JRG College of Pharmacy

JRG COLLEGE OF PHARMACY

UNIVERSITY SOLVED QUESTION WITH ANSWER

Year : 2024-25

Subject : Human Anatomy & Physiology

Subject Code : BP101T

Subject In-Charge : Ms.Kiranmayee Bhatra

Registration No.:

Total Number of Pages: 03 **Course: B.Pharm**

SUBJECT: Human Anatomy and Physiology – I **Sub Code: BP101T**

1st Semester Regular/Back Examination: 2024-25

BRANCH(S): B.Pharm **Q.Code: A218**

Time: 3 Hours **Max Marks: 75**

Answer Question No.1 (Part-I) which is compulsory, any seven from Part-II, and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1		Answer the following questions mentioning the answer with correct option (MCQs)								(20 x 1)
	1)	Which type of synovial joint allows movement in primarily one direction, like a door hinge?								
		a	Ball and socket joint	b	Pivot joint	c	Hinge joint	d	Condyloid joint	
	2)	What is the typical pulse rate for a healthy adult at rest?								
		a	40-60 bpm	b	60-100 bpm	c	100-120 bpm	d	Above 120 bpm	
	3)	Which part of the brain plays a key role in controlling vital processes like heartbeat, breathing, and blood pressure?								
		a	Cerebrum	b	Cerebellum	c	Medulla oblongata	d	Thalamus	
	4)	What does the T wave on an ECG represent?								
		a	Atrial contraction	b	Ventricular contraction	c	Atrial repolarization	d	Ventricular repolarization	
	5)	The intrinsic pathway is initiated by the exposure of Factor XII (Hageman factor) to which substance?								
		a	Tissue Factor	b	Collagen	c	Thrombin	d	Fibrinogen	
	6)	Hemolytic disease of the newborn (HDN) may occur in the fetus of a second pregnancy if:								
		a	The mother is Rh+ and the baby is Rh-	b	The mother is Rh+ and the baby is Rh+	c	The mother is Rh- and the baby is Rh-	d	The mother is Rh- and the baby is Rh+	
	7)	Immediate hemolytic transfusion reactions are most commonly caused by incompatibility in which blood group system?								
		a	Rh system	b	Lewis system	c	Kell system	d	ABO system	
	8)	Cell-to-cell communication that involves a ligand on one cell's surface binding to a receptor on an adjacent cell's surface is known as:								
		a	Autocrine signaling	b	Paracrine signalling	c	Juxtacrine signaling	d	Endocrine signaling	
	9)	Which of the following is NOT typically considered a component of a homeostatic control system?								
		a	Receptor	b	Control center	c	Effector	d	Stimulus (the change itself, not a component that acts on the change)	

	10)	What is the role of Langerhans cells in the epidermis?								
		a	Produce melanin	b	Strengthen the skin	c	Part of the immune system, helping fight off germs and infections	d	Provide light-touch sensation	
	11)	Lymph is ultimately returned to the bloodstream via which major vessels?								
		a	Aorta	b	Pulmonary arteries	c	Subclavian veins	d	Jugular veins	
	12)	Where are the ganglia of the sympathetic nervous system typically located?								
		a	In or near the effector organs	b	Distributed throughout the body's periphery	c	Near the spinal cord (sympathetic chain or collateral ganglia)	d	Within the central nervous system	
	13)	Which cranial nerve is primarily involved in tongue movement for speech and swallowing?								
		a	Vagus nerve (CN X)	b	Glossopharyngeal nerve (CN IX)	c	Hypoglossal nerve (CN XII)	d	Accessory nerve (CN XI)	
	14)	Which of the following is true about arteries?								
		a	They have thin walls and carry deoxygenated blood towards the heart.	b	They have thick walls and carry oxygenated blood away from the heart.	c	They are the smallest blood vessels, facilitating gas exchange	d	They contain valves to prevent backflow of blood	
	15)	What is the formula for calculating cardiac output (CO)?								
		a	CO = SV / HR	b	CO = HR + SV	c	CO = SV × HR	d	CO = BP × TPR (Blood Pressure × Total Peripheral Resistance)	
	16)	The Frank-Starling mechanism explains that an increase in preload (end-diastolic volume) leads to								
		a	A decrease in stroke volume	b	A decrease in cardiac output	c	An increase in the force of ventricular contraction and stroke volume	d	No change in cardiac output	
	17)	What is the condition where the lens of the eye becomes cloudy, causing blurry vision?								
		a	Glaucoma	b	Cataracts	c	Macular degeneration	d	Conjunctivitis	
	18)	The ossicles (hammer, anvil, and stirrup) are located in which part of the ear and function to amplify sound?								
		a	Outer ear	b	Middle ear	c	Inner ear	d	Cochlea	
	19)	Which type of blood transfusion uses the patient's own blood collected beforehand for a planned procedure?								
		a	Allogeneic transfusion	b	Autologous transfusion	c	Directed donation	d	Emergency transfusion	
	20)	An irregularly irregular rhythm on an ECG with an absence of P waves is characteristic of:								
		a	Ventricular tachycardia	b	Atrial fibrillation	c	Sinus tachycardia	d	Heart block	

Part-II

QII **Focused-Short Answer Type Questions- (Answer Any Seven)** **(7 x 5)**

1) Describe the Structure and functions of skin.
2) Define Homeostasis .Explain positive and negative feedback mechanism with example.
3) Explain Physiology of muscle contraction.
4) Define and classify joints. Write shortly about synovial joints with example
5) Define blood Coagulation. Write in details about different steps involved in blood coagulation process.
6) Write the structure and function of eye and briefly explain about physiology of vision.
7) Shortly explain about regulation of blood Pressure. Write a note on cardiac cycle.
8) Explain in details about Transport mechanism across Plasma membrane.
9) Define and classify tissue. Write detailed note on connective tissue.

Part-III

QIII **Long Answer Type Questions (Answer Any Two)** **(2 x 10)**

1) Describe details regarding conduction system of heart and its regulation by autonomic nervous system. Shortly explain about cardiac output, cardiac cycle.
2) Write in details about Divisions of skeletal system, types of bone, salient features and functions of bones of appendicular skeletal system
3) Describe General principles of cell communication and intracellular signaling pathway activation by extracellular signal molecule and explain Contact-dependent and Paracrine signaling with examples.

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Part - 1

Q. 1. Which type of synovial joint allows movement in primarily one dir^n like a door hinge ?

→ ~~pivot~~ Hinge joint.

Q2. What is a typical pulse rate of healthy adult as rest ?

— 60 - 100 bpm.

Q3. Which part of brain plays a key role in controlling vital processes like heartbeat, breathing & blood pressure.

→ Medulla oblongata.

Q4) What does the T wave on a ECG represent ?

→ Ventricular repolarisation.

Q5) The intrinsic pathway is initiated by the exposure of Factor XII to which substance ?

→ Collagen.

Q6) Hemolytic disease of newborn may occur in the fetus of a second pregnancy if.

- The mother is Rh- and the baby is Rh+.

Q7) Immediate hemolytic transfusion rx^n are most commonly caused by incompatibility in which blood group system ?

→ ABO System.

8) Cell-to-cell communication that involves a ligand on one cell's surface binding to receptor on an adjecent cell's surface is known as:
→ Juxtacrine signalling.

9) which of the following is NOT typically considered a component of homeostatic control system?
→ Stimulus (the change itself. not a component that acts on the change.

10) what is the role of Longerhans cell in the epidermis?
→ Part of immune system helping fight off germs and infections

11) Lymph is ultimately returned to blood stream via which major vessels?
→ subclavian veins.

12) Where are the ganglia of the sympathetic nervous system typically located
→ Near the spinal cord.

13) Which cranial nerve is primarily involved in tongue movement for speech and swallowing?
→ Hypoglossal nerve (CN XII)

14) Which is true arteries?
→ The have thick walls and carry oxygenated blood away from the heart.

15) What is the formula for calculating cardiac output (CO).
→ CO = SV x HR.

16) The Frank-Starling mechanism explains that an increase in preload leads to
→ An increase in the force of ventricular contraction and stroke volume.

17) What is the condition where the lense of the eye become cloudy, causing blurry vision. ?

→ Cataract.

18) The ossicles (hammer, evil, stirrup) are located in which part of ear func to amplify sound.

→ Middle Ear.

19) which type of Blood transfusion uses the patient's own collected beforehand for a planned procedure.

→ Autologous transfusion.

20) An irregularly irregular rhythm on an ECG with an absense of P wave is characteristic of.

Ans:— Atrial fibrillation.

PART-II

Part - 2

Q① Describe the structure & functions of skin.

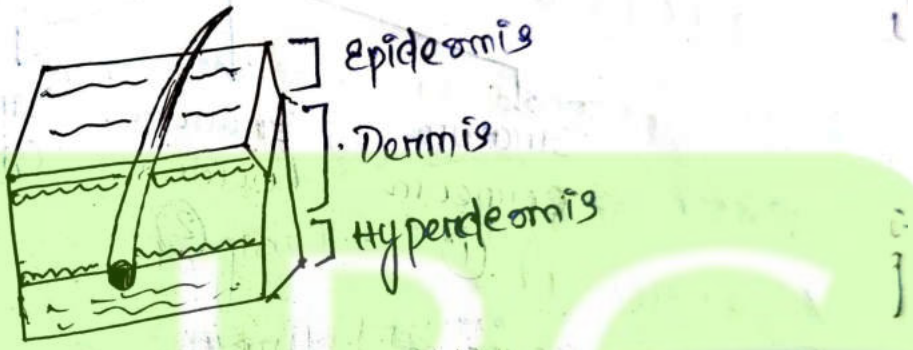
Ans→ Skin

→ Skin is the outer covering of body.

→ It's the largest organ of integumentary system

→ Protect's our body from external from bacteria, virus, etc.

→ Have 3 layers:- (A) (i) Epidermis
(B) (ii) Dermis
(C) (iii) Hypodermis



(A) (i) Epidermis

→ Outer layer of skin.

→ Provides a waterproof barrier & protecting our skin.

→ Consists of 4 types :- (i) Keratinocytes
(ii) Melanocytes
(iii) Langherhans cells
(iv) Merkel cells.

(i) Keratinocytes

→ Helps to produce Keratin.

→ composed of epidermal cells.

(iii) Melanocyte

→ helps in produce melanin.

→ composed of 8% of epidermal cells.

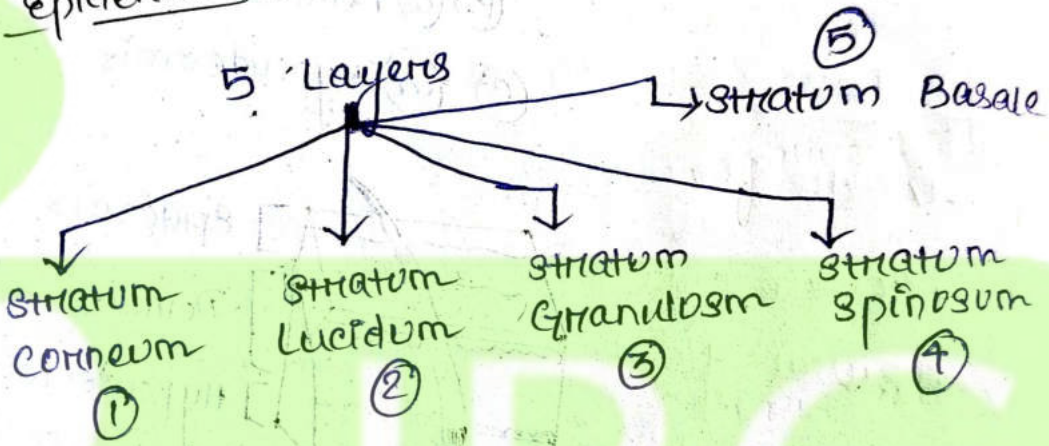
(iii) Langerhan's cell

→ Protect our skin from microorganism.

(iv) Merkel cells

→ helps in receive sensation of touch/pain.

• Layers of epidermis :-



(i) Stratum Corneum

→ Upper part layer of epidermis.

→ made up of keratinized cell.

→ Act as a barrier against heat, H_2O & many other chemicals.

(ii) Stratum Lucidum

→ Found only in thick skin.

→ contains flat, dead, keratinized cells.

(iii) Stratum spinosum

→ gives strength & flexibility.

(iii) Stratum Granulosum

→ Middle layer of epidermis.

→ H_2O proof barrier

(iv) Stratum Basale

→ Inner layer of epidermis.

→ forms a strong bond between epidermis & dermis.

→ helps in the formation of fingerprints.

(B) Dermis

→ Middle layer of skin.

→ contain connective tissue.

→ sweat gland.

→ contain blood vessel, glands, hair follicles, etc.

→ 2 layers :- (i) Pepillary layer.
(ii) Reticular layer.

(i) Pepillary Layer

→ Made up of loose connective tissue.

→ contains small blood vessel.

→ contain nerve endings that receives sensation of touch, pain, hot, cold, etc.

(ii) Reticular layer

→ Made up of dense connective tissue.

→ contains fat cells, blood vessels, glands & hair follicles.

→ Hypodermis

→ Inner layer of skin.

→ helps in to store fat.

• Functions of Skin

→ Protect our body from UV rays.

→ Protect from virus, bacteria, etc.

→ Provide sensation for response to stimuli.

→ helps in absorption of various drug & cosmetic products.

→ helps in regulate body temp.

Q ② Define Homeostasis. Explain positive & negative feedback mechanism with example?

Ans → Homeostasis

→ made up of 2 words 'homeo' & 'stasis' which means 'same' & 'state' respectively.

→ Homeostasis is defined as the ability of human body to maintain a constant internal environment by maintaining & balancing pH, temperature, acid-base level in our body.

Feedback Mechanism/system

→ It's the body feedback system to maintain & balance by responding to changes

→ 3 components :- (i) Receptor (ii) Control centre (iii) effectors.

(i) Receptor :- A receptor is a body str. which detect changes in the internal environment of body.

(ii) Control centre :- Receives the stimuli from receptor & analyse it.

(iii) Effector :- effector receives the output from control centre and respond to the command of control centre.

- Types of Feedback system

2 types :-

(1) Positive Feedback → Responses to increase when internal environment of our body is decreased.

→ Brings the body into normal condition by increasing

Eg:- During child birth it stimulate to release of oxytocin which increase the contraction of uterus to help in child birth.

(2) 'Negative' Feedback system

Response to decrease when internal environment of our body is increased.

→ Brings the body into normal cond^n by decrease.

Ese→ During Fever (Temp.↑)

↓

Skin heat (↑)

Signal ↓

Hypothalamus

↓

Temp. Regulation Centre (TRC) → Stimulates → Sweat gland (↑)

Sweat gland (↑) → Sweating (↑) → By cooling the body → Temp. (↓)

Ese→ When blood sugar increases after eating food. Then the pancreas releases insulin to absorb glucose & decrease the blood sugar level & brings to normal condition.

Q(3) Explain the Physiology of muscle contraction.

Ans→ • Stimulus & Action Potential :-

→ A nerve impuls from a motor neuron reaches the neuromuscular junction.

→ Causes the release of acetycholine (ACh) into the synaptic cleft

→ ACh binds to receptors on the sarcolemma, generating an action potential on the muscle fibre.

• Calcium Release :-

→ Action potential travels through T-tubules & stimulates the sarcoplasmic reticulum (SR) to release Ca^{2+} ions into the cytoplasm.

• Cross - Bridge formation :-

→ Ca^{2+} binds to troponin, causing tropomyosin to move away from the binding sites on actin.

→ Myosin heads attach to exposed binding sites on actin, forming cross - bridges.

• Power stroke :-

→ Myosin head pivots using energy from ATP hydrolysis, pulling the actin filament towards the centre of the sacromere and muscle shortening occurs.

• Relaxation :-

→ When stimulation ends, Ca^{2+} is pumped back into the SR.

→ Cross - bridges detach, & the muscle fiber returns to its relaxed state.

Q④ Define & classify joints. Write shortly about synovial joints with example.

Ans→ A joint is a place where 2/more bones meet/come in contact with each other. Joints help in movement & provide mechanical support to the body.

• Classification of Joints :-

① Fibrous Joint :-

→ Bones are joined by fibrous connective tissue.

→ No movement occurs.

→ Ex → Sutures of skull.

(ii) Cartilaginous Joint

→ Slightly movable.

→ Have some degree of movement.

→ Bones are connected with each other in the help of cartilage

→ Ex→ Ribs, vertebral column.

(iii) Synovial Joint

→ Freely movable.

→ Present in synovial cavity.

→ Ex→ shoulder & pelvic joints, etc.

Types of Synovial Joint

6 types:-

① Gliding Joint → Bones are flat shaped. Permit side to side movement b/w the flat surface of the bone.

Ex→ Wrist Joint (Intercarpel joint, intertarsal joint)

② Hinge Joint → Allow only 1 plane movement.

→ In this one bone is convex shape & other is concave shape.

→ Ex→ knee & elbow joints

(iv) Pivot Joint

→ Monoaxial.
→ Allow rotation only around its own longitudinal axis
→ Ex→ Pelvic joints

(v) Condyloid Joint

→ Oval shape of 1 bone is connected to the oval shape of another bone.
→ Ex→ Carpal joints

(vi) Saddle Joint

→ Type of ball & socket joint
→ Convex head of 1 bone fixed into other bone.
→ Ex→ Thumb Joint.

(vii) Ball & socket Joint

→ Freely movable Joint.
→ Joints are triaxial permitting movement around axis.
→ Ex→ shoulder joint & hip joint.

Q.5) Define Blood coagulation. Write in details about different steps involved in blood coagulation process.

Ans→ Blood coagulation is the process by which liquid blood changes into a solid clot to prevent excessive bleeding from an injured blood vessel.

Steps Involved :-

(i) Formation of Prothrombin Activator :-

→ When a blood vessel is injured, platelets & damaged tissues release sub. called thromboplastin.

→ Thromboplastin combines with Ca^{2+} ions & clotting factors to form prothrombin activator.

→ Have 2 Pathways :- • Intrinsic pathway → starts inside blood vessels.
• Extrinsic Pathway → triggered by tissue damage outside the blood vessel.

(ii) conversion of Prothrombin to Thrombin :-

→ The prothrombin activator converts prothrombin into thrombin in the presence of Ca^{2+}.

$$\text{Prothrombin} \xrightarrow[Ca^{2+}]{\text{Prothrombinase}} \text{Thrombin}$$

(iii) Clot Retraction & Repair :-

→ The clot contracts to brings the edges of the wound together.

→ Platelets release platelet - derived growth factor (PDGF),

which helps in vessel wall repair.

(iv) Clot Dissolution :-

After healing, plasminogen is converted to plasmin, which dissolves the fibrin clot, restoring normal blood flow.

(c) (3) Write the structure & function of eye & briefly explain about physiology of vision.

Eye is a sensory organ responsible for the sense of vision. It ~~action~~ acts like camera, focusing light rays on the retina to form images.

Str. of eye → eyeball is roughly spherical & about 2.5cm in diameter. It consists of three layers.

(a) Outer layer → Fibrous Tissue :-

- Cornea :- Transparent front part; allows & bends (refracts) light into the eye.

• Sclera :- White part; maintains the shape & protects the eye.

(b) Middle layer - Vascular Tunic :-

• Choroid :- Dark layer rich in blood vessels; provides nutrition & prevents light reflection.

• Ciliary Body :- controls the shape of the lens for focusing.

• Iris :- Coloured part; regulates the amount of light entering the eye through the pupil.

(c) Inner layer - Retina :-

• contain photoreceptor cells :
  → Rods → For dim light (night vision).
  → cones → For bright light & color vision.

• The fovea centralis is the point of sharpest vision.

• The optic disc has no receptors; the optic nerve exists here.

(2) Accessory structures :-

→ Lens → Focuses light on retina.

→ Aqueous humor & vitreous humor :→ Maintain pressure & shape.

→ Eyelids, eyelashes, & lacrimal glands :→ Protect & lubricate the eye.

③ Physiology of Vision

① Light entry :- Light rays enter through the cornea & & aqueous humor & pupil & lens & vitreous humor & retina.

② Refraction :- Cornea & lens bend light to focus it on the retina.

③ Image Formation :- An inverted & real image forms on the retina.

④ Photoreceptor Activation :- Rods & cones convert light into nerve impulses through a chem. called rhodopsin.

→ Rods work in dim light ; cones detect colors.

⑤ Transmission to Brain :- Optic nerve carry impulses to the visual area of the occipital lobe of the brain.

Q ⑦ Shortly explain about regulation of BP. Write a note on cardiac cycle.

Ans→ BP is regulated by nervous, hormonal, & renal mechanisms to maintain normal circulation.

→ Short - term Regulation :- controlled by baroreceptors. When BP falls, sympathetic nerves increase heart rate & cause vasoconstriction to raise BP.

↳ Long - Term Regulation :- controlled by renin - angiotensin - aldosterone system & kidneys. When BP is low, renin is released & forms angiotensin II & causes vasoconstriction & aldosterone release & increases blood vol. & BP.

Note on cardiac cycle :- Cardiac cycle is the sequence of events that occur during 1 heartbeat (~0.8 sec). It includes :-

(i) Atrial systole (0.1 sec.) :- Atria contract & blood flows into ventricles.

(ii) Ventricular systole (0.3 sec.) :- Ventricles contract & AV valves close, heart refills with blood.

(8) explain in details about Transport mechanism across plasma membrane.

Ans:- The plasma membrane is selectively permeable, allowing only certain substances to enter/leave the cell.

(A) Passive Transport :-

(a) Simple Diffusion :- Movement of small molecules directly through the lipid layer.

(b) Facilitated Diffusion :- Movement of larger mole. through carrier proteins/channel proteins.

(c) Osmosis :- Diffusion of H_2O through a semipermeable membrane from low solute to high conc^n.

(ii) Active Transport :-
Substances move against conc^n gradient using ATP.
→ Ex: Na^+/K^+ pump transports sod. out & potassium into the cell using energy.

(iii) Bulk Transport :~
For large mole. / particles.
→ endocytosis → cell engulfs material.
→ exocytosis → cell releases substances.

Q(9) Define & classify tissue. Write detailed note on connective tissue.

Ans→ Tissue is a group of cells that have similar structure & work together to form a specific function in the body.

Classification of Tissues :~
(i) Epithelial Tissue → covers body surfaces & line organs.
(ii) Connective Tissue → connects, supports, & bends other tissues/organs.
(iii) Muscular Tissue → Helps in movement & contraction.
(iv) Nervous Tissue → Transmits nerve impulses for coordination & control.

Connective Tissue is the most abundant & widely distributed tissue in the body. It connects, supports, protects, & binds other tissues & organs.

Structure :- 3 components :-

→ cells → Fibers & → Ground Substances.

Functions :-

(i) Provides structural support to organs.

(ii) connects different tissues.

(iii) stores fat & energy.

Types of connective Tissue :-

(i) Loose → eg. : Aerolar & Adipose Tissue.

(ii) Dense → eg : Tendons & legaments.

(iii) specialized → eg : Cartilage, Bone & Blood.

Examples :- → Aerolar tissue binds skin to muscles.

→ Adipose tissue stores fat.

→ Blood helps in transport & defence.

Part-3

(1). Conduction system of heart :-

The heart has a specialized conduction system that initiates and propagates electrical impulses responsible for rhythmic contraction.

Components :-

1. Sino atrial (SA) node :
- located in Right atrium near the superior vena cava.
- Act as natural pacemaker of heart
- initiate heart beat of 70/80 beat/min.
- impulse spreads through atrial myocardium causing atrial contraction.

2. Atrioventricular node :-
- located in interatrial septum near the tricuspid valve.
- Delays the impulse (~01 sec) allowing complete atrial contraction before ventricular contraction.

3. Bundle of His :-
- components connects the AV node to the interventricular septum.
- Divides into right and left branches.

4. Purkinje fibres :-
- Fine branches spreading through the ventricular myocardium.
- conduct impulses rapidly to cause synchronous ventricular contraction.

(2)

Regulation of Autonomic Nervous system :-

- Sympathetic Nervous System :-

→ increase heart rate and contractility.
→ Neurotransmitters are β_1, dopamine, epinephrine.

→ Increase heart rate
→ increase cardiac output.
→ Decrease digestion.

• Parasympathetic Nervous system :-
→ Decrease heart rate via vagus nerve.
→ Neuro transmitter : Acetylcholine, peptides
→ Decrease heart rate.
→ Decrease cardiac output.
→ increase digestion.

Cardiac cycle :-
Sequence of mechanical and electrical events in one heart beat (~0.8 sec)

a) Atrial systole : atria contracts, blood moves to ventricles.
b) Ventricular systole :- ventricle contracts, AV valve close (first heart sound 'Lub').
c) Ventricular diastole :- relaxation, semilunar valve close (second heart sound 'dub')
d) passive filling :- AV valves open, blood flows into ventricles.

2) Write in details about Division of skeletal system, types of bones, salient features and functions of bones of appendicular skeletal system

(2) Divisions of Skeletal System :-

(1) Axial Skeleton :-
- 80 bones.
- Skull, vertebral column, ribs, sternum.
- Function :-
supports and protects vital oregans (brain, heart, lungs).

2. Appendicular skeleton :-

- 126 bones.
- Pectoral girdle, upper limbs, pelvic girdle, lower limbs.
- Function :-
  locomotion, manipulation of environment.

Types of Bone :-

1. long bone : eg : Femur, humerus
2. Short bone : carpal, tarsal
3. Flat bone : skull, ribs - sternum
4. Irregular bone : vertebrae
5. Sesamoid bone : patella.

Salient features of bone :-

- Hard, dense connective tissue.
- composed of osteocytes in calcified matrix.
- Highly vascularized and capable of remodelling.

Appendicular skeleton :-

1. Pectoral Girdle and upper limbs :-

- clavicle, scapula, humerus, radius ulna, carpals, metacarpals, phalanges.

function

- Allows wide range of motion for upper limb.

2. pelvic girdle and lower limbs :-

- Hip bones, femur, tibia, fibula, tarsals, metatarsals, phalanges.

→

Function :-

Supports body weight, locomotion, stability.

Functions :-

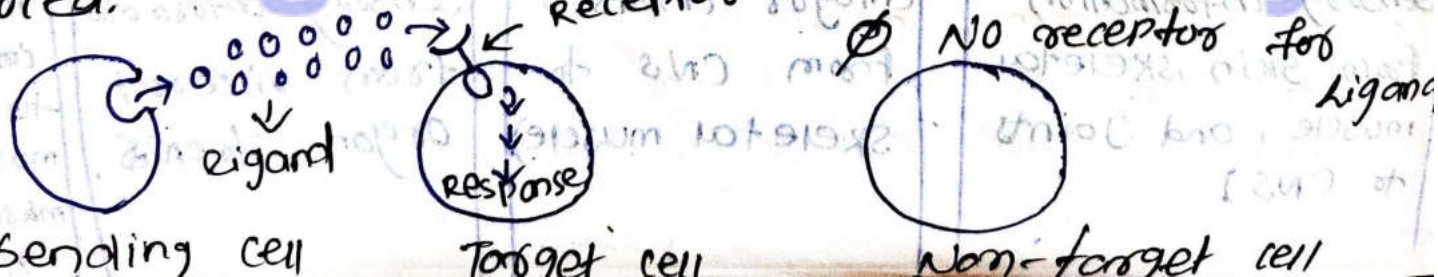
- Facilitates movement.
- Provides attachment sites for muscles.
- Supports body weight (lower limb).
- Protects reproductive and urinary organs (pelvis).

3) Describe General principles of cell communication and intracellular signaling pathway activation by extracellular signal molecule and explain Contact-dependent and Paracrine signaling with examples.

CELL SIGNALLING:-

↳ Chemical signal in the form of Proteins or oth molecules are often secreated from the cell an released into extracellular space where they flow above the ~~neibour~~ neighboring cell for Communicati the signaling mechanism is followed by

1. Sending cell :- This is a ligand secreating cell.
2. Target cell :- This cell has a receptor to which the ligand binds and triggers a signaling cascade/ phenomena within the cell. There by Produc a response
3. Non-target cell :- This cell has lacs of a recepto for ligand binding, therefore no response is Produced.



FORMS OF SIGNALLING:—

↳ signal transmission from a sending cell to a receving cell. it's termed as cell - cell signalling / inter cellular signaling.

↳ on the basis of distance traveled by the signal through the organism to reach the target cell, chemical signalling it's catagorised as follow.

1. Paracrine signalling:-

↳ In this type of signalling. cell Communicate over quite short distances that are adjcent to one another and the signalling process it's carried through the release of chemical messanger

2. SYNAPTIC SIGNALLING:-

→ It it's an example of of Paracrine signaling where nervous cell transmit signal at a perticular junction synaps

3. AUTOCRING SIGNALLING:-

A cell signals to it self to release a ligant that binds to receptors on it's own surface.

4. Endocrine signaling:-

The circulatory system it's used as a distribution network by the cell to transmit signals over long distances

SIGNALING THROUGH CELL-CELL CONTACT:-

↳ Cell Communication it's also known as 'cell signalling'.

↳ It it's the ability of cell to receive and send signal from a to another cell.

↳ Cell Communication it's important for growth and development of cell. It it's also important to maintain homeostasis.

Communication between cells requires:

↳ ① Ligand:- The signalling molecule
② Receptor:- The site where receptor binds.

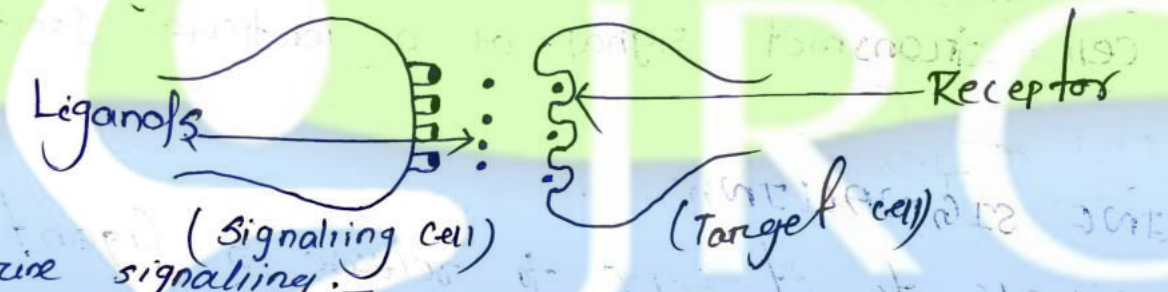
TYPES of cell signalling:-

1. Paracrine signalling.
2. AutoCrine signalling
3. EndoCrine signalling.
4. Direct signalling

Paracrine signalling:-

↳ ParaCrine signaling is a form of cell signalling in which target cell is very closer to the signalling cell. but not directly attached.

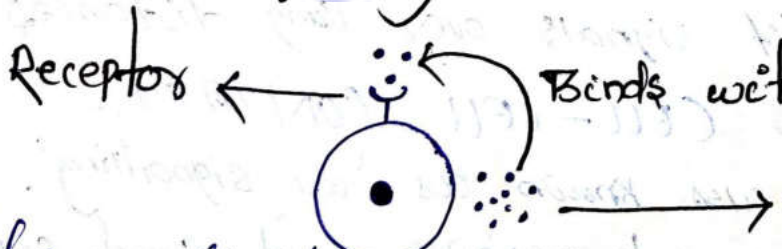
↳ It play an important role in growth and development.



Autocrine signalling:-

↳ In autoCrine signalling, a cell signals to it self, releasing a ligand that binds to receptor on its own surface.

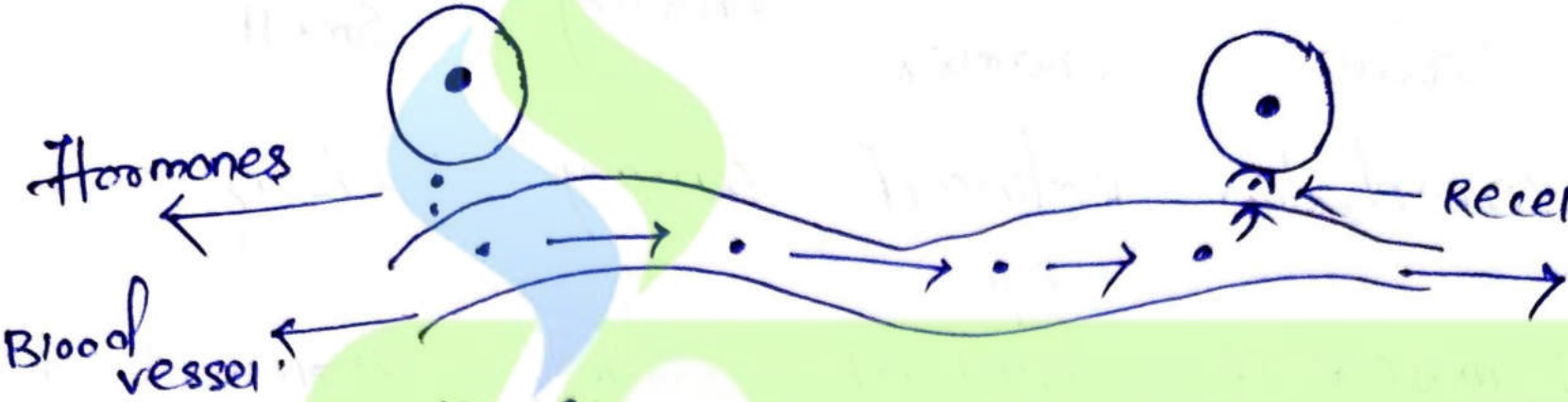
↳ Autocrine signalling plays a key role in 'metastasis'.



EndoCrine Signalling:-

when the target cell is too far from signalling cell. then cell releases its signals (ligands) on to the 'blood stream'. and act on target cell and this type of signalling called EndoCrine cell Signalling.

→ In endocrine signalling, signals are in the form of hormones.



DIRECT SIGNALLING:-

Direct signalling occur by transferring signal molecule accro
gap Junction b/w neighbouring cell.