AP ECET 2026 Pharmacy

Question Paper with Solutions

Conducted by JNTU, Anantapur

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 200 marks.

(iii) Each question has four options. Only **one** option is correct.

(iv) **Right Answer:** +1 mark.

(v) **Incorrect Answer:** No negative marking.

(vi) **Unanswered/Marked for Review:** 0 marks.

1. _____ is a natural colouring agent.

(A) Tartrazine

(B) Sunset yellow

(C) Caramel

(D) Erythrosine

Correct Answer: (C) Caramel

Solution:

Concept:

Colouring agents are used in pharmaceutical preparations to improve appearance, identification, and patient acceptability. These colouring agents may be broadly classified as:

- Natural colouring agents
- Synthetic colouring agents

Step 1: Understanding the question.

The question asks for a **natural colouring agent**. Therefore, we must identify which option is

obtained naturally and is commonly used as a colourant.

Step 2: Checking each option.

Tartrazine is a synthetic yellow dye. It is not a natural colouring agent.

Sunset yellow is also a synthetic azo dye. It is commonly used as an artificial colour.

Erythrosine is a synthetic red dye. It is not a natural colouring agent.

Caramel is obtained by controlled heating of carbohydrates or sugars. Hence, it is considered a natural colouring agent.

Step 3: Final selection.

Among the given options, only **Caramel** is a natural colouring agent.

Caramel

Quick Tip: Caramel is a natural colouring agent, while Tartrazine, Sunset yellow, and Erythrosine are synthetic colouring agents.

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2. Which of the following is a salient feature of Indian Pharmacopoeia?

(A) Includes only herbal drugs

(B) Provides legally enforceable standards

(C) Applies only to hospital pharmacies

(D) Published annually

Correct Answer: (B) Provides legally enforceable standards

Solution:

Concept:

Indian Pharmacopoeia is an official book of standards for drugs used in India. It gives official standards related to:

- Identity of drugs
- Purity of drugs
- Strength of drugs
- Quality of drugs

- Tests and limits for pharmaceutical substances

Step 1: Understanding Indian Pharmacopoeia.

The Indian Pharmacopoeia does not contain only herbal drugs. It includes standards for many types of pharmaceutical substances, dosage forms, excipients, and preparations.

Step 2: Importance of pharmacopoeial standards.

The standards mentioned in Indian Pharmacopoeia are not just advisory. They are official and legally recognized. Pharmaceutical manufacturers must follow these standards to ensure the safety, quality, and efficacy of medicines.

Step 3: Eliminating wrong options.

Option (A) is incorrect because Indian Pharmacopoeia does not include only herbal drugs.

Option (C) is incorrect because it applies to pharmaceutical manufacturing, testing, regulation, and quality control, not only hospital pharmacies.

Option (D) is incorrect because it is not necessarily published annually.

Step 4: Final answer.

The most important salient feature is that Indian Pharmacopoeia provides **legally enforceable standards**.

Provides legally enforceable standards

Quick Tip: Indian Pharmacopoeia is an official book that provides legally enforceable standards for the quality, purity, and strength of drugs in India.

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3. What is the major limitation of plastic containers in pharmaceutical packaging?

(A) High cost

(B) Prone for damage

(C) Brittleness

(D) Interaction with drugs by sorption

Correct Answer: (D) Interaction with drugs by sorption

Solution:

Concept:

Plastic containers are widely used in pharmaceutical packaging because they are light in weight, easy to handle, and less fragile than glass. However, plastics may interact with drug products.

Step 1: Meaning of sorption.

Sorption includes two processes:

- **Adsorption:** Drug molecules stick to the surface of the plastic.
- **Absorption:** Drug molecules penetrate into the plastic material.

Step 2: Why sorption is a problem.

If a drug interacts with the plastic container by sorption, the actual amount of drug available in the formulation may decrease. This can affect:

- Drug potency
- Drug stability
- Therapeutic effectiveness
- Accuracy of dose

Step 3: Checking the other options.

Plastic containers are generally not very costly compared to glass or metal containers.

They are usually less prone to breakage than glass.

Brittleness is not the major general limitation of plastic containers.

Step 4: Final answer.

The major limitation of plastic containers is their possible **interaction with drugs by sorption**.

Interaction with drugs by sorption

Quick Tip: The main packaging problem with plastic containers is drug-plastic interaction such as adsorption, absorption, leaching, and permeation.

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4. Which packaging material provides the best protection against moisture and gases?

(A) Plastic

(B) Paper

(C) Metal

(D) Rubber

Correct Answer: (C) Metal

Solution:

Concept:

Pharmaceutical packaging protects the product from environmental factors such as:

- Moisture
- Oxygen
- Light
- Microbial contamination
- Mechanical damage

Step 1: Requirement of the question.

The question asks for the material that gives the **best protection against moisture and gases**. Therefore, the material should act as a very strong barrier.

Step 2: Comparing the options.

Paper is porous and does not provide strong protection against moisture or gases.

Plastic can provide protection, but many plastics allow some permeation of gases and moisture.

Rubber is flexible but may allow permeation and is usually used as closures or stoppers.

Metal provides excellent barrier properties against moisture, gases, light, and external contamination.

Step 3: Why metal is best.

Metal containers such as aluminium tubes or tins are impermeable to gases and moisture when properly sealed. This makes them highly suitable for products requiring strong environmental protection.

Step 4: Final answer.

Thus, the best packaging material among the given options is **Metal**.

Metal

Quick Tip: Metal containers provide excellent barrier protection against moisture, gases, and light when compared with paper, rubber, and many plastics.

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5. Which of the following preservatives is most effective in acidic pH?

(A) Benzyl alcohol

(B) Sodium benzoate

(C) Chlorobutanol

(D) Phenol

Correct Answer: (B) Sodium benzoate

Solution:

Concept:

Preservatives are added to pharmaceutical preparations to prevent microbial growth. The effectiveness of many preservatives depends strongly on pH.

Step 1: Understanding sodium benzoate.

Sodium benzoate is the sodium salt of benzoic acid. It is most effective in acidic conditions because, at low pH, benzoate ions are converted into undissociated benzoic acid.

Step 2: Why acidic pH increases activity.

The undissociated form of benzoic acid can easily penetrate microbial cell membranes. After entering the microbial cell, it interferes with cellular functions and inhibits microbial growth.

Step 3: Checking the other options.

Benzyl alcohol is used as a preservative, but it is not the best-known answer for maximum effectiveness in acidic pH.

Chlorobutanol is also a preservative, but its use is not specifically linked as strongly with acidic pH.

Phenol is an antimicrobial agent, but sodium benzoate is the correct preservative for acidic pH.

Step 4: Final answer.

Therefore, the preservative most effective in acidic pH is **Sodium benzoate**.

Sodium benzoate

Quick Tip: Sodium benzoate works best in acidic pH because it forms undissociated benzoic acid, which shows better antimicrobial action.

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6. Membrane filters remove particles mainly by _____.

(A) Size exclusion

(B) Chemical reaction

(C) Adsorption

(D) Sedimentation

Correct Answer: (A) Size exclusion

Solution:

Concept:

Membrane filtration is a filtration technique in which particles are separated from fluids by passing the fluid through a membrane with very small pores.

Step 1: Principle of membrane filtration.

The pores of the membrane have a fixed size. Particles larger than the pore size cannot pass through the membrane and are retained on the surface or within the membrane.

Step 2: Meaning of size exclusion.

Size exclusion means separation based on particle size. Smaller particles or molecules pass through the pores, while larger particles are blocked.

Step 3: Why other options are incorrect.

Chemical reaction is not the main principle because membrane filters do not normally remove particles by reacting chemically with them.

Adsorption may occur to some extent, but it is not the main mechanism.

Sedimentation occurs due to gravity, but membrane filtration works due to pore size and pressure difference.

Step 4: Final answer.

Thus, membrane filters remove particles mainly by **size exclusion**.

Size exclusion

Quick Tip: Membrane filters mainly work by size exclusion: particles larger than the pore size are retained, while smaller particles pass through.

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7. Freeze drying is also called _____ drying.

(A) Tray

(B) Drum

(C) Spray

(D) Sublimation

Correct Answer: (D) Sublimation

Solution:

Concept:

Freeze drying is a drying method used for heat-sensitive pharmaceutical and biological products. It is also known as lyophilization.

Step 1: Principle of freeze drying.

In freeze drying, the product is first frozen. After freezing, water present in the product is removed under vacuum.

Step 2: Meaning of sublimation.

Sublimation is the direct conversion of ice into vapour without passing through the liquid state.

$$\text{Ice} \longrightarrow \text{Water vapour}$$

Step 3: Why it is called sublimation drying.

Since freeze drying removes water from the frozen state directly as vapour, the process is based on sublimation. Therefore, freeze drying is also called sublimation drying.

Step 4: Checking other options.

Tray drying, drum drying, and spray drying are different drying methods and do not represent the basic principle of freeze drying.

Step 5: Final answer.

Hence, freeze drying is also called **sublimation drying**.

$$\boxed{\text{Sublimation}}$$

Quick Tip: Freeze drying is also called lyophilization or sublimation drying because frozen water is removed directly as vapour under vacuum.

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8. Which mill is most suitable for grinding hard and abrasive materials?

(A) Hammer mill

(B) Ball mill

(C) Roller mill

(D) Cutter mill

Correct Answer: (B) Ball mill

Solution:

Concept:

Milling is a size reduction process used to reduce large particles into smaller particles. Different mills are selected depending on the nature of the material.

Step 1: Understanding hard and abrasive materials.

Hard materials require strong grinding force. Abrasive materials may damage equipment surfaces, so the mill should be suitable for repeated impact and attrition.

Step 2: Working of ball mill.

A ball mill contains balls inside a rotating cylinder. As the cylinder rotates, the balls fall on the material and produce size reduction by:

- Impact
- Attrition

Step 3: Why ball mill is suitable.

Ball mills are commonly used for grinding hard and abrasive materials because the grinding media can apply strong mechanical force and produce fine powder.

Step 4: Checking other mills.

Hammer mill is useful for brittle materials but is not the best for hard abrasive materials.

Roller mill is more suitable for compression and soft to moderately hard materials.

Cutter mill is mainly used for fibrous and tough materials, not hard abrasive materials.

Step 5: Final answer.

Therefore, the most suitable mill for hard and abrasive materials is **Ball mill**.

Ball mill

Quick Tip: Ball mill reduces size by impact and attrition, making it suitable for hard and abrasive materials.

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9. A cyclone separator would be least efficient for separation of _____ particles.

(A) Large

(B) Dense

(C) Very fine

(D) Coarse

Correct Answer: (C) Very fine

Solution:

Concept:

A cyclone separator is used to separate solid particles from air or gas using centrifugal force. It is commonly used in pharmaceutical processing to collect dust or powder particles.

Step 1: Working principle.

In a cyclone separator, the particle-laden air enters tangentially and moves in a spiral path. Due to centrifugal force, heavier and larger particles move outward and fall down into the collection chamber.

Step 2: Effect of particle size.

Large, dense, and coarse particles experience stronger centrifugal force. Therefore, they are separated more easily.

Step 3: Why very fine particles are difficult to separate.

Very fine particles have very low mass. Because of their small size and low inertia, the centrifugal force acting on them is weak. They may remain suspended in the air stream and escape with the outgoing air.

Step 4: Final answer.

Thus, a cyclone separator is least efficient for separating **very fine particles**.

Very fine

Quick Tip: Cyclone separators are efficient for large and dense particles but less efficient for very fine particles because fine particles have low inertia.

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10. In pharmaceutical mixing, segregation is most likely to occur when _____.

(A) Particles have similar size

(B) Particles differ widely in size and density

(C) Liquid binders are used

(D) Homogenizers are used

Correct Answer: (B) Particles differ widely in size and density

Solution:

Concept:

Mixing is an important unit operation in pharmaceutics. It is used to produce uniform distribution of ingredients in powders, granules, semisolids, and liquids.

Step 1: Meaning of segregation.

Segregation means separation of mixed particles after or during mixing. It results in non-uniform distribution of ingredients.

Step 2: Cause of segregation.

Segregation commonly occurs when particles differ in:

- Size
- Shape
- Density
- Surface properties

Step 3: Why size and density difference causes segregation.

If particles differ widely in size, smaller particles may settle into spaces between larger particles. If particles differ in density, heavier particles may settle faster than lighter particles. This causes separation and reduces content uniformity.

Step 4: Checking other options.

Particles of similar size usually mix better and show less segregation.

Liquid binders are used in granulation and may reduce powder separation.

Homogenizers are used to improve uniformity, not to promote segregation.

Step 5: Final answer.

Therefore, segregation is most likely to occur when particles differ widely in size and density.

Particles differ widely in size and density

Quick Tip: Segregation in powder mixing increases when particles have large differences in size, shape, or density.

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11. Silverson mixer is mainly used for _____.

(A) High shear homogenization

(B) Dry powder mixing

(C) Filtration

(D) Drying

Correct Answer: (A) High shear homogenization

Solution:

Concept:

A Silverson mixer is a type of high-speed mixer used in pharmaceutical industries for producing fine and uniform dispersions, emulsions, and suspensions.

Step 1: Understanding Silverson mixer.

The Silverson mixer works on the principle of high shear force. In this equipment, the material is subjected to intense mechanical energy due to the high-speed rotation of the rotor.

Step 2: Meaning of high shear homogenization.

High shear homogenization means reducing particle size or droplet size and producing a uniform mixture by applying strong shear force.

Step 3: Why other options are incorrect.

Dry powder mixing is usually performed using mixers such as double cone blender or V-blender.

Filtration is a separation process and does not require a Silverson mixer.

Drying is a moisture removal process and is done by dryers, not by a Silverson mixer.

Step 4: Final answer.

Thus, Silverson mixer is mainly used for high shear homogenization.

High shear homogenization

Quick Tip: Silverson mixer is a high shear mixer mainly used for homogenization, emulsification, and dispersion.

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12. A dry powder suspension for reconstitution is prepared mainly to _____.

(A) Improve taste

(B) Increase shelf life

(C) Increase viscosity

(D) Improve color

Correct Answer: (B) Increase shelf life

Solution:

Concept:

Dry powder for oral suspension is a dosage form in which the drug is supplied in dry powder form and water is added before use.

Step 1: Understanding dry powder suspension.

Some drugs are unstable in aqueous medium for a long time. If they are stored as liquid suspension, they may undergo degradation.

Step 2: Why dry form is used.

When the drug is kept in dry powder form, the possibility of hydrolysis and microbial growth is reduced. This improves the stability of the preparation.

Step 3: Reconstitution before use.

The patient or pharmacist adds water before administration. After reconstitution, the product is used within a limited time.

Step 4: Final answer.

The main purpose of preparing dry powder suspension for reconstitution is to increase shelf life.

Increase shelf life

Quick Tip: Dry powder suspensions are prepared for drugs that are unstable in water, so they help to increase shelf life.

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13. Multi-layered tablets are designed mainly to _____.

(A) Increase weight

(B) Improve patient acceptance

(C) Separate incompatible drugs or control release

(D) Reduce cost

Correct Answer: (C) Separate incompatible drugs or control release

Solution:

Concept:

Multi-layered tablets contain two or more layers of drug or excipients compressed together in a single tablet.

Step 1: Purpose of different layers.

Different layers can separate ingredients that may react with each other if mixed directly.

Step 2: Use in controlled release.

One layer may release the drug immediately, while another layer may release the drug slowly. This helps in controlling the release pattern.

Step 3: Checking other options.

Increasing weight is not the main purpose.

Patient acceptance may improve, but that is not the primary reason.

Reducing cost is also not the main objective.

Step 4: Final answer.

Therefore, multi-layered tablets are mainly designed to separate incompatible drugs or control release.

Separate incompatible drugs or control release

Quick Tip: Multi-layered tablets are useful for separating incompatible ingredients and achieving modified or controlled drug release.

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14. _____ route is used for administration of pessaries.

(A) Vaginal

(B) Rectal

(C) Nasal

(D) Pulmonary

Correct Answer: (A) Vaginal

Solution:

Concept:

Pessaries are solid dosage forms intended to be inserted into the vagina.

Step 1: Understanding pessaries.

Pessaries are used for local action in the vaginal cavity. They may contain antiseptics, antifungal agents, hormones, or other drugs.

Step 2: Route of administration.

Since pessaries are inserted into the vagina, their route of administration is the vaginal route.

Step 3: Why other options are wrong.

Rectal route is used for suppositories.

Nasal route is used for nasal drops, sprays, and insufflations.

Pulmonary route is used for inhalation preparations.

Step 4: Final answer.

Hence, pessaries are administered by the vaginal route.

Vaginal

Quick Tip: Pessaries are for vaginal use, while suppositories are generally used by the rectal route.

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15. Sera are used to provide _____.

(A) Passive immunity

(B) Active immunity

(C) Long-term protection

(D) No immunity

Correct Answer: (A) Passive immunity

Solution:

Concept:

Sera contain ready-made antibodies. These antibodies are introduced into the body to provide immediate protection.

Step 1: Understanding immunity.

Immunity may be active or passive. Active immunity develops when the body produces its own antibodies. Passive immunity is produced when ready-made antibodies are given.

Step 2: Role of sera.

Sera do not stimulate the body to make antibodies. Instead, they directly provide antibodies.

Step 3: Nature of protection.

Passive immunity acts quickly, but it is usually temporary because the antibodies are gradually destroyed.

Step 4: Final answer.

Therefore, sera are used to provide passive immunity.

Passive immunity

Quick Tip: Sera provide ready-made antibodies, so they produce passive immunity.

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16. A drug unstable to heat but stable to moisture should be dried by _____ drying.

(A) Tray

(B) Fluidized bed

(C) Freeze

(D) Drum

Correct Answer: (B) Fluidized bed

Solution:

Concept:

Drying method is selected according to the nature of the drug, especially its sensitivity to heat and moisture.

Step 1: Understanding the condition.

The drug is unstable to heat, so excessive heating should be avoided. The drug is stable to moisture, so moisture exposure is not the main concern.

Step 2: Fluidized bed drying.

Fluidized bed drying gives efficient drying due to good contact between hot air and particles. The drying time is short, so heat exposure is reduced.

Step 3: Why other methods are less suitable.

Tray drying may expose the drug to heat for a longer time.

Drum drying uses high heat and is not suitable for heat-sensitive drugs.

Freeze drying is generally used when the material is highly heat sensitive and often moisture sensitive, but the given correct choice is fluidized bed drying.

Step 4: Final answer.

Hence, the suitable method is fluidized bed drying.

Fluidized bed

Quick Tip: Fluidized bed drying reduces drying time and is useful when rapid drying with less heat exposure is required.

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17. A highly potent low-dose drug requires which mixing equipment for content uniformity?

(A) Double cone blender

(B) Sigma mixer

(C) Turbine mixer

(D) Fluidized bed dryer

Correct Answer: (A) Double cone blender

Solution:

Concept:

For potent low-dose drugs, uniform distribution of the active ingredient is very important because even a small variation can affect dose accuracy.

Step 1: Need for content uniformity.

Low-dose drugs are present in very small quantities. Therefore, proper blending is needed to distribute the drug uniformly throughout the powder mass.

Step 2: Double cone blender.

A double cone blender is commonly used for dry powder mixing. It provides gentle tumbling action and helps in achieving uniform mixing.

Step 3: Why other options are incorrect.

Sigma mixer is mainly used for wet mass and semisolid mixing.

Turbine mixer is mainly used for liquids.

Fluidized bed dryer is used for drying, not primarily for blending low-dose drugs.

Step 4: Final answer.

Thus, double cone blender is suitable for achieving content uniformity.

Double cone blender

Quick Tip: For low-dose potent drugs, uniform dry powder blending is very important; double cone blender is commonly used for this purpose.

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18. A drug meant for immediate nasal absorption must be formulated to be _____.

(A) Hypotonic

(B) Hypertonic

(C) Isotonic

(D) Acidic

Correct Answer: (C) Isotonic

Solution:

Concept:

Nasal preparations should be comfortable and non-irritating to the nasal mucosa.

Step 1: Meaning of isotonic.

An isotonic solution has osmotic pressure similar to body fluids. It does not cause irritation or damage to mucosal tissues.

Step 2: Importance in nasal absorption.

For immediate nasal absorption, the formulation must remain in contact with the nasal mucosa without causing irritation or excessive secretion.

Step 3: Why other options are wrong.

Hypotonic and hypertonic solutions may cause irritation.

Acidic formulation may irritate the nasal mucosa and reduce patient comfort.

Step 4: Final answer.

Therefore, the drug should be formulated as isotonic.

Isotonic

Quick Tip: Nasal preparations should preferably be isotonic to avoid irritation and improve patient comfort.

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19. A suspension shows rapid sedimentation due to particle size. Which unit operation before formulation would improve stability?

(A) Filtration

(B) Extraction

(C) Drying

(D) Size reduction

Correct Answer: (D) Size reduction

Solution:

Concept:

Suspension stability depends greatly on particle size. Larger particles settle faster than smaller particles.

Step 1: Understanding sedimentation.

Sedimentation is the settling of particles under the influence of gravity.

Step 2: Effect of particle size.

If particle size is large, the particles settle quickly. Reducing the particle size slows down sedimentation and improves uniformity.

Step 3: Role of size reduction.

Size reduction converts larger particles into smaller particles. This helps improve the physical stability of suspensions.

Step 4: Final answer.

Hence, size reduction before formulation improves suspension stability.

Size reduction

Quick Tip: Smaller particles settle more slowly, so size reduction helps improve suspension stability.

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20. A drug requiring prolonged action but low dose variation should be formulated as _____.

(A) Fast dissolving tablet

(B) Sustained release tablet

(C) Effervescent tablet

(D) Chewable tablet

Correct Answer: (B) Sustained release tablet

Solution:

Concept:

Sustained release dosage forms are designed to release drug slowly over an extended period.

Step 1: Requirement of the question.

The question mentions prolonged action. This means the drug should remain effective for a longer duration.

Step 2: Role of sustained release tablets.

Sustained release tablets maintain drug concentration for a longer time and reduce frequent dosing.

Step 3: Low dose variation.

Controlled release from the tablet helps avoid sudden peaks and troughs in drug level.

Step 4: Final answer.

Therefore, the drug should be formulated as a sustained release tablet.

Sustained release tablet

Quick Tip: Sustained release tablets provide prolonged action by releasing the drug slowly over time.

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21. An eye drop formulation with poor corneal contact time would be benefited by _____.

(A) Increasing tonicity

(B) Increasing pH

(C) Lowering pH

(D) Increasing viscosity

Correct Answer: (D) Increasing viscosity

Solution:

Concept:

Ophthalmic formulations must remain in contact with the eye surface for sufficient time to allow drug absorption.

Step 1: Problem of poor contact time.

Eye drops are quickly removed from the eye by blinking and tear drainage.

Step 2: Effect of viscosity.

Increasing viscosity makes the formulation thicker. This helps the eye drop stay on the corneal surface for a longer time.

Step 3: Benefit.

Longer contact time improves drug absorption and therapeutic effect.

Step 4: Final answer.

Thus, increasing viscosity improves corneal contact time.

Increasing viscosity

Quick Tip: Increasing viscosity in eye drops increases contact time and improves ocular drug absorption.

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22. Quality assurance (QA) differs from quality control because QA focuses on _____.

(A) Testing finished products

(B) Rejecting batches

(C) Building quality into processes

(D) Calibrating instruments

Correct Answer: (C) Building quality into processes

Solution:

Concept:

Quality Assurance and Quality Control are related but different concepts.

Step 1: Quality Control.

Quality Control mainly checks finished products or samples to confirm whether they meet required specifications.

Step 2: Quality Assurance.

Quality Assurance is broader. It focuses on systems, procedures, documentation, and processes to ensure quality is built into the product from the beginning.

Step 3: Main difference.

QA is preventive, while QC is mainly detective.

Step 4: Final answer.

Hence, QA focuses on building quality into processes.

Building quality into processes

Quick Tip: QA prevents quality problems by improving processes, while QC detects quality problems by testing products.

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23. A pharmaceutical plant layout designed to minimize cross-contamination should follow _____.

(A) Random workflow

(B) Unidirectional material flow

(C) Multidirectional material flow

(D) Centralized storage

Correct Answer: (B) Unidirectional material flow

Solution:

Concept:

Plant layout is very important in pharmaceutical manufacturing because it affects quality, safety, and contamination control.

Step 1: Meaning of cross-contamination.

Cross-contamination occurs when one material contaminates another material or product.

Step 2: Role of material flow.

If material moves in multiple directions, chances of mixing, confusion, and contamination increase.

Step 3: Unidirectional flow.

Unidirectional material flow means materials move in one planned direction from raw material area to processing area to finished product area.

Step 4: Final answer.

Therefore, unidirectional material flow minimizes cross-contamination.

Unidirectional material flow

Quick Tip: Unidirectional material flow prevents backtracking and helps reduce cross-contamination in pharmaceutical plants.

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24. Soft gelatin capsules require plasticizers more compared to hard gelatin capsules for _____.

(A) Preventing oxidation of fill material

(B) Improving drug solubility

(C) Enhancing disintegration in gastric fluid

(D) Maintaining shell flexibility at low moisture equilibrium

Correct Answer: (D) Maintaining shell flexibility at low moisture equilibrium

Solution:

Concept:

Soft gelatin capsules contain gelatin, water, and plasticizers such as glycerin or sorbitol.

Step 1: Function of plasticizers.

Plasticizers make the gelatin shell soft, flexible, and elastic.

Step 2: Need in soft gelatin capsules.

Soft gelatin capsules have a flexible shell. Without enough plasticizer, the shell may become hard, brittle, or cracked.

Step 3: Moisture equilibrium.

At low moisture levels, gelatin can lose flexibility. Plasticizers help maintain flexibility even when moisture content is low.

Step 4: Final answer.

Thus, plasticizers are used to maintain shell flexibility at low moisture equilibrium.

Maintaining shell flexibility at low moisture equilibrium

Quick Tip: Plasticizers such as glycerin keep soft gelatin capsule shells flexible and prevent brittleness.

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25. Hard gelatin capsules stored at $< 20\%$ RH will _____.

(A) Become brittle and crack

(B) Shrink

(C) Stick together

(D) Disintegration time increases

Correct Answer: (A) Become brittle and crack

Solution:

Concept:

Hard gelatin capsules contain moisture, which is necessary to maintain flexibility.

Step 1: Meaning of RH.

RH means relative humidity. It represents the amount of moisture present in air.

Step 2: Effect of low RH.

When capsules are stored at very low relative humidity, they lose moisture.

Step 3: Result of moisture loss.

Loss of moisture makes the gelatin shell dry and brittle. Brittle capsules can easily crack during handling.

Step 4: Final answer.

Therefore, hard gelatin capsules stored below 20% RH become brittle and crack.

Become brittle and crack

Quick Tip: Low humidity makes gelatin capsules brittle, while high humidity may make them soft and sticky.

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26. Which excipient is most unsuitable in nasal insufflations due to mucosal irritation?

(A) Lactose

(B) Dextrose

(C) Talc

(D) Starch

Correct Answer: (C) Talc

Solution:

Concept:

Nasal insufflations are powder preparations administered into the nasal cavity.

Step 1: Requirement of nasal excipients.

Excipients used in nasal preparations should be non-irritating and safe for nasal mucosa.

Step 2: Problem with talc.

Talc is insoluble and may irritate mucosal surfaces. It is not suitable for nasal insufflations.

Step 3: Other excipients.

Lactose, dextrose, and starch are comparatively more acceptable as diluents in some powder formulations.

Step 4: Final answer.

Hence, talc is most unsuitable due to mucosal irritation.

Talc

Quick Tip: Talc should be avoided in nasal insufflations because it can irritate the nasal mucosa.

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27. In fusion method of effervescent granule preparation, granulation occurs due to _____.

(A) Addition of water

(B) Release of water of crystallization from citric acid

(C) Melting of sodium bicarbonate

(D) Carbon dioxide formation

Correct Answer: (B) Release of water of crystallization from citric acid

Solution:

Concept:

Effervescent granules contain acid and carbonate or bicarbonate, which produce carbon dioxide when dissolved in water.

Step 1: Fusion method.

In the fusion method, no external water is added. Instead, heat is applied.

Step 2: Role of citric acid.

Citric acid contains water of crystallization. On heating, this water is released.

Step 3: Granulation process.

The released water provides enough moisture to form a wet mass, which helps in granulation.

Step 4: Final answer.

Thus, granulation occurs due to release of water of crystallization from citric acid.

Release of water of crystallization from citric acid

Quick Tip: In fusion method, citric acid releases water of crystallization, which helps in forming effervescent granules.

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28. Large volume parenterals (LVPs) must be free from preservatives because _____.

(A) They alter pH

(B) They cause precipitation

(C) Toxicity risk due to large dose

(D) They reduce sterility

Correct Answer: (C) Toxicity risk due to large dose

Solution:

Concept:

Large volume parenterals are sterile preparations administered in large volumes, usually by intravenous route.

Step 1: Understanding preservatives.

Preservatives are added to prevent microbial growth in some formulations.

Step 2: Why they are avoided in LVPs.

Since LVPs are administered in large quantities, even a small concentration of preservative can result in a significant total amount entering the body.

Step 3: Toxicity concern.

This may cause toxicity, especially because LVPs are given directly into systemic circulation.

Step 4: Final answer.

Therefore, LVPs must be free from preservatives due to toxicity risk from large dose.

Toxicity risk due to large dose

Quick Tip: Large volume parenterals should not contain preservatives because large administered volume increases toxicity risk.

---

29. In percolation, the term menstruum refers to _____.

(A) Residual plant material

(B) Extracted active principle

(C) Solvent used for extraction

(D) Final concentrated product

Correct Answer: (C) Solvent used for extraction

Solution:

Concept:

Percolation is an extraction process used to obtain active constituents from crude drugs.

Step 1: Important terms.

In extraction, the solvent used to extract active constituents is called menstruum.

Step 2: Other terms.

The material left after extraction is called marc.

The liquid extract obtained is called percolate.

Step 3: Final answer.

Thus, menstruum means the solvent used for extraction.

Solvent used for extraction

Quick Tip: In percolation, menstruum is the solvent, marc is the exhausted drug, and percolate is the liquid extract.

---

30. What is the most important function of the Pharmacy and Therapeutics Committee?

(A) Purchase medicines

(B) Approve drug promotion

(C) Select and monitor medicines for formulary

(D) Dispense medicines

Correct Answer: (C) Select and monitor medicines for formulary

Solution:

Concept:

The Pharmacy and Therapeutics Committee is responsible for safe, effective, and rational use of medicines in hospitals.

Step 1: Meaning of formulary.

A formulary is an approved list of medicines used in a hospital or healthcare institution.

Step 2: Role of committee.

The committee evaluates medicines based on safety, efficacy, cost, and need.

Step 3: Monitoring function.

It also monitors medicine use and updates the formulary when required.

Step 4: Final answer.

Therefore, the most important function is to select and monitor medicines for formulary.

Select and monitor medicines for formulary

Quick Tip: The Pharmacy and Therapeutics Committee controls the hospital formulary and promotes rational drug use.

---

31. What is the main use of reserved antibiotics?

(A) Treat minor infections

(B) Prevent emergence of resistance

(C) Increase hospital revenue

(D) Treat severe multidrug-resistant infections

Correct Answer: (B) Prevent emergence of resistance

Solution:

Concept:

Reserved antibiotics are antibiotics kept for special situations and are not used routinely.

Step 1: Why antibiotics are reserved.

If powerful antibiotics are used unnecessarily, microorganisms may develop resistance.

Step 2: Purpose of reserved antibiotics.

Their restricted use helps preserve their effectiveness and prevents the emergence and spread of antimicrobial resistance.

Step 3: Why other options are not correct.

They are not meant for minor infections.

They are not used to increase hospital revenue.

They may be used in severe infections, but the main purpose of reserving them is to prevent resistance.

Step 4: Final answer.

Thus, the main use of reserved antibiotics is to prevent emergence of resistance.

Prevent emergence of resistance

Quick Tip: Reserved antibiotics should be used carefully to prevent antimicrobial resistance.

---

32. Narcotic and psychotropic drugs in hospital pharmacy must be _____.

(A) Kept on open shelves

(B) Stored with general medicines

(C) Kept in double-lock system

(D) Stored in refrigerator

Correct Answer: (C) Kept in double-lock system

Solution:

Concept:

Narcotic and psychotropic drugs have abuse potential and are regulated strictly.

Step 1: Need for security.

These medicines must be stored safely to prevent misuse, theft, and unauthorized access.

Step 2: Double-lock system.

A double-lock system provides extra security by requiring controlled access.

Step 3: Why other options are wrong.

Open shelves and general medicine storage are unsafe.

Refrigeration is needed only for drugs requiring low temperature, not for all narcotics.

Step 4: Final answer.

Therefore, narcotic and psychotropic drugs must be kept in a double-lock system.

Kept in double-lock system

Quick Tip: Narcotic and psychotropic drugs require secure storage, proper records, and controlled access.

---

33. ICU drug distribution requires special control because of _____.

(A) Large quantity

(B) Complex therapy

(C) Low patient load

(D) High-risk and emergency drugs

Correct Answer: (D) High-risk and emergency drugs

Solution:

Concept:

ICU patients are critically ill and often require urgent and high-risk medicines.

Step 1: ICU drug use.

ICU drugs may include emergency medicines, life-saving drugs, sedatives, vasopressors, and

injectable preparations.

Step 2: Why special control is required.

Wrong drug, wrong dose, or delay in ICU can lead to serious harm.

Step 3: Importance of monitoring.

Special control ensures proper storage, availability, dosing, and safe administration.

Step 4: Final answer.

Hence, ICU drug distribution requires special control because of high-risk and emergency drugs.

High-risk and emergency drugs

Quick Tip: ICU medicines need strict control because many are high-risk and life-saving emergency drugs.

---

34. Long-term tendering is preferred over short-term purchase mainly to _____.

(A) Increase storage

(B) Reduce cost and ensure continuous supply

(C) Reduce paperwork

(D) Improve quality control

Correct Answer: (B) Reduce cost and ensure continuous supply

Solution:

Concept:

Tendering is a procurement method used for purchasing medicines and supplies.

Step 1: Long-term tendering.

In long-term tendering, supply arrangements are made for a longer period.

Step 2: Cost benefit.

Bulk and planned purchasing can reduce purchase cost.

Step 3: Supply benefit.

It also ensures regular and continuous availability of medicines.

Step 4: Final answer.

Thus, long-term tendering is preferred to reduce cost and ensure continuous supply.

Reduce cost and ensure continuous supply

Quick Tip: Long-term tendering helps in economical purchasing and prevents interruption in medicine supply.

---

35. Economic Order Quantity aims to minimize _____.

(A) Total ordering and carrying cost

(B) Drug expiry

(C) Theft

(D) Transportation

Correct Answer: (A) Total ordering and carrying cost

Solution:

Concept:

Economic Order Quantity is an inventory control method used to decide the most economical quantity to order.

Step 1: Ordering cost.

Ordering cost includes expenses related to placing and processing orders.

Step 2: Carrying cost.

Carrying cost includes storage, handling, insurance, and inventory holding cost.

Step 3: Aim of EOQ.

EOQ balances ordering cost and carrying cost so that total inventory cost becomes minimum.

Step 4: Final answer.

Therefore, EOQ aims to minimize total ordering and carrying cost.

Total ordering and carrying cost

Quick Tip: EOQ gives the order quantity at which total ordering cost and carrying cost are minimum.

---

36. What is the advantage of ice lined refrigerator over domestic one in a hospital?

(A) Cost effective

(B) Larger size

(C) Consumes less power

(D) Maintains uniform temperature

Correct Answer: (D) Maintains uniform temperature

Solution:

Concept:

Ice lined refrigerators are used in hospitals and vaccine storage because they maintain stable temperatures.

Step 1: Importance of temperature control.

Many medicines and vaccines lose potency if exposed to improper temperature.

Step 2: Ice lining.

Ice lining helps maintain temperature even during power failure or door opening.

Step 3: Comparison with domestic refrigerator.

Domestic refrigerators may show larger temperature fluctuations. Ice lined refrigerators provide better uniformity.

Step 4: Final answer.

Thus, the advantage is that it maintains uniform temperature.

Maintains uniform temperature

Quick Tip: Ice lined refrigerators are preferred for vaccines because they maintain a uniform and stable temperature.

---

37. When FEFO method is preferred over FIFO?

(A) Drug cost is high

(B) Variation in shelf life

(C) Drugs are narcotics

(D) Storage is small

Correct Answer: (B) Variation in shelf life

Solution:

Concept:

FIFO means First In First Out. FEFO means First Expiry First Out.

Step 1: Understanding FIFO.

In FIFO, the stock received first is issued first.

Step 2: Understanding FEFO.

In FEFO, the stock with earliest expiry date is issued first.

Step 3: When FEFO is better.

When different batches have different expiry dates or shelf lives, FEFO prevents expiry-related wastage.

Step 4: Final answer.

Therefore, FEFO is preferred when there is variation in shelf life.

Variation in shelf life

Quick Tip: FEFO means First Expiry First Out and is best when medicines have different expiry dates.

---

38. What is the disposal process of expired cytotoxic drugs?

(A) Flushing in drain

(B) Municipal garbage

(C) Incineration

(D) Recycling

Correct Answer: (C) Incineration

Solution:

Concept:

Cytotoxic drugs are hazardous drugs used mainly in cancer therapy. They can be harmful to humans and the environment.

Step 1: Hazard of cytotoxic drugs.

Expired cytotoxic drugs cannot be discarded like ordinary waste.

Step 2: Proper disposal.

They should be destroyed by high-temperature incineration to prevent exposure and contami-

nation.

Step 3: Why other options are wrong.

Flushing in drain can contaminate water.

Municipal garbage can expose people and animals.

Recycling is unsafe for cytotoxic drugs.

Step 4: Final answer.

Thus, expired cytotoxic drugs are disposed of by incineration.

Incineration

Quick Tip: Cytotoxic drug waste is hazardous and should be disposed of safely by incineration.

---

39. Unit dose drug distribution reduces _____.

(A) Drug errors

(B) Drug cost

(C) Drug storage

(D) Staff requirement

Correct Answer: (A) Drug errors

Solution:

Concept:

Unit dose drug distribution means medicines are supplied in ready-to-administer single doses.

Step 1: Purpose of unit dose system.

Each dose is properly labeled and packed for an individual patient.

Step 2: Reduction in errors.

This reduces wrong drug, wrong dose, and wrong patient errors.

Step 3: Hospital benefit.

It improves medication safety and helps pharmacists monitor therapy.

Step 4: Final answer.

Therefore, unit dose distribution reduces drug errors.

Drug errors

Quick Tip: Unit dose drug distribution improves patient safety by reducing medication errors.

---

40. Physical incompatibility in intravenous admixture results in _____.

(A) Colour change

(B) Precipitation

(C) Loss of sterility

(D) Toxicity

Correct Answer: (B) Precipitation

Solution:

Concept:

Intravenous admixtures must be physically and chemically compatible before administration.

Step 1: Physical incompatibility.

Physical incompatibility is visible or detectable change in the preparation, such as cloudiness, gas formation, or precipitation.

Step 2: Precipitation.

When two incompatible substances are mixed, an insoluble substance may form. This is called precipitation.

Step 3: Risk in IV admixtures.

Precipitates in IV preparations can block blood vessels and cause serious harm.

Step 4: Final answer.

Thus, physical incompatibility in intravenous admixture commonly results in precipitation.

Precipitation

Quick Tip: Physical incompatibility in IV admixtures is commonly seen as precipitation, turbidity, or cloudiness.

---

41. Radiopharmaceuticals must be stored in _____.

(A) Glass bottles

(B) Plastic trays

(C) Open shelves

(D) Lead-lined containers

Correct Answer: (D) Lead-lined containers

Solution:

Concept:

Radiopharmaceuticals contain radioactive substances and require special handling and storage.

Step 1: Radiation hazard.

Radioactive materials emit radiation, which can be harmful to healthcare workers and patients if not controlled.

Step 2: Use of lead.

Lead is a dense material that absorbs radiation effectively and provides shielding.

Step 3: Storage requirement.

Therefore, radiopharmaceuticals must be stored in lead-lined containers to reduce radiation exposure.

Step 4: Final answer.

Thus, the correct storage is lead-lined containers.

Lead-lined containers

Quick Tip: Lead-lined containers are used for radiopharmaceuticals because lead provides radiation shielding.

---

42. The minimum qualification required for registration as a pharmacist is prescribed by _____.

(A) State Pharmacy Council

(B) Medical Council

(C) Education Regulations framed by PCI

(D) CDSCO

Correct Answer: (C) Education Regulations framed by PCI

Solution:

Concept:

Pharmacy education and pharmacist registration standards are regulated through pharmacy laws and regulations.

Step 1: Role of PCI.

PCI stands for Pharmacy Council of India. It frames Education Regulations for pharmacy education.

Step 2: Minimum qualification.

The minimum qualification required for registration as a pharmacist is prescribed in the Education Regulations framed by PCI.

Step 3: Other options.

State Pharmacy Council registers pharmacists, but the educational standards are prescribed by PCI regulations.

Medical Council is related to medical profession.

CDSCO is related to drug regulation.

Step 4: Final answer.

Hence, the correct answer is Education Regulations framed by PCI.

Education Regulations framed by PCI

Quick Tip: PCI frames Education Regulations that prescribe minimum qualification for pharmacist registration.

---

43. Under Pharmacy Practice Regulations-2015, patient counselling is _____.

(A) Optional

(B) Only for Schedule X drugs

(C) Only for hospital pharmacists

(D) Mandatory professional duty

Correct Answer: (D) Mandatory professional duty

Solution:

Concept:

Patient counselling is an important responsibility of pharmacists.

Step 1: Meaning of patient counselling.

Patient counselling means explaining the proper use of medicines, dose, timing, side effects, precautions, and storage instructions.

Step 2: Pharmacy Practice Regulations.

Under Pharmacy Practice Regulations-2015, pharmacists are expected to provide professional pharmaceutical care.

Step 3: Professional duty.

Patient counselling is not optional. It is a mandatory professional responsibility.

Step 4: Final answer.

Therefore, patient counselling is a mandatory professional duty.

Mandatory professional duty

Quick Tip: Patient counselling is a mandatory professional duty of pharmacists under Pharmacy Practice Regulations.

---

44. Loan license means _____.

(A) Manufacturing without factory

(B) Manufacturing using another licensee's facilities

(C) Selling imported drugs manufactured by other companies outside India

(D) Manufacturing by taking bank loan

Correct Answer: (B) Manufacturing using another licensee's facilities

Solution:

Concept:

A loan license is related to drug manufacturing permission.

Step 1: Meaning of loan license.

A loan license allows a person or company to manufacture drugs by using the manufacturing facilities of another licensed manufacturer.

Step 2: Important point.

The licensee may not own the manufacturing facility but uses another approved facility.

Step 3: Why other options are wrong.

It does not mean manufacturing without factory in an illegal sense.

It is not related to imported drugs.

It is not related to bank loans.

Step 4: Final answer.

Thus, loan license means manufacturing using another licensee's facilities.

Manufacturing using another licensee's facilities

Quick Tip: Loan license allows drug manufacturing by using the facilities of another licensed manufacturer.

---

45. Schedule X drugs sale requires _____.

(A) No prescription

(B) Duplicate prescription and special register

(C) Oral order

(D) Only hospital purchase order

Correct Answer: (B) Duplicate prescription and special register

Solution:

Concept:

Schedule X drugs are controlled drugs with strict sale and record requirements.

Step 1: Need for control.

These drugs may have abuse potential or require strict monitoring.

Step 2: Prescription requirement.

Schedule X drugs are sold only on proper prescription.

Step 3: Record requirement.

The sale must be recorded in a special register, and duplicate prescription records are maintained.

Step 4: Final answer.

Therefore, Schedule X drug sale requires duplicate prescription and special register.

Duplicate prescription and special register

Quick Tip: Schedule X drugs require strict documentation, including duplicate prescription and special register.

---

46. Possession of narcotic drugs without authorization leads to _____.

(A) Fine only

(B) License cancellation

(C) Warning

(D) Imprisonment and fine

Correct Answer: (D) Imprisonment and fine

Solution:

Concept:

Narcotic drugs are strictly controlled under law due to abuse and addiction potential.

Step 1: Authorization requirement.

Possession, sale, storage, or use of narcotic drugs requires proper authorization.

Step 2: Illegal possession.

Possessing narcotic drugs without permission is a serious legal offence.

Step 3: Penalty.

Such offence can lead to imprisonment and monetary fine.

Step 4: Final answer.

Therefore, unauthorized possession leads to imprisonment and fine.

Imprisonment and fine

Quick Tip: Unauthorized possession of narcotic drugs is a serious offence and may lead to imprisonment and fine.

47. Poison sale requires _____.

(A) Oral permission

(B) Medical certificate

(C) Police license

(D) Entry in poison register

Correct Answer: (D) Entry in poison register

Solution:

Concept:

Poisons are dangerous substances and their sale is controlled by law.

Step 1: Need for record.

Because poisons can cause serious harm, their sale must be documented properly.

Step 2: Poison register.

The details of poison sale, purchaser, quantity, and purpose are recorded in a poison register.

Step 3: Why this is required.

This helps prevent misuse and allows legal tracking of poison sales.

Step 4: Final answer.

Thus, poison sale requires entry in poison register.

Entry in poison register

Quick Tip: Sale of poisons must be recorded in a poison register for legal control and safety.

48. National Pharmaceutical Pricing Authority fixes price of drugs listed in _____.

(A) Schedule X

(B) NLEM

(C) Schedule C

(D) Schedule C1

Correct Answer: (B) NLEM

Solution:

Concept:

NPPA stands for National Pharmaceutical Pricing Authority.

Step 1: Role of NPPA.

NPPA fixes and regulates prices of essential medicines in India.

Step 2: Meaning of NLEM.

NLEM means National List of Essential Medicines. It contains medicines considered essential for healthcare.

Step 3: Price control.

Drugs listed in NLEM are brought under price regulation to make them affordable.

Step 4: Final answer.

Therefore, NPPA fixes price of drugs listed in NLEM.

NLEM

Quick Tip: NPPA regulates prices of medicines listed in the National List of Essential Medicines.

---

49. Medical termination of pregnancy is permitted _____.

(A) Anytime

(B) Only after police approval

(C) Only after marriage

(D) Under specified conditions and gestational limits

Correct Answer: (D) Under specified conditions and gestational limits

Solution:

Concept:

Medical termination of pregnancy is legally regulated. It cannot be performed at any time or for any reason without following legal conditions.

Step 1: Understanding legal permission.

The law permits medical termination of pregnancy only under specified conditions.

Step 2: Gestational limit.

The permission also depends on the duration of pregnancy. Termination must be within legally

allowed gestational limits.

Step 3: Why other options are wrong.

It is not permitted anytime.

Police approval is not the general requirement.

It is not restricted only to married women.

Step 4: Final answer.

Therefore, medical termination of pregnancy is permitted under specified conditions and gestational limits.

Under specified conditions and gestational limits

Quick Tip: Medical termination of pregnancy is allowed only as per legal conditions and gestational limits.

---

50. CDSCO is responsible for _____.

(A) Drug price fixation

(B) Drug approval and regulation

(C) Pharmacy education

(D) Pharmacist registration

Correct Answer: (B) Drug approval and regulation

Solution:

Concept:

CDSCO stands for Central Drugs Standard Control Organization. It is the national regulatory authority for drugs in India.

Step 1: Main responsibility of CDSCO.

CDSCO is responsible for approval of new drugs, regulation of clinical trials, and control of drug standards at the central level.

Step 2: Drug approval.

New drugs require regulatory approval before marketing. CDSCO plays a key role in this process.

Step 3: Drug regulation.

CDSCO also helps regulate import, quality, and safety of drugs and medical products.

Step 4: Why other options are wrong.

Drug price fixation is done by NPPA.

Pharmacy education is regulated by PCI.

Pharmacist registration is handled by State Pharmacy Councils.

Step 5: Final answer.

Thus, CDSCO is responsible for drug approval and regulation.

Drug approval and regulation

Quick Tip: CDSCO is India's central drug regulatory authority responsible for drug approval and regulation.

---

51. In Gutzeit test, _____ reacts with mercuric chloride paper and produces _____ colour stain.

(A) Arsenious acid; yellow

(B) Arsine; orange

(C) Arsenious acid; orange

(D) Arsine; yellow

Correct Answer: (A) Arsenious acid; yellow

Solution:

Concept:

The Gutzeit test is an important limit test used for the detection of arsenic impurity in pharmaceutical substances. It is based on the conversion of arsenic compounds into arsine gas, which reacts with mercuric chloride paper.

Step 1: Understanding the Gutzeit test.

In this test, arsenic present in the sample is converted into arsine gas. The arsine gas then comes in contact with mercuric chloride paper.

Step 2: Reaction with mercuric chloride paper.

The mercuric chloride paper develops a yellow stain due to the formation of arsenic-mercury

complex.

Step 3: Relation with arsenious acid.

Arsenious acid is involved in the arsenic impurity test and produces the characteristic yellow stain in the Gutzeit method.

Step 4: Checking the options.

Option (A) correctly matches arsenious acid with yellow colour stain.

Option (B), (C), and (D) do not correctly match both the reacting substance and colour.

Step 5: Final answer.

Therefore, the correct answer is **arsenious acid; yellow**.

Arsenious acid; yellow

Quick Tip: Gutzeit test is used for arsenic impurity, and mercuric chloride paper develops a yellow stain.

---

52. Green vitriol is chemically known as

(A) Copper sulphate

(B) Zinc sulphate

(C) Ferrous sulphate

(D) Ferric chloride

Correct Answer: (C) Ferrous sulphate

Solution:

Concept:

Several inorganic compounds are known by common names. These names are often based on their colour, source, or historical usage.

Step 1: Meaning of green vitriol.

Green vitriol is the common name of ferrous sulphate.

Step 2: Chemical identity.

Ferrous sulphate contains ferrous ion, Fe^{2+}, and sulphate ion, SO_4^{2-}.

$$\text{Ferrous sulphate} = FeSO_4$$

Step 3: Why it is called green vitriol.

Ferrous sulphate crystals are generally greenish in colour. Hence, it is commonly called green vitriol.

Step 4: Checking other options.

Copper sulphate is called blue vitriol.

Zinc sulphate is called white vitriol.

Ferric chloride is not called green vitriol.

Step 5: Final answer.

Therefore, green vitriol is chemically known as **ferrous sulphate**.

Ferrous sulphate

Quick Tip: Green vitriol is ferrous sulphate, blue vitriol is copper sulphate, and white vitriol is zinc sulphate.

---

53. Deficiency of _____ ion in blood leads to metabolic acidosis.

(A) Sodium

(B) Potassium

(C) Bicarbonate

(D) Chloride

Correct Answer: (C) Bicarbonate

Solution:

Concept:

The bicarbonate buffer system is one of the most important buffer systems of blood. It helps maintain normal blood pH.

Step 1: Understanding metabolic acidosis.

Metabolic acidosis occurs when the blood becomes too acidic due to either accumulation of acids or loss of base.

Step 2: Role of bicarbonate ion.

Bicarbonate ion, HCO_3^-, acts as a base in the blood. It neutralizes excess hydrogen ions.

$$H^+ + HCO_3^- \rightarrow H_2CO_3$$

Step 3: Effect of bicarbonate deficiency.

When bicarbonate ion level decreases, the buffering capacity of blood decreases. As a result, hydrogen ion concentration increases and blood pH falls.

Step 4: Conclusion.

A fall in bicarbonate ion concentration leads to metabolic acidosis.

Step 5: Final answer.

Therefore, deficiency of **bicarbonate** ion in blood leads to metabolic acidosis.

Bicarbonate

Quick Tip: Bicarbonate ion is the major blood buffer. Its deficiency causes metabolic acidosis.

---

54. Lugol's solution contains _____% iodine and _____% potassium iodide.

(A) 1; 2

(B) 2; 1

(C) 10; 5

(D) 5; 10

Correct Answer: (D) 5; 10

Solution:

Concept:

Lugol's solution is an aqueous iodine solution. It contains iodine and potassium iodide.

Step 1: Composition of Lugol's solution.

Lugol's solution is commonly prepared using iodine and potassium iodide in water.

Step 2: Role of potassium iodide.

Iodine has low solubility in water. Potassium iodide helps iodine dissolve by forming polyiodide ions.

$$I_2 + I^- \rightarrow I_3^-$$

Step 3: Standard concentration.

Lugol's solution contains:

5% iodine

and

10% potassium iodide

Step 4: Checking the options.

Option (D) gives the correct composition as 5% iodine and 10% potassium iodide.

Step 5: Final answer.

Therefore, Lugol's solution contains 5% iodine and 10% potassium iodide.

$$\boxed{5; 10}$$

Quick Tip: Lugol's solution contains 5% iodine and 10% potassium iodide.

---

55. _____ acts as an antimicrobial agent by halogenation mechanism.

(A) Hydrogen peroxide

(B) Chlorine

(C) Potassium permanganate

(D) Boric acid

Correct Answer: (B) Chlorine

Solution:

Concept:

Antimicrobial agents kill or inhibit microorganisms by different mechanisms such as oxidation, halogenation, protein denaturation, or enzyme inhibition.

Step 1: Understanding halogenation.

Halogenation means antimicrobial action by halogens such as chlorine and iodine.

Step 2: Action of chlorine.

Chlorine acts as a strong antimicrobial agent. It reacts with water to form hypochlorous acid.

$$Cl_2 + H_2O \rightarrow HOCl + HCl$$

Step 3: Antimicrobial effect.

Hypochlorous acid is a powerful oxidizing and halogenating agent. It damages microbial proteins, enzymes, and cellular components.

Step 4: Checking other options.

Hydrogen peroxide acts mainly by oxidation.

Potassium permanganate is also an oxidizing agent.

Boric acid has weak antiseptic property but does not act mainly by halogenation.

Step 5: Final answer.

Therefore, the antimicrobial agent acting by halogenation mechanism is **chlorine**.

Chlorine

Quick Tip: Chlorine and iodine are halogen antimicrobial agents. Chlorine acts mainly through hypochlorous acid formation.

---

56. Oxygen filled cylinder is painted in _____ colour for hospital use.

(A) Blue

(B) Grey

(C) White

(D) Black

Correct Answer: (C) White

Solution:

Concept:

Medical gas cylinders are colour-coded so that the gas inside can be identified quickly and safely.

Step 1: Need for colour coding.

In hospitals, different gases such as oxygen, nitrous oxide, carbon dioxide, and medical air are used. Wrong identification may cause serious accidents.

Step 2: Oxygen cylinder colour.

Oxygen cylinders are commonly identified by white colour for hospital use.

Step 3: Importance in hospital setup.

White colour helps healthcare workers recognize oxygen cylinders immediately during emergency situations.

Step 4: Checking other options.

Blue, grey, and black are not the correct colour codes for oxygen cylinder in this question.

Step 5: Final answer.

Therefore, oxygen filled cylinder is painted in **white** colour.

White

Quick Tip: Medical oxygen cylinders are identified by white colour in hospital use.

---

57. Chemically epsom salt is _____ sulphate.

(A) Sodium

(B) Magnesium

(C) Potassium

(D) Calcium

Correct Answer: (B) Magnesium

Solution:

Concept:

Epsom salt is the common name of magnesium sulphate.

Step 1: Chemical identity of epsom salt.

Epsom salt is chemically magnesium sulphate.

$$\text{Epsom salt} = MgSO_4 \cdot 7H_2O$$

Step 2: Understanding the blank.

The question says epsom salt is _____ sulphate. Since epsom salt is magnesium sulphate, the blank must be magnesium.

Step 3: Checking other options.

Sodium sulphate, potassium sulphate, and calcium sulphate are different salts and are not called epsom salt.

Step 4: Final answer.

Thus, chemically epsom salt is magnesium sulphate.

Magnesium

Quick Tip: Epsom salt is magnesium sulphate, $MgSO_4 \cdot 7H_2O$.

---

58. Rochelle salt is chemically _____.

(A) Sodium potassium chloride

(B) Sodium potassium tartrate

(C) Potassium sodium sulphate

(D) Sodium potassium carbonate

Correct Answer: (B) Sodium potassium tartrate

Solution:

Concept:

Rochelle salt is a double salt. It contains sodium, potassium, and tartrate ions.

Step 1: Chemical name.

Rochelle salt is chemically known as sodium potassium tartrate.

Step 2: Formula.

Its chemical formula is commonly represented as:

$$KNaC_4H_4O_6 \cdot 4H_2O$$

Step 3: Why option (B) is correct.

The name sodium potassium tartrate directly matches the composition of Rochelle salt.

Step 4: Checking other options.

Sodium potassium chloride, potassium sodium sulphate, and sodium potassium carbonate are not Rochelle salt.

Step 5: Final answer.

Therefore, Rochelle salt is chemically sodium potassium tartrate.

Sodium potassium tartrate

Quick Tip: Rochelle salt is sodium potassium tartrate, a double salt of tartaric acid.

---

59. In limit test for iron, _____ is used to prevent precipitation of iron by ammonia.

(A) Thioglycolic acid

(B) Ferric ammonium sulphate

(C) Citric acid

(D) Potassium chloride

Correct Answer: (C) Citric acid

Solution:

Concept:

The limit test for iron is used to detect and control small amounts of iron impurity in pharmaceutical substances.

Step 1: Problem in iron limit test.

In alkaline medium, iron may precipitate as ferric hydroxide due to the presence of ammonia.

$$Fe^{3+} + 3OH^- \rightarrow Fe(OH)_3$$

Step 2: Role of citric acid.

Citric acid forms a soluble complex with iron. This prevents precipitation of iron by ammonia.

Step 3: Importance of preventing precipitation.

If iron precipitates, the test result becomes inaccurate. Citric acid keeps iron in solution so that the test reaction can proceed properly.

Step 4: Checking other options.

Thioglycolic acid helps in colour formation with iron but does not mainly prevent precipitation by ammonia.

Ferric ammonium sulphate is used as an iron standard.

Potassium chloride is not used for this purpose.

Step 5: Final answer.

Therefore, citric acid is used to prevent precipitation of iron by ammonia.

Citric acid

Quick Tip: In the limit test for iron, citric acid prevents precipitation of iron by forming a soluble complex.

---

60. Which substance is mainly used in treating alkaloidal poisoning?

(A) Sodium nitrate

(B) Sodium thiosulphate

(C) Kaolin

(D) Activated charcoal

Correct Answer: (D) Activated charcoal

Solution:

Concept:

Alkaloidal poisoning occurs due to toxic alkaloids. Treatment often involves preventing further absorption of the poison from the gastrointestinal tract.

Step 1: Role of adsorbents in poisoning.

Adsorbents bind poisonous substances in the gastrointestinal tract and reduce their absorption into the blood.

Step 2: Activated charcoal.

Activated charcoal has a very large surface area. It adsorbs many poisons, including several alkaloids.

Step 3: Why activated charcoal is useful.

After adsorption, the poison-charcoal complex remains in the gut and is eliminated from the body.

Step 4: Checking other options.

Sodium nitrate is not mainly used for alkaloidal poisoning.

Sodium thiosulphate is used in cyanide poisoning.

Kaolin is an adsorbent but is less effective than activated charcoal for poisoning management.

Step 5: Final answer.

Therefore, activated charcoal is mainly used in treating alkaloidal poisoning.

Activated charcoal

Quick Tip: Activated charcoal is a powerful adsorbent used in poisoning because it reduces gastrointestinal absorption of many toxins.

---

61. _____ is required for carbohydrate and protein metabolism.

(A) Magnesium

(B) Calcium

(C) Sodium

(D) Potassium

Correct Answer: (A) Magnesium

Solution:

Concept:

Minerals act as essential cofactors in many biochemical reactions. Some minerals are required for enzyme activation, energy metabolism, carbohydrate metabolism, and protein metabolism.

Step 1: Understanding the role of magnesium.

Magnesium is an important intracellular cation. It acts as a cofactor for many enzymes involved in metabolic reactions.

Step 2: Role in carbohydrate metabolism.

Carbohydrate metabolism includes glycolysis, citric acid cycle, and ATP-related reactions. Magnesium helps enzymes that use ATP because ATP is biologically active mostly as a magnesium-ATP complex.

$$ATP + Mg^{2+} \rightarrow MgATP^{2-}$$

Step 3: Role in protein metabolism.

Magnesium is also involved in protein synthesis because it helps in ribosomal stability and enzyme activity during translation.

Step 4: Checking other options.

Calcium is mainly important for bones, muscle contraction, and blood clotting.

Sodium is important for fluid balance and nerve impulse transmission.

Potassium is important for intracellular osmotic balance and nerve function.

But for carbohydrate and protein metabolism, magnesium is the best answer.

Step 5: Final answer.

Therefore, magnesium is required for carbohydrate and protein metabolism.

Magnesium

Quick Tip: Magnesium is an important enzyme cofactor and is required for carbohydrate metabolism, protein synthesis, and ATP-dependent reactions.

---

62. Which of the following is an example for non-reducing sugar?

(A) Glucose

(B) Fructose

(C) Sucrose

(D) Lactose

Correct Answer: (C) Sucrose

Solution:

Concept:

Sugars are classified as reducing and non-reducing sugars on the basis of the presence or absence of a free aldehyde or ketone group.

Step 1: Meaning of reducing sugar.

A reducing sugar can reduce mild oxidizing agents such as Benedict's reagent or Fehling's solution. This is possible when the sugar has a free anomeric carbon.

Step 2: Checking glucose.

Glucose is a reducing sugar because it has a free aldehyde group in its open-chain form.

Step 3: Checking fructose.

Fructose is also considered a reducing sugar because it can undergo tautomerization in alkaline medium and reduce Benedict's reagent.

Step 4: Checking lactose.

Lactose is a reducing disaccharide because one of its anomeric carbons is free.

Step 5: Checking sucrose.

Sucrose is a non-reducing sugar because both anomeric carbons of glucose and fructose are involved in glycosidic linkage. Hence, no free reducing group is available.

$$\text{Sucrose} = \text{Glucose} + \text{Fructose}$$

Step 6: Final answer.

Therefore, sucrose is a non-reducing sugar.

$$\boxed{\text{Sucrose}}$$

Quick Tip: Sucrose is non-reducing because both anomeric carbons are involved in glycosidic bond formation.

---

63. Ketoses are distinguished by which of the following test?

(A) Molisch test

(B) Bial's test

(C) Seliwanoff's test

(D) Benedict test

Correct Answer: (C) Seliwanoff's test

Solution:

Concept:

Carbohydrates are identified by different chemical tests. Different tests help distinguish general carbohydrates, reducing sugars, pentoses, aldoses, and ketoses.

Step 1: Understanding ketoses.

Ketoses are sugars containing a ketone group. Fructose is a common example of a ketose.

Step 2: Principle of Seliwanoff's test.

Seliwanoff's test is used to distinguish ketoses from aldoses. Ketoses react faster than aldoses in this test.

Step 3: Reagent used.

Seliwanoff's reagent contains resorcinol and concentrated hydrochloric acid.

Step 4: Positive test.

Ketoses give a cherry-red colour quickly due to formation of hydroxymethylfurfural and its condensation with resorcinol.

Step 5: Checking other options.

Molisch test is a general test for carbohydrates.

Bial's test is mainly used for pentoses.

Benedict test is used for reducing sugars.

Seliwanoff's test is specifically used to distinguish ketoses.

Step 6: Final answer.

Therefore, ketoses are distinguished by Seliwanoff's test.

Seliwanoff's test

Quick Tip: Seliwanoff's test distinguishes ketoses from aldoses; ketoses give a rapid cherry-red colour.

---

64. Citric acid cycle takes place in _____.

(A) Cytoplasm

(B) Nucleus

(C) Mitochondria

(D) Ribosome

Correct Answer: (C) Mitochondria

Solution:

Concept:

The citric acid cycle is also known as the Krebs cycle or tricarboxylic acid cycle. It is a central metabolic pathway for energy production.

Step 1: Understanding the citric acid cycle.

The citric acid cycle oxidizes acetyl-CoA into carbon dioxide and produces reduced coenzymes such as NADH and $FADH_2$.

Step 2: Site of the cycle.

In eukaryotic cells, the citric acid cycle takes place in the mitochondrial matrix.

Step 3: Why mitochondria?

Mitochondria are known as the powerhouse of the cell because they are involved in aerobic respiration and ATP production.

Step 4: Checking other options.

Cytoplasm is the site of glycolysis.

Nucleus contains genetic material and controls cellular activities.

Ribosomes are involved in protein synthesis.

The citric acid cycle occurs in mitochondria.

Step 5: Final answer.

Therefore, the citric acid cycle takes place in mitochondria.

Mitochondria

Quick Tip: Glycolysis occurs in cytoplasm, while the citric acid cycle occurs in mitochondria.

---

65. The end product of glycolysis under aerobic condition is _____.

(A) Lactic acid

(B) Pyruvic acid

(C) Acetyl CoA

(D) Citric acid

Correct Answer: (B) Pyruvic acid

Solution:

Concept:

Glycolysis is the process by which glucose is broken down to produce energy. It occurs in the cytoplasm of the cell.

Step 1: Starting molecule of glycolysis.

The starting molecule of glycolysis is glucose.

$$\text{Glucose} \rightarrow \text{Glycolysis}$$

Step 2: End product in aerobic condition.

In the presence of oxygen, glucose is converted into pyruvic acid through glycolysis.

$$\text{Glucose} \rightarrow 2 \text{ Pyruvic acid}$$

Step 3: Further fate of pyruvic acid.

Under aerobic conditions, pyruvic acid enters mitochondria and is converted into acetyl CoA. Then acetyl CoA enters the citric acid cycle.

Step 4: Difference from anaerobic condition.

Under anaerobic condition, pyruvic acid is converted into lactic acid.

Step 5: Final answer.

Therefore, the end product of glycolysis under aerobic condition is pyruvic acid.

$$\boxed{\text{Pyruvic acid}}$$

Quick Tip: Aerobic glycolysis produces pyruvic acid, while anaerobic glycolysis produces lactic acid.

---

66. The vitamin required for blood coagulation is _____.

(A) Vitamin A

(B) Vitamin B

(C) Vitamin C

(D) Vitamin K

Correct Answer: (D) Vitamin K

Solution:

Concept:

Vitamins are organic substances required in small quantities for normal body functions. Different vitamins have different biological roles.

Step 1: Understanding blood coagulation.

Blood coagulation means clot formation. It prevents excessive bleeding after injury.

Step 2: Role of vitamin K.

Vitamin K is required for the synthesis of clotting factors in the liver.

Step 3: Important clotting factors.

Vitamin K is involved in the synthesis of factors II, VII, IX, and X.

Step 4: Deficiency effect.

Deficiency of vitamin K causes defective clotting and increased bleeding tendency.

Step 5: Final answer.

Therefore, vitamin K is required for blood coagulation.

Vitamin K

Quick Tip: Vitamin K is known as the anti-hemorrhagic vitamin because it is required for blood clotting.

---

67. Deficiency of vitamin C causes _____.

(A) Rickets

(B) Scurvy

(C) Beriberi

(D) Night blindness

Correct Answer: (B) Scurvy

Solution:

Concept:

Vitamin C is also known as ascorbic acid. It is a water-soluble vitamin.

Step 1: Role of vitamin C.

Vitamin C is required for collagen synthesis, wound healing, antioxidant protection, and healthy gums.

Step 2: Deficiency condition.

Deficiency of vitamin C causes scurvy.

Step 3: Symptoms of scurvy.

Scurvy may cause bleeding gums, poor wound healing, weakness, and joint pain.

Step 4: Checking other options.

Rickets is due to vitamin D deficiency.

Beriberi is due to vitamin B_1 deficiency.

Night blindness is due to vitamin A deficiency.

Step 5: Final answer.

Therefore, deficiency of vitamin C causes scurvy.

Scurvy

Quick Tip: Vitamin C deficiency causes scurvy, which is characterized by bleeding gums and poor wound healing.

---

68. The biological catalyst present in living cells is called _____.

(A) Hormone

(B) Enzyme

(C) Vitamin

(D) Mineral

Correct Answer: (B) Enzyme

Solution:

Concept:

A catalyst is a substance that increases the rate of a chemical reaction without being consumed in the reaction.

Step 1: Biological catalyst.

In living organisms, biochemical reactions occur continuously. These reactions are catalyzed by enzymes.

Step 2: Function of enzymes.

Enzymes lower activation energy and speed up reactions.

Step 3: Nature of enzymes.

Most enzymes are proteins, although some RNA molecules also show catalytic activity.

Step 4: Checking other options.

Hormones act as chemical messengers.

Vitamins act as nutrients or coenzymes.

Minerals act as electrolytes or cofactors.

Enzymes act as biological catalysts.

Step 5: Final answer.

Therefore, the biological catalyst present in living cells is called an enzyme.

Enzyme

Quick Tip: Enzymes are biological catalysts that speed up biochemical reactions in living cells.

---

69. The protein part of an enzyme is called _____.

(A) Apoenzyme

(B) Coenzyme

(C) Holoenzyme

(D) Cofactor

Correct Answer: (A) Apoenzyme

Solution:

Concept:

Some enzymes require a non-protein component for activity. Such enzymes have a protein part and a non-protein part.

Step 1: Definition of apoenzyme.

The protein part of an enzyme is called apoenzyme.

Step 2: Definition of cofactor.

The non-protein part required for enzyme activity is called a cofactor.

Step 3: Definition of holoenzyme.

When apoenzyme combines with its cofactor, the complete active enzyme is called holoenzyme.

$$\text{Apoenzyme} + \text{Cofactor} = \text{Holoenzyme}$$

Step 4: Checking other options.

Coenzyme is an organic non-protein cofactor.

Cofactor may be organic or inorganic.

Holoenzyme is the complete active enzyme.

Apoenzyme is the protein part.

Step 5: Final answer.

Therefore, the protein part of an enzyme is called apoenzyme.

Apoenzyme

Quick Tip: Apoenzyme is the protein part; cofactor is the non-protein part; holoenzyme is the complete active enzyme.

---

70. The process of conversion of glucose to glycogen is called _____.

(A) Glycolysis

(B) Glycogenesis

(C) Glycogenolysis

(D) Gluconeogenesis

Correct Answer: (B) Glycogenesis

Solution:

Concept:

Carbohydrate metabolism includes several important pathways such as glycolysis, glycogenesis, glycogenolysis, and gluconeogenesis.

Step 1: Meaning of glycogenesis.

Glycogenesis is the synthesis of glycogen from glucose.

$$\text{Glucose} \rightarrow \text{Glycogen}$$

Step 2: When glycogenesis occurs.

It occurs when blood glucose level is high, especially after meals. Excess glucose is stored as glycogen mainly in liver and muscles.

Step 3: Checking other options.

Glycolysis means breakdown of glucose to pyruvate.

Glycogenolysis means breakdown of glycogen to glucose.

Gluconeogenesis means formation of glucose from non-carbohydrate sources.

Step 4: Final answer.

Therefore, the conversion of glucose to glycogen is called glycogenesis.

Glycogenesis

Quick Tip: Glycogenesis means glucose to glycogen, while glycogenolysis means glycogen to glucose.

---

71. The confirmatory test for bile pigments in urine is:

(A) Hay's test

(B) Benedict's test

(C) Fouchet's test

(D) Rothera's test

Correct Answer: (C) Fouchet's test

Solution:

Concept:

Bile pigments are mainly bilirubin and its related compounds. Their presence in urine usually indicates liver or biliary tract disorders. Different urine tests are used to identify different abnormal constituents.

Step 1: Understanding bile pigments.

Bile pigments are formed from the breakdown of haemoglobin. Bilirubin is one of the most important bile pigments.

Step 2: Test used for bile pigments.

Fouchet's test is a confirmatory test for bile pigments in urine. In this test, bilirubin is oxidized to biliverdin, which gives a green colour.

Step 3: Checking other options.

Hay's test is used for bile salts.

Benedict's test is used for reducing sugars such as glucose.

Rothera's test is used for ketone bodies.

Therefore, these tests are not confirmatory tests for bile pigments.

Step 4: Final answer.

Thus, the confirmatory test for bile pigments in urine is Fouchet's test.

Fouchet's test

Quick Tip: Remember: Fouchet's test is for bile pigments, Hay's test is for bile salts, Benedict's test is for glucose, and Rothera's test is for ketone bodies.

---

72. Normal haemoglobin level in adult male is _____ g/dL.

(A) 8 – 10

(B) 10 – 12

(C) 13 – 17

(D) 18 – 22

Correct Answer: (C) 13 – 17

Solution:

Concept:

Haemoglobin is the iron-containing protein present in red blood cells. It carries oxygen from lungs to tissues and also helps in carrying carbon dioxide from tissues to lungs.

Step 1: Understanding normal haemoglobin value.

Normal haemoglobin level varies according to age, sex, physiological condition, and health status.

Step 2: Adult male range.

In adult males, the normal haemoglobin level is generally around 13 to 17 g/dL.

Step 3: Checking the options.

8 – 10 g/dL is low and indicates anaemia.

10 – 12 g/dL is also below the normal adult male range.

13 – 17 g/dL is the normal adult male range.

18 – 22 g/dL is higher than the usual normal range.

Step 4: Final answer.

Therefore, the normal haemoglobin level in adult male is 13 – 17 g/dL.

$$\boxed{13 - 17 \text{ g/dL}}$$

Quick Tip: Normal haemoglobin level in adult males is approximately 13 – 17 g/dL, while lower values may indicate anaemia.

---

73. Which vitamin is essential for blood clotting?

(A) Vitamin A

(B) Vitamin D

(C) Vitamin E

(D) Vitamin K

Correct Answer: (D) Vitamin K

Solution:

Concept:

Blood clotting, also called coagulation, is a protective mechanism that prevents excessive blood loss after injury.

Step 1: Role of vitamin K.

Vitamin K is required for the synthesis of several clotting factors in the liver.

Step 2: Important clotting factors.

Vitamin K helps in the activation of clotting factors such as:

- Factor II
- Factor VII
- Factor IX
- Factor X

Step 3: Effect of deficiency.

If vitamin K is deficient, clotting factors are not properly formed. This may lead to delayed clotting and increased bleeding tendency.

Step 4: Checking other vitamins.

Vitamin A is mainly related to vision and epithelial health.

Vitamin D is important for calcium absorption and bone health.

Vitamin E acts mainly as an antioxidant.

Vitamin K is directly related to blood clotting.

Step 5: Final answer.

Therefore, vitamin K is essential for blood clotting.

$$\boxed{\text{Vitamin K}}$$

Quick Tip: Vitamin K is known as the anti-haemorrhagic vitamin because it is essential for blood coagulation.

---

74. Bilirubin level helps in measuring the function of _____.

(A) Liver

(B) Heart

(C) Kidney

(D) Lung

Correct Answer: (A) Liver

Solution:

Concept:

Bilirubin is a yellow pigment formed from the breakdown of haemoglobin. It is processed and excreted mainly through the liver.

Step 1: Formation of bilirubin.

When old red blood cells are destroyed, haemoglobin is broken down and bilirubin is formed.

Step 2: Role of liver.

The liver takes up bilirubin, conjugates it, and excretes it through bile.

Step 3: Clinical importance.

If liver function is impaired, bilirubin may accumulate in the blood. This can cause jaundice.

Step 4: Checking other organs.

Heart function is usually assessed by cardiac markers and ECG.

Kidney function is commonly assessed by urea and creatinine.

Lung function is assessed by respiratory tests.

Bilirubin is mainly used to assess liver and biliary function.

Step 5: Final answer.

Therefore, bilirubin level helps in measuring liver function.

Liver

Quick Tip: Bilirubin is an important liver function marker; increased bilirubin may indicate jaundice or liver/bile duct problems.

75. Wilson disease is due to excess of _____.

(A) Copper

(B) Zinc

(C) Calcium

(D) Sodium

Correct Answer: (A) Copper

Solution:

Concept:

Wilson disease is a genetic disorder of copper metabolism. In this disease, copper is not properly excreted from the body.

Step 1: Normal copper metabolism.

Normally, excess copper is removed from the body through bile.

Step 2: What happens in Wilson disease?

In Wilson disease, copper accumulates in tissues because its excretion is defective.

Step 3: Organs affected.

Excess copper may accumulate mainly in:

- Liver
- Brain
- Eyes

Step 4: Clinical importance.

Copper accumulation can cause liver disease, neurological symptoms, and Kayser-Fleischer rings in the eyes.

Step 5: Final answer.

Therefore, Wilson disease is due to excess copper.

Copper

Quick Tip: Wilson disease is associated with copper accumulation, while copper deficiency is not the cause of this disease.

76. Chloroquine contains chlorine at _____ position.

(A) 2^{nd}

(B) 4^{th}

(C) 7^{th}

(D) 8^{th}

Correct Answer: (C) 7^{th}

Solution:

Concept:

Chloroquine is an antimalarial drug. Chemically, it is a 4-aminoquinoline derivative.

Step 1: Understanding chloroquine structure.

Chloroquine contains a quinoline nucleus. The chlorine atom is attached to the quinoline ring.

Step 2: Position of chlorine.

In chloroquine, the chlorine substituent is present at the 7^{th} position of the quinoline ring.

Step 3: Importance of structure.

The quinoline ring and its substituents are important for the antimalarial activity of chloroquine.

Step 4: Checking options.

The chlorine is not at the 2^{nd}, 4^{th}, or 8^{th} position. It is specifically at the 7^{th} position.

Step 5: Final answer.

Therefore, chloroquine contains chlorine at the 7^{th} position.

$$\boxed{7^{th}}$$

Quick Tip: Chloroquine is a 4-aminoquinoline derivative with chlorine at the 7^{th} position.

---

77. Ibuprofen belongs to which chemical class?

(A) Salicylates

(B) Aryl propionic acid derivatives

(C) Indole acetic acids

(D) Fenamate derivatives

Correct Answer: (B) Aryl propionic acid derivatives

Solution:

Concept:

Ibuprofen is a non-steroidal anti-inflammatory drug, commonly called an NSAID. NSAIDs are classified chemically into different groups.

Step 1: Understanding ibuprofen.

Ibuprofen is used as an analgesic, antipyretic, and anti-inflammatory drug.

Step 2: Chemical class.

Ibuprofen contains an aryl group and propionic acid moiety. Therefore, it belongs to the aryl propionic acid derivative class.

Step 3: Examples of same class.

Other aryl propionic acid derivatives include:

- Naproxen
- Ketoprofen
- Flurbiprofen

Step 4: Checking other options.

Aspirin belongs to salicylates.

Indomethacin belongs to indole acetic acid derivatives.

Mefenamic acid belongs to fenamate derivatives.

Ibuprofen belongs to aryl propionic acid derivatives.

Step 5: Final answer.

Therefore, ibuprofen belongs to aryl propionic acid derivatives.

Aryl propionic acid derivatives

Quick Tip: Ibuprofen, naproxen, and ketoprofen are examples of aryl propionic acid derivative NSAIDs.

---

78. Amlodipine contains _____ ring system.

(A) Piperidine

(B) Phenothiazine

(C) Pyrimidine

(D) Dihydropyridine

Correct Answer: (A) Piperidine

Solution:

Concept:

Amlodipine is a calcium channel blocker used as an antihypertensive and antianginal drug.

Step 1: Understanding amlodipine.

Amlodipine belongs to the dihydropyridine class of calcium channel blockers, but in the given options and official answer key, the marked answer is piperidine.

Step 2: Ring system consideration.

The question asks for the ring system present in amlodipine as per the given options. The correct option provided in the paper is piperidine.

Step 3: Checking other options.

Phenothiazine is a tricyclic ring system found in drugs like chlorpromazine.

Pyrimidine is a nitrogen-containing heterocycle but is not the correct answer here.

Dihydropyridine is a class name associated with amlodipine, but according to the marked answer in this paper, the answer is piperidine.

Step 4: Final answer.

Therefore, the correct answer is piperidine.

Piperidine

Quick Tip: Amlodipine is commonly known as a dihydropyridine calcium channel blocker; however, follow the official key when solving the given paper.

---

79. Chemically aspirin is _____.

(A) Salicylic acid

(B) Acetyl salicylamide

(C) Acetyl salicylic acid

(D) Benzoic acid

Correct Answer: (C) Acetyl salicylic acid

Solution:

Concept:

Aspirin is a widely used analgesic, antipyretic, anti-inflammatory, and antiplatelet drug.

Step 1: Chemical name of aspirin.

The chemical name of aspirin is acetyl salicylic acid.

Step 2: Relationship with salicylic acid.

Aspirin is prepared by acetylation of salicylic acid. In this process, the hydroxyl group of salicylic acid is acetylated.

$$\text{Salicylic acid} \rightarrow \text{Acetyl salicylic acid}$$

Step 3: Checking other options.

Salicylic acid is the parent compound but not aspirin itself.

Acetyl salicylamide is not the correct chemical name of aspirin.

Benzoic acid is a different aromatic acid.

Step 4: Final answer.

Therefore, chemically aspirin is acetyl salicylic acid.

$$\boxed{\text{Acetyl salicylic acid}}$$

Quick Tip: Aspirin is acetyl salicylic acid, formed by acetylation of salicylic acid.

---

80. Penicillin contains which core ring system?

(A) Thiazole ring

(B) β-lactam ring

(C) Imidazole ring

(D) Pyridine ring

Correct Answer: (B) β-lactam ring

Solution:

Concept:

Penicillins are important antibacterial drugs. Their antibacterial activity depends on a specific

ring system.

Step 1: Structure of penicillin.

Penicillin contains a β-lactam ring fused with a thiazolidine ring.

Step 2: Importance of β-lactam ring.

The β-lactam ring is responsible for inhibiting bacterial cell wall synthesis.

Step 3: Mechanism.

Penicillin inhibits transpeptidase enzyme, which is required for cross-linking of peptidoglycan in bacterial cell wall.

Step 4: Checking other options.

Thiazole, imidazole, and pyridine rings are not the core ring responsible for penicillin activity. The key core ring system is β-lactam.

Step 5: Final answer.

Therefore, penicillin contains β-lactam ring.

$\boxed{\beta\text{-lactam ring}}$

Quick Tip: Penicillins and cephalosporins are β-lactam antibiotics because they contain a β-lactam ring.

---

81. Morphine is chemically classified as

(A) Synthetic opioid

(B) Semi-synthetic opioid

(C) Natural phenanthrene alkaloid

(D) Benzyl isoquinoline alkaloid

Correct Answer: (C) Natural phenanthrene alkaloid

Solution:

Concept:

Morphine is an important opioid analgesic obtained naturally from opium.

Step 1: Source of morphine.

Morphine is obtained from the opium poppy, *Papaver somniferum*.

Step 2: Chemical classification.

Morphine belongs to the natural phenanthrene alkaloid class.

Step 3: Why it is not synthetic or semi-synthetic.

Synthetic opioids are fully chemically synthesized.

Semi-synthetic opioids are derived by chemical modification of natural opioids.

Morphine itself is naturally occurring.

Step 4: Benzyl isoquinoline comparison.

Some alkaloids belong to benzyl isoquinoline class, but morphine is specifically classified as a phenanthrene alkaloid.

Step 5: Final answer.

Therefore, morphine is a natural phenanthrene alkaloid.

Natural phenanthrene alkaloid

Quick Tip: Morphine and codeine are natural phenanthrene alkaloids obtained from opium.

---

82. Chlorpromazine belongs to which chemical class?

(A) Phenothiazines

(B) Thioxanthenes

(C) Benzodiazepines

(D) Butyrophenones

Correct Answer: (A) Phenothiazines

Solution:

Concept:

Chlorpromazine is an antipsychotic drug used mainly in psychiatric disorders.

Step 1: Chemical class of chlorpromazine.

Chlorpromazine belongs to the phenothiazine class of antipsychotic drugs.

Step 2: Phenothiazine nucleus.

Phenothiazines contain a tricyclic ring system having sulfur and nitrogen atoms.

Step 3: Therapeutic use.

Chlorpromazine is used for schizophrenia, psychosis, nausea, vomiting, and sometimes severe

agitation.

Step 4: Checking other options.

Thioxanthenes are another class of antipsychotics.

Benzodiazepines are mainly sedative, anxiolytic, and anticonvulsant drugs.

Butyrophenones include drugs like haloperidol.

Chlorpromazine belongs to phenothiazines.

Step 5: Final answer.

Therefore, chlorpromazine belongs to phenothiazines.

Phenothiazines

Quick Tip: Chlorpromazine is a phenothiazine antipsychotic, while haloperidol is a butyrophenone antipsychotic.

---

83. Ciprofloxacin belongs to which chemical class?

(A) Sulphonamides

(B) Fluoroquinolones

(C) Cephalosporins

(D) Macrolides

Correct Answer: (B) Fluoroquinolones

Solution:

Concept:

Ciprofloxacin is a broad-spectrum antibacterial drug.

Step 1: Chemical class.

Ciprofloxacin belongs to the fluoroquinolone class of antibiotics.

Step 2: Mechanism of action.

Fluoroquinolones inhibit bacterial DNA gyrase and topoisomerase IV. These enzymes are required for bacterial DNA replication.

Step 3: Importance of fluoro group.

The presence of fluorine in the quinolone structure improves antibacterial activity and spectrum.

Step 4: Checking other options.

Sulphonamides inhibit folic acid synthesis.

Cephalosporins are β-lactam antibiotics.

Macrolides inhibit bacterial protein synthesis.

Ciprofloxacin is a fluoroquinolone.

Step 5: Final answer.

Therefore, ciprofloxacin belongs to fluoroquinolones.

Fluoroquinolones

Quick Tip: Ciprofloxacin, norfloxacin, and levofloxacin are examples of fluoroquinolone antibiotics.

---

84. Diazepam contains which heterocyclic ring?

(A) Imidazole

(B) Triazole

(C) Thiazole

(D) Benzodiazepine

Correct Answer: (D) Benzodiazepine

Solution:

Concept:

Diazepam is a drug belonging to the benzodiazepine class. It is mainly used as an anxiolytic, sedative, muscle relaxant, and anticonvulsant.

Step 1: Understanding the name.

The name benzodiazepine indicates a benzene ring fused with a diazepine ring.

Step 2: Ring system in diazepam.

Diazepam contains the benzodiazepine heterocyclic ring system.

Step 3: Checking other options.

Imidazole is present in drugs such as metronidazole and some antifungals.

Triazole is found in drugs such as fluconazole.

Thiazole is present in some other heterocyclic compounds.

Diazepam contains benzodiazepine ring.

Step 4: Final answer.

Therefore, diazepam contains benzodiazepine ring.

Benzodiazepine

Quick Tip: Diazepam, lorazepam, and alprazolam are benzodiazepine drugs.

---

85. The chemical class of propranolol is _____.

(A) Phenoxyalkylamine

(B) Aryloxypropanolamine

(C) Imidazoline

(D) Benzyl amine

Correct Answer: (B) Aryloxypropanolamine

Solution:

Concept:

Propranolol is a non-selective beta adrenergic blocker used in hypertension, angina, arrhythmias, and other cardiovascular conditions.

Step 1: Chemical structure idea.

Propranolol contains an aromatic ring linked through an oxygen atom to a propanolamine side chain.

Step 2: Chemical class.

Because of this structural feature, propranolol belongs to the aryloxypropanolamine class.

Step 3: Pharmacological importance.

The aryloxypropanolamine structure is important for beta-blocking activity.

Step 4: Checking other options.

Phenoxyalkylamine is a different class.

Imidazoline is associated with drugs acting on imidazoline/alpha receptors.

Benzyl amine is not the correct class of propranolol.

Step 5: Final answer.

Therefore, propranolol belongs to aryloxypropanolamine class.

Aryloxypropanolamine

Quick Tip: Propranolol is a beta blocker chemically classified as an aryloxypropanolamine.

---

86. What is the core skeleton of tetracycline antibiotics?

(A) Four fused benzene rings

(B) Macrocyclic lactone

(C) Quinoline nucleus

(D) Phenothiazine nucleus

Correct Answer: (A) Four fused benzene rings

Solution:

Concept:

Tetracyclines are broad-spectrum antibiotics. Their name is related to their four-ring structure.

Step 1: Meaning of tetracycline.

The term "tetra" means four. Tetracyclines contain four fused cyclic rings.

Step 2: Core skeleton.

The core structure of tetracycline antibiotics consists of four fused rings.

Step 3: Checking other options.

Macrocyclic lactone is the core structure of macrolide antibiotics such as erythromycin.

Quinoline nucleus is present in quinoline antimalarials.

Phenothiazine nucleus is present in drugs like chlorpromazine.

Tetracyclines have a four fused ring skeleton.

Step 4: Final answer.

Therefore, the core skeleton of tetracycline antibiotics is four fused benzene rings.

Four fused benzene rings

Quick Tip: Tetracyclines are named for their four fused ring system.

---

87. Glibenclamide belongs to which chemical class?

(A) Biguanide

(B) Thiazolidinedione

(C) Sulfonylurea

(D) Meglitinide

Correct Answer: (C) Sulfonylurea

Solution:

Concept:

Glibenclamide is an oral antidiabetic drug used in the treatment of type 2 diabetes mellitus.

Step 1: Chemical class.

Glibenclamide belongs to the sulfonylurea class.

Step 2: Mechanism of action.

Sulfonylureas stimulate insulin release from pancreatic beta cells.

Step 3: Examples of sulfonylureas.

Examples include:

- Glibenclamide
- Glipizide
- Gliclazide
- Glimepiride

Step 4: Checking other options.

Metformin belongs to biguanides.

Pioglitazone belongs to thiazolidinediones.

Repaglinide belongs to meglitinides.

Glibenclamide belongs to sulfonylureas.

Step 5: Final answer.

Therefore, glibenclamide belongs to sulfonylurea class.

Sulfonylurea

Quick Tip: Glibenclamide is a sulfonylurea that lowers blood glucose by increasing insulin secretion.

---

88. Which syndrome is most likely associated with aspirin in children with influenza fever?

(A) Reye's syndrome

(B) Stevens–Johnson syndrome

(C) Cushing's syndrome

(D) Guillain–Barré syndrome

Correct Answer: (A) Reye's syndrome

Solution:

Concept:

Aspirin should generally be avoided in children and teenagers with viral infections such as influenza or chickenpox.

Step 1: Aspirin risk in children.

Use of aspirin in children with viral fever is associated with a rare but serious condition called Reye's syndrome.

Step 2: What is Reye's syndrome?

Reye's syndrome mainly affects the liver and brain. It may cause acute liver dysfunction and encephalopathy.

Step 3: Why aspirin is avoided.

Because of the risk of Reye's syndrome, safer antipyretics like paracetamol are generally preferred in children.

Step 4: Checking other options.

Stevens–Johnson syndrome is a severe skin reaction.

Cushing's syndrome is related to excess corticosteroids.

Guillain–Barré syndrome is an autoimmune neuropathy.

Aspirin in children with influenza is classically associated with Reye's syndrome.

Step 5: Final answer.

Therefore, the correct answer is Reye's syndrome.

Reye's syndrome

Quick Tip: Aspirin is avoided in children with viral infections because it can cause Reye's syndrome.

---

89. _____ class of antihypertensive drugs is contraindicated due to teratogenic effects on the fetus in pregnant women with hypertension.

(A) Thiazide diuretics

(B) Beta blockers

(C) ACE inhibitors

(D) Calcium channel blockers

Correct Answer: (C) ACE inhibitors

Solution:

Concept:

Drug use during pregnancy requires special care because some drugs can harm the developing fetus.

Step 1: Understanding teratogenicity.

Teratogenic drugs are drugs that can cause fetal abnormalities when taken during pregnancy.

Step 2: ACE inhibitors in pregnancy.

ACE inhibitors are contraindicated in pregnancy because they can cause fetal kidney damage, oligohydramnios, skull defects, and other serious fetal problems.

Step 3: Examples of ACE inhibitors.

Common ACE inhibitors include:

- Enalapril
- Captopril
- Lisinopril
- Ramipril

Step 4: Checking other options.

Beta blockers and calcium channel blockers may be used carefully in selected cases.

Thiazide diuretics are not the classic answer for fetal teratogenic contraindication here.

ACE inhibitors are clearly contraindicated due to fetal toxicity.

Step 5: Final answer.

Therefore, ACE inhibitors are contraindicated in pregnant women with hypertension.

ACE inhibitors

Quick Tip: ACE inhibitors are contraindicated in pregnancy because they can cause serious fetal toxicity.

---

90. A patient is started on isoniazid as part of antitubercular therapy. Vitamin _____ should be given prophylactically to prevent the common adverse effect of this drug.

(A) K

(B) C

(C) A

(D) B_6

Correct Answer: (D) B_6

Solution:

Concept:

Isoniazid is a first-line antitubercular drug. It is very effective against tuberculosis, but it can cause some adverse effects.

Step 1: Common adverse effect of isoniazid.

One important adverse effect of isoniazid is peripheral neuropathy. Peripheral neuropathy may present as tingling, numbness, burning sensation, or pain in hands and feet.

Step 2: Cause of neuropathy.

Isoniazid interferes with vitamin B_6, also called pyridoxine, metabolism. Deficiency of pyridoxine increases the risk of neuropathy.

Step 3: Preventive measure.

To prevent this adverse effect, vitamin B_6 is given prophylactically along with isoniazid.

Step 4: Checking other vitamins.

Vitamin K is related to blood clotting.

Vitamin C is related to collagen synthesis and antioxidant function.

Vitamin A is related to vision and epithelial health.

Vitamin B_6 is specifically used with isoniazid to prevent neuropathy.

Step 5: Final answer.

Therefore, vitamin B_6 should be given prophylactically with isoniazid.

Vitamin B_6

Quick Tip: Isoniazid can cause peripheral neuropathy, so pyridoxine or vitamin B_6 is given prophylactically.

---

91. A 30-year-old asthmatic patient needs a drug for acute bronchospasm relief. Which agent is most appropriate for rapid bronchodilation?

(A) Inhaled beclomethasone

(B) Inhaled salbutamol (albuterol)

(C) Inhaled ipratropium as monotherapy in a young asthmatic

(D) Oral theophylline

Correct Answer: (B) Inhaled salbutamol (albuterol)

Solution:

Concept:

Acute bronchospasm in asthma requires a drug that acts rapidly and relaxes bronchial smooth muscles quickly. Such drugs are called bronchodilators.

Step 1: Understanding acute bronchospasm.

In acute bronchospasm, the bronchial smooth muscles contract suddenly, causing narrowing of airways. This leads to wheezing, breathlessness, chest tightness, and difficulty in breathing.

Step 2: Requirement of treatment.

The drug should act quickly because the patient needs immediate relief. Therefore, a short-acting bronchodilator is preferred.

Step 3: Role of salbutamol.

Salbutamol, also called albuterol, is a short-acting β_2-adrenergic agonist. It stimulates β_2 receptors in bronchial smooth muscle and causes relaxation.

$$\beta_2 \text{ stimulation} \Rightarrow \text{bronchial smooth muscle relaxation}$$

Step 4: Why inhaled route is preferred.

The inhaled route delivers the drug directly to the lungs. This gives rapid action and fewer

systemic side effects.

Step 5: Checking other options.

Inhaled beclomethasone is a corticosteroid used for long-term control, not immediate relief.

Ipratropium may be useful in some cases, but it is not the best monotherapy for rapid relief in a young asthmatic.

Oral theophylline has slower action and more side effects.

Step 6: Final answer.

Therefore, the most appropriate drug for rapid bronchodilation is inhaled salbutamol.

Inhaled salbutamol (albuterol)

Quick Tip: For acute asthma attack, remember SABA: Short-Acting Beta Agonist, such as salbutamol, gives rapid bronchodilation.

---

92. Which of the following drugs irreversibly inhibits the H^+/K^+-ATPase pump in gastric parietal cells used to treat peptic ulcer disease?

(A) Misoprostol

(B) Ranitidine

(C) Sucralfate

(D) Omeprazole

Correct Answer: (D) Omeprazole

Solution:

Concept:

Peptic ulcer disease is commonly treated by reducing gastric acid secretion. Proton pump inhibitors are among the most effective acid-suppressing drugs.

Step 1: Understanding the proton pump.

The H^+/K^+-ATPase pump is present in gastric parietal cells. It is responsible for the final step of acid secretion into the stomach.

Step 2: Role of omeprazole.

Omeprazole is a proton pump inhibitor. It irreversibly inhibits the H^+/K^+-ATPase pump.

$$H^+/K^+\text{-ATPase inhibition} \Rightarrow \text{decreased gastric acid secretion}$$

Step 3: Why irreversible inhibition is important.

Because omeprazole irreversibly blocks the pump, acid secretion remains reduced until new proton pumps are synthesized.

Step 4: Checking other options.

Misoprostol is a prostaglandin analogue.

Ranitidine is an H_2-receptor blocker.

Sucralfate forms a protective coating over ulcerated mucosa.

Omeprazole directly inhibits the proton pump.

Step 5: Final answer.

Therefore, the drug that irreversibly inhibits the H^+/K^+-ATPase pump is omeprazole.

Omeprazole

Quick Tip: Omeprazole is a proton pump inhibitor and blocks the final step of gastric acid secretion.

---

93. Which oral drug is the first-line treatment in most newly diagnosed type 2 diabetes patients who are overweight?

(A) Metformin

(B) Acarbose

(C) Glibenclamide

(D) Sitagliptin

Correct Answer: (A) Metformin

Solution:

Concept:

Type 2 diabetes mellitus is commonly associated with insulin resistance. In overweight patients, insulin resistance is a major problem.

Step 1: Understanding the requirement.

The question asks for the first-line oral drug in newly diagnosed type 2 diabetes patients who

are overweight.

Step 2: Role of metformin.

Metformin is a biguanide antidiabetic drug. It mainly reduces hepatic glucose production and improves insulin sensitivity.

$$\text{Metformin} \Rightarrow \text{decreased hepatic gluconeogenesis}$$

Step 3: Why metformin is preferred in overweight patients.

Metformin does not usually cause weight gain. It may also help in modest weight reduction or weight neutrality, so it is preferred in overweight type 2 diabetic patients.

Step 4: Checking other options.

Acarbose delays carbohydrate absorption but is not the usual first-line drug.

Glibenclamide is a sulfonylurea and may cause hypoglycemia and weight gain.

Sitagliptin is a DPP-4 inhibitor but is not usually the first-line choice over metformin.

Step 5: Final answer.

Therefore, the first-line drug is metformin.

$$\boxed{\text{Metformin}}$$

Quick Tip: Metformin is the first-line oral antidiabetic drug in most type 2 diabetes patients, especially if overweight.

---

94. _____ drug is mostly considered as first-line therapy for uncomplicated urinary tract infection (UTI) in a young, non-pregnant woman.

(A) Gentamicin injection

(B) Nitrofurantoin

(C) Amoxicillin

(D) Ciprofloxacin

Correct Answer: (B) Nitrofurantoin

Solution:

Concept:

Uncomplicated urinary tract infection means infection of the urinary tract in a healthy patient without major complications, structural abnormality, or pregnancy.

Step 1: Understanding uncomplicated UTI.

In young non-pregnant women, uncomplicated UTI is commonly caused by bacteria such as *E. coli*.

Step 2: First-line drug.

Nitrofurantoin is commonly used as first-line therapy for uncomplicated lower UTI because it concentrates well in urine.

Step 3: Why nitrofurantoin is suitable.

It acts mainly in the urinary tract and has good activity against common UTI pathogens.

Step 4: Checking other options.

Gentamicin injection is not used routinely for uncomplicated UTI.

Amoxicillin may have resistance problems.

Ciprofloxacin is effective but is usually reserved due to resistance and safety concerns.

Step 5: Final answer.

Therefore, nitrofurantoin is mostly considered first-line therapy.

Nitrofurantoin

Quick Tip: Nitrofurantoin is commonly preferred for uncomplicated lower UTI because it achieves high urinary concentration.

---

95. HIV viral RNA is converted to proviral DNA using enzyme?

(A) Helicase

(B) Proteinase

(C) Integrase

(D) Reverse transcriptase

Correct Answer: (D) Reverse transcriptase

Solution:

Concept:

HIV is a retrovirus. Retroviruses have RNA as their genetic material, but they form DNA inside

the host cell.

Step 1: Understanding HIV replication.

After HIV enters the host cell, its RNA genome must be converted into DNA.

Step 2: Enzyme involved.

The enzyme reverse transcriptase converts viral RNA into complementary DNA.

$$\text{Viral RNA} \xrightarrow{\text{Reverse transcriptase}} \text{Viral DNA}$$

Step 3: Formation of proviral DNA.

The DNA formed from viral RNA becomes proviral DNA after integration into the host genome.

Step 4: Checking other enzymes.

Helicase unwinds nucleic acid strands.

Proteinase helps in viral protein processing.

Integrase inserts viral DNA into host DNA.

Reverse transcriptase converts RNA into DNA.

Step 5: Final answer.

Therefore, the enzyme is reverse transcriptase.

Reverse transcriptase

Quick Tip: HIV uses reverse transcriptase to convert viral RNA into DNA.

---

96. Which of the following drug is not a disease modifying anti rheumatic drug (DMARD)?

(A) Methotrexate

(B) Cyclophosphamide

(C) Ibuprofen

(D) Infliximab

Correct Answer: (C) Ibuprofen

Solution:

Concept:

DMARDs are drugs that slow the progression of rheumatoid arthritis and modify the disease

process.

Step 1: Understanding DMARDs.

DMARDs reduce inflammation and immune-mediated joint damage over time. They are different from simple pain-relieving drugs.

Step 2: Checking methotrexate.

Methotrexate is a commonly used conventional DMARD.

Step 3: Checking cyclophosphamide and infliximab.

Cyclophosphamide is an immunosuppressant used in some autoimmune conditions.

Infliximab is a biological DMARD that blocks TNF-α.

Step 4: Checking ibuprofen.

Ibuprofen is an NSAID. It reduces pain and inflammation but does not modify the disease progression of rheumatoid arthritis.

Step 5: Final answer.

Therefore, ibuprofen is not a DMARD.

Ibuprofen

Quick Tip: NSAIDs like ibuprofen provide symptomatic relief, while DMARDs slow disease progression.

---

97. Which drug would be most appropriate for providing both long-term asthma control and relief of allergic rhinitis symptoms?

(A) Oral theophylline

(B) Ipratropium bromide inhaler

(C) Salbutamol inhaler

(D) Montelukast

Correct Answer: (D) Montelukast

Solution:

Concept:

Asthma and allergic rhinitis are often associated with allergic inflammation. Leukotrienes play an important role in both conditions.

Step 1: Understanding montelukast.

Montelukast is a leukotriene receptor antagonist. It blocks leukotriene receptors and reduces inflammation, bronchoconstriction, and mucus secretion.

Step 2: Use in asthma.

Montelukast can be used for long-term asthma control, especially in allergic asthma or exercise-induced bronchospasm.

Step 3: Use in allergic rhinitis.

It also helps relieve symptoms of allergic rhinitis such as sneezing, nasal congestion, and runny nose.

Step 4: Checking other options.

Oral theophylline has more adverse effects and is not mainly used for allergic rhinitis.

Ipratropium mainly reduces bronchoconstriction or secretions but is not the best combined choice.

Salbutamol gives quick relief in acute bronchospasm but does not provide long-term allergic rhinitis control.

Step 5: Final answer.

Therefore, the best answer is montelukast.

Montelukast

Quick Tip: Montelukast is useful in both asthma control and allergic rhinitis because it blocks leukotriene action.

---

98. Which of the following antiepileptic drug is associated with a particularly high risk of neural tube defects?

(A) Valproic acid

(B) Lamotrigine

(C) Levetiracetam

(D) Low dose carbamazepine

Correct Answer: (A) Valproic acid

Solution:

Concept:

Some antiepileptic drugs are teratogenic and can cause congenital defects when used during pregnancy.

Step 1: Understanding neural tube defects.

Neural tube defects occur when the neural tube fails to close properly during embryonic development. Examples include spina bifida and anencephaly.

Step 2: Valproic acid risk.

Valproic acid is strongly associated with neural tube defects when used during pregnancy.

Step 3: Clinical importance.

Women of childbearing age taking valproic acid require careful counseling, pregnancy planning, and folic acid supplementation when appropriate.

Step 4: Checking other options.

Lamotrigine and levetiracetam are generally considered safer alternatives compared with valproic acid.

Carbamazepine can also have teratogenic risk, but valproic acid has particularly high risk.

Step 5: Final answer.

Therefore, the correct answer is valproic acid.

Valproic acid

Quick Tip: Valproic acid is highly teratogenic and is especially associated with neural tube defects.

---

99. The most appropriate drug suitable as first-line pharmacotherapy for diabetic peripheral neuropathic pain is _____.

(A) Aspirin

(B) Pregabalin

(C) Ibuprofen

(D) Acetaminophen

Correct Answer: (B) Pregabalin

Solution:

Concept:

Diabetic peripheral neuropathy causes nerve pain due to long-term damage to peripheral nerves in diabetes mellitus.

Step 1: Nature of neuropathic pain.

Neuropathic pain is different from ordinary inflammatory pain. It may feel like burning, tingling, electric shock, numbness, or shooting pain.

Step 2: Role of pregabalin.

Pregabalin is commonly used for neuropathic pain. It binds to the $\alpha_2\delta$ subunit of voltage-gated calcium channels and reduces release of excitatory neurotransmitters.

Step 3: Why NSAIDs are not preferred.

Aspirin and ibuprofen are useful for inflammatory pain, but they are not the best first-line therapy for neuropathic pain.

Step 4: Acetaminophen comparison.

Acetaminophen is useful for mild pain and fever, but it is not the preferred drug for diabetic neuropathic pain.

Step 5: Final answer.

Therefore, pregabalin is the most appropriate first-line pharmacotherapy.

Pregabalin

Quick Tip: Pregabalin and gabapentin are commonly used for neuropathic pain, including diabetic peripheral neuropathy.

---

100. The mechanism of action of methimazole used to treat hyperthyroidism is

(A) It blocks the release of stored thyroid hormone from the gland.

(B) It replaces deficient thyroid hormone in the bloodstream.

(C) It inhibits thyroid peroxidase, reducing synthesis of thyroid hormones.

(D) It destroys thyroid tissue through radiation.

Correct Answer: (C) It inhibits thyroid peroxidase, reducing synthesis of thyroid hormones.

Solution:

Concept:

Methimazole is an antithyroid drug used in the treatment of hyperthyroidism.

Step 1: Understanding hyperthyroidism.

Hyperthyroidism occurs when the thyroid gland produces excessive thyroid hormones, mainly T_3 and T_4.

Step 2: Role of thyroid peroxidase.

Thyroid peroxidase is an enzyme required for iodination of tyrosine residues and coupling reactions in thyroid hormone synthesis.

Step 3: Action of methimazole.

Methimazole inhibits thyroid peroxidase. As a result, synthesis of new thyroid hormones decreases.

$$\text{Methimazole} \Rightarrow \text{thyroid peroxidase inhibition} \Rightarrow \downarrow T_3, T_4 \text{ synthesis}$$

Step 4: Checking other options.

Blocking release of stored hormone is not the main action of methimazole.

Replacing deficient hormone is the action of levothyroxine.

Destroying thyroid tissue through radiation is the action of radioactive iodine.

Step 5: Final answer.

Therefore, methimazole inhibits thyroid peroxidase and reduces thyroid hormone synthesis.

It inhibits thyroid peroxidase, reducing synthesis of thyroid hormones.

Quick Tip: Methimazole treats hyperthyroidism by inhibiting thyroid peroxidase and reducing new thyroid hormone synthesis.

---

101. Presence of transverse markings and reticulate vessels is a characteristic pharmacognostic feature of

(A) Castor seed

(B) Senna leaf

(C) Ispaghula husk

(D) Aloe

Correct Answer: (A) Castor seed

Solution:

Concept:

Pharmacognostic features help in the identification of crude drugs using their macroscopical and microscopical characters.

Step 1: Understanding castor seed.

Castor seed is obtained from *Ricinus communis*. It is an important crude drug source of castor oil.

Step 2: Characteristic feature.

The presence of transverse markings and reticulate vessels is considered a characteristic pharmacognostic feature of castor seed.

Step 3: Why identification features are important.

Such diagnostic features help distinguish genuine crude drugs from adulterants and substitutes.

Step 4: Checking other options.

Senna leaf is identified by leaf characters and calcium oxalate crystals.

Ispaghula husk is known for mucilage and swelling index.

Aloe is a dried juice and has different diagnostic features.

Step 5: Final answer.

Therefore, the correct answer is castor seed.

Castor seed

Quick Tip: Diagnostic pharmacognostic features are useful for correct identification and quality control of crude drugs.

---

102. The swelling index is a specific evaluation parameter mainly used for quality control of

(A) Senna

(B) Aloe

(C) Ispaghula

(D) Digitalis

Correct Answer: (C) Ispaghula

Solution:

Concept:

Swelling index is used for crude drugs containing mucilage. It measures the ability of a drug to swell in water.

Step 1: Understanding swelling index.

Swelling index indicates the volume increase when a mucilage-containing drug absorbs water.

Step 2: Ispaghula and mucilage.

Ispaghula husk contains a high amount of mucilage. When it comes in contact with water, it swells strongly.

Step 3: Quality control importance.

The swelling index helps assess the quality and effectiveness of ispaghula as a bulk-forming laxative.

Step 4: Checking other options.

Senna is mainly evaluated for anthraquinone glycosides.

Aloe is evaluated for anthracene derivatives.

Digitalis is evaluated for cardiac glycosides.

Ispaghula is specifically evaluated by swelling index.

Step 5: Final answer.

Therefore, swelling index is mainly used for quality control of ispaghula.

Ispaghula

Quick Tip: Swelling index is important for mucilage-containing drugs such as ispaghula.

---

103. Which diagnostic identification test is used for anthraquinone glycosides present in senna?

(A) Keller–Killiani test

(B) Borntrager's test

(C) Shinoda test

(D) Foam test

Correct Answer: (B) Borntrager's test

Solution:

Concept:

Senna contains anthraquinone glycosides, which are responsible for its laxative action.

Step 1: Understanding anthraquinone glycosides.

Anthraquinone glycosides are plant constituents commonly found in laxative crude drugs such as senna, aloe, and cascara.

Step 2: Test for anthraquinone glycosides.

Borntrager's test is used for detecting anthraquinone glycosides.

Step 3: Principle of Borntrager's test.

Anthraquinones are extracted and treated with alkali. A pink to red colour in the alkaline layer indicates presence of anthraquinone glycosides.

Step 4: Checking other tests.

Keller–Killiani test is used for cardiac glycosides.

Shinoda test is used for flavonoids.

Foam test is used for saponins.

Borntrager's test is used for anthraquinone glycosides.

Step 5: Final answer.

Therefore, the diagnostic test is Borntrager's test.

Borntrager's test

Quick Tip: Borntrager's test is used for anthraquinone glycosides; Keller–Killiani test is used for cardiac glycosides.

---

104. Digitalis leaves should be collected during which season?

(A) Before flowering stage

(B) During flowering stage

(C) After flowering stage

(D) During fruiting stage

Correct Answer: (B) During flowering stage

Solution:

Concept:

The time of collection of crude drugs is very important because active constituents vary with season and stage of plant growth.

Step 1: Understanding digitalis.

Digitalis leaves contain cardiac glycosides. These glycosides are responsible for the medicinal activity of digitalis.

Step 2: Best collection stage.

Digitalis leaves are collected during the flowering stage because the active constituent content is suitable at this stage.

Step 3: Why timing matters.

If leaves are collected too early or too late, the concentration of active glycosides may be lower, affecting drug quality.

Step 4: Checking other options.

Before flowering, after flowering, or fruiting stage are not the correct collection stages according to the given paper.

Step 5: Final answer.

Therefore, digitalis leaves should be collected during flowering stage.

During flowering stage

Quick Tip: Crude drugs should be collected at the stage when their active constituents are maximum.

---

105. The major pharmacognostic feature of *Terminalia arjuna* bark is the presence of _____.

(A) Resin ducts

(B) Abundant calcium oxalate crystals and sclereids

(C) Latex vessels

(D) Oil glands

Correct Answer: (B) Abundant calcium oxalate crystals and sclereids

Solution:

Concept:

Terminalia arjuna bark is an important crude drug used traditionally for cardiac support. Pharmacognostic examination helps identify the genuine bark.

Step 1: Understanding bark identification.

Barks are identified by their macroscopical and microscopical characters such as cork, fibres, sclereids, crystals, and medullary rays.

Step 2: Diagnostic feature of Arjuna bark.

A major pharmacognostic feature of *Terminalia arjuna* bark is the presence of abundant calcium oxalate crystals and sclereids.

Step 3: Importance of sclereids and crystals.

Sclereids are thick-walled cells that provide mechanical strength. Calcium oxalate crystals are useful microscopic diagnostic markers.

Step 4: Checking other options.

Resin ducts are found in some resinous drugs.

Latex vessels are found in latex-yielding plants.

Oil glands are characteristic of volatile oil-containing drugs.

Arjuna bark is identified by calcium oxalate crystals and sclereids.

Step 5: Final answer.

Therefore, the correct answer is abundant calcium oxalate crystals and sclereids.

Abundant calcium oxalate crystals and sclereids

Quick Tip: Microscopic features like sclereids and calcium oxalate crystals are important for bark identification.

---

106. The pungent principle of ginger falls in the category of

(A) Alkaloid

(B) Gum

(C) Oleoresin

(D) Tannin

Correct Answer: (C) Oleoresin

Solution:

Concept:

Ginger is obtained from the rhizome of *Zingiber officinale*. It is used as a carminative, flavoring agent, and digestive stimulant.

Step 1: Understanding pungent principle.

The pungent taste of ginger is mainly due to constituents such as gingerols and shogaols.

Step 2: Category of pungent constituents.

These pungent principles are present in the oleoresin fraction of ginger.

Step 3: Meaning of oleoresin.

Oleoresin is a natural mixture containing volatile oil and resinous material.

Step 4: Checking other options.

Alkaloids are nitrogen-containing basic compounds.

Gums are polysaccharide exudates.

Tannins are polyphenolic astringent compounds.

The pungent principle of ginger belongs to oleoresin.

Step 5: Final answer.

Therefore, the correct answer is oleoresin.

Oleoresin

Quick Tip: Ginger's pungency is mainly due to gingerols and shogaols present in its oleoresin.

---

107. The presence of _____ is responsible for the characteristic aroma of clove.

(A) Tannins in cortex

(B) Alkaloids in pith

(C) Fixed oil in endosperm

(D) Volatile oil in oil glands

Correct Answer: (D) Volatile oil in oil glands

Solution:

Concept:

Clove is an aromatic crude drug obtained from dried flower buds of *Syzygium aromaticum*.

Step 1: Reason for aroma.

The characteristic aroma of clove is due to volatile oil present in oil glands.

Step 2: Main constituent.

The main active aromatic constituent of clove oil is eugenol.

Step 3: Why oil glands are important.

Oil glands store volatile oil, which evaporates easily and produces the characteristic smell.

Step 4: Checking other options.

Tannins may contribute to astringency but not the main aroma.

Alkaloids in pith are not responsible for clove aroma.

Fixed oil in endosperm is not the characteristic aromatic principle of clove.

Step 5: Final answer.

Therefore, the aroma of clove is due to volatile oil in oil glands.

Volatile oil in oil glands

Quick Tip: Clove aroma is due to volatile oil rich in eugenol, present in oil glands.

---

108. Asafoetida is pharmacognostically identified as _____.

(A) Dried rhizome

(B) Dried latex exudate

(C) Seed oil

(D) Bark resin

Correct Answer: (B) Dried latex exudate

Solution:

Concept:

Asafoetida is a crude drug obtained from plants of the genus *Ferula*. It is known for its strong odour and medicinal use.

Step 1: Source of asafoetida.

Asafoetida is obtained as an exudate from the roots and rhizomes of *Ferula* species.

Step 2: Nature of the drug.

The exudate is dried and used as the crude drug. Therefore, pharmacognostically it is identified as dried latex exudate.

Step 3: Why other options are incorrect.

It is not a dried rhizome because the rhizome itself is not the drug.

It is not seed oil.

It is not simply bark resin.

Step 4: Final answer.

Therefore, asafoetida is dried latex exudate.

Dried latex exudate

Quick Tip: Asafoetida is a dried oleo-gum-resin/latex exudate obtained from *Ferula* species.

---

109. The presence of nicotine-like stimulant action with methyl xanthines is associated with

(A) *Theobroma coca*

(B) *Ephedra sinica*

(C) *Atropa belladonna*

(D) *Camellia sinensis*

Correct Answer: (D) *Camellia sinensis*

Solution:

Concept:

Methyl xanthines are stimulant compounds such as caffeine, theophylline, and theobromine. They are found in certain plant sources.

Step 1: Understanding *Camellia sinensis*.

Camellia sinensis is the tea plant. Tea contains methyl xanthines, especially caffeine.

Step 2: Stimulant action.

Caffeine produces central nervous system stimulation. This stimulant action may be compared with nicotine-like stimulant effects in a broad pharmacognostic sense.

Step 3: Checking other options.

Ephedra sinica contains ephedrine.

Atropa belladonna contains tropane alkaloids such as atropine.

Theobroma coca option is not the correct answer here according to the given paper.

Camellia sinensis is associated with methyl xanthines.

Step 4: Final answer.

Therefore, the correct answer is *Camellia sinensis*.

$$\boxed{\textit{Camellia sinensis}}$$

Quick Tip: Tea, obtained from *Camellia sinensis*, contains caffeine, a methyl xanthine stimulant.

---

110. An epidemic is defined as

(A) Constant presence of disease in a population

(B) Worldwide spread of disease

(C) Sudden increase in disease cases above expected level

(D) Occurrence of rare disease

Correct Answer: (C) Sudden increase in disease cases above expected level

Solution:

Concept:

Epidemiology deals with the distribution and determinants of diseases in populations. Terms like endemic, epidemic, and pandemic describe disease occurrence patterns.

Step 1: Meaning of epidemic.

An epidemic occurs when the number of disease cases in a population suddenly rises above the expected level.

Step 2: Comparison with endemic.

Endemic means constant presence of a disease in a particular population or geographic area.

Step 3: Comparison with pandemic.

Pandemic means worldwide spread of a disease across countries or continents.

Step 4: Checking other options.

Constant presence of disease is endemic.

Worldwide spread of disease is pandemic.

Occurrence of a rare disease alone does not define an epidemic.

Sudden increase above expected level defines an epidemic.

Step 5: Final answer.

Therefore, an epidemic is a sudden increase in disease cases above the expected level.

Sudden increase in disease cases above expected level

Quick Tip: Endemic means constant presence, epidemic means sudden rise above expected level, and pandemic means worldwide spread.

---

111. The antihypertensive activity of *Rauwolfia serpentina* is mainly due to the presence of

(A) Ajmaline

(B) Reserpine

(C) Vincristine

(D) Colchicine

Correct Answer: (B) Reserpine

Solution:

Concept:

Rauwolfia serpentina is an important medicinal plant known for its antihypertensive and sedative properties.

Step 1: The main active alkaloid responsible for antihypertensive action is **reserpine**.

Step 2: Reserpine acts by depleting catecholamines such as noradrenaline from sympathetic nerve endings.

Step 3: Due to reduced sympathetic activity, blood pressure decreases.

Step 4: Ajmaline is mainly antiarrhythmic, vincristine is anticancer, and colchicine is antigout/anti-inflammatory.

Reserpine

Quick Tip: *Rauwolfia serpentina* is remembered for reserpine, which has antihypertensive action.

---

112. The presence of volatile oil cells and schizogenous oil cavities is a diagnostic feature of

(A) Ginger

(B) Clove

(C) Fennel

(D) Asafoetida

Correct Answer: (C) Fennel

Solution:

Concept:

Diagnostic pharmacognostic features help in identifying crude drugs by their microscopic characters.

Step 1: Fennel is an aromatic fruit drug rich in volatile oil.

Step 2: It shows volatile oil cells and schizogenous oil cavities.

Step 3: These structures store volatile oil responsible for aroma and medicinal activity.

Step 4: Ginger, clove, and asafoetida have different diagnostic features.

Fennel

Quick Tip: Fennel is identified microscopically by volatile oil cells and schizogenous oil cavities.

---

113. Tolu balsam is mainly employed in pharmaceutical preparations as _____ agent.

(A) Antimalarial

(B) Expectorant and flavouring

(C) Antidiabetic

(D) Cardiotonic

Correct Answer: (B) Expectorant and flavouring

Solution:

Concept:

Tolu balsam is a balsamic resinous substance used in pharmaceutical preparations.

Step 1: Tolu balsam has pleasant aromatic odour.

Step 2: It is used as a flavouring agent in pharmaceutical formulations.

Step 3: It also has expectorant property and helps in respiratory preparations.

Step 4: It is not mainly used as antimalarial, antidiabetic, or cardiotonic agent.

Expectorant and flavouring

Quick Tip: Tolu balsam is mainly used as an expectorant and flavouring agent.

---

114. _____ attributed to the anti-rheumatic activity of colchicum seeds.

(A) Vinblastine

(B) Reserpine

(C) Colchicine

(D) Podophyllotoxin

Correct Answer: (C) Colchicine

Solution:

Concept:

Colchicum seeds contain an important alkaloid called colchicine.

Step 1: Colchicine is the active constituent of colchicum.

Step 2: It is used in gout and inflammatory conditions.

Step 3: Its anti-rheumatic and anti-inflammatory action is due to colchicine.

Step 4: Vinblastine, reserpine, and podophyllotoxin belong to different plant sources.

Colchicine

Quick Tip: Colchicum seeds are remembered for colchicine, useful in gout and inflammatory disorders.

---

115. What is the source of anti-tumour alkaloids vincristine and vinblastine?

(A) *Catharanthus roseus*

(B) *Podophyllum emodi*

(C) *Rauwolfia serpentina*

(D) *Artemisia annua*

Correct Answer: (A) *Catharanthus roseus*

Solution:

Concept:

Vincristine and vinblastine are important anticancer alkaloids.

Step 1: These alkaloids are obtained from *Catharanthus roseus*.

Step 2: They are also called vinca alkaloids.

Step 3: They act by interfering with microtubule formation during cell division.

Step 4: Hence, they are useful as anti-tumour agents.

Catharanthus roseus

Quick Tip: Vincristine and vinblastine are vinca alkaloids obtained from *Catharanthus roseus*.

---

116. Which of the following belongs to lignin category of natural products?

(A) Podophyllotoxin

(B) Quinine

(C) Artemisinin

(D) Ergotamine

Correct Answer: (A) Podophyllotoxin

Solution:

Concept:

Lignans are natural products formed by coupling of phenylpropanoid units.

Step 1: Podophyllotoxin is a lignan compound.

Step 2: It is obtained from *Podophyllum* species.

Step 3: It has anticancer importance and is used as a precursor for anticancer drugs.

Step 4: Quinine is an alkaloid, artemisinin is a sesquiterpene lactone, and ergotamine is an ergot alkaloid.

Podophyllotoxin

Quick Tip: Podophyllotoxin is a lignan obtained from *Podophyllum*.

---

117. The hypoglycaemic effect of *Gymnema sylvestre* is primarily due to its ability to

(A) Stimulate insulin degradation

(B) Regenerate pancreatic β-cells and suppress sweet taste

(C) Inhibit glucose absorption only

(D) Increase glucagon secretion

Correct Answer: (B) Regenerate pancreatic β-cells and suppress sweet taste

Solution:

Concept:

Gymnema sylvestre is traditionally used in diabetes management.

Step 1: It contains gymnemic acids.

Step 2: These constituents help reduce sweet taste sensation.

Step 3: It is also associated with regeneration/support of pancreatic β-cells.

Step 4: Thus, it helps reduce blood glucose levels.

Regenerate pancreatic β-cells and suppress sweet taste

Quick Tip: *Gymnema sylvestre* is known as "sugar destroyer" because it suppresses sweet taste and supports antidiabetic action.

---

118. _____ are mainly responsible for the diuretic activity of Punarnava (*Boerhaavia diffusa*).

(A) Alkaloids

(B) Flavonoids and potassium salts

(C) Glycosides

(D) Tannins

Correct Answer: (B) Flavonoids and potassium salts

Solution:

Concept:

Punarnava is an Ayurvedic drug commonly used for its diuretic property.

Step 1: Diuretics increase urine output.

Step 2: Punarnava contains flavonoids and potassium salts.

Step 3: These constituents contribute to its diuretic activity.

Step 4: Hence, flavonoids and potassium salts are the correct constituents.

Flavonoids and potassium salts

Quick Tip: Punarnava is remembered as a diuretic drug due to flavonoids and potassium salts.

---

119. Quinine, a potent antimalarial drug, is obtained from

(A) *Artemisia annua*

(B) Cinchona bark

(C) *Podophyllum* rhizome

(D) Ergot sclerotia

Correct Answer: (B) Cinchona bark

Solution:

Concept:

Quinine is a natural antimalarial alkaloid.

Step 1: Quinine is obtained from Cinchona bark.

Step 2: Cinchona bark contains quinoline alkaloids.

Step 3: Quinine was historically one of the most important antimalarial drugs.

Step 4: *Artemisia annua* gives artemisinin, not quinine.

Cinchona bark

Quick Tip: Quinine is obtained from Cinchona bark, while artemisinin is obtained from *Artemisia annua*.

120. Lanolin used as a pharmaceutical aid is obtained from

(A) Plant wax

(B) Petroleum wax

(C) Wool fat of sheep

(D) Beeswax secretion

Correct Answer: (C) Wool fat of sheep

Solution:

Concept:

Lanolin is a wax-like substance used as a pharmaceutical excipient.

Step 1: Lanolin is obtained from wool fat.

Step 2: Wool fat is collected from sheep wool.

Step 3: It is used in ointment bases because it has emollient and absorption properties.

Step 4: It is not plant wax, petroleum wax, or beeswax.

Wool fat of sheep

Quick Tip: Lanolin is purified wool fat obtained from sheep and is used in ointment bases.

121. What is the primary objective of financial planning in community pharmacy?

(A) Increase stock levels

(B) Maximize discounts

(C) Ensure optimal fund utilization and profitability

(D) Reduce manpower

Correct Answer: (C) Ensure optimal fund utilization and profitability

Solution:

Concept:

Financial planning is essential for smooth functioning of a community pharmacy.

Step 1: A pharmacy must manage money properly for purchase, storage, and operation.

Step 2: The goal is not simply increasing stock or reducing manpower.

Step 3: Proper financial planning ensures optimal use of funds.

Step 4: It also helps maintain profitability and business stability.

Ensure optimal fund utilization and profitability

Quick Tip: Financial planning in pharmacy aims at proper fund use, cost control, and profitability.

---

122. The primary reason for degreasing cotton before using it as surgical dressing is to

(A) Increase absorbency

(B) Improve tensile strength

(C) Enhance colour

(D) Reduce fibre length

Correct Answer: (A) Increase absorbency

Solution:

Concept:

Surgical cotton must absorb blood, pus, and other fluids efficiently.

Step 1: Natural cotton contains waxy and fatty substances.

Step 2: These fatty materials reduce water absorption.

Step 3: Degreasing removes wax and fat from cotton fibres.

Step 4: Therefore, absorbency increases.

Increase absorbency

Quick Tip: Degreasing cotton removes fatty matter and makes cotton more absorbent.

---

123. Surgical catgut sutures are prepared from

(A) Collagen of sheep or goat intestine

(B) Silk fibres of *Bombyx mori*

(C) Cotton cellulose fibres

(D) Synthetic polymers

Correct Answer: (A) Collagen of sheep or goat intestine

Solution:

Concept:

Catgut is an absorbable surgical suture.

Step 1: Catgut is prepared from animal intestine.

Step 2: It is mainly obtained from collagen of sheep or goat intestine.

Step 3: Since collagen is proteinaceous, catgut is absorbed by body enzymes.

Step 4: Silk, cotton, and synthetic polymers are different suture materials.

Collagen of sheep or goat intestine

Quick Tip: Catgut is an absorbable suture prepared from collagen of sheep or goat intestine.

---

124. Which of the following tests is used for best detecting the presence of excessive silica in crude drugs?

(A) Ash value

(B) Acid-insoluble ash value

(C) Water-soluble ash

(D) Extractive value

Correct Answer: (B) Acid-insoluble ash value

Solution:

Concept:

Ash values are used to detect inorganic matter and adulteration in crude drugs.

Step 1: Silica is mainly present as sand and earthy matter.

Step 2: Silica does not dissolve in acid easily.

Step 3: Acid-insoluble ash value measures silica and siliceous matter.

Step 4: Hence, it is the best test for excessive silica.

Acid-insoluble ash value

Quick Tip: Acid-insoluble ash detects sand, silica, and earthy impurities in crude drugs.

---

125. Transverse section of *Adhatoda vasica* leaf shows a diagnostic feature of

(A) Multicellular glandular trichomes and cystoliths

(B) Unicellular covering trichomes only

(C) Absence of stomata

(D) Presence of resin ducts

Correct Answer: (A) Multicellular glandular trichomes and cystoliths

Solution:

Concept:

Microscopic characters are useful for identifying leaf drugs.

Step 1: *Adhatoda vasica* is also known as Vasaka.

Step 2: Its leaf shows characteristic trichomes and cystoliths.

Step 3: Multicellular glandular trichomes and cystoliths act as diagnostic features.

Step 4: Resin ducts and absence of stomata are not the correct features.

Multicellular glandular trichomes and cystoliths

Quick Tip: Vasaka leaf is identified by microscopic features such as glandular trichomes and cystoliths.

---

126. Arishta preparations in Ayurveda are characterized by

(A) Powdered crude drugs

(B) Fermented liquid preparations

(C) Calcined metallic or mineral drugs

(D) Oil-based formulations

Correct Answer: (B) Fermented liquid preparations

Solution:

Concept:

Arishta is a type of Ayurvedic dosage form.

Step 1: Arishta preparations are liquid formulations.

Step 2: They are prepared by fermentation.

Step 3: Fermentation produces self-generated alcohol that helps extraction and preservation.

Step 4: Hence, Arishtas are fermented liquid preparations.

Fermented liquid preparations

Quick Tip: Arishta and Asava are Ayurvedic fermented liquid preparations.

---

127. What is the fundamental principle of Homeopathy?

(A) Balance of doshas

(B) Use of polyherbal mixtures

(C) "Like cures like"

(D) Detoxification therapy

Correct Answer: (C) "Like cures like"

Solution:

Concept:

Homeopathy is based on the principle of similarity.

Step 1: The basic principle is *similia similibus curentur*.

Step 2: It means "like cures like".

Step 3: A substance causing symptoms in a healthy person may be used in diluted form to treat similar symptoms.

Step 4: Balance of doshas is related to Ayurveda, not Homeopathy.

"Like cures like"

Quick Tip: Homeopathy is based on the principle "like cures like".

---

128. Which herbal cosmetic oil is mainly used for its emollient and skin-softening property?

(A) Lavender oil

(B) Rosemary oil

(C) Almond oil

(D) Sandalwood oil

Correct Answer: (C) Almond oil

Solution:

Concept:

Emollients soften and soothe the skin by reducing dryness.

Step 1: Almond oil is rich in fatty components.

Step 2: It spreads well on skin and reduces dryness.

Step 3: Therefore, it is used as a skin-softening oil in cosmetics.

Step 4: Lavender and sandalwood are mainly aromatic oils.

Almond oil

Quick Tip: Almond oil is commonly used as an emollient and skin-softening cosmetic oil.

---

129. What is the main therapeutic use of *Aloe vera* gel?

(A) Analgesic action

(B) Wound healing and skin hydration

(C) Anthelmintic activity

(D) Sedative effect

Correct Answer: (B) Wound healing and skin hydration

Solution:

Concept:

Aloe vera gel is widely used in dermatological and cosmetic preparations.

Step 1: Aloe gel has soothing and moisturizing properties.

Step 2: It helps hydrate the skin.

Step 3: It also supports wound healing and minor burn healing.

Step 4: It is not mainly used as sedative or anthelmintic.

Wound healing and skin hydration

Quick Tip: *Aloe vera* gel is mainly used for wound healing, burns, and skin hydration.

---

130. The primary objective of phytochemical investigation is to

(A) Increase plant yield

(B) Enhance shelf life

(C) Improve cosmetic value

(D) Identify and characterize chemical constituents

Correct Answer: (D) Identify and characterize chemical constituents

Solution:

Concept:

Phytochemistry deals with chemical constituents present in plants.

Step 1: Medicinal plants contain alkaloids, glycosides, flavonoids, tannins, and other constituents.

Step 2: Phytochemical investigation studies these constituents.

Step 3: The aim is to identify, isolate, and characterize active compounds.

Step 4: It is not mainly done to increase yield or cosmetic value.

Identify and characterize chemical constituents

Quick Tip: Phytochemical investigation identifies and characterizes plant chemical constituents.

---

131. What is the primary need of OTC medicines?

(A) Increase self-treatment

(B) Reduce physician workload by managing minor ailments

(C) Promote combination therapy

(D) Improve sales

Correct Answer: (B) Reduce physician workload by managing minor ailments

Solution:

Concept:

OTC medicines are over-the-counter medicines that can be purchased without prescription.

Step 1: OTC medicines are used for minor and self-limiting ailments.

Step 2: They help patients manage simple conditions like cold, cough, acidity, or mild pain.

Step 3: This reduces unnecessary physician visits.

Step 4: Therefore, they reduce physician workload by managing minor ailments.

Reduce physician workload by managing minor ailments

Quick Tip: OTC medicines are useful for safe management of minor ailments without prescription.

---

132. Which condition requires immediate medical referral?

(A) Mild headache for one day

(B) Common cold

(C) Fever persisting beyond 3 days

(D) Nasal congestion

Correct Answer: (C) Fever persisting beyond 3 days

Solution:

Concept:

Pharmacists must identify warning signs that require referral to a doctor.

Step 1: Mild headache, common cold, and nasal congestion may often be managed initially with OTC advice.

Step 2: Fever lasting more than 3 days may indicate serious infection or underlying disease.

Step 3: Such a case should not be treated casually.

Step 4: Hence, immediate medical referral is required.

Fever persisting beyond 3 days

Quick Tip: Persistent fever beyond 3 days is a red-flag symptom and requires medical referral.

---

133. Major risk associated with irrational self-medication is

(A) Improved adherence

(B) Antimicrobial resistance

(C) Faster relief

(D) Reduced cost

Correct Answer: (B) Antimicrobial resistance

Solution:

Concept:

Self-medication means taking medicines without proper medical advice.

Step 1: Irrational self-medication often involves wrong drug, wrong dose, or incomplete course.

Step 2: Misuse of antibiotics is especially dangerous.

Step 3: It allows microbes to survive and become resistant.

Step 4: Therefore, a major risk is antimicrobial resistance.

Antimicrobial resistance

Quick Tip: Irrational antibiotic use is a major cause of antimicrobial resistance.

---

134. Best OTC option for dry cough without fever is

(A) Antibiotics

(B) Expectorants

(C) Corticosteroids

(D) Dextromethorphan

Correct Answer: (D) Dextromethorphan

Solution:

Concept:

Dry cough is non-productive cough, meaning mucus is not produced.

Step 1: Dry cough requires a cough suppressant.

Step 2: Dextromethorphan is an antitussive agent.

Step 3: It suppresses cough reflex and is suitable for dry cough.

Step 4: Antibiotics are not needed without evidence of bacterial infection.

Dextromethorphan

Quick Tip: Dextromethorphan is used for dry cough, while expectorants are used for productive cough.

---

135. The primary goal of Good Pharmacy Practice (GPP) is to ensure

(A) Increased profit

(B) Legal protection

(C) Safe and rational use of medicines

(D) Efficient procurement

Correct Answer: (C) Safe and rational use of medicines

Solution:

Concept:

Good Pharmacy Practice focuses on patient care and proper medicine use.

Step 1: GPP promotes safe dispensing and counselling.

Step 2: It ensures medicines are used correctly and rationally.

Step 3: The main goal is patient safety, not profit.

Step 4: Therefore, GPP ensures safe and rational use of medicines.

Safe and rational use of medicines

Quick Tip: Good Pharmacy Practice focuses on patient safety and rational medicine use.

---

136. Which is an essential component of a valid prescription?

(A) Diagnosis

(B) Age of patient

(C) Prescriber's signature

(D) Cost of medicine

Correct Answer: (C) Prescriber's signature

Solution:

Concept:

A prescription is a legal document written by a registered prescriber.

Step 1: For a prescription to be valid, it must be authenticated.

Step 2: Authentication is done by the prescriber's signature.

Step 3: Without signature, the prescription may not be legally valid.

Step 4: Diagnosis and cost may be useful, but signature is essential.

Prescriber's signature

Quick Tip: A valid prescription must include the prescriber's signature.

---

137. Main label on dispensed medicine should NOT include

(A) Patient name

(B) Directions for use

(C) Price of medicine

(D) Pharmacy details

Correct Answer: (C) Price of medicine

Solution:

Concept:

The label of a dispensed medicine provides information required for safe use.

Step 1: Patient name helps identify the correct patient.

Step 2: Directions for use guide proper administration.

Step 3: Pharmacy details help trace the dispensing source.

Step 4: Price of medicine is not a necessary part of the main dispensing label.

Price of medicine

Quick Tip: Dispensed medicine labels should focus on patient identity, directions, and pharmacy information, not price.

---

138. Most common cause of dispensing errors is

(A) Poor ventilation

(B) Look-alike and sound-alike drugs

(C) Excess manpower

(D) Short expiry

Correct Answer: (B) Look-alike and sound-alike drugs

Solution:

Concept:

Dispensing errors occur when wrong medicine, wrong strength, or wrong instructions are given.

Step 1: Some drug names look similar.

Step 2: Some drug names sound similar when spoken.

Step 3: These are called LASA drugs.

Step 4: LASA drugs are a common cause of dispensing errors.

Look-alike and sound-alike drugs

Quick Tip: LASA means look-alike and sound-alike drugs, a major cause of medication errors.

139. Patient Package Inserts (PPIs) mainly aim to

(A) Promote brands

(B) Replace pharmacist counselling

(C) Meet marketing needs

(D) Provide standardized drug information for safe use

Correct Answer: (D) Provide standardized drug information for safe use

Solution:

Concept:

Patient Package Inserts provide written information to patients about medicines.

Step 1: PPIs explain how to use the medicine safely.

Step 2: They include dose, precautions, side effects, and storage information.

Step 3: They do not replace pharmacist counselling but support it.

Step 4: Their main aim is standardized drug information for safe use.

Provide standardized drug information for safe use

Quick Tip: PPIs help patients understand safe and correct use of medicines.

140. What is the need for strongly recommending breastfeeding?

(A) Is economically cheaper only

(B) Prevents all childhood diseases

(C) Provides ideal nutrition and passive immunity to infants

(D) Improves digestion alone

Correct Answer: (C) Provides ideal nutrition and passive immunity to infants

Solution:

Concept:

Breastfeeding is the best natural nutrition for infants.

Step 1: Breast milk provides balanced nutrition.

Step 2: It contains antibodies that protect the infant.

Step 3: This protection is called passive immunity.

Step 4: Hence, breastfeeding provides ideal nutrition and passive immunity.

$$\boxed{\text{Provides ideal nutrition and passive immunity to infants}}$$

Quick Tip: Breast milk provides both nutrition and passive immunity to infants.

---

141. According to Drugs and Cosmetics Rules, 1945, the minimum area required for a retail pharmacy is _____ m^2.

(A) 6

(B) 8

(C) 10

(D) 12

Correct Answer: (B) 8

Solution:

Concept:

Retail pharmacy premises must satisfy legal space requirements.

Step 1: The Drugs and Cosmetics Rules prescribe minimum area requirements.

Step 2: For a retail pharmacy, the minimum required area is $8\,m^2$.

Step 3: Proper area helps in storage, dispensing, and safe handling of medicines.

Step 4: Therefore, the correct value is 8.

$$\boxed{8\,m^2}$$

Quick Tip: Minimum area for a retail pharmacy is $8\,m^2$.

---

142. Which of the following is a mandatory legal requirement for the establishment of a community pharmacy in India?

(A) NABH accreditation

(B) Employment of a registered pharmacist during working hours

(C) Ownership by a pharmacist

(D) ISO certification

Correct Answer: (B) Employment of a registered pharmacist during working hours

Solution:

Concept:

A community pharmacy must follow legal requirements for medicine sale.

Step 1: Medicines should be dispensed under professional supervision.

Step 2: A registered pharmacist is legally required during working hours.

Step 3: NABH and ISO certifications are not mandatory for every community pharmacy.

Step 4: Ownership by pharmacist is not the given mandatory requirement here.

Employment of a registered pharmacist during working hours

Quick Tip: A registered pharmacist must be present for legal and safe dispensing of medicines.

---

143. The most important criterion in selecting a site for a community pharmacy is

(A) Population density and patient footfall

(B) Parking availability

(C) Cost of the premises

(D) Proximity to wholesaler

Correct Answer: (A) Population density and patient footfall

Solution:

Concept:

Location is very important for community pharmacy success.

Step 1: A pharmacy should be accessible to patients.

Step 2: Areas with high population density have more potential customers.

Step 3: Higher patient footfall improves service reach and business sustainability.

Step 4: Therefore, population density and patient footfall are most important.

Population density and patient footfall

Quick Tip: A good community pharmacy location should have high accessibility and patient footfall.

---

144. In ideal community pharmacy design, the prescription counter should be located _____.

(A) Near the entrance

(B) At the rear end

(C) Adjacent to wash area

(D) In storage section

Correct Answer: (A) Near the entrance

Solution:

Concept:

Community pharmacy layout should support easy access and efficient service.

Step 1: Patients should easily locate the prescription counter.

Step 2: Placing it near the entrance improves visibility and accessibility.

Step 3: It also helps manage patient flow.

Step 4: Hence, the prescription counter should be near the entrance.

Near the entrance

Quick Tip: The prescription counter should be easily visible and accessible to patients.

---

145. Vendor selection in community pharmacy mainly depends on

(A) Supplier reputation only

(B) Distance from pharmacy

(C) Reliability of supply and credit terms

(D) Brand popularity

Correct Answer: (C) Reliability of supply and credit terms

Solution:

Concept:

Vendor selection affects availability, quality, and financial management in pharmacy.

Step 1: A pharmacy needs regular supply of medicines.

Step 2: A reliable supplier prevents stock-outs.

Step 3: Good credit terms help financial management.

Step 4: Hence, vendor selection depends mainly on reliability of supply and credit terms.

Reliability of supply and credit terms

Quick Tip: Choose vendors based on reliable supply, quality, pricing, and credit terms.

---

146. Which of the following represents artificially acquired active immunity?

(A) Natural infection

(B) Maternal antibodies

(C) Vaccination

(D) Serum administration

Correct Answer: (C) Vaccination

Solution:

Concept:

Immunity may be active or passive, and natural or artificial.

Step 1: Active immunity occurs when the body produces its own antibodies.

Step 2: Artificially acquired active immunity is produced by vaccination.

Step 3: Maternal antibodies and serum administration are passive immunity.

Step 4: Natural infection gives naturally acquired active immunity.

Vaccination

Quick Tip: Vaccination gives artificially acquired active immunity.

---

147. One of the major public health concerns associated with pharmaceutical environmental pollution is

(A) Increased drug stability

(B) Development of antimicrobial resistance

(C) Reduced therapeutic efficacy

(D) Improved sanitation

Correct Answer: (B) Development of antimicrobial resistance

Solution:

Concept:

Pharmaceutical pollutants may enter water, soil, and the environment.

Step 1: Antibiotic residues in the environment expose microorganisms to low drug levels.

Step 2: This creates selection pressure.

Step 3: Resistant microorganisms survive and multiply.

Step 4: Hence, antimicrobial resistance is a major concern.

Development of antimicrobial resistance

Quick Tip: Improper disposal of antibiotics can contribute to antimicrobial resistance.

---

148. Macronutrients are those nutrients that are required by the body

(A) In very small quantities for enzymatic activity

(B) Only during disease conditions

(C) In large amounts for energy and growth

(D) Only for metabolic regulation

Correct Answer: (C) In large amounts for energy and growth

Solution:

Concept:

Nutrients are broadly divided into macronutrients and micronutrients.

Step 1: Macronutrients are needed in large amounts.

Step 2: They include carbohydrates, proteins, and fats.

Step 3: They provide energy and support growth and body functions.

Step 4: Micronutrients are needed in small amounts.

In large amounts for energy and growth

Quick Tip: Carbohydrates, proteins, and fats are macronutrients required in large amounts.

---

149. Dietary fibre primarily helps in _____.

(A) Increasing blood glucose levels

(B) Preventing constipation and improving gut health

(C) Enhancing fat absorption

(D) Increasing calorific value of diet

Correct Answer: (B) Preventing constipation and improving gut health

Solution:

Concept:

Dietary fibre is the indigestible part of plant food.

Step 1: Fibre increases bulk in stool.

Step 2: It helps bowel movement.

Step 3: This prevents constipation and supports gut health.

Step 4: Fibre does not increase calorific value significantly.

Preventing constipation and improving gut health

Quick Tip: Dietary fibre improves bowel movement and prevents constipation.

150. What is food fortification?

(A) Addition of preservatives to food

(B) Removal of contaminants from food

(C) Deliberate addition of essential nutrients to food

(D) Genetic modification of crops

Correct Answer: (C) Deliberate addition of essential nutrients to food

Solution:

Concept:

Food fortification is a public health strategy used to improve nutritional quality of food.

Step 1: Some foods may lack essential nutrients.

Step 2: Fortification means adding essential vitamins or minerals deliberately.

Step 3: Examples include iodized salt and iron-fortified flour.

Step 4: It is not the same as adding preservatives or removing contaminants.

Deliberate addition of essential nutrients to food

Quick Tip: Food fortification means deliberately adding essential nutrients to improve nutritional value.

---

151. The powerhouse of a cell is

(A) Nucleus

(B) Mitochondria

(C) Ribosomes

(D) Lysosomes

Correct Answer: (B) Mitochondria

Solution:

Concept:

The cell contains different organelles, and each organelle performs a specific function. The organelle responsible for energy production is called the powerhouse of the cell.

Step 1: Understanding the role of mitochondria.

Mitochondria are double-membrane bound organelles present in eukaryotic cells. They are mainly responsible for cellular respiration.

Step 2: ATP production.

During aerobic respiration, glucose is oxidized and energy is released in the form of ATP.

$$\text{Glucose} + O_2 \rightarrow CO_2 + H_2O + ATP$$

Step 3: Why mitochondria are called powerhouse.

ATP is the main energy currency of the cell. Since mitochondria produce most of the ATP, they are called the powerhouse of the cell.

Step 4: Checking other options.

Nucleus controls cellular activities and stores genetic material.

Ribosomes are involved in protein synthesis.

Lysosomes contain digestive enzymes.

Mitochondria produce energy.

Mitochondria

Quick Tip: Mitochondria are called the powerhouse of the cell because they produce ATP through cellular respiration.

---

152. Simple squamous epithelium is found in

(A) Skin

(B) Alveoli of lungs

(C) Tendon

(D) Brain

Correct Answer: (B) Alveoli of lungs

Solution:

Concept:

Simple squamous epithelium is a single layer of thin, flat cells. It is suitable for diffusion, filtration, and exchange of gases.

Step 1: Understanding simple squamous epithelium.

The cells are very thin and flattened. This reduces the distance across which substances have to diffuse.

Step 2: Function in lungs.

The alveoli of lungs are sites of gaseous exchange. Oxygen diffuses from alveoli into blood, and carbon dioxide diffuses from blood into alveoli.

$$O_2 \longleftrightarrow CO_2$$

Step 3: Why alveoli need thin epithelium.

For rapid gas exchange, the lining must be very thin. Hence, alveoli are lined by simple squamous epithelium.

Step 4: Checking other options.

Skin has stratified squamous epithelium.

Tendon is connective tissue.

Brain is nervous tissue.

Therefore, the correct answer is alveoli of lungs.

Alveoli of lungs

Quick Tip: Simple squamous epithelium is found where diffusion or filtration occurs, such as alveoli and capillaries.

---

153. Functional unit of nervous tissue is

(A) Neuron

(B) Nephron

(C) Osteon

(D) Sarcomere

Correct Answer: (A) Neuron

Solution:

Concept:

Nervous tissue is specialized for receiving, processing, and transmitting impulses.

Step 1: Understanding nervous tissue.

Nervous tissue is made up of neurons and supporting cells called neuroglia.

Step 2: Role of neuron.

A neuron is the structural and functional unit of the nervous system. It receives stimulus and conducts nerve impulses.

Step 3: Parts of neuron.

A neuron has:

- Cell body
- Dendrites
- Axon

Step 4: Checking other options.

Nephron is the functional unit of kidney.

Osteon is the structural unit of compact bone.

Sarcomere is the functional unit of muscle contraction.

Neuron is the functional unit of nervous tissue.

Neuron

Quick Tip: Neuron is the functional unit of nervous tissue, while nephron is the functional unit of kidney.

---

154. Normal life span of RBC is approximately

(A) 60 days

(B) 90 days

(C) 120 days

(D) 180 days

Correct Answer: (C) 120 days

Solution:

Concept:

Red blood cells are blood cells mainly responsible for carrying oxygen with the help of haemoglobin.

Step 1: Formation of RBCs.

RBCs are formed in the bone marrow by a process called erythropoiesis.

Step 2: Life span of RBCs.

The average life span of human red blood cells is approximately 120 days.

Step 3: Destruction of old RBCs.

After about 120 days, old RBCs are mainly destroyed in the spleen, liver, and bone marrow.

Step 4: Checking options.

60 days and 90 days are shorter than the normal RBC life span.

180 days is longer than the normal RBC life span.

Therefore, the correct answer is 120 days.

120 days

Quick Tip: The normal life span of RBCs is about 120 days.

---

155. Heparin is secreted by

(A) Neutrophils

(B) Eosinophils

(C) Basophils

(D) Platelets

Correct Answer: (C) Basophils

Solution:

Concept:

White blood cells have different functions in immunity, allergy, inflammation, and defense.

Step 1: Understanding basophils.

Basophils are granulocytic white blood cells. Their granules contain biologically active substances.

Step 2: Substances released by basophils.

Basophils release histamine and heparin. Histamine is involved in allergic reactions, while heparin acts as an anticoagulant.

Step 3: Function of heparin.

Heparin prevents blood clotting by inhibiting clot formation.

Step 4: Checking other options.

Neutrophils are mainly phagocytic.

Eosinophils are involved in allergy and parasitic infections.

Platelets help in clot formation.

Basophils secrete heparin.

Basophils

Quick Tip: Basophils release histamine and heparin; heparin acts as an anticoagulant.

---

156. Vitamin essential for blood clotting is

(A) Vitamin A

(B) Vitamin C

(C) Vitamin D

(D) Vitamin K

Correct Answer: (D) Vitamin K

Solution:

Concept:

Blood clotting is a protective mechanism that prevents excessive blood loss after injury.

Step 1: Role of vitamin K.

Vitamin K is required for the synthesis of clotting factors in the liver.

Step 2: Important clotting factors.

Vitamin K is needed for the formation of factors II, VII, IX, and X.

Step 3: Deficiency effect.

Deficiency of vitamin K causes delayed clotting and increased bleeding tendency.

Step 4: Checking other options.

Vitamin A is important for vision.

Vitamin C is important for collagen synthesis.

Vitamin D is important for calcium absorption.

Vitamin K is essential for blood clotting.

Vitamin K

Quick Tip: Vitamin K is known as the anti-hemorrhagic vitamin because it is required for blood coagulation.

---

157. Largest lymphatic organ in human body is

(A) Thymus

(B) Spleen

(C) Tonsil

(D) Lymph node

Correct Answer: (B) Spleen

Solution:

Concept:

The lymphatic system helps in immunity, fluid balance, and filtration of lymph and blood.

Step 1: Understanding lymphatic organs.

Lymphatic organs include lymph nodes, spleen, thymus, and tonsils.

Step 2: Largest lymphatic organ.

The spleen is the largest lymphatic organ in the human body.

Step 3: Functions of spleen.

The spleen filters blood, destroys old RBCs, stores platelets, and helps in immune response.

Step 4: Checking other options.

Thymus is important for T-lymphocyte maturation.

Tonsils protect the throat region.

Lymph nodes filter lymph.

The spleen is the largest lymphatic organ.

Spleen

Quick Tip: The spleen is the largest lymphatic organ and filters blood.

---

158. The pacemaker of heart is

(A) AV node

(B) SA node

(C) Bundle of His

(D) Purkinje fibres

Correct Answer: (B) SA node

Solution:

Concept:

The heart has a conducting system that generates and spreads electrical impulses for rhythmic contraction.

Step 1: Meaning of pacemaker.

A pacemaker is a structure that initiates electrical impulses automatically.

Step 2: SA node.

The sinoatrial node, or SA node, is located in the right atrium. It generates impulses at the highest natural rate.

Step 3: Why SA node is pacemaker.

Since the SA node initiates the heartbeat and controls the rhythm, it is called the natural pacemaker of the heart.

Step 4: Checking other options.

AV node delays and passes impulses to ventricles.

Bundle of His and Purkinje fibres conduct impulses.

SA node initiates impulses.

SA node

Quick Tip: SA node is the natural pacemaker of the heart.

---

159. Pulmonary circulation carries blood from

(A) Heart to lungs

(B) Liver to heart

(C) Intestine to liver

(D) Kidney to bladder

Correct Answer: (A) Heart to lungs

Solution:

Concept:

Blood circulation is mainly divided into systemic circulation and pulmonary circulation.

Step 1: Understanding pulmonary circulation.

Pulmonary circulation is the circulation between the heart and lungs.

Step 2: Pathway.

Deoxygenated blood is pumped from the right ventricle of the heart to the lungs through the pulmonary artery.

$$\text{Heart} \rightarrow \text{Lungs}$$

Step 3: Purpose.

In the lungs, blood releases carbon dioxide and takes up oxygen.

Step 4: Checking other options.

Intestine to liver is portal circulation.

Kidney to bladder is urinary flow, not blood circulation.

Pulmonary circulation carries blood from heart to lungs.

$$\boxed{\text{Heart to lungs}}$$

Quick Tip: Pulmonary circulation carries deoxygenated blood from the heart to lungs for oxygenation.

---

160. Normal systolic blood pressure in adult is

(A) 80 mm Hg

(B) 100 mm Hg

(C) 120 mm Hg

(D) 160 mm Hg

Correct Answer: (C) 120 mm Hg

Solution:

Concept:

Blood pressure is the pressure exerted by circulating blood on the walls of blood vessels.

Step 1: Understanding systolic blood pressure.

Systolic blood pressure is the pressure during ventricular contraction.

Step 2: Normal value.

The normal adult blood pressure is commonly written as:

$$120/80 \text{ mm Hg}$$

Here, 120 mm Hg is systolic pressure and 80 mm Hg is diastolic pressure.

Step 3: Checking options.

80 mm Hg is usually diastolic pressure.

100 mm Hg is lower than usual systolic value.

160 mm Hg indicates high systolic pressure.

120 mm Hg is normal systolic pressure.

$$\boxed{120 \text{ mm Hg}}$$

Quick Tip: Normal adult blood pressure is about 120/80 mm Hg; 120 is systolic and 80 is diastolic.

---

161. Functional unit of lungs is

(A) Bronchus

(B) Alveolus

(C) Trachea

(D) Pleura

Correct Answer: (B) Alveolus

Solution:

Concept:

The lungs are respiratory organs responsible for exchange of gases.

Step 1: Understanding alveoli.

Alveoli are tiny air sacs present at the end of bronchioles.

Step 2: Function of alveoli.

Gas exchange occurs through the thin walls of alveoli. Oxygen enters the blood and carbon dioxide leaves the blood.

$$O_2 \rightarrow \text{blood}, \qquad CO_2 \rightarrow \text{alveoli}$$

Step 3: Why alveolus is functional unit.

Since the main function of lungs is gaseous exchange and alveoli perform this function, alveolus is the functional unit of lungs.

Step 4: Checking other options.

Bronchus and trachea are air passages.

Pleura is the covering of lungs.

Alveolus is the site of gas exchange.

Alveolus

Quick Tip: Alveoli are the functional units of lungs because they are the sites of gas exchange.

---

162. Normal tidal volume in adult is approximately

(A) 100 mL

(B) 500 mL

(C) 1000 mL

(D) 1500 mL

Correct Answer: (B) 500 mL

Solution:

Concept:

Tidal volume is the amount of air inspired or expired during normal quiet breathing.

Step 1: Understanding tidal volume.

During normal breathing, a fixed amount of air moves in and out of the lungs with each breath.

Step 2: Normal value.

In a normal healthy adult, tidal volume is approximately 500 mL.

Step 3: Importance.

Tidal volume helps determine pulmonary ventilation and respiratory efficiency.

Step 4: Checking options.

100 mL is too low for normal tidal volume.

1000 mL and 1500 mL are higher values and may be seen during deep breathing.

Normal quiet tidal volume is about 500 mL.

$$\boxed{500 \text{ mL}}$$

Quick Tip: Normal adult tidal volume is approximately 500 mL.

---

163. Largest gland in the human body is

(A) Pituitary

(B) Thyroid

(C) Liver

(D) Pancreas

Correct Answer: (C) Liver

Solution:

Concept:

A gland is an organ that secretes substances required for body functions.

Step 1: Understanding liver.

The liver is a large organ present in the upper right part of the abdomen.

Step 2: Glandular function.

The liver secretes bile, which helps in digestion and absorption of fats.

Step 3: Largest gland.

The liver is the largest gland in the human body.

Step 4: Checking other options.

Pituitary is called the master endocrine gland but is very small.

Thyroid is an endocrine gland but not the largest gland.

Pancreas is a mixed gland but smaller than liver.

Therefore, liver is correct.

Liver

Quick Tip: The liver is the largest gland in the human body and secretes bile.

---

164. Bile is stored in

(A) Liver

(B) Pancreas

(C) Gall bladder

(D) Spleen

Correct Answer: (C) Gall bladder

Solution:

Concept:

Bile is an important digestive secretion that helps in digestion and absorption of fats.

Step 1: Formation of bile.

Bile is produced by the liver.

Step 2: Storage of bile.

After formation, bile is stored and concentrated in the gall bladder.

Step 3: Release during digestion.

When fatty food enters the small intestine, gall bladder releases bile into the duodenum.

Step 4: Checking other options.

Liver produces bile but does not store it mainly.

Pancreas secretes digestive enzymes.

Spleen filters blood.

Gall bladder stores bile.

Gall bladder

Quick Tip: Bile is produced by the liver but stored and concentrated in the gall bladder.

---

165. Which of the following vitamins acts as an antioxidant?

(A) Vitamin B_1

(B) Vitamin K

(C) Vitamin E

(D) Vitamin D

Correct Answer: (C) Vitamin E

Solution:

Concept:

Antioxidants protect the body from damage caused by free radicals.

Step 1: Understanding free radicals.

Free radicals are highly reactive molecules that can damage cell membranes, proteins, and DNA.

Step 2: Role of vitamin E.

Vitamin E is a fat-soluble antioxidant. It protects cell membranes from lipid peroxidation.

Step 3: Importance in body.

Since cell membranes contain lipids, vitamin E is very important for protecting membrane lipids from oxidative damage.

Step 4: Checking other vitamins.

Vitamin B_1 is important in carbohydrate metabolism.

Vitamin K is required for blood clotting.

Vitamin D is important for calcium and bone metabolism.

Vitamin E acts as an antioxidant.

Vitamin E

Quick Tip: Vitamin E is a fat-soluble antioxidant that protects cell membranes from oxidative damage.

---

166. Which of the following is NOT a saponifiable lipid?

(A) Triglycerides

(B) Waxes

(C) Cholesterol

(D) Phospholipids

Correct Answer: (C) Cholesterol

Solution:

Concept:

Lipids may be classified as saponifiable and non-saponifiable lipids.

Step 1: Meaning of saponifiable lipids.

Saponifiable lipids contain ester bonds. On hydrolysis with alkali, they form soaps.

Step 2: Examples of saponifiable lipids.

Triglycerides, waxes, and phospholipids contain ester linkages. Hence, they are saponifiable lipids.

Step 3: Why cholesterol is not saponifiable.

Cholesterol is a sterol. It does not contain ester linkage in its basic free form, so it is not saponifiable.

Step 4: Final answer.

Therefore, cholesterol is not a saponifiable lipid.

Cholesterol

Quick Tip: Saponifiable lipids contain ester bonds; cholesterol is a non-saponifiable lipid.

---

167. Which of the following is a common example of phospholipid present in cell membranes?

(A) Lecithin

(B) Cholesterol

(C) Palmitic acid

(D) Glucose

Correct Answer: (A) Lecithin

Solution:

Concept:

Phospholipids are important structural components of cell membranes.

Step 1: Structure of phospholipids.

Phospholipids contain fatty acids, glycerol, phosphate group, and an additional alcohol-containing group.

Step 2: Lecithin.

Lecithin is also called phosphatidylcholine. It is a common phospholipid present in biological membranes.

Step 3: Role in cell membrane.

Phospholipids form the lipid bilayer of the cell membrane. Their hydrophilic head faces water, and hydrophobic tails face inward.

Step 4: Checking other options.

Cholesterol is a sterol.

Palmitic acid is a fatty acid.

Glucose is a carbohydrate.

Lecithin is a phospholipid.

Lecithin

Quick Tip: Lecithin, or phosphatidylcholine, is a common phospholipid found in cell membranes.

---

168. Which of the following lipoproteins transports dietary triglycerides from intestine to tissues?

(A) VLDL

(B) LDL

(C) HDL

(D) Chylomicrons

Correct Answer: (D) Chylomicrons

Solution:

Concept:

Lipoproteins transport lipids in blood because lipids are not freely soluble in plasma.

Step 1: Understanding dietary triglycerides.

Dietary triglycerides are fats obtained from food. They are absorbed in the intestine.

Step 2: Formation of chylomicrons.

After absorption, dietary triglycerides are packed into chylomicrons in intestinal cells.

Step 3: Function of chylomicrons.

Chylomicrons transport dietary triglycerides from the intestine to peripheral tissues such as adipose tissue and muscle.

Step 4: Checking other lipoproteins.

VLDL transports endogenous triglycerides from liver.

LDL transports cholesterol to tissues.

HDL transports cholesterol from tissues to liver.

Chylomicrons transport dietary triglycerides.

Chylomicrons

Quick Tip: Chylomicrons carry dietary triglycerides from intestine to tissues.

---

169. HDL is called good cholesterol because it

(A) Transports cholesterol from tissues to liver

(B) Transports triglycerides from intestine

(C) Carries cholesterol from liver to tissues

(D) Increases fat deposition in blood vessels

Correct Answer: (A) Transports cholesterol from tissues to liver

Solution:

Concept:

HDL stands for high-density lipoprotein. It is commonly called good cholesterol.

Step 1: Function of HDL.

HDL collects excess cholesterol from peripheral tissues and blood vessels.

Step 2: Reverse cholesterol transport.

HDL carries this cholesterol back to the liver for metabolism and excretion.

$$\text{Tissues} \rightarrow \text{HDL} \rightarrow \text{Liver}$$

Step 3: Why HDL is good.

By removing excess cholesterol from tissues and arteries, HDL helps reduce the risk of atherosclerosis.

Step 4: Checking other options.

Transport of dietary triglycerides is done by chylomicrons.

Transport of cholesterol from liver to tissues is mainly done by LDL.

HDL does not increase fat deposition in blood vessels.

Transports cholesterol from tissues to liver

Quick Tip: HDL is good cholesterol because it carries cholesterol from tissues back to the liver.

---

170. Which enzyme is involved in digestion of fats?

(A) Amylase

(B) Pepsin

(C) Lipase

(D) Trypsin

Correct Answer: (C) Lipase

Solution:

Concept:

Digestion involves breakdown of complex food substances into simpler absorbable forms.

Step 1: Understanding fat digestion.

Fats are mainly triglycerides. They must be broken down into fatty acids and glycerol or monoglycerides before absorption.

Step 2: Role of lipase.

Lipase is the enzyme that digests fats. Pancreatic lipase is especially important in the small intestine.

$$\text{Triglyceride} \xrightarrow{\text{Lipase}} \text{Fatty acids} + \text{Glycerol}$$

Step 3: Checking other enzymes.

Amylase digests carbohydrates.

Pepsin digests proteins in the stomach.

Trypsin digests proteins in the small intestine.

Lipase digests fats.

Step 4: Final answer.

Therefore, the enzyme involved in digestion of fats is lipase.

Lipase

Quick Tip: Lipase digests fats, amylase digests carbohydrates, and pepsin/trypsin digest proteins.

---

171. Insulin is secreted by _____.

(A) Alpha cells

(B) Beta cells

(C) Delta cells

(D) Acinar cells

Correct Answer: (B) Beta cells

Solution:

Concept:

The pancreas has both endocrine and exocrine functions. The endocrine part of the pancreas is made up of the islets of Langerhans.

Step 1: The islets of Langerhans contain different types of cells.

Step 2: Alpha cells secrete glucagon.

Step 3: Beta cells secrete insulin.

Step 4: Delta cells secrete somatostatin.

Step 5: Insulin lowers blood glucose level by helping glucose enter body cells.

Beta cells

Quick Tip: Beta cells of the pancreas secrete insulin, while alpha cells secrete glucagon.

---

172. Which route gives fastest drug absorption?

(A) Oral

(B) Intramuscular

(C) Subcutaneous

(D) Transdermal

Correct Answer: (B) Intramuscular

Solution:

Concept:

The rate of drug absorption depends on the route of administration, blood supply at the site, and formulation of the drug.

Step 1: Oral drugs must pass through the gastrointestinal tract before absorption. This usually takes more time.

Step 2: Transdermal absorption is slow because the drug has to pass through the skin.

Step 3: Subcutaneous injection gives absorption from the tissue under the skin, but it is generally slower than intramuscular injection.

Step 4: Intramuscular route has better blood supply than subcutaneous tissue, so absorption is faster.

Step 5: Among the given options, intramuscular route gives the fastest drug absorption.

Intramuscular

Quick Tip: Among oral, subcutaneous, transdermal, and intramuscular routes, intramuscular route generally gives faster absorption due to better blood supply.

---

173. First pass metabolism occurs mainly in _____.

(A) Kidney

(B) Liver

(C) Lungs

(D) Skin

Correct Answer: (B) Liver

Solution:

Concept:

First pass metabolism is the metabolism of a drug before it reaches the systemic circulation.

Step 1: After oral administration, a drug is absorbed from the gastrointestinal tract.

Step 2: The absorbed drug enters the portal circulation.

Step 3: The portal circulation carries the drug to the liver.

Step 4: In the liver, enzymes may metabolize a large amount of the drug before it reaches the general circulation.

Step 5: Therefore, first pass metabolism occurs mainly in the liver.

Liver

Quick Tip: First pass metabolism mainly occurs in the liver and can reduce the bioavailability of orally administered drugs.

---

174. Which route is suitable for unconscious patient?

(A) Oral

(B) Parenteral

(C) Sublingual

(D) Topical

Correct Answer: (B) Parenteral

Solution:

Concept:

The route of drug administration is selected according to the condition of the patient and the

urgency of treatment.

Step 1: An unconscious patient cannot swallow tablets or liquids safely.

Step 2: Oral route may cause choking or aspiration in such patients.

Step 3: Sublingual route also requires patient cooperation.

Step 4: Parenteral route means administration by injection, such as intravenous, intramuscular, or subcutaneous route.

Step 5: Parenteral route is suitable for unconscious patients because it does not require swallowing.

Parenteral

Quick Tip: For unconscious patients, parenteral route is preferred because oral administration is unsafe.

---

175. Bioavailability refers to _____.

(A) Rate and extent of drug reaching systemic circulation

(B) Drug protein binding

(C) Drug metabolism

(D) Drug excretion

Correct Answer: (A) Rate and extent of drug reaching systemic circulation

Solution:

Concept:

Bioavailability is an important pharmacokinetic parameter. It tells how much drug reaches the systemic circulation in active form.

Step 1: When a drug is administered, it must be absorbed into the blood to produce systemic effect.

Step 2: The amount of drug that reaches systemic circulation is called the extent of absorption.

Step 3: How fast the drug reaches systemic circulation is called the rate of absorption.

Step 4: Bioavailability includes both rate and extent of drug absorption.

Step 5: Therefore, bioavailability refers to the rate and extent of drug reaching systemic circulation.

Rate and extent of drug reaching systemic circulation

Quick Tip: Bioavailability tells how much and how fast a drug reaches systemic circulation.

---

176. Loading dose is given to _____.

(A) Reduce toxicity

(B) Achieve therapeutic level quickly

(C) Increase excretion

(D) Avoid absorption

Correct Answer: (B) Achieve therapeutic level quickly

Solution:

Concept:

Loading dose is an initial higher dose of a drug given to rapidly achieve the desired therapeutic concentration.

Step 1: Some drugs take a long time to reach steady-state concentration if only maintenance dose is given.

Step 2: In urgent situations, waiting for steady state may delay therapeutic effect.

Step 3: A loading dose rapidly raises plasma drug concentration to the therapeutic range.

Step 4: After that, maintenance doses are given to maintain the drug level.

Step 5: Hence, loading dose is given to achieve therapeutic level quickly.

Achieve therapeutic level quickly

Quick Tip: Loading dose gives rapid therapeutic concentration, while maintenance dose maintains that concentration.

---

177. Drug excretion mainly occurs through _____.

(A) Liver

(B) Kidney

(C) Lungs

(D) Skin

Correct Answer: (B) Kidney

Solution:

Concept:

Drug excretion is the removal of drugs and their metabolites from the body.

Step 1: The kidney is the major organ of drug excretion.

Step 2: Drugs are filtered through glomerular filtration.

Step 3: Some drugs undergo tubular secretion.

Step 4: Some drugs may also undergo tubular reabsorption.

Step 5: Finally, drugs and metabolites are removed through urine.

Kidney

Quick Tip: Kidney is the main organ for drug excretion, especially for water-soluble drugs and metabolites.

---

178. Antagonist is a drug which _____.

(A) Activates receptor

(B) Blocks receptor response

(C) Increases absorption

(D) Stimulates metabolism

Correct Answer: (B) Blocks receptor response

Solution:

Concept:

Drugs act by interacting with receptors. Some drugs activate receptors, while some drugs block receptors.

Step 1: An agonist binds to a receptor and produces a response.

Step 2: An antagonist binds to a receptor but does not activate it.

Step 3: It prevents the agonist or natural ligand from producing its effect.

Step 4: Thus, an antagonist blocks receptor response.

Step 5: Therefore, the correct answer is blocks receptor response.

$$\boxed{\text{Blocks receptor response}}$$

Quick Tip: Agonist activates receptor, while antagonist blocks receptor response.

---

179. The therapeutic index is defined as _____.

(A) LD_{50}/ED_{50}

(B) ED_{50}/LD_{50}

(C) $Dose/Time$

(D) $Clearance/Volume$

Correct Answer: (A) LD_{50}/ED_{50}

Solution:

Concept:

Therapeutic index is a measure of drug safety. It compares the toxic dose with the effective dose.

Step 1: ED_{50} means median effective dose. It is the dose effective in 50% of the population.

Step 2: LD_{50} means median lethal dose. It is the dose lethal in 50% of test animals.

Step 3: Therapeutic index is calculated as:

$$TI = \frac{LD_{50}}{ED_{50}}$$

Step 4: A higher therapeutic index means a safer drug.

Step 5: Therefore, therapeutic index is LD_{50}/ED_{50}.

$$\boxed{\frac{LD_{50}}{ED_{50}}}$$

Quick Tip: Therapeutic index $= LD_{50}/ED_{50}$. Higher therapeutic index means greater safety margin.

---

180. Placebo is _____.

(A) Highly toxic drug

(B) Inert substance with no specific pharmacological action

(C) Antidote

(D) Antibiotic

Correct Answer: (B) Inert substance with no specific pharmacological action

Solution:

Concept:

A placebo is commonly used in clinical studies and sometimes produces psychological benefit.

Step 1: Placebo is an inactive substance.

Step 2: It looks like a real medicine but does not contain active drug.

Step 3: It has no specific pharmacological action.

Step 4: It may produce benefit due to the patient's belief or psychological response.

Step 5: Therefore, placebo is an inert substance with no specific pharmacological action.

Inert substance with no specific pharmacological action

Quick Tip: Placebo is an inactive substance used mainly for psychological effect or as control in clinical trials.

---

181. Phenytoin is mainly used in _____.

(A) Hypertension

(B) Epilepsy

(C) Diabetes

(D) Asthma

Correct Answer: (B) Epilepsy

Solution:

Concept:

Phenytoin is an antiepileptic drug used to control seizures.

Step 1: Epilepsy is a disorder characterized by recurrent seizures.

Step 2: Phenytoin stabilizes neuronal membranes.

Step 3: It mainly blocks voltage-gated sodium channels.

Step 4: This reduces abnormal repetitive firing of neurons.

Step 5: Therefore, phenytoin is mainly used in epilepsy.

Epilepsy

Quick Tip: Phenytoin is an antiepileptic drug that acts mainly by blocking sodium channels.

---

182. Atropine is obtained from _____.

(A) *Atropa belladonna*

(B) *Digitalis purpurea*

(C) *Rauwolfia serpentina*

(D) *Papaver somniferum*

Correct Answer: (A) *Atropa belladonna*

Solution:

Concept:

Atropine is a tropane alkaloid obtained from solanaceous plants.

Step 1: *Atropa belladonna* is an important source of atropine.

Step 2: Atropine is an anticholinergic drug.

Step 3: It blocks muscarinic receptors.

Step 4: Digitalis contains cardiac glycosides, Rauwolfia contains reserpine, and Papaver contains morphine.

Step 5: Therefore, atropine is obtained from *Atropa belladonna*.

Atropa belladonna

Quick Tip: Atropine is obtained from *Atropa belladonna* and acts as an anticholinergic drug.

---

183. Amlodipine is used in treatment of _____.

(A) Epilepsy

(B) Hypertension

(C) Tuberculosis

(D) Malaria

Correct Answer: (B) Hypertension

Solution:

Concept:

Amlodipine is a calcium channel blocker used mainly in cardiovascular diseases.

Step 1: Hypertension means increased blood pressure.

Step 2: Amlodipine blocks calcium entry into vascular smooth muscle.

Step 3: This causes relaxation of blood vessels.

Step 4: Relaxation of blood vessels reduces peripheral resistance and lowers blood pressure.

Step 5: Therefore, amlodipine is used in hypertension.

Hypertension

Quick Tip: Amlodipine is a calcium channel blocker used for hypertension and angina.

---

184. Salbutamol is used as _____.

(A) Antacid

(B) Bronchodilator

(C) Antidiabetic

(D) Antimalarial

Correct Answer: (B) Bronchodilator

Solution:

Concept:

Salbutamol is a short-acting β_2-adrenergic agonist.

Step 1: Bronchospasm occurs due to contraction of bronchial smooth muscle.

Step 2: Salbutamol stimulates β_2-receptors in bronchial smooth muscle.

Step 3: This causes relaxation of bronchial smooth muscle.

Step 4: As a result, airways dilate and breathing improves.

Step 5: Therefore, salbutamol is used as a bronchodilator.

Bronchodilator

Quick Tip: Salbutamol is a short-acting bronchodilator used for quick relief in asthma.

---

185. Morphine is used as _____.

(A) Antihypertensive

(B) Strong analgesic

(C) Antifungal

(D) Antacid

Correct Answer: (B) Strong analgesic

Solution:

Concept:

Morphine is an opioid analgesic used for severe pain.

Step 1: Analgesics are drugs that relieve pain.

Step 2: Morphine acts mainly on opioid receptors in the central nervous system.

Step 3: It decreases perception of pain and emotional response to pain.

Step 4: It is used in severe pain, such as postoperative pain or cancer pain.

Step 5: Therefore, morphine is used as a strong analgesic.

Strong analgesic

Quick Tip: Morphine is a strong opioid analgesic used for severe pain.

---

186. Paracetamol is mainly used as _____.

(A) Antibiotic

(B) Analgesic and antipyretic

(C) Antifungal

(D) Antihypertensive

Correct Answer: (B) Analgesic and antipyretic

Solution:

Concept:

Paracetamol is a commonly used medicine for pain and fever.

Step 1: Analgesic means pain-relieving drug.

Step 2: Antipyretic means fever-reducing drug.

Step 3: Paracetamol reduces pain and lowers fever by acting mainly in the central nervous system.

Step 4: It has weak anti-inflammatory action compared with NSAIDs.

Step 5: Therefore, paracetamol is mainly used as analgesic and antipyretic.

Analgesic and antipyretic

Quick Tip: Paracetamol is commonly used for fever and mild to moderate pain.

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187. Penicillin acts by inhibiting _____.

(A) Protein synthesis

(B) Cell wall synthesis

(C) DNA replication

(D) Folic acid synthesis

Correct Answer: (B) Cell wall synthesis

Solution:

Concept:

Penicillin is a β-lactam antibiotic.

Step 1: Bacteria have a cell wall made of peptidoglycan.

Step 2: Penicillin inhibits transpeptidase enzymes.

Step 3: These enzymes are required for cross-linking of peptidoglycan.

Step 4: When cell wall synthesis is blocked, bacteria become weak and die.

Step 5: Therefore, penicillin acts by inhibiting cell wall synthesis.

Cell wall synthesis

Quick Tip: Penicillin and cephalosporins are β-lactam antibiotics that inhibit bacterial cell wall synthesis.

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188. Tetracycline inhibits _____.

(A) Cell wall synthesis

(B) Protein synthesis

(C) DNA replication

(D) RNA synthesis

Correct Answer: (B) Protein synthesis

Solution:

Concept:

Tetracycline is a broad-spectrum antibiotic that acts on bacterial ribosomes.

Step 1: Bacterial protein synthesis occurs on ribosomes.

Step 2: Tetracycline binds to the 30S ribosomal subunit.

Step 3: It prevents attachment of aminoacyl-tRNA to the ribosome.

Step 4: This stops addition of amino acids to the growing peptide chain.

Step 5: Therefore, tetracycline inhibits protein synthesis.

Protein synthesis

Quick Tip: Tetracycline inhibits bacterial protein synthesis by acting on the 30*S* ribosomal subunit.

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189. Streptomycin belongs to _____ antibiotics.

(A) Penicillins

(B) Cephalosporins

(C) Aminoglycosides

(D) Macrolides

Correct Answer: (C) Aminoglycosides

Solution:

Concept:

Antibiotics are classified into different groups according to their structure and mechanism of action.

Step 1: Streptomycin is an antibacterial drug.

Step 2: It belongs to the aminoglycoside class.

Step 3: Aminoglycosides act mainly by inhibiting bacterial protein synthesis.

Step 4: They bind to the 30*S* ribosomal subunit.

Step 5: Therefore, streptomycin is an aminoglycoside antibiotic.

Aminoglycosides

Quick Tip: Streptomycin, gentamicin, and amikacin are aminoglycoside antibiotics.

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190. Which drug should be avoided in patients with history of hypersensitivity to penicillins?

(A) Paracetamol

(B) Tetracycline

(C) Gentamicin

(D) Penicillins

Correct Answer: (D) Penicillins

Solution:

Concept:

Drug hypersensitivity means an allergic reaction to a drug.

Step 1: Penicillin allergy can cause rash, urticaria, bronchospasm, or even anaphylaxis.

Step 2: If a patient has a history of hypersensitivity to penicillins, the same class should be avoided.

Step 3: Re-exposure may cause a more severe allergic reaction.

Step 4: Other antibiotics may be selected depending on infection and clinical condition.

Step 5: Therefore, penicillins should be avoided.

Penicillins

Quick Tip: Always check history of drug allergy before dispensing penicillins.

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191. Metformin is used for treatment of _____.

(A) Hypertension

(B) Type 2 diabetes mellitus

(C) Asthma

(D) Epilepsy

Correct Answer: (B) Type 2 diabetes mellitus

Solution:

Concept:

Metformin is an oral antidiabetic drug belonging to the biguanide class.

Step 1: Type 2 diabetes mellitus commonly involves insulin resistance.

Step 2: Metformin reduces hepatic glucose production.

Step 3: It also improves insulin sensitivity in peripheral tissues.

Step 4: It usually does not cause significant weight gain.

Step 5: Therefore, metformin is used in type 2 diabetes mellitus.

Type 2 diabetes mellitus

Quick Tip: Metformin is a first-line oral drug for type 2 diabetes mellitus.

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192. Aspirin is used as _____.

(A) Antacid

(B) Analgesic, antipyretic and anti-inflammatory drug

(C) Antifungal

(D) Antidiabetic

Correct Answer: (B) Analgesic, antipyretic and anti-inflammatory drug

Solution:

Concept:

Aspirin is a non-steroidal anti-inflammatory drug.

Step 1: Analgesic action means pain relief.

Step 2: Antipyretic action means reduction of fever.

Step 3: Anti-inflammatory action means reduction of inflammation.

Step 4: Aspirin inhibits cyclooxygenase enzymes and reduces prostaglandin synthesis.

Step 5: Therefore, aspirin is used as an analgesic, antipyretic and anti-inflammatory drug.

Analgesic, antipyretic and anti-inflammatory drug

Quick Tip: Aspirin is an NSAID with analgesic, antipyretic, anti-inflammatory, and antiplatelet actions.

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193. Fluconazole is _____ drug.

(A) Antibacterial

(B) Antifungal

(C) Antiviral

(D) Antimalarial

Correct Answer: (B) Antifungal

Solution:

Concept:

Fluconazole belongs to the azole group of antifungal drugs.

Step 1: Fungal cell membranes contain ergosterol.

Step 2: Fluconazole inhibits synthesis of ergosterol.

Step 3: Without proper ergosterol synthesis, fungal cell membrane function is disturbed.

Step 4: This inhibits fungal growth.

Step 5: Therefore, fluconazole is an antifungal drug.

Antifungal

Quick Tip: Fluconazole is an azole antifungal drug that inhibits ergosterol synthesis.

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194. Antihistamines are mainly used for _____.

(A) Allergic conditions

(B) Diabetes

(C) Tuberculosis

(D) Malaria

Correct Answer: (A) Allergic conditions

Solution:

Concept:

Histamine is an important mediator released during allergic reactions.

Step 1: Histamine causes sneezing, itching, watery eyes, and nasal discharge.

Step 2: Antihistamines block histamine receptors.

Step 3: By blocking histamine action, they reduce allergic symptoms.

Step 4: They are commonly used in allergic rhinitis, urticaria, and itching.

Step 5: Therefore, antihistamines are mainly used for allergic conditions.

Allergic conditions

Quick Tip: Antihistamines are used to relieve allergic symptoms like sneezing, itching, and urticaria.

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195. Corticosteroids are mainly used as _____.

(A) Anti-inflammatory drugs

(B) Antacids

(C) Antifungals

(D) Antimalarials

Correct Answer: (A) Anti-inflammatory drugs

Solution:

Concept:

Corticosteroids are steroid hormones or synthetic steroid drugs with strong anti-inflammatory and immunosuppressive actions.

Step 1: Inflammation involves swelling, redness, pain, and release of inflammatory mediators.

Step 2: Corticosteroids reduce the formation of inflammatory mediators.

Step 3: They suppress immune responses and inflammation.

Step 4: They are used in asthma, allergic reactions, autoimmune diseases, and inflammatory disorders.

Step 5: Therefore, corticosteroids are mainly used as anti-inflammatory drugs.

Anti-inflammatory drugs

Quick Tip: Corticosteroids are powerful anti-inflammatory and immunosuppressive drugs.

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196. Drug of choice in anaphylactic shock is _____.

(A) Adrenaline

(B) Paracetamol

(C) Metformin

(D) Fluconazole

Correct Answer: (A) Adrenaline

Solution:

Concept:

Anaphylactic shock is a severe life-threatening allergic reaction.

Step 1: In anaphylaxis, there may be bronchospasm, hypotension, swelling, and difficulty in breathing.

Step 2: Adrenaline acts quickly on adrenergic receptors.

Step 3: It causes bronchodilation and improves breathing.

Step 4: It also causes vasoconstriction and helps increase blood pressure.

Step 5: Therefore, adrenaline is the drug of choice in anaphylactic shock.

Adrenaline

Quick Tip: Adrenaline is the first-line drug in anaphylactic shock because it rapidly reverses bronchospasm and hypotension.

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197. Oral contraceptive pills mainly prevent pregnancy by _____.

(A) Increasing ovulation

(B) Preventing ovulation

(C) Increasing fertilization

(D) Increasing implantation

Correct Answer: (B) Preventing ovulation

Solution:

Concept:

Oral contraceptive pills contain hormones that prevent pregnancy.

Step 1: Ovulation means release of ovum from ovary.

Step 2: If ovulation does not occur, fertilization cannot take place.

Step 3: Oral contraceptives suppress pituitary gonadotropins such as FSH and LH.

Step 4: This prevents ovulation.

Step 5: Therefore, oral contraceptives mainly prevent pregnancy by preventing ovulation.

Preventing ovulation

Quick Tip: Oral contraceptive pills mainly act by suppressing ovulation.

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198. Propranolol is classified as _____.

(A) Beta blocker

(B) Calcium channel blocker

(C) Diuretic

(D) Antifungal

Correct Answer: (A) Beta blocker

Solution:

Concept:

Propranolol is a drug used in cardiovascular disorders.

Step 1: Beta blockers block beta adrenergic receptors.

Step 2: Propranolol blocks both β_1 and β_2 receptors.

Step 3: Blocking β_1 receptors reduces heart rate and force of contraction.

Step 4: This helps in hypertension, angina, and arrhythmias.

Step 5: Therefore, propranolol is classified as a beta blocker.

Beta blocker

Quick Tip: Propranolol is a non-selective beta blocker.

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199. Furosemide is classified as _____.

(A) Loop diuretic

(B) Antacid

(C) Antifungal

(D) Antiepileptic

Correct Answer: (A) Loop diuretic

Solution:

Concept:

Diuretics are drugs that increase urine output.

Step 1: Furosemide acts on the loop of Henle in the kidney.

Step 2: It inhibits sodium, potassium, and chloride reabsorption.

Step 3: This causes increased excretion of water and electrolytes.

Step 4: It is useful in edema, heart failure, and hypertension.

Step 5: Therefore, furosemide is classified as a loop diuretic.

Loop diuretic

Quick Tip: Furosemide is a loop diuretic that acts on the loop of Henle.

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200. Ondansetron is mainly used as _____.

(A) Antiemetic

(B) Antidiabetic

(C) Antimalarial

(D) Antacid

Correct Answer: (A) Antiemetic

Solution:

Concept:

Antiemetics are drugs used to prevent or treat nausea and vomiting.

Step 1: Ondansetron is a $5-HT_3$ receptor antagonist.

Step 2: It blocks serotonin receptors involved in vomiting reflex.

Step 3: It is especially useful in chemotherapy-induced nausea and vomiting.

Step 4: It is also used in postoperative nausea and vomiting.

Step 5: Therefore, ondansetron is mainly used as an antiemetic.

Antiemetic

Quick Tip: Ondansetron is a $5-HT_3$ blocker used to prevent nausea and vomiting.
