented

Correct Answer: (A) deflocculated

Solution:
High zeta potential (>30 mV) indicates strong electrostatic repulsion — deflocculated.
Particles remain dispersed, no settling.
Low zeta (<10 mV) — flocculated, loose aggregate.
Deflocculated: stable but viscous; flocculated: easy redispersion.
Zeta = potential at slipping plane.
Measured by electrophoretic mobility.

Quick Tip

High zeta (¿30 mV) → deflocculated, stable. Low zeta (¡10 mV) → flocculated, sediment. Electrolyte reduces zeta potential.

Q70. Non-linear pharmacokinetics is most likely due to _____.

(A) first-pass metabolism
(B) saturation of metabolic enzymes
(C) renal excretion
(D) high plasma protein binding

Correct Answer: (B) saturation of metabolic enzymes

Solution:
Non-linear PK occurs when elimination processes saturate (zero-order).
Enzyme saturation (e.g., CYP3A4) at high dose — rate constant.
First-pass: linear. Renal: capacity-limited but linear at low dose.
Protein binding: displacement causes linear change.
Examples: phenytoin, alcohol.
Michaelis-Menten kinetics: V = Vmax C / (Km + C).

Quick Tip

Non-linear: saturation (zero-order). V = Vmax C / (Km + C). Phenytoin, salicylates.

Q71. Match the following:

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

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

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

Solution:
Schedule Y: Requirements and guidelines for clinical trials.
Schedule G: List of drugs to be sold under medical supervision.
Schedule N: Minimum equipment for pharmacy.
Schedule P: Life period of drugs (stability).

Quick Tip

Schedule Y: clinical trials. Schedule G: dangerous drugs. Schedule P: expiry date.

Q72. The first schedule of the Drugs and Cosmetics Act, 1940 deals with _____.

(A) standards to be complied with by imported drugs and by drugs manufactured for sale, stocked or exhibited for sale, sold or distributed
(B) standard to be complied for cosmetics
(C) authoritative books of Ayurvedic, Siddha and Unani Tibb system
(D) standards to be complied for medical devices

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

Solution:
First Schedule lists classical books for Ayurveda, Siddha, Unani standards.
Schedule A: imported drugs standards.
Schedule F: medical devices.
Schedule V: cosmetics standards.

Quick Tip

Schedule 1: ASU classical books. Charaka, Sushruta, Ashtanga Hridaya. Essential for ASU formulations.

Q73. 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:
DCGI acts on the recommendations of the Drugs Technical Advisory Board (DTAB), which advises on technical matters related to the Drugs and Cosmetics Act.

Quick Tip

DTAB → advisory body for regulatory decisions; key in drug bans and approvals.

Q74. _____ 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 is classified as a psychotropic substance under the NDPS Act. Other options are not controlled under this Act.

Quick Tip

Barbiturates → psychotropic; antibiotics and anthelmintics → not psychotropic.

Q75. 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 DGHS serves as an ex-officio member of PCI by virtue of their position to oversee pharmacy education and practice in India.

Quick Tip

DGHS → statutory member in PCI; ensures government oversight.

Q76. Which drug acts as a selective serotonin reuptake inhibitor (SSRI)? _____

(1) Amitriptyline
(2) Fluoxetine
(3) Diazepam
(4) Phenelzine

Correct Answer: (2) Fluoxetine

Solution:
Fluoxetine selectively inhibits serotonin reuptake in the CNS, increasing serotonin levels. Amitriptyline → TCA; Diazepam → benzodiazepine; Phenelzine → MAOI.

Quick Tip

SSRI mnemonic: "Fluoxetine, Paroxetine, Sertraline, Citalopram" → selective serotonin action.

Q77. 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 acetylcholine at muscarinic receptors in parasympathetic pathways.
It does not affect nicotinic or adrenergic receptors.

Quick Tip

Atropine → "Muscarinic blocker" → dry mouth, tachycardia, pupil dilation effects.

Q78. 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 thyroxine (T_4), used to treat hypothyroidism.
It is converted in the body to the more active T_3.

Quick Tip

T4 → prodrug; converted to T3 in peripheral tissues.

Q79. 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 inhibit transpeptidase enzymes involved in peptidoglycan cross-linking of bacterial cell walls.
This results in bacterial lysis.

Quick Tip

Beta-lactams → cell wall synthesis inhibitors.

Q80. Which of the following antidiabetic agents primarily enhances insulin sensitivity in target tissues? _____

(1) Sulfonylureas
(2) Biguanides
(3) Thiazolidinediones
(4) Alpha-glucosidase inhibitors

Correct Answer: (3) Thiazolidinediones

Solution:
Thiazolidinediones (TZDs) activate PPAR-γ receptors, improving insulin sensitivity in muscle and adipose tissue.
Biguanides (e.g., metformin) reduce hepatic glucose output, sulfonylureas stimulate insulin release.

Quick Tip

TZDs → "sensitize target tissues to insulin."

Q81. 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 has a long duration of action and high potency, making it suitable for spinal anaesthesia.
Lidocaine acts faster but has shorter duration.

> Quick Tip
>
> Bupivacaine → "long-acting spinal anesthetic."

Q82. 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:
BCRP, ABCB1, and MDR1 efflux drugs from cells → multi-drug resistance.
Folate receptors are not involved in drug efflux mechanisms.

> Quick Tip
>
> Overexpression of efflux pumps → resistance; folate receptor → drug targeting, not resistance.

Q83. 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 moves molecules against concentration gradient using ATP.
Passive transport and facilitated diffusion do not require energy.

> Quick Tip
>
> Energy required → active transport; passive/facilitated → no energy.

Q84. 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:
H1 blockers inhibit allergy symptoms and vascular permeability.
H2 receptors, not H1, regulate gastric acid secretion.

> Quick Tip
>
> H1 → allergy/itch; H2 → gastric acid.

Q85. 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 reduces ferric to ferrous iron and forms soluble complexes → enhances absorption.

Quick Tip

Vitamin C co-administered with iron → better absorption.

Q86. 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: (2) 3 : 1

Solution:
Thyroid combination therapy commonly uses T4:T3 in 3:1 ratio to mimic physiological secretion.

Quick Tip

T4:T3 ratio 3:1 in tablets.

Q87. 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 → prevents thromboxane A2 synthesis → inhibits platelet aggregation.

Quick Tip

Aspirin → COX inhibitor → antiplatelet.

Q88. The drug that is not metabolized using hydrolysis reaction is _____

(1) aspirin
(2) lidocaine
(3) morphine
(4) procaine

Correct Answer: (3) morphine

Solution:
Aspirin, lidocaine, and procaine undergo hydrolysis reactions.
Morphine is metabolized primarily by conjugation (glucuronidation) in the liver, not hydrolysis.

Quick Tip

Morphine → glucuronidation; ester drugs → hydrolysis.

Q89. 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:
Alpha-1 adrenergic receptors mediate vasoconstriction and increased blood pressure during the sympathetic "fight or flight" response.
Beta-2 receptors mainly mediate bronchodilation.

Quick Tip

Alpha-1 → vasoconstriction; Beta-2 → bronchodilation.

Q90. 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 oral anticoagulant (DOAC) that directly inhibits thrombin.
Heparin is injectable; Warfarin is a vitamin K antagonist; Aspirin is an antiplatelet.

Quick Tip

DOAC → oral, direct thrombin or factor Xa inhibitor.

Q91. Which of the following is true regarding the purpose of taking a medication history of a 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:
Medication history helps prevent adverse drug reactions, interactions, and ensures patient safety.
Cost is secondary and not a primary purpose.

Quick Tip

Medication history → safety first (interactions/allergies).

Q92. 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 in the gut that reduces intestinal motility.
Other options like Bisacodyl (laxative), Docusate (stool softener), Lactulose (osmotic laxative) are used to treat constipation.

Quick Tip

Antidiarrheal → Loperamide; Laxatives → Bisacodyl, Lactulose, Docusate.

Q93. 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 rapidly increases blood glucose by stimulating hepatic glycogenolysis.
Other agents (Pramlintide, Rosiglitazone, Metformin) are not used for emergency hypoglycaemia.

Quick Tip

Emergency hypoglycaemia → Glucagon injection or IV dextrose.

Q94. 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 an androgen used in replacement therapy for male hypogonadism.
Cortisol → glucocorticoid, Estrogen/Progesterone → female sex hormones.

Quick Tip

Androgen therapy → Testosterone derivatives.

Q95. 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 reduce plasma volume, lowering cardiac output and blood pressure.
They do not directly inhibit calcium channels (CCBs) or increase heart rate.

Quick Tip

Diuretics → decrease intravascular volume → lower BP.

Q96. When absorption energy is increased, then the shift is called _____

(1) Hypochromic shift
(2) Hyperchromic shift
(3) Bathochromic shift
(4) Hypscochromic shift

Correct Answer: (3) Bathochromic shift

Solution:
Bathochromic shift (red shift) → absorption maximum moves to longer wavelength due to increased energy absorption.
Hypochromic → decreased absorption; Hyperchromic → increased absorption at same wavelength.

> Quick Tip
>
> Bathochromic = red shift; Hypsochromic = blue shift; Hyper/Hypochromic → intensity changes.

Q97. 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 IR fingerprint region lies between 500–1500 cm^{-1} and contains unique molecular vibrations.

> Quick Tip
>
> Fingerprint region → identify compounds uniquely.

Q98. 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 law: $A = \epsilon cl$ where A = absorbance, ϵ = molar absorptivity, c = concentration, l = path length.

> Quick Tip
>
> A c l; linear relationship in UV-Vis spectroscopy.

Q99. 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:
Low HETP (Height Equivalent to a Theoretical Plate) and high plate number → better separation efficiency in HPLC.

> Quick Tip
>
> Better column → low HETP + high plates = high resolution.

Q100. 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:
Liquid phase in GLC should have low viscosity to allow efficient flow and separation.

High viscosity would increase column backpressure and reduce efficiency.

Quick Tip

GLC mobile phase → low viscosity, inert, low vapor pressure, high resolving power.

Q101. 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:
GLP (Good Laboratory Practice) ensures reliability and reproducibility of non-clinical safety data.
It focuses on the process and documentation of experiments rather than finished product certification.

Quick Tip

GLP → non-clinical study quality; GMP → product quality.

Q102. 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:
Electrode potential is calculated using the Nernst equation: $E = E^0 - \frac{0.0591}{n} \log Q$.

Other equations relate to diffusion (Ilkovic) or viscosity (Stokes).

Quick Tip

Electrode potential → Nernst equation; concentration redox relationship.

Q103. 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: (2) International Conference on Harmonisation

Solution:
ICH coordinates technical requirements for pharmaceuticals to harmonize quality, safety, and efficacy guidelines.

Quick Tip

ICH = International Conference on Harmonisation (regulatory guideline body).

Q104. 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:
Resolution depends on column efficiency (particle size, diameter) and mobile phase conditions (flow rate).
Detector changes do not affect separation quality.

Quick Tip

HPLC resolution → column mobile phase; detector only measures signal.

Q105. 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 errors arise from defective or uncalibrated equipment or reagents.
Additive/proportional errors are a type of instrumental error.

Quick Tip

Check calibration → prevent instrumental reagent errors.

Q106. 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: (2) Methyl red

Solution:
Methyl red changes color in the pH range 4.4–6.2 (approx. 2.8–4.6 in acidic titrations).
Phenolphthalein → basic range.

Quick Tip

Acidic pH indicators → methyl red; basic → phenolphthalein.

Q107. The phenomenon called "levelling effect" for weak acids will be observed in _____ solvents.

(1) aprotic
(2) protophilic
(3) protogenic
(4) amphiprotic

Correct Answer: (4) amphiprotic

Solution:
Levelling effect → acid/base strength is limited by the solvent itself; observed in amphiprotic solvents like water.

Quick Tip

Levelling effect = solvent dictates maximum acid/base strength.

Q108. 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:
Optimal R_f range (0.3–0.7) ensures good separation and easy quantification.

Quick Tip

R_f too low → spot near baseline; too high → spot near solvent front.

Q109. 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: (2) Micrococcus luteus

Solution:
Amikacin assay uses Micrococcus luteus as the test organism because it is sensitive to aminoglycosides.

Quick Tip

Micrococcus luteus → aminoglycoside sensitivity assay (amikacin).

Q110. 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: (2) organisational and personnel

Solution:
Subpart C deals with responsibilities of personnel, training, and organizational structure to ensure GLP compliance.

Quick Tip

GLP Subpart C → people & organization; Subpart D → facilities.

Q111. 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 relates the population of atoms in the ground and excited states as $N_2/N_1 = \exp(-E/kT)$, which is used in flame photometry.

Quick Tip

Flame photometry $\rightarrow$ uses Boltzmann distribution for excited-state populations.

Q112. 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:
Secondary amines show only one N-H stretching absorption in IR, whereas primary amines show two peaks (symmetric asymmetric).

Quick Tip

Primary amine $\rightarrow$ 2 N-H peaks; Secondary amine $\rightarrow$ 1 N-H peak.

Q113. 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: (2) 0.05 N

Solution:
Normality calculation: $N_1V_1 = N_2V_2 \rightarrow 0.1 \times 10 = N_2 \times 20 \Rightarrow N_2 = 0.05$ N.

> Quick Tip
>
> Use $N_1V_1 = N_2V_2$ for acid-base titration normality calculations.

Q114. 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:
Strong acid + weak base $\rightarrow$ conductance decreases because weak base contributes fewer ions than strong acid.

> Quick Tip
>
> Strong acid titrated with weak base $\rightarrow$ conductance decreases until endpoint.

Q115. 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:
Sodium thiosulfate is the standard titrant for iodometric titrations, reacting with liberated iodine.

Quick Tip

Iodometric titration → sodium thiosulfate titrates iodine.

Q116. 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:
Robustness → method's stability to small deliberate changes.
Ruggedness → reproducibility across different labs/analysts.

Quick Tip

Robustness → small changes; Ruggedness → inter-lab reproducibility.

Q117. 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 solution is stable, reproducible, and absorbs UV light at known wavelengths → primary standard for spectrophotometer calibration.

Quick Tip

UV calibration → primary standard: $K_2Cr_2O_7$.

Q118. 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:
Accuracy = closeness to true value; Precision = repeatability/reproducibility of measurements.

Quick Tip

Accuracy → correctness; Precision → consistency.

Q119. Which guideline is commonly referred to for method validation in pharmaceutical analysis _____

(1) ICH Q3A
(2) ICH Q2 (R1)
(3) ICH QIB
(4) ICH Q4A

Correct Answer: (2) ICH Q2 (R1)

Solution:
ICH Q2 (R1) provides guidance on validation parameters: accuracy, precision, linearity, range, detection quantitation limits.

> Quick Tip
>
> Method validation guideline → ICH Q2 (R1).

Q120. 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:
Increasing mobile phase flow rate decreases the retention time because analytes spend less time in the column.
However, very high flow may reduce resolution.

> Quick Tip
>
> Higher flow → faster elution → shorter retention time; monitor resolution.
