

Q1. (a) Define peptic ulcer.

:- A **peptic ulcer** is an open sore that develops on the inner lining of the stomach, upper small intestine (duodenum), or esophagus due to the erosion caused by stomach acid and digestive enzymes. The two main types are:

- **Gastric ulcers** (occur in the stomach)
- **Duodenal ulcers** (occur in the duodenum)

Causes

- Infection with *Helicobacter pylori* (*H. pylori*) bacteria
- Long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs) like aspirin or ibuprofen
- Excessive acid production (from stress, smoking, alcohol, or certain diseases)

Symptoms

- Burning stomach pain
- Bloating
- Nausea or vomiting
- Weight loss
- In severe cases, internal bleeding

Peptic ulcers are typically diagnosed through endoscopy or tests for *H. pylori* and are treated with antibiotics, proton pump inhibitors (PPIs), and lifestyle modifications.

(b) Enlist sign and symptoms of peptic Ulcer and write the difference between peptic and duodenal ulcer.

:- Signs and Symptoms of Peptic Ulcer:

1. **Burning stomach pain** (especially between meals or at night)
2. **Bloating** and feeling full
3. **Nausea or vomiting**
4. **Heartburn** (acid reflux)
5. **Loss of appetite** or unintended weight loss
6. **Dark or tarry stools** (indicating bleeding)
7. **Vomiting blood** (which may look like coffee grounds)

Difference Between Peptic and Duodenal Ulcer:

Feature	Peptic Ulcer	Duodenal Ulcer
Location	Can occur in the stomach or duodenum	Specifically occurs in the first part of the small intestine (duodenum)
Pain Timing	Worsens with food intake	Improves with food but worsens 2-3 hours after eating
Cause	Often linked to <i>H. pylori</i> infection, NSAIDs, or excess acid	Mostly caused by <i>H. pylori</i> infection and excessive acid production
Symptoms	Pain after meals, nausea, vomiting	Pain on an empty stomach, relieved by eating

Feature	Peptic Ulcer	Duodenal Ulcer
Complications	May cause stomach bleeding, perforation, or obstruction	Less likely to bleed but may cause perforation

(c) Explain the medical management of peptic ulcer.

Medical Management of Peptic Ulcer

The goal of treatment for peptic ulcers is to relieve symptoms, heal the ulcer, and prevent complications. Medical management includes:

1. Medications

a) Proton Pump Inhibitors (PPIs)

- Reduce stomach acid and promote ulcer healing.
- Examples: **Omeprazole, Pantoprazole, Esomeprazole**

b) H2-Receptor Blockers

- Decrease acid production by blocking histamine receptors.
- Examples: **Ranitidine (rarely used), Famotidine**

c) Antacids

- Neutralize stomach acid and provide symptomatic relief.
- Examples: **Magnesium hydroxide, Aluminum hydroxide**

d) Mucosal Protectants

- Form a protective barrier over the ulcer.
- Examples: **Sucralfate, Bismuth subsalicylate**

*e) Antibiotic Therapy (if *H. pylori* infection is present)*

- A combination of **Amoxicillin, Clarithromycin, and Metronidazole** is used for 7-14 days.

f) Prostaglandin Analogues

- Protect the gastric lining, especially in NSAID-induced ulcers.
- Example: **Misoprostol**

2. Lifestyle Modifications

- **Avoid NSAIDs** (e.g., Ibuprofen, Aspirin) or switch to safer alternatives.
- **Quit smoking** as it delays ulcer healing.
- **Limit alcohol and caffeine** intake.
- **Eat small, frequent meals** to reduce stomach irritation.
- **Manage stress** through relaxation techniques like yoga and meditation.

3. Surgical Management (For Complications)

In severe cases, surgery may be required:

- **Vagotomy** (Cutting the vagus nerve to reduce acid secretion)
- **Pyloroplasty** (Widening the opening of the stomach to the small intestine)
- **Partial gastrectomy** (Removing part of the stomach if necessary)

(d) Formulate a nursing care plan for a patient with peptic ulcer.

:- Nursing Care Plan for a Patient with Peptic Ulcer

Assessment Data:

- **Subjective:** Reports of burning epigastric pain, nausea, bloating, and discomfort after meals.
- **Objective:** Possible weight loss, signs of gastrointestinal bleeding (e.g., dark stools, vomiting blood), and tenderness in the epigastric region.

Nursing Diagnosis:

1. **Acute Pain** related to ulceration of the gastric or duodenal mucosa.
2. **Imbalanced Nutrition: Less than Body Requirements** related to nausea, vomiting, and dietary restrictions.
3. **Risk for Deficient Fluid Volume** related to potential gastrointestinal bleeding.
4. **Deficient Knowledge** related to disease process and self-care management.

Nursing Care Plan

Nursing Diagnosis	Goals/Expected Outcomes	Nursing Interventions	Rationale
Acute Pain related to gastric mucosal inflammation	1. Patient will verbalize relief of pain within 30 minutes of interventions. 2. Patient will demonstrate use of relaxation techniques for pain management.	1. Assess pain characteristics (location, intensity, duration). 2. Administer prescribed PPIs, H2 blockers, or antacids. 3. Encourage stress reduction techniques (e.g., deep breathing, guided imagery). 4. Instruct patient to avoid spicy, acidic, and caffeinated foods.	1. Helps determine effectiveness of interventions. 2. Medications reduce acid production and relieve pain. 3. Stress can worsen symptoms by increasing acid secretion. 4. Certain foods can exacerbate gastric irritation.
Imbalanced Nutrition: Less than Body Requirements	1. Patient will maintain adequate nutritional intake as evidenced by	1. Monitor weight and dietary intake. 2. Encourage small, frequent meals. 3. Provide high-protein, non-irritating	1. Ensures adequate nutrition. 2. Prevents overproduction of acid and reduces discomfort. 3.

Nursing Diagnosis	Goals/Expected Outcomes	Nursing Interventions	Rationale
related to nausea and dietary restrictions	stable weight and improved energy levels.	foods. 4. Avoid foods that trigger symptoms.	Supports healing and prevents malnutrition. 4. Reduces gastric irritation.
Risk for Deficient Fluid Volume related to potential gastrointestinal bleeding	1. Patient will maintain adequate hydration and stable vital signs.	1. Monitor for signs of bleeding (e.g., tarry stools, vomiting blood). 2. Assess vital signs for hypovolemia (e.g., hypotension, tachycardia). 3. Maintain IV fluid therapy as prescribed. 4. Prepare for possible blood transfusion if significant bleeding occurs.	1. Early detection of bleeding prevents complications. 2. Vital signs indicate fluid status. 3. IV fluids help prevent dehydration. 4. Severe bleeding may require transfusion to prevent shock.
Deficient Knowledge related to disease process and self-care management	1. Patient will verbalize understanding of peptic ulcer disease, its causes, and management.	1. Educate patient about the importance of medication adherence. 2. Instruct on avoiding NSAIDs, smoking, and alcohol. 3. Teach about early signs of complications (e.g., severe pain, black stools). 4. Provide written materials and encourage follow-up visits.	1. Ensures proper healing and prevents recurrence. 2. Reduces risk factors that worsen ulcers. 3. Early intervention can prevent severe complications. 4. Reinforces learning and encourages self-care.

Q2. (a) Define Asthma.

:- Definition of Asthma

Asthma is a **chronic inflammatory disease** of the airways characterized by **reversible airflow obstruction, bronchial hyperresponsiveness, and excessive mucus production**. It leads to **recurrent episodes of wheezing, breathlessness, chest tightness, and coughing**, especially at night or early in the morning.

Asthma can be triggered by allergens, infections, exercise, cold air, smoke, or stress. While symptoms can be controlled with medication and lifestyle changes, there is no permanent cure for asthma.

(b) Enlist causes and clinical manifestation of asthma.

:- Causes of Asthma

Asthma can be triggered by various **allergic and non-allergic** factors:

1. Allergic (Extrinsic) Causes

- **Pollen** (trees, grass, weeds)
- **Dust mites**

- **Pet dander** (cats, dogs, birds)
- **Mold and fungi**
- **Certain foods** (e.g., nuts, dairy, seafood)

2. Non-Allergic (Intrinsic) Causes

- **Respiratory infections** (cold, flu, pneumonia)
- **Physical activity (Exercise-induced asthma)**
- **Cold or dry air**
- **Strong odors and air pollutants** (smoke, perfumes, chemicals)
- **Emotional stress or anxiety**
- **Certain medications** (Aspirin, NSAIDs, beta-blockers)
- **Gastroesophageal reflux disease (GERD)**

Clinical Manifestations (Signs & Symptoms) of Asthma

- **Wheezing** (high-pitched whistling sound during breathing)
- **Shortness of breath (Dyspnea)**
- **Chest tightness or discomfort**
- **Coughing** (worse at night or early morning)
- **Increased mucus production**
- **Difficulty speaking due to breathlessness**
- **Use of accessory muscles for breathing** (in severe cases)
- **Cyanosis** (bluish skin/lips) in extreme cases

(C) Explain pathophysiology of Asthma.

:- Pathophysiology of Asthma

Asthma is a **chronic inflammatory disorder** of the airways that leads to **bronchoconstriction, airway inflammation, and increased mucus production**, causing airflow obstruction. The pathophysiology involves the following key processes:

1. Trigger Exposure

Asthma is triggered by allergens (e.g., pollen, dust), infections, exercise, cold air, or irritants (smoke, pollution).

2. Immune System Activation

- The allergens or irritants activate **T-helper 2 (Th2) cells**, which stimulate the release of **inflammatory mediators** such as:
 - **Histamine**
 - **Leukotrienes**
 - **Prostaglandins**
 - **Cytokines** (e.g., IL-4, IL-5, IL-13)

3. Inflammation & Airway Hyperresponsiveness

- The inflammatory mediators cause:
 - **Bronchial smooth muscle contraction (Bronchoconstriction)**
 - **Increased vascular permeability**, leading to airway swelling (edema)
 - **Increased mucus secretion**, resulting in airway obstruction
 - **Eosinophil infiltration**, leading to airway hyperreactivity

4. Airflow Obstruction & Symptoms

- **Narrowed airways** due to bronchoconstriction, inflammation, and mucus plugging cause:
 - **Wheezing** (due to turbulent airflow)
 - **Dyspnea (Shortness of breath)**
 - **Coughing** (especially at night or early morning)
 - **Chest tightness**

5. Chronic Changes (Airway Remodeling – in severe cases)

- **Repeated asthma attacks** lead to permanent structural changes, including:
 - **Thickening of the airway walls**
 - **Fibrosis (scar tissue formation)**
 - **Hypertrophy of smooth muscles**
 - **Persistent airway narrowing**

Summary of Pathophysiology:

Trigger → Immune response → Inflammation → Bronchoconstriction, Mucus production & Edema → Airflow obstruction → Asthma symptoms

(d) write down medical and nursing management of asthma and write the discharge planning of the client.

:- Medical and Nursing Management of Asthma

Medical Management

The goal of asthma treatment is to relieve symptoms, prevent exacerbations, and improve lung function.

1. Pharmacological Treatment

- **Bronchodilators (Relievers)**
 - **Short-acting beta-agonists (SABAs):** Salbutamol (Albuterol), Terbutaline – for acute relief
 - **Long-acting beta-agonists (LABAs):** Salmeterol, Formoterol – used for long-term control
 - **Anticholinergics:** Ipratropium bromide, Tiotropium – reduce bronchospasm
- **Anti-inflammatory Drugs (Controllers)**
 - **Inhaled corticosteroids (ICS):** Budesonide, Fluticasone, Beclomethasone – reduce airway inflammation
 - **Oral corticosteroids:** Prednisolone, Dexamethasone – for severe exacerbations
 - **Leukotriene receptor antagonists (LTRAs):** Montelukast, Zafirlukast – prevent inflammation
- **Mast Cell Stabilizers**
 - **Cromolyn sodium, Nedocromil** – prevent allergen-induced asthma
- **Methylxanthines**

- **Theophylline, Aminophylline** – used in severe cases to relax bronchial muscles
 - **Oxygen Therapy**
 - Given in severe cases to maintain adequate oxygenation
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Nursing Management

1. Assessment

- Monitor respiratory rate, depth, and effort
- Assess breath sounds for wheezing or diminished sounds
- Check oxygen saturation (SpO₂) and arterial blood gases (ABGs) if necessary
- Observe for signs of respiratory distress (cyanosis, use of accessory muscles)

2. Nursing Interventions

- **Administer prescribed medications** (bronchodilators, corticosteroids)
 - **Position the patient in high Fowler's position** to improve breathing
 - **Encourage pursed-lip breathing** to promote effective ventilation
 - **Monitor peak expiratory flow rate (PEFR)** to assess airway obstruction
 - **Encourage adequate fluid intake** to loosen mucus secretions
 - **Teach the patient proper inhaler technique** and the use of a spacer
 - **Provide oxygen therapy** as needed to maintain oxygen saturation > 95%
 - **Reduce anxiety** through reassurance and relaxation techniques
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Discharge Planning for a Patient with Asthma

1. Medication Management

- Educate on proper **use of inhalers, nebulizers, and spacers**
- Emphasize the importance of **taking controller medications daily**
- Teach the patient about **identifying and managing side effects of medications**

2. Trigger Avoidance

- Avoid exposure to **dust, smoke, pollen, strong odors, pet dander, and cold air**
- Use **air purifiers and dust-proof covers** for pillows and mattresses
- Avoid **strong chemicals, perfumes, and aerosol sprays**

3. Breathing Techniques & Lifestyle Modifications

- Practice **pursed-lip and diaphragmatic breathing exercises**
- Encourage **regular, moderate exercise** (avoid overexertion)
- Maintain **hydration and a balanced diet**

4. Emergency Action Plan

- Educate on **early warning signs of an asthma attack** (coughing, chest tightness, wheezing)
- Teach **how to use a peak flow meter** to monitor airway function
- Explain the **stepwise action plan** for worsening symptoms

- Provide information on **when to seek emergency care** (e.g., severe breathlessness, blue lips, no relief with medication)

5. Follow-Up and Support

- Schedule **regular follow-up visits** with a physician
- Encourage joining **asthma support groups** for emotional and social support
- Ensure proper **vaccination (influenza, pneumococcal vaccine)** to prevent respiratory infections

Q3. (a) Define benign prostrate Hypertrophy (BPH).

:- Definition of Benign Prostatic Hyperplasia (BPH)

Benign Prostatic Hyperplasia (BPH) is a **non-cancerous enlargement of the prostate gland** that occurs in aging men. It results from **overgrowth of prostate tissue**, which compresses the **urethra**, leading to difficulty in urination.

BPH is common in men over **50 years** and is primarily caused by **hormonal changes**, particularly increased **dihydrotestosterone (DHT)** levels. While BPH is **not cancerous**, it can significantly affect urinary function and quality of life.

(B) Describe the sign and symptoms of BPH.

:- Signs and Symptoms of Benign Prostatic Hyperplasia (BPH)

BPH primarily affects **urinary function** due to prostate enlargement compressing the urethra. Symptoms can be classified into **obstructive** and **irritative** symptoms.

1. Obstructive Symptoms (Due to Urethral Compression)

- **Weak urine stream** (reduced force during urination)
- **Difficulty in starting urination** (hesitancy)
- **Dribbling at the end of urination**
- **Incomplete bladder emptying** (feeling of residual urine)
- **Straining to urinate**

2. Irritative Symptoms (Due to Bladder Dysfunction)

- **Frequent urination** (especially at night – **nocturia**)
- **Urgency to urinate** (strong, sudden urge)
- **Dysuria** (painful urination in some cases)
- **Incontinence** (loss of bladder control in severe cases)

3. Complications (If Untreated)

- **Urinary retention** (inability to pass urine)
- **Recurrent urinary tract infections (UTIs)**
- **Bladder stones** due to stagnant urine
- **Kidney damage** from backpressure on the kidneys (hydronephrosis)

(c) Explain the pre and post operative management of a client with transurethral resection of prostrate (TURP) with special emphasis on pelvic exercise.

:- Pre and Post-Operative Management of Transurethral Resection of the Prostate (TURP)

Pre-Operative Management

The goal before surgery is to prepare the patient physically and psychologically.

1. Patient Assessment

- Assess **urinary symptoms, bladder function, and residual urine volume.**
- Check for **signs of urinary tract infection (UTI)** and treat if present.
- Review **medical history**, including use of blood thinners (e.g., aspirin, warfarin).
- Conduct **laboratory tests** (CBC, renal function tests, urine culture).

2. Pre-Operative Education

- Explain the **procedure** and expected post-operative care.
- Educate on **urinary catheter placement** after surgery.
- Discuss **possible side effects**, such as blood in urine, temporary urinary incontinence, and erectile dysfunction.
- Encourage **pelvic floor exercises (Kegel exercises)** before surgery to strengthen bladder control.

3. Pre-Operative Instructions

- **NPO (Nothing by mouth) for 6-8 hours** before surgery.
 - Stop **anticoagulants** as per doctor's advice to prevent bleeding.
 - Administer **antibiotics** to prevent infection.
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Post-Operative Management

The focus after surgery is on recovery, pain control, and preventing complications.

1. Immediate Post-Operative Care

- Monitor **vital signs (BP, HR, oxygen saturation).**
- Observe for **bleeding in urine (hematuria)** and report excessive clots.
- Maintain **continuous bladder irrigation (CBI)** with normal saline to prevent clot formation.
- Assess for **pain, bladder spasms, or discomfort** and administer prescribed analgesics/antispasmodics (e.g., Oxybutynin).

2. Urinary Catheter Care

- The **Foley catheter remains in place for 24-48 hours** post-surgery.
- Monitor **urine output** and drainage color (initially red, then pink, then clear).
- Ensure **proper flow of irrigation fluid** (avoid blockages).

3. Prevention of Complications

- Encourage **early mobilization** to prevent blood clots and pneumonia.
- Monitor for **urinary retention** after catheter removal.
- Encourage **fluid intake (2-3 liters/day)** to flush out clots.

Pelvic Floor Exercises (Kegel Exercises) for Bladder Control

Importance:

- Strengthens pelvic muscles and improves urinary control after TURP.
- Helps reduce **postoperative incontinence**.

Steps to Perform Kegel Exercises:

1. **Identify the pelvic floor muscles** (the muscles used to stop urination midstream).
 2. **Contract the muscles for 5-10 seconds**, then relax for the same duration.
 3. **Repeat this 10-15 times per session, 3-4 times a day**.
 4. Avoid **holding breath** or tightening abdominal/buttock muscles during the exercise.
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Discharge Instructions

- Continue **pelvic exercises** regularly.
- Avoid **heavy lifting or strenuous activities** for 4-6 weeks.
- Avoid **caffeine, alcohol, and spicy foods** that irritate the bladder.
- Report signs of **infection, severe bleeding, or urinary retention** immediately.
- Attend **follow-up appointments** to monitor recovery.

Q4. Mr. X 70 years male is suffering with diabetes mellitus type II since 10 years. He is admitted in cardiology ward with the complaint of high blood pressure.

:- Case Study: Mr. X (70-Year-Old Male with Type 2 Diabetes & Hypertension)

(a) Definition of Diabetes Mellitus & Clinical Manifestations of Type 2 Diabetes Mellitus (T2DM)

Definition of Diabetes Mellitus

Diabetes Mellitus (DM) is a **chronic metabolic disorder** characterized by **elevated blood glucose levels (hyperglycemia)** due to **impaired insulin secretion and/or insulin resistance**. It results in abnormal carbohydrate, fat, and protein metabolism, leading to various systemic complications.

Clinical Manifestations of Type 2 Diabetes Mellitus (T2DM)

1. **Classic Symptoms ("3 P's")**
 - **Polyuria** – Excessive urination
 - **Polydipsia** – Increased thirst
 - **Polyphagia** – Increased hunger
2. **Other Common Symptoms**
 - **Fatigue & Weakness** – Due to improper glucose utilization
 - **Blurred Vision** – High blood glucose affects the eye lens
 - **Slow Wound Healing** – Poor circulation and immune function
 - **Frequent Infections** – UTIs, skin infections, gum disease
 - **Numbness & Tingling** – Diabetic neuropathy affecting extremities

3. Long-Term Complications (If Uncontrolled)

- **Diabetic Retinopathy** (eye damage, possible blindness)
 - **Nephropathy** (kidney disease, protein in urine)
 - **Neuropathy** (nerve damage, leading to numbness & pain)
 - **Cardiovascular Diseases** (hypertension, heart attack, stroke)
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(b) Pathophysiology of Type 2 Diabetes Mellitus

1. Insulin Resistance

- In T2DM, **body cells (muscle, liver, fat) become resistant to insulin**, preventing glucose uptake.
- Pancreas compensates by **producing more insulin (hyperinsulinemia)** to overcome resistance.

2. Beta-Cell Dysfunction

- Over time, the **pancreatic beta cells** become exhausted and fail to produce enough insulin.

3. Hyperglycemia & Metabolic Abnormalities

- Due to inadequate insulin action, **blood glucose remains high**.
- **Liver releases excess glucose** into the bloodstream, worsening hyperglycemia.
- **Dyslipidemia** (increased triglycerides, low HDL) increases cardiovascular risk.

4. Chronic Inflammation & Endothelial Damage

- Persistent **high glucose levels damage blood vessels**, leading to complications like hypertension, kidney disease, and neuropathy.

Summary: Insulin Resistance → Beta-Cell Dysfunction → Hyperglycemia → Metabolic Dysfunction → Complications

(c) Management of Mr. X (Type 2 DM with Hypertension in Cardiology Ward)

1. Medical Management

(i) Blood Glucose Control

- **Oral Antidiabetic Medications** (Metformin, Sulfonylureas, DPP-4 inhibitors, SGLT-2 inhibitors)
- **Insulin Therapy** (if blood sugar is poorly controlled)
- **Frequent Blood Glucose Monitoring** (before meals & bedtime)

(ii) Hypertension Management

- **Antihypertensive Drugs** (ACE inhibitors, ARBs, Beta-blockers, Calcium channel blockers)
- **Salt Restriction** (<2g/day) to reduce blood pressure
- **Regular BP Monitoring**

(iii) Cardiac Health Management

- **Statins for Cholesterol Control** (Atorvastatin, Rosuvastatin)
- **Antiplatelet Therapy** (Aspirin, Clopidogrel) to prevent clot formation
- **Lifestyle Modification** (exercise, weight loss, smoking cessation)

2. Nursing Management

- **Monitor Vital Signs** (BP, HR, RR, Blood Sugar)
- **Assess for Complications** (hypoglycemia, foot ulcers, kidney issues)
- **Encourage Diabetic Diet** (low sugar, low fat, high fiber, moderate protein)
- **Educate on Foot Care** (daily inspection, proper footwear)
- **Promote Physical Activity** (30 minutes of walking daily)

3. Lifestyle Modifications

- **Healthy Diet:** Low-carb, low-fat, high-fiber foods
- **Regular Exercise:** Improves insulin sensitivity & heart health
- **Weight Management:** Reduces insulin resistance
- **Stress Management:** Reduces BP & blood sugar spikes

(d) Actual & Potential Complications for Mr. X

1. Actual (Existing) Complications

- **Hypertension (High BP)** – Increased risk of heart disease & stroke
- **Cardiovascular Disease** – Due to diabetes & high BP
- **Diabetic Neuropathy** – Numbness or pain in extremities
- **Retinopathy** – Blurred vision due to retinal damage
- **Slow Wound Healing** – Risk of foot ulcers & infections

2. Potential (Future) Complications

- **Diabetic Nephropathy** – Kidney failure if BP & blood sugar remain uncontrolled
- **Diabetic Foot Ulcers & Amputation** – Due to poor circulation & nerve damage
- **Heart Attack & Stroke** – Due to hypertension & high cholesterol
- **Hypoglycemia** – Risk if medications lower blood sugar excessively
- **Cognitive Impairment** – Increased risk of dementia in elderly diabetics

Conclusion

Mr. X, a 70-year-old diabetic patient with hypertension, requires strict glucose and BP control to prevent cardiovascular complications. Lifestyle modifications, medications, and regular monitoring are crucial for his long-term health.

Q5. Short Notes

Gateway theory of Pain.

:- Gateway Theory of Pain

The **Gate Control Theory of Pain**, proposed by **Melzack and Wall in 1965**, explains how pain perception is regulated in the nervous system. It suggests that a "gate" mechanism in the **spinal cord (dorsal horn)** controls the transmission of pain signals to the brain.

Key Concepts of the Theory:

- Pain Signals Travel via Nerve Fibers:**
 - **Small fibers (A-delta & C fibers)** carry pain signals.
 - **Large fibers (A-beta fibers)** carry non-painful sensations (e.g., touch, vibration).
- The "Gate" in the Spinal Cord:**
 - When pain signals from small fibers are dominant, the gate **opens**, allowing pain to reach the brain.
 - When large fibers are stimulated (e.g., by rubbing the skin), the gate **closes**, reducing pain perception.
- Role of the Brain:**
 - Psychological factors like **attention, emotions, and past experiences** can influence pain perception by modulating the gate.

Clinical Application:

- Explains **why rubbing an injury reduces pain** (stimulating large fibers).
- Basis for **pain management techniques** like **TENS (Transcutaneous Electrical Nerve Stimulation)**, massage, and cognitive therapies.

(b) Enlist difference between Hypothyroidism and Hyperthyroidism c.

Differences Between Hypothyroidism and Hyperthyroidism

Feature	Hypothyroidism □ (Underactive Thyroid)	Hyperthyroidism □ (Overactive Thyroid)
Definition	Decreased production of thyroid hormones (T3 & T4)	Excess production of thyroid hormones (T3 & T4)
Common Causes	- Hashimoto's Thyroiditis (Autoimmune) - Iodine deficiency - Thyroidectomy - Pituitary dysfunction	- Graves' Disease (Autoimmune) - Toxic multinodular goiter - Excess iodine intake - Thyroid adenoma
Metabolic Effect	Slows down metabolism	Speeds up metabolism
Symptoms	- Fatigue, lethargy - Weight gain - Cold intolerance - Slow heart rate (bradycardia) - Dry skin, brittle hair - Depression, memory loss - Constipation - Puffy face, hoarseness	- Weight loss - Heat intolerance - Fast heart rate (tachycardia, palpitations) - Anxiety, nervousness, irritability - Sweating, moist skin - Tremors (shaky hands) - Diarrhea - Bulging eyes (exophthalmos in Graves' disease)
TSH Levels	High (due to low T3 & T4)	Low (due to high T3 & T4)
T3 & T4 Levels	Low	High
Treatment	- Thyroid hormone replacement (Levothyroxine) - Iodine supplementation (if deficient)	- Antithyroid drugs (Methimazole, PTU) - Radioactive iodine therapy - Beta-blockers (for symptom relief) - Surgery (thyroidectomy) in severe cases

(c) Duke's criteria for infective endocarditis

:- Duke's Criteria for Infective Endocarditis

The **Duke Criteria** is a diagnostic tool used to identify **Infective Endocarditis (IE)**, categorizing cases as **definite, possible, or rejected** based on clinical, microbiological, and imaging findings.

1. Major Criteria

✓ Positive Blood Cultures (for typical organisms causing IE)

- **Two separate blood cultures** positive for:
 - *Staphylococcus aureus*, *Streptococcus viridans*, *Enterococcus spp.*, *HACEK group*
- Persistently positive blood cultures
- Single positive culture for *Coxiella burnetii* or high antibody titer

✓ Evidence of Endocardial Involvement

- **Echocardiogram Findings:**
 - Vegetation (clumps of bacteria on valves)
 - Abscess
 - New dehiscence of prosthetic valve
 - **New Valvular Regurgitation** (murmur not previously detected)
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2. Minor Criteria

✓ Predisposing Factors (IV drug use, heart conditions, prosthetic valves)

✓ Fever $\geq 38^{\circ}\text{C}$ (100.4°F)

✓ Vascular Phenomena (arterial emboli, Janeway lesions, intracranial hemorrhage, conjunctival hemorrhages)

✓ Immunologic Phenomena (Osler's nodes, Roth spots, glomerulonephritis, positive rheumatoid factor)

✓ Microbiological Evidence (positive blood culture that doesn't meet major criteria)

Diagnosis Based on Duke Criteria:

✓ Definite IE:

- 2 major criteria OR
- 1 major + 3 minor criteria OR
- 5 minor criteria

✓ Possible IE:

- 1 major + 1 minor criteria OR
- 3 minor criteria

✓ Rejected IE:

- Alternate diagnosis OR resolution within ≤ 4 days of antibiotics

Clinical Significance:

Duke's criteria help clinicians diagnose **infective endocarditis early**, enabling prompt **antibiotic therapy and surgical intervention** if necessary.

(d) Psoriasis.

:- Psoriasis: A Brief Overview

Definition:

Psoriasis is a **chronic autoimmune skin disorder** characterized by **rapid skin cell turnover**, leading to **scaly, red, and inflamed patches** on the skin. It is a **non-contagious** condition that commonly affects the scalp, elbows, knees, and lower back.

Causes & Triggers:

- **Genetic factors** (family history)
- **Immune system dysfunction** (T-cell mediated response)
- **Triggers:**
 - Stress
 - Infections (strep throat)
 - Skin injuries (Koebner phenomenon)
 - Cold weather
 - Certain medications (β -blockers, NSAIDs)

Types of Psoriasis:

1. **Plaque Psoriasis (Psoriasis Vulgaris)** – Most common (80–90%), thick scaly patches.
2. **Guttate Psoriasis** – Small, red, drop-shaped lesions, often after infections.
3. **Inverse Psoriasis** – Smooth, red lesions in skin folds (groin, armpits).
4. **Pustular Psoriasis** – White pustules surrounded by red skin.
5. **Erythrodermic Psoriasis** – Severe, widespread redness and peeling, life-threatening.

Symptoms:

- **Red patches with silvery-white scales**
 - **Itching, burning, or soreness**
 - **Dry, cracked skin that may bleed**
 - **Thickened, ridged nails (nail psoriasis)**
 - **Joint pain (Psoriatic Arthritis in some cases)**
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Treatment & Management:

- ✓ **Topical Treatments** – Corticosteroids, Vitamin D analogs, coal tar
 - ✓ **Phototherapy (UVB light therapy)** – Helps slow skin growth
 - ✓ **Systemic Therapy (for severe cases)** – Methotrexate, Cyclosporine, Biologics (TNF inhibitors, IL-17 blockers)
 - ✓ **Lifestyle Modifications** – Moisturizers, stress management, avoiding triggers
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Conclusion:

Psoriasis is a **lifelong condition with flare-ups and remissions**. While there is **no permanent cure**, **proper treatment and lifestyle changes** can help **control symptoms and improve quality of life**.

(e) Biomedical waste management.

:- Biomedical Waste Management

Definition:

Biomedical waste refers to **any waste generated during medical, research, or healthcare activities** that may be infectious, toxic, or hazardous to humans and the environment.

Sources of Biomedical Waste:

- Hospitals, clinics, nursing homes
 - Laboratories, research centers
 - Veterinary hospitals
 - Blood banks, pharmaceutical industries
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Categories of Biomedical Waste:

1. **Infectious Waste** – Blood, body fluids, cultures
 2. **Pathological Waste** – Human tissues, organs, body parts
 3. **Sharps Waste** – Needles, scalpels, broken glass
 4. **Pharmaceutical Waste** – Expired or unused drugs
 5. **Chemical Waste** – Disinfectants, laboratory chemicals
 6. **Radioactive Waste** – Radioactive substances from cancer treatment
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Color Coding & Segregation of Biomedical Waste:

Color Code	Type of Waste	Disposal Method
Yellow	Infectious waste, human tissues, anatomical waste	Incineration or deep burial
Red	Contaminated plastic items (IV tubes, catheters)	Autoclaving & shredding

Color Code	Type of Waste	Disposal Method
Blue/White	Glassware, broken ampoules	Disinfection & recycling
Black	General waste (non-hazardous)	Municipal disposal

Methods of Biomedical Waste Disposal:

- ✓ **Incineration** – Burns hazardous waste at high temperatures
- ✓ **Autoclaving** – Uses steam sterilization to kill microbes
- ✓ **Shredding** – Used for plastic waste after disinfection
- ✓ **Deep Burial** – For pathological waste in rural areas
- ✓ **Chemical Treatment** – Uses disinfectants for liquid waste

Importance of Proper Waste Management:

- **Prevents infections & disease transmission**
- **Protects healthcare workers & the public**
- **Reduces environmental pollution**
- **Ensures compliance with health & safety laws**

Conclusion: Biomedical waste management is **essential for infection control and environmental safety**. Proper segregation, treatment, and disposal help **minimize health hazards** and **maintain hygiene in healthcare settings**.