

Q1. All questions refer to 2018 Q1. A-C

Q2. Write Short notes:-

(a) Anti Hypertensive drugs.

**:- Anti-Hypertensive Drugs (5 Marks)**

**Definition:**

Anti-hypertensive drugs are **medications used to lower high blood pressure (hypertension)** and reduce the risk of complications like **stroke, heart attack, and kidney failure**.

**Classification of Anti-Hypertensive Drugs:**

1. **Diuretics** – Increase urine output to reduce blood volume and pressure.
  - Example: **Hydrochlorothiazide, Furosemide**
2. **Beta-Blockers** – Reduce heart rate and cardiac output.
  - Example: **Atenolol, Metoprolol**
3. **Calcium Channel Blockers (CCBs)** – Relax blood vessels by preventing calcium entry.
  - Example: **Amlodipine, Verapamil**
4. **ACE Inhibitors** – Block Angiotensin-Converting Enzyme (ACE), reducing blood pressure.
  - Example: **Enalapril, Lisinopril**
5. **Angiotensin II Receptor Blockers (ARBs)** – Block angiotensin receptors, causing vasodilation.
  - Example: **Losartan, Telmisartan**
6. **Alpha-Blockers** – Reduce vascular resistance by blocking alpha receptors.
  - Example: **Prazosin, Doxazosin**
7. **Vasodilators** – Directly relax blood vessels.
  - Example: **Hydralazine, Sodium Nitroprusside**

**Uses of Anti-Hypertensive Drugs:**

- Control **high blood pressure** to prevent complications.
- Reduce risk of **stroke, heart disease, and kidney failure**.
- Used in conditions like **heart failure and post-myocardial infarction**.

**Conclusion:**

Anti-hypertensive drugs work through different mechanisms to **lower blood pressure and protect vital organs**. Proper selection depends on **patient condition, age, and associated diseases**.

(B) Bronchodilators.

**:- 1. Definition:**

Bronchodilators are **medications that relax the airway muscles** and widen the bronchi and bronchioles, making breathing easier. They are used to treat **asthma, chronic obstructive pulmonary disease (COPD), and other respiratory conditions**.

## 2. Classification of Bronchodilators:

1. **Beta-2 Adrenergic Agonists** – Stimulate  $\beta_2$  receptors, causing airway relaxation.
  - **Short-acting (SABA):** Salbutamol, Terbutaline (used in acute attacks).
  - **Long-acting (LABA):** Salmeterol, Formoterol (for maintenance therapy).
2. **Anticholinergics (Muscarinic Antagonists)** – Block acetylcholine, reducing airway constriction.
  - **Short-acting (SAMA):** Ipratropium.
  - **Long-acting (LAMA):** Tiotropium.
3. **Methylxanthines** – Inhibit phosphodiesterase, increasing cAMP for bronchodilation.
  - Example: Theophylline, Aminophylline.

## 3. Uses of Bronchodilators:

- **Treat asthma** by relieving airway obstruction.
- **Manage COPD** to improve airflow and reduce symptoms.
- **Used in anaphylaxis** (severe allergic reactions) along with other medications.

## 4. Side Effects:

- **Tachycardia (rapid heart rate).**
- **Tremors and nervousness.**
- **Headache and dizziness.**

## Conclusion:

Bronchodilators are essential in treating **asthma and COPD** by relaxing airway muscles, improving breathing, and preventing respiratory distress.

(C) NSAID

**:- Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) (5 Marks)**

## 1. Definition:

NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) are **medications that reduce pain, inflammation, and fever** without the use of steroids. They work by **inhibiting cyclooxygenase (COX) enzymes**, which are responsible for prostaglandin synthesis.

## 2. Classification of NSAIDs:

1. **Non-Selective COX Inhibitors** (Inhibit both COX-1 & COX-2):
  - Example: Aspirin, Ibuprofen, Naproxen, Diclofenac
2. **Selective COX-2 Inhibitors** (Cause fewer gastric side effects):
  - Example: Celecoxib, Etoricoxib

### 3. Pharmacological Actions:

- **Anti-inflammatory** – Reduces swelling and inflammation.
- **Analgesic (Pain relief)** – Used for mild to moderate pain.
- **Antipyretic (Fever reduction)** – Lowers body temperature.
- **Antiplatelet (Aspirin)** – Prevents blood clot formation.

### 4. Uses of NSAIDs:

- Treatment of **arthritis, musculoskeletal pain, and headaches**.
- **Fever reduction** in infections.
- **Post-operative pain relief**.
- **Aspirin is used in cardiovascular diseases** for blood thinning.

### 5. Side Effects:

- **Gastric irritation, ulcers, and bleeding**.
- **Kidney damage (nephrotoxicity)** with prolonged use.
- **Increased risk of heart attack (COX-2 inhibitors)**.

### Conclusion:

NSAIDs are widely used for **pain, inflammation, and fever** but should be used with caution due to their **gastrointestinal and renal side effects**.

(D) what precautions you will take before and during infusion drip.

### **:- Precautions Before and During Infusion Drip (5 Marks)**

#### **1. Precautions Before Starting the Infusion:**

1. **Check the Doctor's Order** – Verify the **type, dose, and rate of infusion** prescribed.
2. **Inspect the IV Fluid and Equipment** – Ensure the fluid is **clear, not expired, and free from contamination**.
3. **Check Patient Identity and Allergies** – Confirm the **right patient** and check for **allergies to IV medications**.
4. **Select the Right IV Site** – Choose a **healthy vein**, avoiding areas with swelling or infection.
5. **Maintain Aseptic Technique** – Use **sterile gloves** and disinfect the skin to prevent infection.

#### **2. Precautions During the Infusion:**

1. **Monitor the Flow Rate** – Ensure the **IV drip is running at the correct speed** to prevent complications.
2. **Observe for Reactions** – Watch for **signs of allergy, swelling, redness, or pain** at the IV site.
3. **Prevent Air Embolism** – **Remove air bubbles** from the IV tubing before connecting it to the patient.

4. **Assess for Fluid Overload** – Monitor for **shortness of breath, swelling, or high blood pressure**, especially in heart or kidney patients.
5. **Regularly Check the IV Site** – Look for **signs of phlebitis (inflammation) or infiltration (fluid leakage into tissues)**.

**Conclusion:**

Proper **preparation, monitoring, and aseptic techniques** ensure **safe and effective IV fluid administration**, reducing risks of infection, complications, and patient discomfort.

Q3. Short answer questions.

(a) Uses of aspirin.

**:- Uses of Aspirin (2 Marks)**

1. **Pain Relief (Analgesic)** – Used to treat mild to moderate pain such as **headaches, muscle pain, and arthritis**.
2. **Fever Reduction (Antipyretic)** – Lowers body temperature in **fever**.
3. **Anti-Inflammatory** – Reduces **swelling and inflammation** in conditions like **rheumatoid arthritis**.
4. **Blood Thinner (Antiplatelet)** – Prevents **blood clot formation**, reducing the risk of **heart attacks and strokes**.

(B) Define pharmacodynamics.

**:- Pharmacodynamics (2 Marks)**

**Definition:**

Pharmacodynamics is the **study of how drugs act on the body**, including their **mechanism of action, effects, and biological response** at the cellular or organ level. It explains the **relationship between drug concentration and effect**.

**Example: Beta-blockers** reduce heart rate by **blocking beta-adrenergic receptors**.

(C) Side effect of penicillin.

**:-** Refer to 2019 Q3 (c)

(D) Two drug used in angina pectoris.

**:- Two Drugs Used in Angina Pectoris (2 Marks)**

1. **Nitroglycerin** – A **nitrate** that relaxes blood vessels, improving blood flow to the heart.
2. **Atenolol** – A **beta-blocker** that reduces heart rate and oxygen demand, relieving chest pain.

(E) Two uses of Heparin.

**:- Two Uses of Heparin (2 Marks)**

1. **Prevention and Treatment of Blood Clots** – Used in **deep vein thrombosis (DVT), pulmonary embolism (PE), and stroke**.
2. **Anticoagulation During Medical Procedures** – Used in **cardiac surgeries, dialysis, and during blood transfusions** to prevent clotting.

## SECTION-B Pathology (25 Marks) & Genetics (12 Marks)

Q1. Define tuberculosis and describe its pathophysiology.

**:- Tuberculosis (TB) and Its Pathophysiology (10 Marks)**

### 1. Definition:

Tuberculosis (TB) is a **chronic infectious disease** caused by **Mycobacterium tuberculosis**, primarily affecting the **lungs** but can also involve other organs such as the **bones, kidneys, and brain**. It spreads through **airborne droplets** when an infected person coughs or sneezes.

### 2. Pathophysiology of Tuberculosis:

#### 1. Entry and Infection:

- Mycobacterium tuberculosis **enters the lungs** via inhaled droplets.
- It reaches the **alveoli**, where it is engulfed by **alveolar macrophages**.

#### 2. Immune Response and Granuloma Formation:

- If the immune system is **strong**, macrophages can destroy the bacteria.
- If not, bacteria **survive inside macrophages**, multiply, and trigger an immune response.
- The immune system forms a **granuloma (tubercle)**—a collection of **macrophages, lymphocytes, and dead cells**—to contain the infection.

#### 3. Latent TB vs. Active TB:

- **Latent TB:** The immune system contains the bacteria within granulomas, preventing disease symptoms. The person is infected but not contagious.
- **Active TB:** If the immune system weakens, the bacteria escape granulomas, multiply, and cause **tissue destruction and cavitation** in the lungs, leading to symptoms like **chronic cough, weight loss, night sweats, and fever**.

#### 4. Spread of Infection:

- If untreated, TB can spread via the **bloodstream (miliary TB)** to other organs like the **brain (TB meningitis), spine (Pott's disease), or kidneys**.

### Conclusion:

Tuberculosis is a **serious infectious disease** with a complex **immune response**. Early detection, proper treatment with **anti-TB drugs**, and **public health measures** are crucial for controlling its spread.

Q2. (a) Write is pericardial Effusion.

**:- Pericardial Effusion (2 Marks)**

### Definition:

Pericardial effusion is the **abnormal accumulation of fluid in the pericardial sac** (the space between the heart and the pericardium). It can impair heart function if excessive.

### Causes:

- **Infections (viral, bacterial, TB)**
- **Inflammation (pericarditis)**
- **Heart failure**
- **Cancer (metastatic disease)**
- **Autoimmune diseases (e.g., lupus, rheumatoid arthritis)**

#### **Complication:**

Severe pericardial effusion can lead to **cardiac tamponade**, a life-threatening condition where excess fluid compresses the heart, impairing its ability to pump blood.

(b) Discuss the pathological changes taking place in disease condition.

#### **:- Pathological Changes in Disease Conditions (3 Marks)**

Pathological changes refer to the **structural and functional alterations** that occur in tissues and organs due to disease. These changes can be categorized as follows:

##### **1. Cellular Changes:**

- **Cell Injury** – Due to hypoxia, toxins, infections.
- **Cell Death – Necrosis (uncontrolled cell death) or Apoptosis (programmed cell death).**
- **Atrophy, Hypertrophy, Hyperplasia, and Metaplasia** – Adaptations in response to stress or damage.

##### **2. Tissue and Organ Changes:**

- **Inflammation** – Redness, swelling, heat, and pain due to immune response.
- **Fibrosis and Scarring** – Excessive collagen deposition after tissue damage.
- **Neoplasia (Tumor Formation)** – Uncontrolled cell growth leading to benign or malignant tumors.

##### **3. Systemic Changes:**

- **Circulatory Disorders** – Hypertension, atherosclerosis, or ischemia affecting organs.
- **Immune System Disorders** – Autoimmune reactions or immunodeficiency.
- **Metabolic Imbalances** – Diabetes, electrolyte disturbances, or hormonal imbalances.

These pathological changes affect the **progression, symptoms, and severity** of a disease. Understanding them helps in **diagnosis, treatment, and prevention**.

Q3. (a) Define Peptic Ulcer.

:- Refer to 2022 SECTION B Q2. (a)

(b) write its causes & pathophysiology.

#### **:- Causes & Pathophysiology (5 Marks)**

##### **1. Causes:**

Causes of diseases can be classified into different categories:

**1. Infectious Causes:**

- Bacteria (e.g., Tuberculosis, Pneumonia)
- Viruses (e.g., HIV, Influenza)
- Fungi (e.g., Candidiasis)
- Parasites (e.g., Malaria)

**2. Genetic Causes:**

- Inherited disorders (e.g., Sickle cell anemia, Cystic fibrosis)
- Genetic mutations (e.g., Cancer)

**3. Environmental Causes:**

- Pollution, Radiation, Toxins
- Smoking, Alcohol, Poor diet

**4. Autoimmune and Metabolic Causes:**

- Diabetes, Rheumatoid arthritis, Lupus

**5. Trauma and Physical Injury:**

- Accidents, Burns, Fractures

**2. Pathophysiology:**

Pathophysiology refers to the **functional and structural changes** that occur in the body due to disease. It involves:

**1. Cellular Injury and Death:**

- Hypoxia (lack of oxygen) → Cell damage → Necrosis or Apoptosis.

**2. Inflammatory Response:**

- Release of chemical mediators (Histamine, Cytokines) → Swelling, Pain, Redness.

**3. Tissue and Organ Dysfunction:**

- Example: In heart failure, the heart's pumping ability is reduced → Poor circulation → Fluid buildup in lungs and legs.

**4. Compensatory Mechanisms:**

- The body attempts to adapt (e.g., Increased heart rate in shock, Increased insulin production in early diabetes).

**5. Progression to Chronic Disease or Recovery:**

- If the damage is severe, it can lead to **chronic illness or organ failure**. With treatment, **healing and recovery** occur.

## Conclusion:

Understanding the **causes and pathophysiology** helps in diagnosing diseases, planning treatment, and preventing complications.

(c) Enlist sign & symptoms of peptic ulcer.

:- Refer to 2022 SECTION B Q2. (b)

Q4. Write Short note on :-

(a) Down syndrome

Refer to 2022 Q4 (c)

(b) Mutation

:- **Mutation (4 Marks)**

### 1. Definition:

A **mutation** is a **permanent change in the DNA sequence** of a gene, which can alter the function of a protein or lead to genetic disorders. Mutations can occur **spontaneously** or be caused by **environmental factors** like radiation and chemicals.

### 2. Types of Mutations:

1. **Point Mutation** – A single nucleotide is changed (e.g., Sickle Cell Anemia).
2. **Frameshift Mutation** – Addition or deletion of nucleotides, shifting the reading frame.
3. **Missense Mutation** – A single amino acid change, affecting protein function.
4. **Nonsense Mutation** – Leads to a **premature stop codon**, stopping protein synthesis.
5. **Silent Mutation** – No effect on protein function.

### 3. Causes of Mutation:

- **Spontaneous Errors** during DNA replication.
- **Exposure to Mutagens** (e.g., UV radiation, chemicals, smoking).
- **Viral Infections** that alter genetic material.

### 4. Effects of Mutations:

- **Harmful** – Causes genetic disorders (e.g., Cystic Fibrosis, Cancer).
- **Beneficial** – Leads to **evolution and adaptation** (e.g., antibiotic resistance in bacteria).
- **Neutral** – No significant effect on function.

## Conclusion:

Mutations play a key role in **genetic variation, evolution, and diseases**. Some mutations cause **harmful conditions**, while others may provide an **advantage in survival**.



(c) Blood Groups.

:- Refer to 2018 Q5 (d)