

**!! JAY AMBE !!**

## **SHORT QUESTION AND ANSWER**

**B. PHARMACY SEMESTER - I**

**SUBJECT NAME: HUMAN ANATOMY AND PHYSIOLOGY-I**

**SUBJECT CODE: BP101TP**

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**CHAPTER -1**

**INTRODUCTION OF ANATOMY & PHYSIOLOGY**

**1. Define following terms:**

- **Anatomy:** Anatomy describes the structures of the body -- their scientific names, composition, location, and associated structures. Anatomy (“a cutting open”) is a plan or map of the body.
- **Physiology:** Physiology studies the function of each structure, individually and in combination with other structures.
- **Cell:** It is living structural and functional units of body enclosed by membrane.
- **Cytology:** It is the branch of science concern with the study of cells.
- **Tissue:** It is a group of cells that usually have common embryonic origin and function together for special activities.
- **Blood:** It is a liquid connective tissue.
- **Lymph:** It is a thin, watery, clear, modified tissue fluid formed by the passage of substance from the blood capillaries into the tissue space (interstitial space) and enters in to the closed system of lymphatic capillaries to lymphatic vessels and lymphatic sinus.
- **Cardiovascular System:** Cardiovascular is the system which includes the study of the heart, blood vessels and blood.
- **Immune System:** It is the collection of cells, tissues and molecules that protects the body from numerous pathogenic microbes and toxins in our environment.

**2. Classify anatomy and define it in brief:**

**The study of anatomy is divided into 2 major fields:**

- i. **Gross anatomy** is the study of large visible structures
  - ii. **Microscopic anatomy** is the study of structures that are too small to see, such as cells and molecules.
- i. **Gross anatomy**, also called macroscopic anatomy, is separated into 5 major divisions:
    - A. **Surface anatomy** describes surface forms and marks.
    - B. **Regional anatomy** describes the organization of specific areas of the body such as the head or hand. This approach is used mostly in professional schools: medical, dental, physical therapy.
    - C. **Systemic anatomy** describes groups of organs that function together for a single purpose.
    - D. **Developmental anatomy** describes the structural changes in an organism from fertilized egg to maturity. Embryology is the anatomical study of early development.
    - E. **Clinical anatomy** describes various medical specialties, including medical anatomy (changes that occur during illness), and radiographic anatomy.
  - ii. **Microscopic anatomy** is divided into two major divisions:
    - A. **Cytology**, the study of cells and their structures.

**B. Histology**, the study of tissues and their structures.

**3. Classify Physiology and define it in brief**

Physiology has many specialties. The 4 basic divisions are:

- i. **Cell physiology**, including chemical and molecular processes within and between cells.
- ii. **Special physiology**, the study of specific organs such as the heart.
- iii. **Systemic physiology**, the cooperative functions of all the organs in an organ system. We will use a systemic physiology approach in this class.
- iv. **Pathological physiology**, the effects of diseases on organs and organ systems.

**4. Explain level of organization of the body in brief:**

- Our bodies are organized at many different levels.
- The levels of organization of living things, from smallest to largest, are:
  - i. **Atoms**, the smallest functional units of matter.
  - ii. **Molecules**, active chemicals.
  - iii. **Organelles**, specialized structures within a cell.
  - iv. **Cells**, the smallest living units.
  - v. **Tissues**, a group of similar cells that work together.
  - vi. **Organs**, two or more tissue types working together.
  - vii. **Organ systems**, two or more organs working together.
  - viii. **Organism**, a single individual, including all of the above.

**5. Enlist human body systems and introduce it in brief:**

1. **The Integumentary System:** includes the skin & derived structures, it protects internal organs & helps maintain body temperature.
2. **The Skeletal System:** includes the bones & joints, it provides support & protection to internal organs.
3. **The Muscular System:** includes skeletal muscle and it provides movement.
4. **The Nervous System:** includes the brain, spinal cord, and nerves. It provides regulation of body functions & sensory perception.
5. **The Endocrine System:** includes hormone-producing cells & glands. It regulates homeostasis, growth & development.
6. **The Cardiovascular System:** includes blood, heart, & blood vessels. It is responsible for delivery of oxygen & nutrients to the tissues.
7. **The Lymphatics & Immune System:** includes lymphatic vessels & fluid. It is involved in the defense against infection.
8. **The Respiratory System:** includes lungs & airways. It is involved in the absorption of oxygen & release of carbon dioxide.

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9. **The Digestive System:** includes organs of the gastrointestinal tract. It is responsible for the absorption of nutrients.
10. **The Urinary System:** includes the kidneys, ureters, and bladder. It is responsible for electrolyte balance & waste removal.
11. **The Reproductive System:** includes the reproductive organs in males and females. It controls the biological process by which new individuals are produced.

### 6. Define homeostasis and write their regulators in brief:

- Ability to maintain relatively stable internal conditions despite a changing external environment. Dynamic state of equilibrium, or balance.

A homeostatic regulatory mechanism consists of 5 parts:

- i. **Receptors:** It act as a sensors/receiver that respond to a stimulus. It monitors change in control condition.
- ii. **Sensory Neurons:** It send the input information/message to control center, means information from cell/tissue/organ etc to integrated system i.e brain and spinal cord.
- iii. **Integrated System:** It analyze the incoming message received from the sensory neurons and sends out commands/messages. In the body there are hundred controlled conditions. A few examples are heart rate, blood pressure, temperature and breathing rate.
- iv. **Motor Neurons:** The output information/message from integrated center (brain and spinal cord) to cell/tissue/organ etc are travelled by motor neurons.
- v. **Effectors:** The cell/tissue/organ etc act as effector that responds according to output command of the control/integrated center.

### 7. Name the body cavity and explain it in brief:

- The dorsal (posterior) cavity and the ventral (anterior) cavity are the largest body compartments.
- Subdivisions of the Posterior (Dorsal) and Anterior (Ventral) Cavities
- The posterior (dorsal) and anterior (ventral) cavities are each subdivided into smaller cavities.
- In the posterior (dorsal) cavity, the cranial cavity houses the brain, and the spinal cavity (or vertebral cavity) encloses the spinal cord.
- The anterior (ventral) cavity has divided by the diaphragm muscle into 2 parts:
  - i. **A superior thoracic cavity**, containing the
    - A. **Pleural cavity (left and right, divided by the mediastinum) organs:** lungs  
membranes: visceral and parietal pleura
    - B. **Pericardial cavity organs: heart membranes:** visceral and parietal pericardium
  - ii. **Inferior abdominopelvic cavity**, containing the
    - A. **Peritoneal cavity membranes:** visceral and parietal peritoneum

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B. **Abdominal cavity (superior peritoneal) organs:** liver, stomach, spleen, intestine

C. **Pelvic cavity (inferior peritoneal) organs:** intestine, bladder, reproductive organs

### 8. Enlist types of fluid present in body.

A. Intracellular fluid (67%) - Inside the cell

B. Extracellular fluid (33%) - Outside the cell

- a. Interstitial Fluid (ISF).
- b. Plasma.
- c. Transcellular fluid
  - i. Cerebrospinal fluid
  - ii. Ocular fluid (Aqueous humor)
  - iii. Joint fluid (Synovial fluid)
  - iv. Urine

### 9. Enlist optical component of microscope with function.

SR. NO	COMPONENT	FUNCTION
1.	<b>Diaphragm:</b>	It is flitted just below the stage for regulating the amount of light falling on the object. Diaphragm is of two types, disc and iris.
2.	<b>Condenser</b>	: It is attached below the diaphragm. Condenser can be moved up and down to focus light on the object.
3.	<b>Reflector (Mirror):</b>	It is attached just above the base. Both its surface bear mirrors, plane on one side and concave on other side. Plane side is used in strong light and concave side in weak light. Reflector directs the light on the object through the condenser and diaphragm system.
4.	<b>Objective Lenses:</b>	They are fitted over the nose piece. Objective lenses are of three types – low power (commonly 10X or 5X), high power (commonly 45X) and oil immersion (commonly 100X, can be more).
5.	<b>Ocular Lens or Eyepiece:</b>	It is lens through which image of the microscopic object is observed. It also takes part in magnification. Depending upon magnification, the eye piece is of four types-5X, 10X, 15X, and 20 X

## CELLULAR LEVEL OF ORGANIZATION

### 1. Classify the parts of cell.

It is mainly divided into three main parts:

#### i. Plasma membrane:

- It is the outer surface of cells. It separates cells from internal environments to external environments.
- It is a selective barrier that regulates the flow of materials into and out of a cell. This selectivity helps to maintain the normal cellular activities.

#### ii. Cytoplasm:

- It consists of all the cellular contents between plasma membrane and nucleus.
- It consists of two components:
  - a) **Cytosol:** The fluid portion of cytoplasm contains water, dissolved solutes and suspended particles.
  - b) **Organelles:** This is surrounded by cytosol. Each type of organelle has characteristic shapes and specific functions. Eg: Ribosomes, Endoplasmic Reticulum, Golgi complex, Lysosomes, Peroxisomes and Mitochondria.

#### iii. Nucleus:

- It is a large organelle. It is a house for most of DNA.
- Within the nucleus, each chromosome is a single molecule of DNA associated with several proteins, contains thousands of hereditary units called genes that control cellular structures and functions.

### 2. Plasma membrane consists of which kind of lipids?

- It consists of three types of lipids,
  - a) **Phospholipids:** 75% of membrane lipids are phospholipids. It contains phosphate groups.
  - b) **Cholesterol:** 20% of membrane lipids are cholesterol. Which is a steroid attached with – OH group.
  - c) **Glycolipids:** 5% of membrane lipids are glycolipids. Attached with carbohydrate groups.

### 3. Plasma membrane consists of which kind of proteins?

- Plasma membrane consists of two types of proteins
  - a) **Integrated proteins:**
    - It extends across the phospholipid bilayer among the fatty acid tails.
    - Most of integral proteins are glycoproteins, it is attached with sugar groups.
    - The portion of the attached sugar group faces the extracellular fluids.
  - b) **Peripheral proteins:**
    - They do not extend across the phospholipid bilayer.
    - They are loosely attached to the inner and outer surface of the membrane and are easily separated from it.

### 4. Explain the function of plasma membrane protein in brief.

- i. Act as channels
- ii. Act as transporter
- iii. Works as receptors
- iv. Works as enzymes
- v. Act as a cytoskeleton anchor
- vi. Work as a cell identity marker

### 5. Enlist the types of movement of materials across the plasma membrane.

- a) Passive process
  - Diffusion – solute migration
  - Osmosis – solvent migration



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- Pore transport – transport of materials via pore on protein surface

### b) Active process

- Primary Active Transport
- Secondary Active Transport
- Phagocytosis & Pinocytosis

### 6. Which is the largest organelles of the cytoplasm ?

- Mitochondria is the largest organelles of the cytoplasm

### 7. Which is the largest organelles of the cell ?

- Nucleus is the largest organelles of the cell

### 8. Who is known as power house of cell?

- Mitochondria is known as power house of cell because it generate ATP

### 9. What are the functions of rough and smooth endoplasmic reticulum?

- Rough endoplasmic reticulum helpful for the protein synthesis
- Smooth endoplasmic reticulum is useful for fatty acids, phospholipids and steroidal synthesis.

### 10. Enlist the steps of protein synthesis.

#### a) Transcription

#### b) Translation

– Initiation

– Elongation

– Termination

### 11. How many types of RNA present into the nucleus. Give their brief introduction.

Three forms of RNA are made from the DNA template,

- messenger RNA (mRNA) which direct synthesis of a polypeptide chain,
- transfer RNA (tRNA) which bind to amino acid during translation and
- ribosomal RNA (rRNA) which comes together with ribosomal protein to make up ribosomes.

### 12. Enlist the steps for eukaryotic somatic cell division.

**Interphase:** Cell is between divisions, chromosomes are not seen under light microscope. It include G1 Phase, S Phase and G2 Phase

**Cell division:** parent cell produce two identical daughter cells, chromosomes are visible under light microscope. It include Mitosis and Cytokinesis.

#### a) Nuclear division known as mitosis:

Mitosis is divided in to four stages prophase, metaphase, anaphase and telophase.

#### b) Cytoplasmic division known as cytokinesis.

### 13. Differentiate between active and passive transport mechanism of cell.

Sr. No	Active Transport	Passive transport
1.	It is energy dependent process	It is energy independent process
2.	It is uphill process	It is downhill process
3.	It is against concentration gradient process	It follows the concentration gradients.
4.	Transport of molecules from lower concentration to higher	Transport of molecules from higher concentration to lower
5.	Primary active, secondary active, phagocytosis and pinocytosis are example of active transport.	Diffusion, osmosis and pore transfer are the example of passive transport

**14. Enlist the cell junction molecules.**

- a) Selectins,
- b) cadherins,
- c) integrins, and
- d) the immunoglobulin super family.

**15. Enlist the types of cell junction.**

- 1. Anchoring Junctions:
  - a. Adherens junctions (zonula adherens)
  - b. Desmosomes (macula adherens) and
  - c. Hemidesmosomes
- 2. Gap junctions (communicating junction)
- 3. Tight junctions (occluding junctions)



## **TISSUE LEVEL OF ORGANIZATION**

### **1. Define tissue**

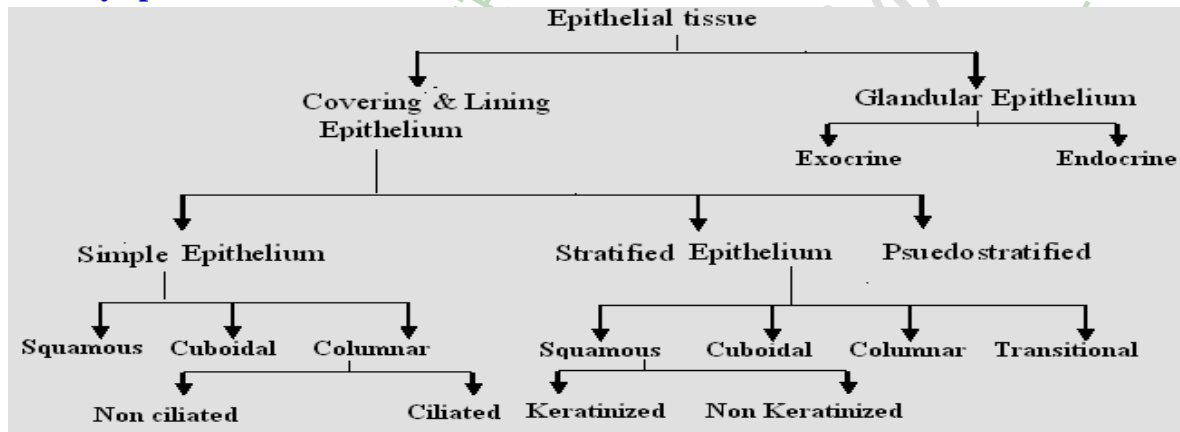
**Definition:** “It is a group of cells that usually have common embryonic origin and function together for special activities.”

### **2. Enlist types of tissue with their functions.**

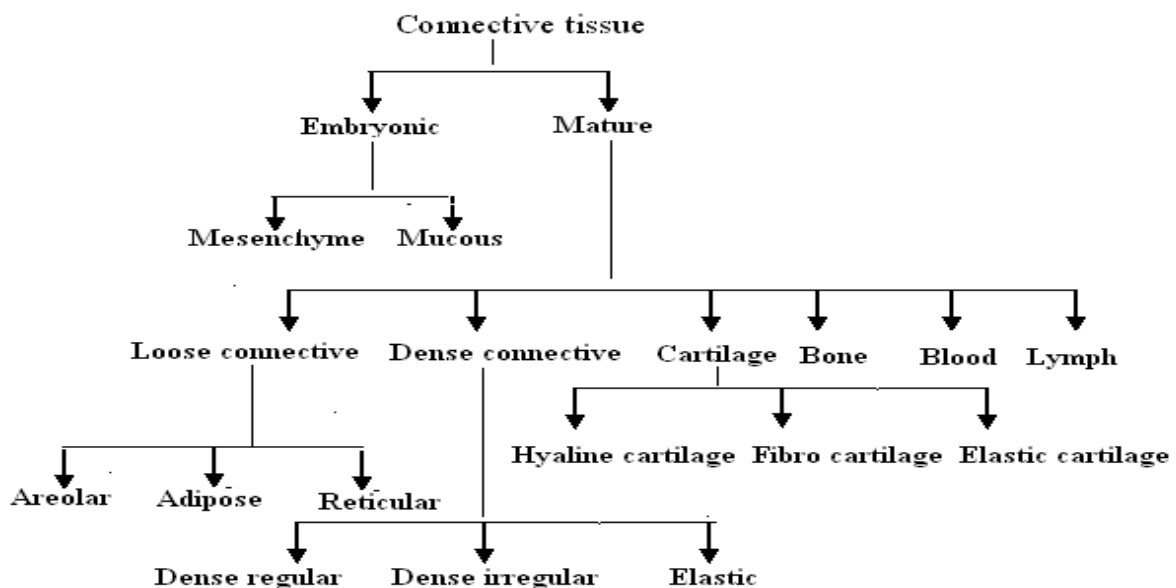
#### **Four Types of Tissues and Their Functions**

<b>Tissue Type</b>	<b>Function</b>
Epithelial	Covers body surface and lines internal organs
Connective	Support and protection
Nervous	Send and receive information about stimuli
Muscle	Movement

### **3. Classify epithelial tissue:**



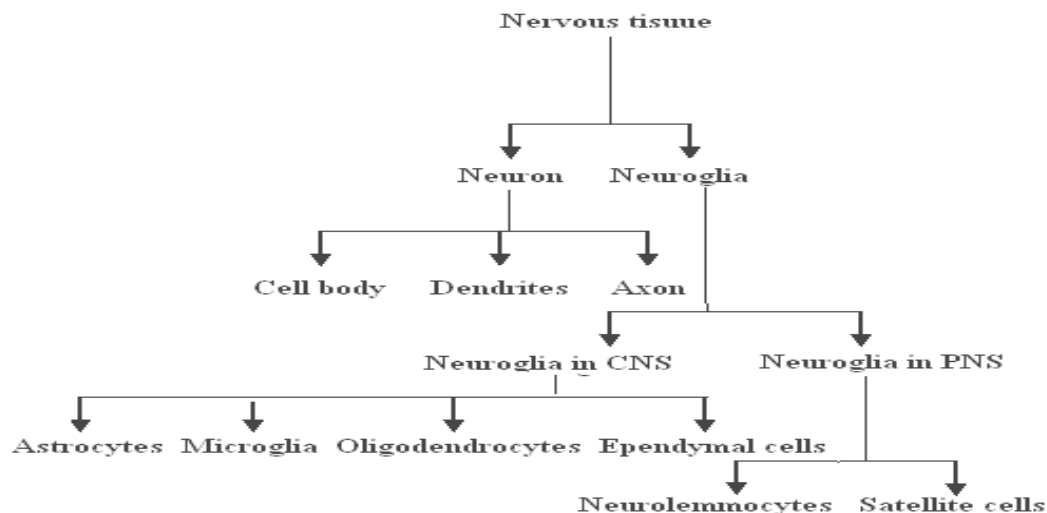
### **4. Classify connective tissue:**



**5. Classify muscular tissue and differentiate between muscular tissue.**

<b>Compare muscle tissue</b>		
<b>Skeletal</b>	<b>Cardiac</b>	<b>Smooth</b>
Striation: striated	somewhat striated	non-striated
Cells: straight cylindrical parallel, non-branching	tapered cylinders parallel & branched	spindle shape
Nucleus: multi-nuclei, peripheral	mostly uni-nucleus most peripheral	uni-nucleus central
Discs: none	intercalated	none
Location: attach bones	cardiac wall	hollow organs
Control: voluntary	involuntary	involuntary
Function: body movement	heart contraction	visceral & circulatory
Speed of contraction: fastest	intermediate	slowest

**6. Classify nervous tissue:**



**7. Classify neurons according to their structure:**

**i) Multi polar neurons and give their brief introduction:**

- It has several dendrites and one axon.
- Most neurons of brain and spinal cord are of this type.

**ii) Bipolar neurons:**

- It has one main dendrites and one axon.
- It is found in the eye, inner ear and olfactory areas of the brain.

**iii) Unipolar neurons:**

- It's originated as bipolar neurons in the embryo but during the development axon and body get fuse into a single process that divides in to two branch and consist one cell body.
- It is always sensory neurons.

**8. Classify neurons according to function and give their brief introduction:**

**i) Sensory neurons or afferent neurons:**

- It transmits nerve impulse from receptors of skin, sense organ, muscles, and joints into the CNS.

**ii) Motor or Efferent Neurons:**

It conveys motor nerve impulse from the CNS to the effectors which may be either muscles or glands

**9. Classify neurons according to myelin sheath.**

- i. Myelinated:** Produce white matter in brain and spinal cord
- ii. Unmyelinated or non myelinated:** Produce grey matter in brain and spinal cord

**INTEGUMENTARY SYSTEM**

**1. Describe the hypodermis. Is it part of the skin?**

Yes, it's part of the skin. The hypodermis is the innermost and thickest layer of the skin. It cushions the body and helps regulate skin and body temperature.

**2. Describe the composition of the epidermis.**

The epidermis is made up of Stratified Squamous Epithelium.

**3. Name two types of sweat glands and differentiate between the two.**

Eccrine and Apocrine sweat glands.

- The apocrine glands are slightly larger and produce a thicker and more odorous sweat.
- The eccrine glands are located over almost the entire body,
- the apocrine glands are located mainly in the armpits, genital area, and around the nipples

**4. What are mammary glands and what is their function?**

It's a modified sweat gland that is highly specialized for milk production.

**5. What are ceruminous glands and what is their function?**

Another type of modified sweat gland that protects against insects by producing a bitter waxy antibacterial secretion.

**6. What are sebaceous glands, where are they found, and what is their function?**

Connected to hair follicles; located in the dermis. Most secrete directly into follicles but some directly onto the skin. Their gland shape differs depending on location. Function is to secrete oil.

**7. Explain the layer of skin.**

The skin is composed of two main layers:

- a) the epidermis, made of closely packed epithelial cells, and
- b) the dermis, made of dense, irregular connective tissue that houses blood vessels, hair follicles, sweat glands, and other structures.

Beneath the dermis lies the hypodermis, which is composed mainly of loose connective and fatty tissues.

## **SKELETAL SYSTEM**

**1. Give the numbers of bone in human body**

- 206

**2. Define bone.**

- Bone is a complex and dynamic living tissue.

**3. State the different division & types of human skeleton.**

- **Division of skeleton**
  - Axial skeleton
  - Appendicular skeleton

**4. State the different types of bone**

- Long bone
- Short bone
- flat bone
- Irregular bone
- Sesamoid bone
- Sutural bone

**5. Give four function of bones**

- Support
- Protection
- Assistance in movements
- Mineral homeostasis
- Blood cell production

**6. How many bones are present in vertebral column?**

- 26 bones are present in vertebral column

**7. Name the suture present in the cranium.**

- Coronal suture
- Sagittal suture
- Lamboid suture
- Squamous suture

**8. State the different sinus present in cranium.**

- Maxillary, Ethmoid, Sphenoid, And Frontal

**9. How many bones are present in cranium**

- 8 bones are present in cranium.

**10. How many bones are present in face?**

- 14 facial bone

**11. What are true ribs, false ribs and floating ribs?**

- **True Ribs:** The first seven ribs are known as “true ribs” because they connect the thoracic vertebrae directly to the sternum through their own band of costal cartilage.
- **False Ribs:** Ribs 8, 9, and 10 all connect to the sternum through cartilage that is connected to the cartilage of the seventh rib, so we consider these to be “false ribs.”
- **Floating Ribs:** Ribs 11 and 12 are also false ribs, but are also considered to be “floating ribs” because they do not have any cartilage attachment to the sternum at all.

**12. Name the part of typical vertebrae.**

- Body
- Superior & inferior articular process
- Lamina
- Pedicle
- Spinous process

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- Transverse process
- Vertebral arch
- vertebral foramen

### 13. Give the name of 1<sup>st</sup> and 2<sup>nd</sup> cervical vertebrae.

- 1<sup>st</sup> vertebrae- Atlas
- 2<sup>nd</sup> vertebrae- Axis

### 14. Give the functions of vertebral column.

- The major function of the vertebral column is **protection** of the **spinal cord**; it also provides stiffening for the body and attachment for the pectoral and pelvic girdles and many muscles. In humans an additional function is to transmit body weight in walking and standing.

### 15. Name the parts of sternum.

- The sternum consists of three main parts, listed from the top:
  - Manubrium.
  - Body (gladiolus)
  - Xiphoid process.

### 16. Name the bone of thoracic cage.

- The **sternum**, the **ribs**, and the **thoracic vertebrae**.

### 17. Which is the largest and longest bone present in human body?

- Femur of thigh

### 18. State the list of bones present in wrist region.

- 16 carpel bones present in wrist region

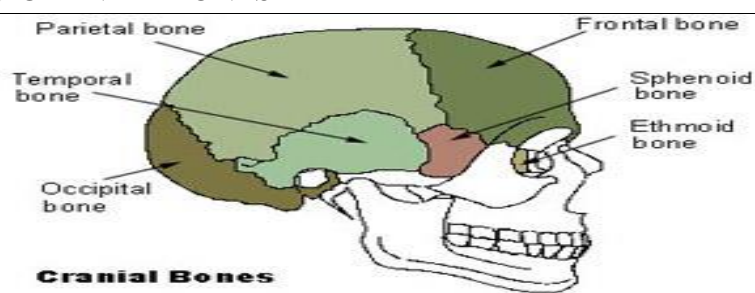
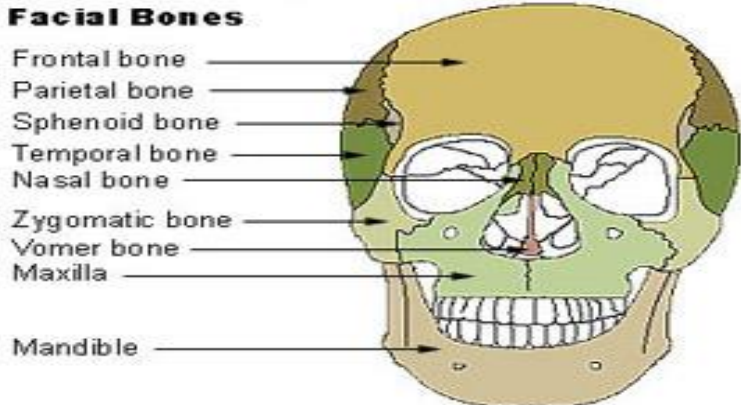
### 19. How many bones present in fingers of hand?

- 28 phalanges bones present in fingers

### 20. Name the cavity present in scapula.

- Glenoid cavity articulate with humerus at shoulder joint

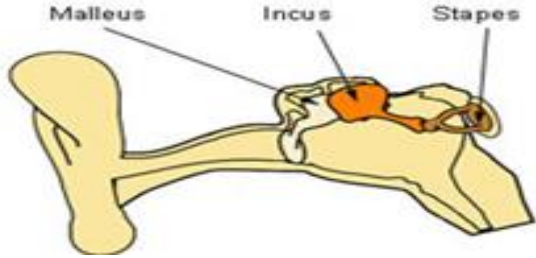
### 21. State the name and their number of axial bones in human body.

SR. NO	BONES	NUMBERS	DAIGRAM
CRANIAL BONES			
1	Parietal	2	
2	Temporal	2	
3	Frontal	1	
4	Occipital	1	
5	Ethmoid	1	
6	Sphenoid	1	
FACIAL BONES			
1	Maxilla	2	
2	Zygomatic	2	
3	Mandible	1	
4	Nasal	2	
5	Platine	2	
6	Inferior nasal concha	2	
7	Lacrima	2	
8	Vomer	1	

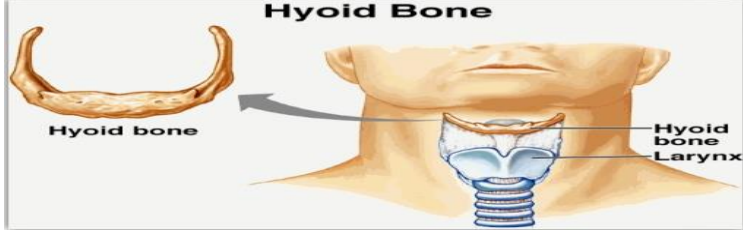


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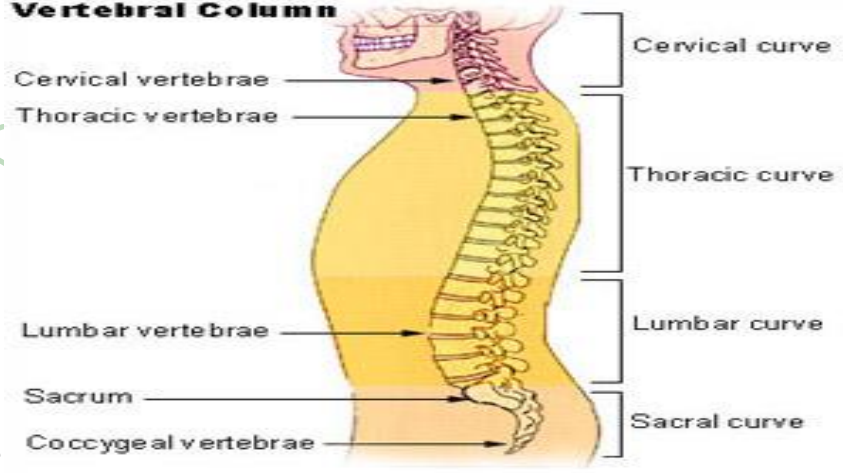
### AUDITORY OSSICLES

1	Malleus	2	
2	Incus	2	
3	Stapes	2	

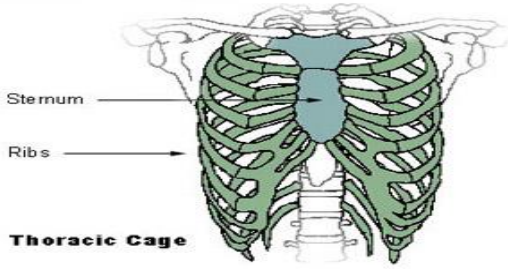
### HYOID

1	Hyoid	1	
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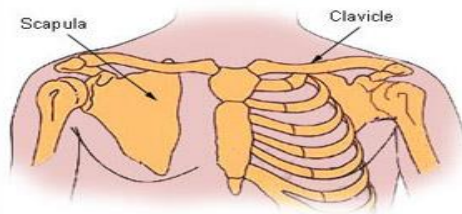
### VERTEBRAL COLUMN

1	Cervical vertebrae	7	
2	Thoracic vertebrae	12	
3	Lumbar vertebrae	5	
4	Sacrum	1	
5	Coccyx	1	

### THORACIC CAGE

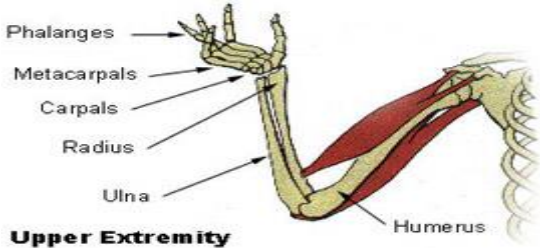
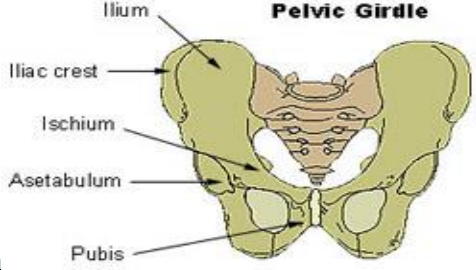
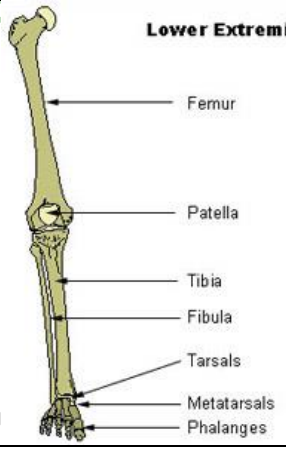
1	Sternum	1	
2	Ribs	24	
Total axial bones		80	

**22. State the name and their number of appendicular bones in human body.**

SR. NO	BONES	NUMBERS	DAIGRAM
<b>PECTORAL GIRDLES</b>			
1	Clavicle	2	
2	Scapula	2	



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UPPER EXTREMITY			
1	Humerus	2	 <p><b>Upper Extremity</b></p>
2	Radius	2	
3	Ulna		
4	Carpals	16	
5	Metacarpals	10	
6	Phalanges	28	
PELVIC GIRDLE			
1	Coxal,	2	 <p><b>Pelvic Girdle</b></p>
2	innominate, or hip bones	2	
LOWER EXTREMITY			
1	Femur	2	 <p><b>Lower Extremity</b></p>
2	Tibia	2	
3	Fibula	2	
4	Patella	2	
5	Tarsals	14	
6	Metatarsals	10	
7	Phalanges	28	
Total bones		126	

### 23. List the location and function of the major bones of axial skeleton

Bone(s)	Location	Function	Major grouping of axial skeleton
<b>Cranium</b>	Head	Supports facial structures, encloses and protects the brain, provides muscle attachments for chewing and moving the head	Skull
<b>Mandible</b>	Lower jaw	Permits chewing	Skull
<b>Vertebrae</b>	Spine	Permit mechanical stability for the body and protect the spinal cord	Vertebral column
<b>Ribs</b>	Chest wall	Provide protection for the organs of the upper body	Thoracic cage
<b>Sternum</b>	Center of the chest	Provides attachment for many (not all) ribs	Thoracic cage

**B.PHARM SEM – I SHORT QUESTION AND ANSWER****24. List the location and function of the major bones of appendicular skeleton**

<b>Bone(s)</b>	<b>Location</b>	<b>Function</b>	<b>Grouping</b>
<b>Scapula</b>	Flat, triangular bone located on the posterior side of each shoulder	Articulates with the clavicle and humerus	Pectoral girdle
<b>Clavicle</b>	Located in each shoulder at the base of the neck	Helps to keep the shoulders in place; connects upper arm to the body	Pectoral girdle
<b>Humerus</b>	Extends from the scapula to the elbow	Provides attachments for muscles that move the shoulder and upper arm at the proximal end; articulates with the radius and ulna at the distal end	Upper limbs
<b>Radius</b>	Located on the lateral side of the forearm between the elbow and wrist	Provides attachment for muscles that bend the arm at the elbow and muscles that allow movement of the wrist	Upper limbs
<b>Ulna</b>	Located on the medial side of the forearm between the elbow and wrist	Provides attachment for muscles that bend and straighten the arm at the elbow and muscles that allow movement of the wrist	Upper limbs
<b>Ilium</b>	Located on the superior portion of the coxal bone	Connects the bones of the lower limbs to the axial skeleton	Pelvic girdle
<b>Femur</b>	Extends from the hip to the knee	Provides attachment for muscles of the lower limbs and buttocks; distal end articulates with the tibia and patella	Lower limbs
<b>Tibia</b>	Located on the medial side of the leg between the knee and the ankle	Articulates with the femur, on its superior side, to form the knee joint; articulates with the fibula on the lateral side; articulates with the patella on the anterior side; and the tarsals to form the ankle joint	Lower limbs
	<b>Fibula</b>	Forms the lateral part of the ankle joint	Lower limbs
	<b>Patella</b>	Supports movement of the knee joint	

**25. Enlist the types of joints in human skeletal system with examples****Fibrous joint:-**

- Suture :- Joints between cranial bones
- Syndesmoses :- Tibiofibular joint
- Interossrous membranes :- joint between radius and ulna

**Cartilaginous joint**

- Synchondroses:- joint between 1<sup>st</sup> rib and sternum
- Symphyses :- anterior surface of hip joints
- Synovial joint
- Planner joint :- Intercarpal joints, intertarsal joints
- Hinge joint :- Joint of knee, ankle, elbow, Pivot joint
- Condylod joint:- Joint of wrist, metacarpophalangeal
- Saddle joint :- carpometacarpals and metacarpal joints
- Ball-and- Socket joint:- hip and shoulder joints

**26. Enlist diseases related to skeletal system**

- Rheumatoid Arthritis
- Osteoarthritis
- Gout
- Joint dislocation

## **JOINTS**

**1. What is arthrology and amphiarthroses ?**

- Study of joints is known as arthrology. Slightly movable joints are called amphiarthroses.

**2. What is the meaning of diarthrosis?**

- Synovial joint is also known as diarthrosis.
- It joins bones with a fibrous joint capsule that is continuous with the periosteum of the joined bones, constitutes the outer boundary of the synovial cavity, and surrounds the bones articulating surfaces. The synovial cavity is filled with synovial fluid.

**3. What is arthritis?**

- Arthritis is inflammation and painful joints due to degradation of cartilages or synovial membrane or deposition of uric acid.

**4. What is the meaning of sutures?**

- Sutures are immovable joints. In sutures, skull bones are joined by strong bundles of white fibers.

**5. Classify the joints.**

The joints can be classified into three main types.

- a) Immovable or synarthrose joints,
- b) Slightly movable or amphiarthrose joints, and
- c) Freely movable or synovial joints.

**6. Explain the ball and socket joints.**

- Ball and socket joints have a ball like spherical end called head which fits into cup like depression.
- It is freely movable in all directions.
- It lies at the shoulder joint and hip joint

**7. Write brief note of synovial joints?**

- In synovial joint one bone forms knob like swelling while other one forms a depression.
- The ends of both the bones are covered by smooth articular cartilages.
- Between two bones is synovial cavity filled with synovial fluid.

**8. Where the hinge joints present?**

- Hinge joints are formed between two or more bones where the bones can only move along one axis to flex or extend.

**9. Introduce pivot joints.**

- Pivot joint is also called rotary joint. It allows only rotary movement around single axis.
- The moving bone rotates within a ring that is formed from second bone and adjoining ligament.

## **BLOOD**

**1. Define blood:**

“It is a liquid connective tissue”. Which consist WBCs, RBCs, Platelets and other dissolved solutes and protein.

**2. What are the functions of blood?**

- i. Transportation of oxygen, carbon dioxide, nutrients etc
- ii. Maintains Body Temperature:
- iii. Controls pH
- iv. Removes toxins from the body
- v. Protection.

**3. Why human is known as warm blooded animal ?**

Because human blood temperature is high than the normal body temperature i.e 38°C.

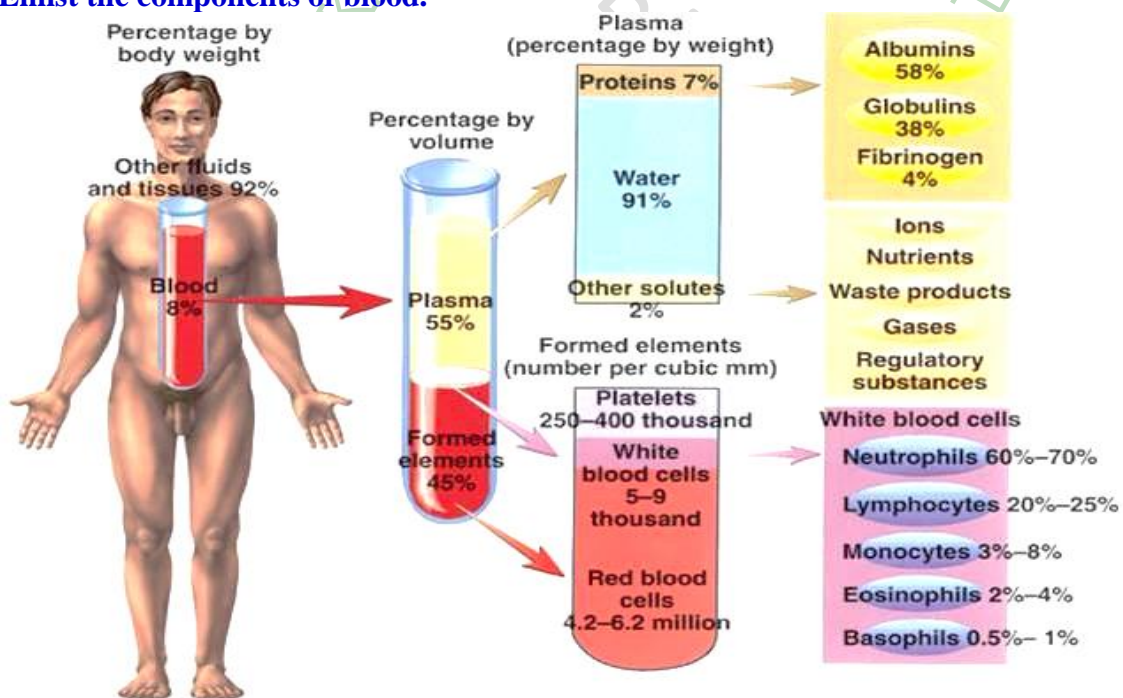
**4. What is the Ph of Blood ?**

Blood Ph is 7.3 to 7.4

**5. What is the normal blood volume in adult human ?**

- Healthy adult consist 8 % of blood of their total body weight
- Adult male contains 5-6 liters of blood while adult female contains 4-5 liters of blood.

**6. Enlist the components of blood.**



**7. Write brief introduction about hemopoiesis.**

- Hematopoiesis or hemopoiesis is the Process of blood cell production
- About 0.05-0.1% of red bone marrow cells are known as hemopoietic Stem cells or hemopoietic cells produce five different blast cells.
  - **Proerythroblasts:** Develop into red blood cells (erythrocytes)
  - **Myeloblasts:** Develop into basophils, neutrophils, eosinophils
  - **Lymphoblasts:** Develop into lymphocytes
  - **Monoblasts:** Develop into monocytes.
  - **Megakaryoblasts:** Develop into platelets

**8. What is RBCs ?**

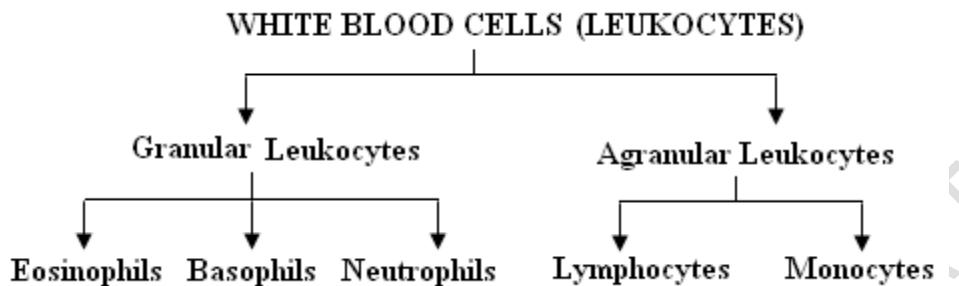
- RBCs means Red blood cells also known as erythrocytes

## B.PHARM SEM – I SHORT QUESTION AND ANSWER

- The average normal RBC count is
  - For men 5.4 million/uL
  - For women 4.8 million/uL.
- They are tiny (7.5u in diameter, 2u thick) biconcave and anucleate.
- They survive for about 120 days.
- About  $5 \times 10^{11}$  RBCs are destroyed everyday, in the liver and spleen.

### 9. What is WBCs?

- WBCs means white blood cells also known as leucocytes
- Normal value of WBCs in healthy adult is 4000-11000/cmm



### 10. What is normal value of platelets?

- The normal value of platelets is 2,50,000 to 4,00,000.
- Platelets have short life span, just 5-9 days.

### 11. What is normal bleeding time of blood?

The normal bleeding time is 1-3 minutes

### 12. What is normal clotting time of blood?

The normal clotting time of blood is 4-10 minute.

### 2. When veinpuncture method is suitable for collection of blood ?

- When large amount of blood (more than 1 cc) is required to be collected, it is collected by veinpuncture.

### 3. Why pricking site is covered with spirited wet cotton swab?

- The spirited wet cotton swab should be pressed upon the puncture site, to prevent oozing out of blood and to prevent any contamination by bacteria's.

### 4. Which are the methods of collection of blood?

- Veinpuncture
- Pricking method

### 5. Name the three anticoagulants used to preserve blood.

- Acetic acid
- Heparin
- Sodium citrate
- Calcium citrate

### 6. State the characteristic of pricking needle.

- The pricking needle is a flat needle with cutting edges and very short but sharp bayonet point

**7. State the common site of collection of blood.**

- Ball of finger (left ring finger)
- Ear lobe
- Heel or big toe in infants
- Pad of thumb

**8. Why left ring finger is chosen for blood collection in pricking method?**

- Because:-Synovial sheath of ring finger stop short of the hand or not covered the entire figure and due to this, the infection does not exceed the limit.
- It is least used as compared to other fingers.

**9. State the principle of Sahli's method.**

- When the blood is mixed with N/10 HCl RBCs are haemolyzed and Hb is liberated.
- This Hb is converted in to acid hematin which reddish brown in colour.
- The solution is diluted with distilled water till it matches with the standard glass tubes.
- The Hb% can directly be read from the graduated tube.

**13. Why 0.1 N HCl used in estimation of Hb?**

- HCl causes haemolysis
- The standards side tubes with which colour are being matched are available with the dilution of HCl.

**14. Give 2 advantages of Sahli's method of Hb estimation.**

**Advantages**

- Easy to handle
- Simple method based on matching visual colour with a standard

**15. Name the methods of Hb estimation.**

**Direct methods**

- Determination of O<sub>2</sub> carrying capacity
- Iron estimation
- Spectrophotometry

**Indirect methods**

- Sahli's method
- Haldane's method
- Tallquist method

**16. State Hb gram percent in infants, adult male and adults women.**

- Infant:- 23 gm%
- Adult male:- 13-15 gm% [average 14.8 gm%]
- Female:- 12-15 gm% [average 13.7 gm%]

**17. Why female Hb conc. is lesser than the male.**

- Low Hb in female due menstruation cycle, pregnancy, lactation and in male testosterone stimulates formation of RBC., hence Hb is higher in male than female.

**18. State the function of Hb.**

- Transport of O<sub>2</sub> from lungs to tissue and CO<sub>2</sub> from tissue to lungs
- Maintained of pH



**19. Define Anemia. Give the type of anemia.**

**Anemia:** Deficiency of haemoglobin leads to decrease oxygen carrying capacity of blood is called anemia.

**Type of anemia**

- Pernicious anemia
- Megaloblastic anemia
- Haemolytic anemia
- Aplastic anemia

**20. What is O<sub>2</sub> carrying capacity of the blood? State the quantity of O<sub>2</sub> carried by 1g of Hb?**

- Amount O<sub>2</sub> in cc carried out by 100ml blood during one pulmonary circulation. 1.34 cc of O<sub>2</sub> carried out by 1gm of Hb.

**21. Define colour index. What is hypochromic and hyperchromic anemia?**

- The colour index is defined as relative amount of haemoglobin present in one RBC. Normal colour index is **0.85-1.15**. It is finding out by formula:

$$\text{Colour index} = \frac{\text{Hb}\%}{\text{RBC}\%}$$

**\*Hypochromic anemia** = If colour index is less than 0.85

**\*\*Hyperchromic anemia** = If colour index is more than 1.15

**22. What is haematin? Which is the colour of acid haematin?**

- Haemoglobin reacts with acid (HCl) to form acid haematin, which is reddish brown in colour.

**23. State meaning of bleeding time. State normal value of bleeding time.**

- The time between the moment of escape of blood from blood vessels and the cessation of its flow is defined as bleeding time.
- Usual bleeding time is 1-3 min.

**24. State meaning of clotting time. State normal value of clotting time**

- The time between the moment of escape of blood from blood vessels and development of fibrin (clot) is defined as clotting time.
- Usual clotting time is 4-10 min.

**25. State the principle of clotting time.**

- During coagulation sol form of the change to gel from. The time elapsed between the moment of blood outside the vessels and the observation of physical change is taken as clotting time.

**26. Name the methods used to find clotting time.**

- Lee and White's method
- Wright's method
- Dukes method

**27. Defines thrombocytopenia, hemophilia, purpura and what their effect on bleeding time and clotting time is.**

- **Thrombocytopenia:-** Is the condition caused by the decrease thrombocyte count or platelets count. It prolongs bleeding time.



## B.PHARM SEM – I SHORT QUESTION AND ANSWER

- **Hemophilia:-** Is the condition caused by the absence of any one of the factor required for the clotting of blood. It prolongs clotting time.
- **Purpura:-** Is the condition caused by platelet deficiency and characterized by the appearance of red spot on the skin. It prolongs bleeding time.

**28. When the patient having fever, is there any change in the bleeding time and clotting time? Why?**

- Yes, if patient have fever it prolongs bleeding time and clotting time is shorten in warmth condition. Because clotting factor are slowly released in warmth condition.

**29. State the condition in which prolongs clotting time.**

- Absence of clotting factor
- Decrease in temperature
- Smoothness of surface
- Dilution of blood.

**30. State the condition in which prolongs bleeding time.**

- Purpura
- Thrombocytopenia
- Scurvy (deficiency of Vit. C)

**31. Why bleeding time is smaller than clotting time? Give reason.**

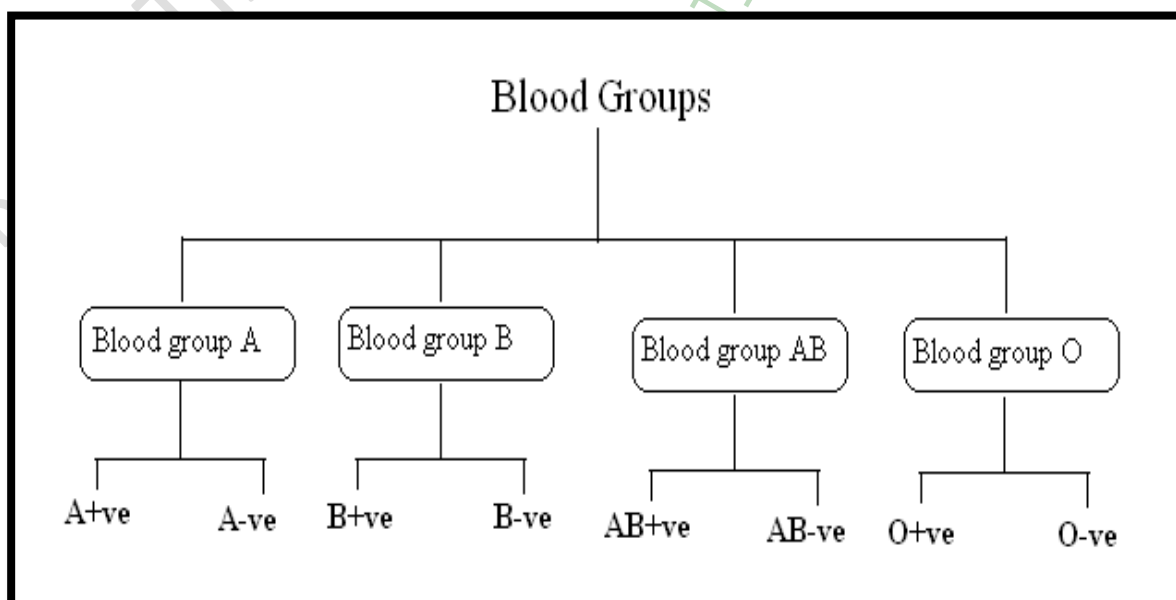
- Bleeding time is smaller than clotting time because bleeding is stopped by vascular spasm and platelet plug formation, while clotting involves a series of enzymatic reaction taking more time.

**32. What is blood group? State the basic classification of blood group. Write down summary of ABO system of blood group.**

- Blood group is grouping of blood according to the type of agglutinin (antigen) present in blood.

**Classification of blood group:-**

- Classification of blood group based on presence and absence of antigen & rhesus factor in blood cells



## B.PHARM SEM – I SHORT QUESTION AND ANSWER

### Summary of ABO system

Sr. No.	group	Agglutinogen (Antigen in RBC)	Agglutinins (Antibodies)	Can donate to groups	Can receive from groups
1	AB	A and B	None	AB	All groups
2	A	A	Anti-B	A & AB	A & O
3	B	B	Anti-A	B & AB	B & O
4	O	none	Anti-A & Anti-B	All groups	Only O

### 33. State the principle of blood group findings ( Landsteiner Law).

**Principle:** The ABO system of blood group is based on the presence of Agglutinin A, B, both A & B or none. Landsteiner stated, if particular type of Agglutinin is present in the blood, then the corresponding agglutinin always absent and if particular type of Agglutinin is absent in the blood, then the corresponding agglutinin always presents. Anti sera-A consist agglutinin alpha and it causes clumping of RBCs of blood containing agglutinin A. Anti sera-B consist agglutinin beta and it causes clumping of RBCs of blood containing agglutinin B.

### 34. Blood group is determined as follows:

- 1] Clumping in antisera A ---- Blood group A
  - 2] Clumping in antisera B ---- Blood group B
  - 3] Clumping in antisera A & antisera B ---- Blood group AB
  - 4] No Clumping in antisera A & antisera B ---- Blood group O
- The blood group assigned as +ve & -ve, according to the Rh system. If Rh system is present then blood group assigned as +ve and if Rh system is absent then blood group assigned as -ve.
  - Antisera D contains antibodies against Rh factor, hence, if clumping is seen in this sera, blood group will be +ve and if not seen, then will be -ve.

### 35. Why blood group AB is called universal recipient?

- Blood group AB is called universal recipient because it does not contain any agglutinins hence can receive blood of any group.

### 36. Why blood group O is called universal donor?

- Blood group O is called universal donor because it does not contain any agglutininogen hence can donate blood to any group.

### 37. State complication and indication of blood transfusion.

- **Complication of blood transfusion:-**  
When incompatible blood is transfused intravenously from donor to recipient antibodies present in recipient blood bring coagulation of blood take place due to antigen antibody reaction in recipient blood.
- **Indication of blood transfusion:-**  
Haemolysis of erythrocytes, damage of urinary passages, blockage of capillaries and death.

### 38. State 2 precautions to be taken while selecting the donor.

- Blood group should be match
- Donor should be free from any disease, infection or disorder

**39. What happen when Rh- mother has conception of Rh+ foetus? How will you prevent such complication?****Conception of Rh+ foetus takes place**

- If mother is Rh- and father is Rh+, the child may inherited the dominant Rh+ gene from father.
- So During pregnancy some blood of foetus is passed to mother blood from placenta. So Rh+ antibodies are form in mother's blood.
- Generally 1<sup>st</sup> pregnancy is safe but not 2<sup>nd</sup> because antibodies are present in mother blood so during 2<sup>nd</sup> pregnancy mother's antibodies crosses placenta and enter into foetus blood so it causes clumping of foetus blood and this condition is called erythroblastosis foetalis

**Precaution:**

- To Rh- mother of an Rh+ foetus, Rh-antibodies are given to destroy the Rh+ cells that enter from foetus to mother within the 2-3 days after the birth of child. So prevent complication in both mother as well as child.
- e.g RHOGAM antibodies.

**40. What is haemocytometry? Enlist parts of haemocytometer. Differentiate between RBC & WBC dilution tubes.**

- The counting of RBCs & WBCs in blood using haemocytometer set is called haemocytometry

**Parts of haemocytometer**

- Dilution pipettes
- Neubauer's counting chamber
- Thomas cover slip.

**41. Give composition & purpose of WBCs dilution fluid**

Sr. No.	Constituent	Amount	Purpose
1	Glacial acetic acid	2 ml	Destroy RBCs
2	Gentian or methyl violet (1%)	1 ml	Stain nuclei of WBCs
3	Water	Upto 100 ml	Diluent

**42. Give the reason the first few drops of the blood fluid mixture is discarded before charging squares.**

- Because it does not contain blood so the first few drops of the blood fluid mixture is discarded before charging squares.

**43. State the principle of WBC count.**

**Principle** The number of WBCs in blood is too many and the size of the cells is too small. It is therefore, impossible to count the cells even under high power. This difficulty is partially overcome by diluting the blood with suitable dilution of known degree. The dilute blood is placed in capillary space of known capacity in the counting chamber and cover slip. The cells thus spread out in single layer in this space and the number of cells can be count under low power of a microscope. The count can be calculated by multiplying with dilution factor and are reported as cells per cubic mm of blood.

**44. What normal WBC count of blood per cubic millimeter.**

- Normal WBC count- 4000-10,000/cmm of blood

**45. What is leucopenia & leucocytosis.**

- **Leucopenia:-** If total WBCs count is decrease below than 4000/cmm of blood
- **Leucocytosis:-** If total WBCs count is increase above than 10000/cmm of blood

**46. Give some general characteristics of WBCs/leucocytes.**

- Wandering cells which are nucleated and do not contain Hb.
- They are slightly bigger in size and less in number than RBCs
- Origin is extravascular
- Life span is too short, that is few hrs to few days

**47. Enlist functions of WBCs.**

- Phagocytosis
- Antibody formation
- Formation of fibroblast
- Liberation of histamine and allergic reactions
- Secretion of heparin
- Protection from antigens

**48. What is leukemia? What are its types?**

- Leukemia is malignant (cancerous) disease in which total WBCs count goes beyond 1,00,000/cmm. Premature cells are increased in large number in the blood These are functionless.
- **Types of leukemia:-**
  - Chronic leukemia
  - Acute leukemia
  - Myelogenous leukemia
  - Lymphocytic leukemia

**49. Give the reason why RBCs are not seen while counting WBCs.**

- Because glacial acetic acid contain of WBCs dilution fluid destroys RBCs so RBCs are not seen while counting WBCs.

**50. State the principle of RBC count.**

**Principle** The number of WBCs in blood is too many and the size of the cells is too small. It is therefore, impossible to count the cells even under high power. This difficulty is partially overcome by diluting the blood with suitable dilution of known degree. The dilute blood is placed in capillary space of known capacity in the counting chamber and cover slip. The cells thus spread out in single layer in this space and the number of cells can be count under low power of a microscope. The count can be calculated by multiplying with dilution factor and are reported as cells per cubic mm of blood.

Give composition & purpose of RBCs dilution fluid.

Sr. No.	Constituent	Amount	Purpose
1	Sodium chloride	1 gm	Provides isotonicity, & prevents hemolysis
2	Sodium sulphate	5.5 gm	Provides isotonicity, & prevents rouleux formation
3	Mercuric chloride	0.5 gm	Causes fixation of the cells; prevent bacterial growth.
4	Water	Upto 100 ml	Diluent

**51. Give the RBCs count of foetus, infants, child, adult male, adult female in per cmm of blood.**

- Foetus:- 7-8 millions/cmm
- Infants:- 6-7 millions/cmm
- Child:- 7-8 millions/cmm
- Adult male:- 5 millions/cmm
- Adult female:- 4.5 millions/cmm

**52. Why RBCs count is high in the people living at high altitude?**

- Because at high altitude oxygen contain is less so RBCs count high.

**53. Are RBCs form by cell division? Yes/No. Give reason.**

- No because RBCs does not consist nucleus.

**54. State the process of formation of RBCs.**

- Erythropoiesis

**55. Give general characteristics of RBCs.**

- RBCs are circular, dumb bell shape, biconcave & non nucleated cell.
- Contain heamoglobin
- 7.2 in diameter, 2.2 in thickness

**56. Where the RBCs are formed in foetus and adults.**

- RBCs are formed in spleen and liver in embryo in fetus
- RBCs are formed in red bone marrow in adults

**57. Explain the properties of RBCs.**

- **Haemolysis;**- RBCs in isotonic solution, swells and finally break to liberate haemoglobin
- **Rouleaux formation;**- It is the property of RBCs to come together over one another like pile of coin.
- **Suspension stability;**- Remains suspended in plasma as long as blood flowing
- **Erythrocyte sedimentation rate**
- **Agglutination:** - RBCs contain specific antigens called agglutinogens, if expose to specific agglutinins, clumping of RBCs take place as Ag-Ab reaction called agglutination.

**58. What is polycythemia? Give the reason of polycythemia.**

- Increase in RBCs count is called polycythemia

**Reason of polycythemia-**

- Higher altitude
- During muscular exercise
- Increase temp. in environment
- Loss of body water
- Ingection of adrenaline
- Carbon monoxide poisoning

**59. What is microcytic and megaloblastic anemia?**

- **Microcytic anemia;**- In hypochromic anemia Hb is reduced and hence deficiency of iron due to which size of RBCs is reduced so t is called as microcytic anemia.
- **Megaloblastic anemia;**- In hyperchromic anemia is due to defective RBCs formation. Size of RBCs is large so it is called as Megaloblastic anemia.

**60. Which stain is used for differential WBCs count? Give composition of that stain.**

## B.PHARM SEM – I SHORT QUESTION AND ANSWER

- **Leishman's stain** is used for differential WBCs count
- **Composition:-**
- **Methyl alcohol:** precipitates the protein which sticks to slide; thus it prevent loss film during washing
- **Metylene blue:** dye which stains nucleus of the cell to blue colour and also stain basophils
- **Eosin:** a dye which stains cytoplasm of the cell to pink and also stains neutrophils granules

### 61. Which lens is used for differential WBCs count under microscope?

- Oil immersion lens

### 62. Name oil used in differential WBCs count.

- Cedarwood oil

### 63. Give the normal values of differential WBC count.

- Neutrophils :- 50 – 70 %
- Eosinophils :- 1 – 4 %
- Basophils :- 0 – 1 %
- Lymphocytes:- 20 – 30 %
- Monocytes :- 2 – 5 %

### 64. Differentiate between neutrophils and eosinophils

I] Have multiple lobes

I] Have bubble lobes

II] Purple colour with die

II] Red colour with die

### 65. What is ESR?

- Erythrocyte sedimentation rate is the settling of erythrocytes in plasma when allowed to stand.

### 66. Name the methods used to find ESR.

- Westegren's method
- Wintrobe's method

### 67. State the principle of ESR.

- **Principle** Erythrocytes of blood have a tendency to settle down because of their greater density than plasma and rouleaux formation. Thus the blood mixed with anti –coagulant, placed in a long vertical tube, the sedimentation of erythrocytes occurs leaving small clear plasma at the top in a vertical column in one hour.

### 68. State the clinical significances of ESR.

- Used to diagnosed various infections or diseases like- septicemia, pulmonary tuberculosis, anemia, jaundice, malignant tumor etc

### 69. Name the factors affecting on ESR sedimentation rate.

- Large protein molecule
- Globulin concentration
- Increase RBCs (polycythemia)
- Increase size of RBCs



## B.PHARM SEM – I SHORT QUESTION AND ANSWER

### 70. Define osmosis, isotonic solution and paratonic solution .

- **Osmosis:** If two solution having different concentration of solute are separated by semipremiable membrane then molecules of solvent moves from the solution i.e lower concentration to that of higher concentration. This phenomenon is called osmosis.
- **Isotonic solution:-** The solutions having same osmotic pressure are called isotonic solutions e.g. 0.9% NaCl is isotonic to protoplasm of RBCs.
- **Paratonic solutions:-** The concentration of solutions is different than that of isotonic solutions are called paratonic solutions
- If conc. less then called hypotonic and if more the called hypertonic solutions.

### 71. State the principle of effect of osmotic pressure on RBCs.

- The cell membrane of RBCs behaves as semipermeable membrane between protoplasm of RBCs and plasma of blood in which they are suspended. If they are placed in hypotonic solution , the solvent penetrate into cell by process of osmosis. As result, the biconcave cell becomes spherical, enlarged and further increases leads rupture of cell (haemolysis). If placed in the hypertonic solution, they causes shrinking of RBC.

### 72. What is crenation point?

- When RBCs are kept in hypertonic solution RBCs shrinks and as a result cell membrane is wrinkled. This shape of RBC is called crenation.

### 73. What is fragility point?

- The ability of RBC to rupture and liberate haemoglobin called fragility. Fragility point is the point at which 50% of RBCs are ruptured.

### 74. Types of WBCs.

- Wbcs divide in two types:
  - i. Granular Cells: a) Basophiles b) Eosinophil c) Neutrophil
  - ii. Agranular Cells : a) Lymphocytes b) Monocytes



## CHAPTER 4

## PERIPHERAL AND AUTONOMIC NERVOUS SYSTEM

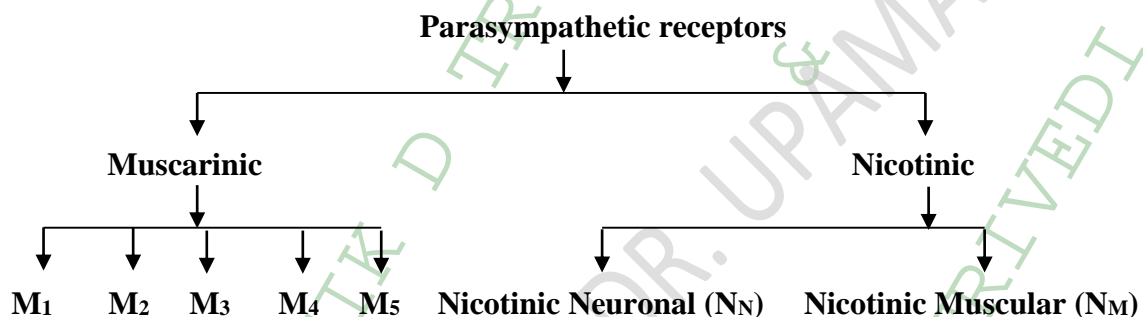
## 1. Give brief introduction about autonomic nervous system (ANS)

- It is the part of nervous system that deals with the involuntary movements. It is also known as visceral nervous systems. It works under the conscious and unconscious conditions and maintain the involuntary functions. It control automatically, pumping of blood, beating of heart, contraction of blood vessel, lungs and GI tract, secretion of saliva, lacrimal fluid etc....

## 2. Write subdivision of ANS:

- Parasympathetic Nervous System (Cholinergic Nervous System)
- Sympathetic Nervous Systems (Adrenergic Nervous System)

## 3. Classify the receptors of parasympathetic system.



## 4. Name the neurotransmitter of parasympathetic nervous system.

- Parasympathetic nervous system consist Acetylcholine as a neurotransmitter in ganglionic as well as neuroeffector junction.

## 5. Write the effects of Ach on various organ according to location of receptors.

**M<sub>1</sub> receptors:**

Location	Function
Autonomic ganglion/junction (Junction – I)	Activation of post ganglionic neuron/fiber

**M<sub>2</sub> receptors:**

Location	Function
Heart	Decrease force of contraction (Negative Inotropic) Decrease heart rate (Negative Chronotropic) Decrease conduction (Negative dromotropic)

**M<sub>3</sub> receptors:**

Location	Function
GI smooth muscle	Contraction of GI smooth muscle
Bronchial smooth muscle	Contraction of bronchial smooth muscle (Lungs contraction)
Urinary tract	Contract detrusor – urinary bladder muscle which relax trigon of urinary bladder and produce micturition.
Salivary secretion	Increase secretion of saliva
Lacrimal secretion	Increase secretion of tear/lachrymal fluid
Gastric secretion	Increase secretion of HCl in GI tract
Eye	Produce meiosis (Contraction of pupils)

**B.PHARM SEM – I SHORT QUESTION AND ANSWER**

	Iris consist two types of smooth muscles 1) Sphincter pupillae 2) Dilator pupillae (Radial Muscle). Contraction of sphincter pupillae constrict pupil known as meiosis and contraction of dilator pupillae produce dilation of pupil known as mydriasis.
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**N<sub>N</sub> receptors:**

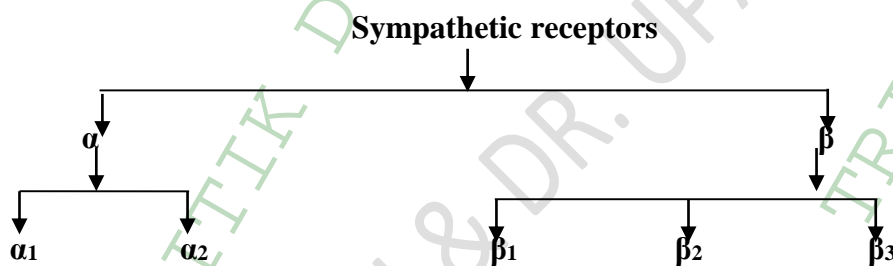
Location	Function
Autonomic ganglion/junction (Junction – I)	Activation of post ganglionic neuron/fiber
Adrenal medulla	Release of adrenalin and some nor adrenalin
CNS	Complex undefined action but inhibitory

**N<sub>M</sub> receptors:**

Location	Function
Neuromuscular Junction	Contraction of skeletal muscle

**6. Explain the neurotransmitters of sympathetic nervous system**

- Sympathetic nervous system consist two neurotransmitters, in autonomic ganglia it consist Acetylcholine as neurotransmitter and Adrenalin on neuroeffector junctions.

**7. Classify the receptors present in sympathetic nervous system****8. Explain the action of adrenaline or nor adrenaline on sympathetic system according to location of receptors.****α<sub>1</sub> receptors:**

Location	Function
Blood vessels	Produce vasoconstriction
Iris	It contract radial muscles and dilate the pupil known as mydriasis
GI tract	Contract the GI sphincter and relax the the GI muscle
Urinary bladder	Contract the trigon and relax the urinary bladder
Glands	Increase the secretion of glands
Uterus	It produce contraction in nonpregnant uterus
Heart	Weak action on heart
Male sex organ	Penile erection and ejaculation
Skin	Contraction of pilomotor muscles.

**α<sub>2</sub> receptors:**

Location	Function
Presynaptic nerve ending	It reduce release of noradrenalin
Blood vessels	Produce constriction of blood vessels
CNS	Reduction in central sympathetic flow due to decrease of Noradrenalin level
Pancreas	Reduce insulin level so increase blood sugar level
Platelets	Aggregate platelets
GI muscle	Relaxation of GI muscle

## B.PHARM SEM – I SHORT QUESTION AND ANSWER

### $\beta_1$ receptors:

Location	Function
Heart	Increase force of contraction (Positive Inotropic) Increase heart rate (Positive Chronotropic) Increase conduction (Positive dromotropic)
Kidney	Release of renin, so renin activate angiotensinogen I which convert in angiotensinogen II by the help of angiotensinogen converting enzyme (ACE) and activate the aldosterone. Which retain the $\text{Na}^+$ and water and increase the blood volume as well as angiotensinogen act on AT-I and AT-II receptor and contract the blood vessels.

### $\beta_2$ receptors:

Location	Function
Blood vessels	Dilation of blood vessels
Lungs	Dilation of bronchial smooth muscles and lungs
GI muscle	Relaxation of GI muscle
Bladder	Relaxation of detrusor produce relaxation in urinary bladder (contract the trigon)
Liver	Produce glycogenolysis means conversion of glycogen to glucose and increase blood sugar level
Pancreas	Increase glucagon secretion which increase blood sugar level
Adipose tissue	Lipolysis (Break down of fats)
Uterus	Produce relaxation in pregnant uterus

**$\beta_3$  receptors:** Role and functions of  $\beta_3$  receptors are not clearly defined.

### 9. Differentiate between parasympathetic and sympathetic nervous system.

Sympathetic and Parasympathetic Effects		
Structure	Sympathetic	Parasympathetic
Eye (pupil)	Dilation	Constriction
Nasal Mucosa	Mucus reduction	Mucus increased
Salivary Gland	Saliva reduction	Saliva increased
Heart	Rate increased	Rate decreased
Arteries	Constriction	Dilation
Lung	Bronchial muscle relaxation	Bronchial muscle contraction
Gastrointestinal Tract	Decreased motility	Increased motility
Liver	Conversion of glycogen to glucose increased	Glycogen synthesis
Kidney	Decreased urine	Increased urine
Bladder	Contraction of sphincter	Relaxation of sphincter
Sweat Glands	↑Sweating	No change

Neurotransmitter	Neurotransmitter – I is acetylcholine and Neurotransmitter – II is Adrenalin	Neurotransmitter – I and II both are acetylcholine
Preganglionic fiber	Short	Long
Postganglionic fiber	Long	Short

## **SENSE ORGAN**

### **1. Enlist parts of the ear.**

**The parts of the ear include:**

1. External or outer ear, consisting of:
  - Pinna or auricle and External auditory canal or tube
2. Tympanic membrane middle ear (tympanic cavity), consisting of:
  - Ossicles -Malleus, Incus and Stapes
  - Eustachian
3. Inner ear, consisting of:
  - Cochlea (contains the nerves for hearing)
  - Vestibule (contains receptors for balance)
  - Semicircular canals (contain receptors for balance)

### **2. Name the nerve supply to ear**

- Vestibulocochlear nerve [VIIIth auditory nerve]

### **3. Enlist the bones of middle ear**

- Malleus
- Incus
- Stapes

### **4. Which is the smallest bone of the body.**

- Stapes is the smallest bone of the body

### **5. Name the fluid present in ear.**

- The cochlear canals contain two types of fluid: perilymph and endolymph. Perilymph has a similar ionic composition as extracellular fluid found elsewhere in the body and fills the scalae tympani and vestibuli. Endolymph, found inside the cochlear duct (scala media), has a unique composition not found elsewhere in the body.

### **6. Which is the organ of the sense of sight?**

- Eye

### **7. Enlist the layers of tissues in wall of the eye.**

- The Fibrous Tunic,
- The Vascular Tunic, And
- The Nervous Tunic

**8. State the functions of parts of eyeball**

<b>Cornea</b>	The clear front window of the eye. The cornea transmits and focuses light into the eye.
<b>Iris</b>	The colored part of the eye. The iris helps regulate the amount of light that enters the eye.
<b>Lens</b>	The transparent structure inside the eye that focuses light rays onto the retina.
<b>Macula</b>	A small area in the retina that contains special light-sensitive cells. The macula allows us to see fine details clearly.
<b>Optic Nerve</b>	The nerve that connects the eye to the brain. The optic nerve carries the impulses formed by the retina to the brain, which interprets them as images.
<b>Pupil</b>	The dark center in the middle of the iris. The pupil determines how much light is let into the eye. It changes sizes to accommodate for the amount of light that is available.
<b>Retina</b>	The nerve layer that lines the back of the eye. The retina senses light and creates impulses that are sent through the optic nerve to the brain.
<b>Vitreous</b>	The clear, jelly-like substance that fills the middle of the eye.

**9. Name the fluid present in the eye.**

- Aqueous humor & vitreous fluid

**10. State the difference between rods and cones.**

	<b>Rod Cells</b>	<b>Cone Cells</b>
Location in retina	Found around periphery	Found around centre (fovea)
Optimal light conditions	Dim light ('night' vision)	Bright light ('day' vision)
Visual acuity	Low resolution (many rods : one bipolar cell)	High resolution (one cone : one bipolar cell)
Colour sensitivity	All wavelengths	Certain wavelengths (red, green, blue)
Type of vision	Achromatic (black and white)	Colour
Number of types	One (all contain rhodopsin)	Three different iodopsin pigments
Relative abundance	Many	Fewer

**11. Give name and location of suspensory ligaments.**

- **Suspensory ligament** of lens - a series of fibers that connect the ciliary body of the eye with the lens, holding it in place. Upper eyelid - top, movable, superior fold of skin that covers the front of the eyeball when closed, including the cornea.

**12. Which nerve supplies to eye?**

- Optic nerve [ Cranial nerve II]

**13. What is the meaning of gustatory sensation?**

- The gustatory system is the sensory system responsible for the perception of taste and flavour.

**14. Give short introduction of gustatory sensation.**

- The tongue is covered with thousands of small bumps called papillae, which are visible to the naked eye. Within each papilla are hundreds of taste buds.

### B.PHARM SEM – I SHORT QUESTION AND ANSWER

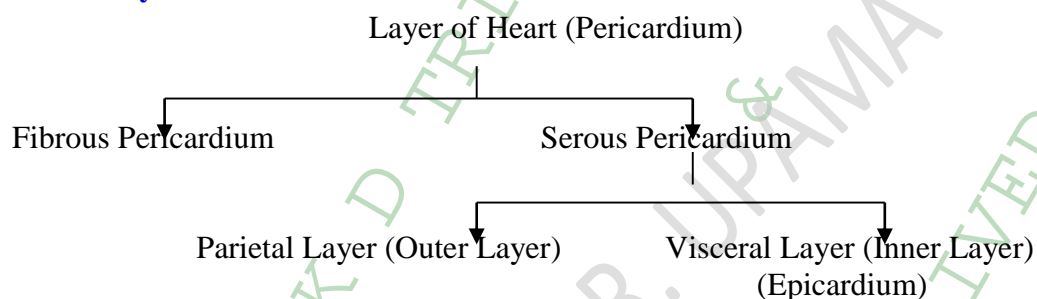
- The exception to this is the filiform papillae that do not contain taste buds.
- There are between 2000 and 5000 taste buds that are located on the back and front of the tongue. Others are located on the roof, sides and back of the mouth, and in the throat.
- Each taste bud contains 50 to 100 taste receptor cells.

**15. Explain the site of various kind of taste on tongue.**

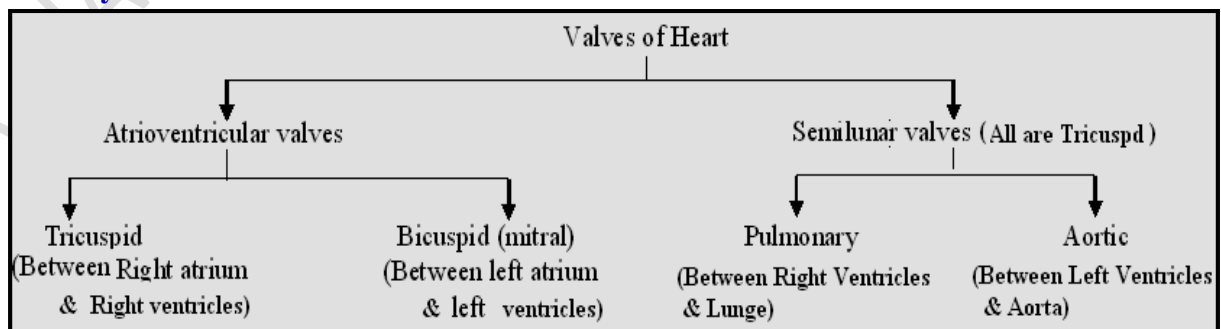


**CARDIOVASCULAR SYSTEM****1. Write brief anatomy of heart:**

- Cone shaped heart is relatively small, about the same size of closed fist of person.
  - It is 12 cm (5 in.) long, 9 cm (3.5 in.) wide and 6 cm (2.5 in.) thick.
  - In an adult, average weight of heart is 300gm.
  - The heart consist four chambers:
    - a) Two atria or atrium
    - b) Two ventricles
  - It is located near to the middle of thoracic cavity in the mediastinum (the space between the lungs) and it rest on to the diaphragm.
  - About two third of the mass of the heart lies to the left of the body's midline.
- Pointed end portion which is formed by the tip of left ventricle is known as apex and opposite to apex the wide superior and posterior margin is known as base.

**2. Enlist the layer of heart:****3. Enlist the wall of heart**

- The wall of the heart is formed by three layers:
  - a) **Epicardium (External layer):**
    - It is also known as the visceral layer of the serous pericardium.
    - It is composed of mesothelium and delicate connective tissue.
    - It is the outer or external wall of the heart.
  - b) **Myocardium (Middle layer):**
    - Myo means muscles so it is made up by cardiac muscles tissue.
    - It provides the bulkiness to the heart and it is responsible for the pumping action of heart.
  - c) **Endocardium (Inner layer):**
    - The endocardium is an innermost, thin, smooth layer of epithelial tissue that lines the inner surface of the heart chambers and valves.

**4. Classify the valve of heart:****5. Enlist the types of circulation through the heart:**

- i. Coronary circulation
- ii. Systemic circulation
- iii. Pulmonary circulation



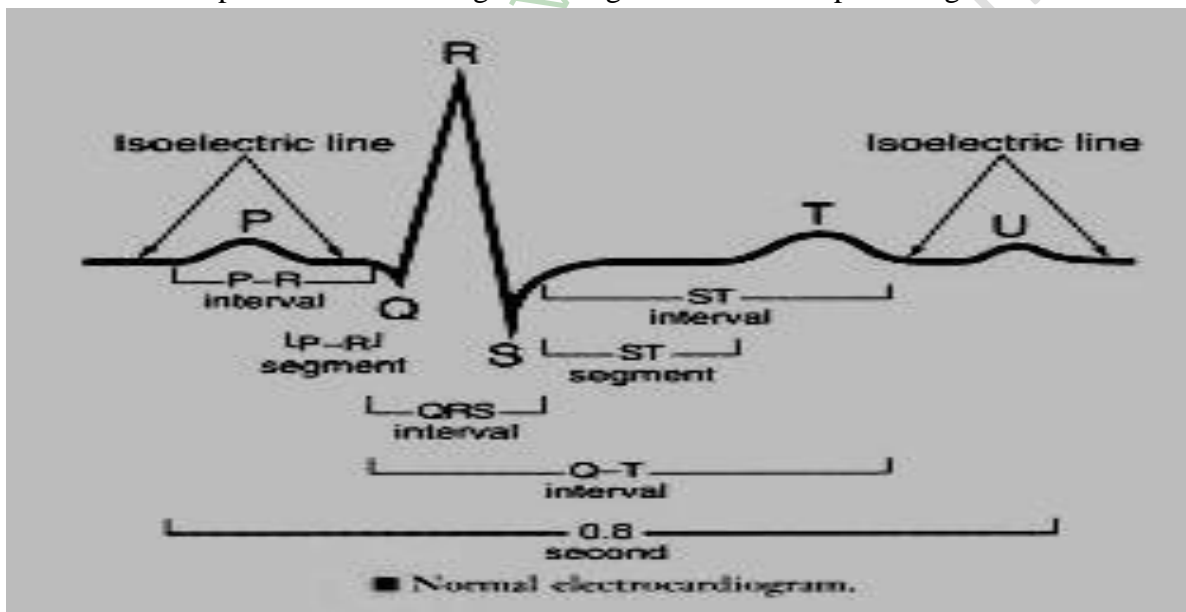
**6. Write the path of conduction system via heart:**

SA-node → AV-node → AV bundle → Right & Left Bundle branches → Purkinje fibers

**7. What is ECG? Give brief introduction of ECG**

- ECG known as electrocardiogram.
- It has mainly three waves:
  - P Wave: Atrial depolarization
  - QRS Complex: Ventricle depolarization
  - T Wave: Ventricle repolarization

A typical ECG tracing of the cardiac cycle (heartbeat) consists of a P wave, a QRS complex, a T wave, and a U wave which is normally visible in 50 to 75% of ECGs. The baseline voltage of the electrocardiogram is known as the *isoelectric line*. Typically the isoelectric line is measured as the portion of the tracing following the T wave and preceding the next P wave.



**8. Define cardiac cycle. Enlist the steps of cardiac cycle.**

- Definition: A cardiac cycle include all the events associated within one heart beat”
- The normal heart beats in healthy adult is 75 beats/min and cardiac cycle last for 0.8 sec.

- i. Atrial systole – Represent P wave
- ii. Ventricle systole – Represent QRS complex
- iii. Ventricle systole – Represent T wave

**9. What is stroke volume?**

The blood ejection per beat from each ventricle is known as stroke volume.

$$\text{Stroke volume} = \text{EDV} - \text{ESV} = 130 \text{ ml} - 60 \text{ ml} = 70 \text{ ml}$$

**10. What is isovolumetric contraction ?**

For about 0.05 sec all four valve are closed which is known as isovolumetric contraction.

**11. What is preload?**

- The blood supply to the ventricle is often referred to as preload. Technically, the definition of preload is the volume or pressure in the ventricle at the end of diastole or refers as end-diastolic volume.

**12. What is afterload ?**

- The resistance to the ejection of blood by the ventricle is called afterload.

**13. Define pulse and pulse rate. State normal pulse rate.**

- Pulse is the rhythmic wave of increased blood pressure propagated with each ventricular blood ejection at an increased velocity.
- Pulse rate means frequency of pulse per minute.
- **Normal pulse rate** 70-75 beats per minute

**14. What is bradycardia and tachycardia?**

- Bradycardia- abnormally decreased pulse rate per minute [ less than 70-75 beat/min]
- Tachycardia- abnormally increased pulse rate per minute [ more than 70-75 beat/min]

**15. Give the reason in infants pulse rate is high and in old pulse rate is low.**

- Children are smaller, so it takes less time for blood to circle the body. Their heart beats faster to keep the cycle going.

**16. Name the factors affects the pulse rate.**

- Rate/ min
- Rhythm
- Volume
- Tension and force of the pulse
- Condition of the vessel wall

**17. Give the significances of pulse rate.**

- Pulse rate given information about.
- Rate/ min
- Rhythm
- Volume
- Tension and force of the pulse
- Condition of the vessel wall

**18. Which types of sounds are appears in heart? And describe them.**

- Two sounds may be heard due to passive closing of valves.
- i. **Lubb**:- Due to closing of atrio-ventricular valves from which backflow of blood contracting ventricles to the relaxing heart. This is long and dull systolic sound.
- ii. **Dupp**:- Due to closing off aortic and pulmonary valves. This sound is short and sharp.

**19. Which instrument is used to listening heart sound?**

- Stethoscopes

**20. Define blood pressure. State normal value of BP.**

- Blood pressure is the lateral pressure produce by the blood on the wall of blood vessels.
- Systolic blood pressure: It is maximum pressure during the systole of the heart.
- Diastolic blood pressure: It is minimum pressure during the systole of the heart.
- **Normal value of BP**:-90 mmHg - 130 mmHg

## B.PHARM SEM – I SHORT QUESTION AND ANSWER

### 21. Name the instrument is used to measure BP. Enlist part of that instrument.

- Sphygmometer is the instrument is used to measure BP
- **Part of that Sphygmometer:-** Mercury manometer
- Cuff
- Rubber pump with valve
- Rubber pump

### 22. Name the methods used to measure BP.

- Palpitary method
- Oscillatory method
- Auscultatory method

### 23. What is hypertension? Give types of hypertension.

- Increased in blood pressure than the normal, that condition is called hypertension.
- **Types of hypertension:-** Primary hypertension      Second hypertension

### 24. Why systolic BP is high than diastolic BP.

- BP depends upon two factors. Systolic blood pressure is mainly depending upon the cardiac output while diastolic BP depend on peripheral resistance. Both these factors increase systolic BP significantly. However, is not much alters diastolic pressure so systolic BP is high than diastolic BP.

### 25. Enlist factors affecting BP.

- Age: - Increases with age
- Obesity: - Generally associated with high BP
- Climate:- BP is higher in cold climate than hot climate
- Exercise & emotions: - Increases systolic BP
- Food intake: - May increases BP
- During pregnancy: - May increases BP
- Gravity; - Higher in standing position, lower in lying and intermediate in the sitting position

### 26. What is ECG?

- Graphical records of electric changes occurring during the cardiac cycle of the heart is known as electrocardiogram (ECG or EKG)

### 27. Name the instrument used to measure ECG.

- The instrument used to record ECG is known as electrocardiograph

### 28. Name the waves observed in ECG. Explain it.

Sr. No.	Name of the wave	Potential (mV)	Time (sec)	Indication	Clinical significance
2.	P-wave	0.02	0.08	Atrial depolarization	Enlargement of atria
3.	QRS complex	1.8	0.06	Ventricular depolarization	Myocardial infarction Enlargement of ventricles
4.	T-wave	0.4	0.12	Ventricular repolarization	Coronary artery diseases (CAD), hyperkalemia
5.	P-Q interval	-	0.12-0.2	Indicates the conduction of impulse from SA node to AV node	CAD, arrhythmia
6.	ST segment	-	0.12	Time when ventricles contracts	Myocardial infraction
7.	Q-T interval			Time between ventricular depolarization to ventricular repolarization	Myocardial damage, myocardial ischemia