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Where Minds Pollinate

Class 12
Biology 

Chapter 2

Notes

Follow Our Socials



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Ch-2 (Blood Circulatory System)

Needs:- Cells of body need food from small intestine

- O_2 from lungs
- Waste & CO_2 removed from body (lungs & kidneys)

↓
Circulatory System

Cardiovascular System:-

↳ consists of:-
→ Strong muscular heart

→ Blood

→ three kinds of blood vessels

Arteries

Veins

Capillaries

Angiology:-

Study of cardiovascular diseases

-: HUMAN HEART :-

Location:-

→ Size varies with the body size
human about the size of adults fist
heart slightly big-



→ size is 14 cm long, 9 cm wide (of avg adult) also

→ is within the mediastinum, Bordered laterally by the lungs, Posteriorly by the backbone & anteriorly by the sternum

→ Its base lies beneath the second rib -

→ Terminating as bluntly apex at the level of fifth intercostal space / Muscles (space b/w 2 ribs)

-: ROLE OF PERICARDIUM :-

→ enclosed sac that surrounds heart

→ Inelastic nature → prevents heart from being overstretched & overfilling with blood

1) Epicardium:- Thin serous membrane com-
posed of smooth outer surface of heart.

2) Myocardium:- Thick middle layer of heart

3) Endocardium:- composed of cardiac muscle cells.
smooth inner surface of heart chamber.
composed of cardiac muscle.
consists of simple squamous epithelium.

→ Heart Valves:- over a layer of connective tissue.

* H.V are formed by a folding of endocardium, making a double layer of endocardium with connective tissues in b/w.

→ Thickness of walls of each chamber → different.

→ Atria → have thin walls → only have to force/pump blood into ventricles. don't require much power.

→ Ventricles → have thick walls → have to force/pump blood out of the heart → especially left ventricle have to pump blood around whole body.

∴ Right ventricle has thinner walls than the left ventricle in a ratio of 1:3.
It pumps blood to the lungs which is at a short distance from the heart.

• **RIGHT ATRIUM** → Receives blood from
(1) Superior Vena cava (2) Inferior Vena cava (3) The coronary sinus

• **LEFT ATRIUM** → Receive blood from

→ (4) Pulmonary veins.

→ Two atria are separated from each other by Interatrial septum.

Most Strongest / Thickest chamber of heart is Left Ventricle!

→ the atria opens into the ventricles through atrioventricular canals

• RIGHT Ventricle:-

→ opens into the pulmonary trunk.

• LEFT Ventricle:-

→ opens into the Aorta (large arteries).

→ the 2 ventricles are separated from each other by (interventricular septum) -

→ the atrioventricular valve is on each atrioventricular canal & is composed of cusps or flaps.

• Tricuspid Valve:-

→ the atrioventricular valve b/w the R. Ventricle & R. Atrium has 3 cusps called T.V.

• Bicuspid / Mitral Valve

→ the atrioventricular valve b/w the L. Ventricle & left atrium has 2 cusps is called B/M.

→ Papillary Muscles:- Each ventricle contains cone-shaped muscular pillars called P.M.

→ Chordae Tendinae:- P.M are attached by thin strong connective tissue strings, called C.T to the cusps of Atrioventricular valves.

→ Papillary muscles contract.

When ventricles contract = prevent valves from opening into the atria by pulling on the chordae Tendinae attached to the valve cusps.

* Aorta & Pulmonary Trunk Possess Aortic & Pulmonary Semilunar Valves!

↓
prevent back ward flow!

Pericardium:- Fiber membrane covered by heart external
***Location =** found as an external covering around the heart.

Pericardial fluid:-

- serous fluid produced.
- lubricate the heart.
- prevent friction b/w the surrounding organs.
- Hold the heart in its position by maintain the hollowspace for heart to expand itself when it's full.

Parts of Pericardium:-

→ 2 parts:-

(i) **Visceral** - (directly covers outside the heart)
 layer:-

(ii) **Parietal** - (sac around the outer region of heart that contains fluid in Pericardial cavity).
 layer:-

PERICARDIUM	serous fluid- Pericardium fluid	Pericardial cavity
External covering of heart	present in b/w the Pericardium cavity	space b/w the Pericardium & heart

→ Structure of walls of Heart:-

→ FOUR CHAMBERS:- lie above the ventricles

→ 2 atria (Entrance chamber).

→ 2 ventricles (Belly).

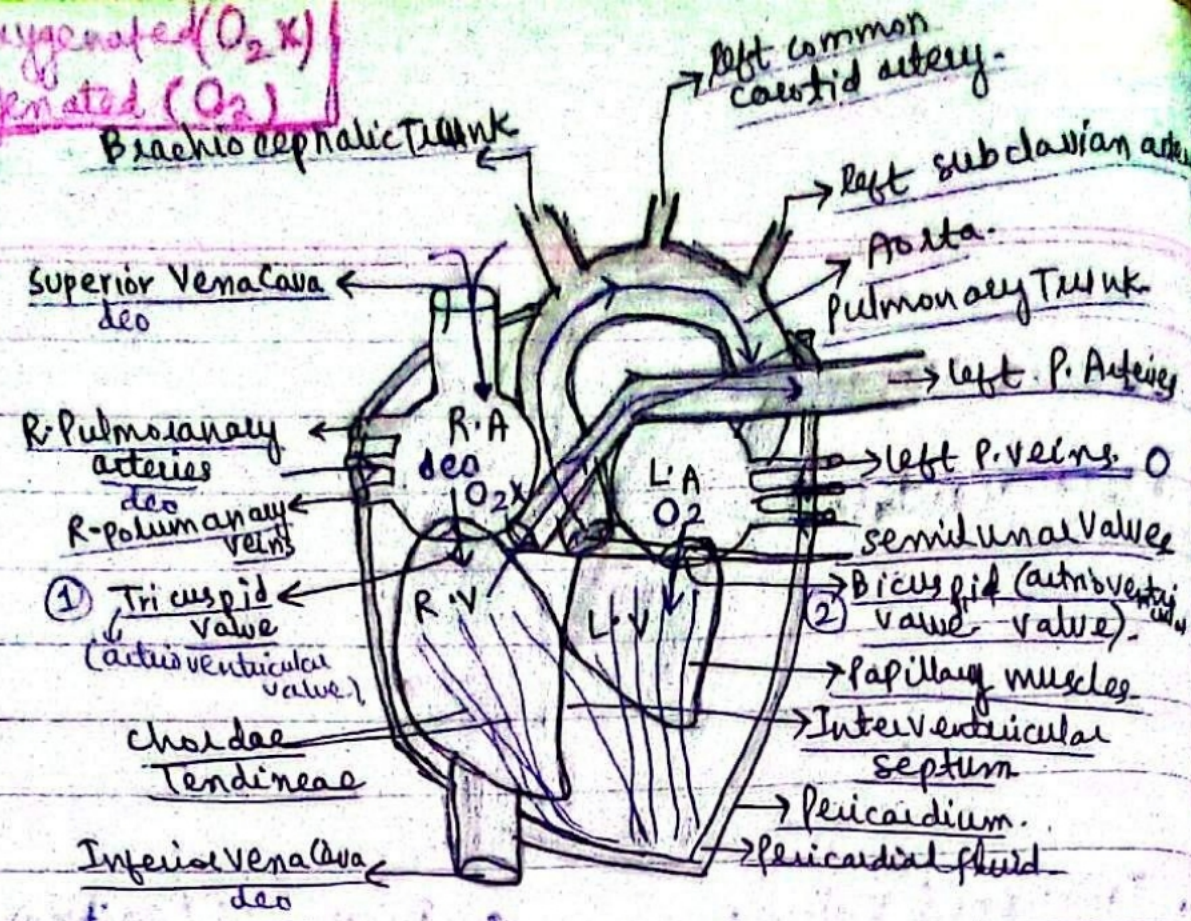
Heart wall consists of
 → Three layers of Tissues in heart:-

(i) → Epicardium.

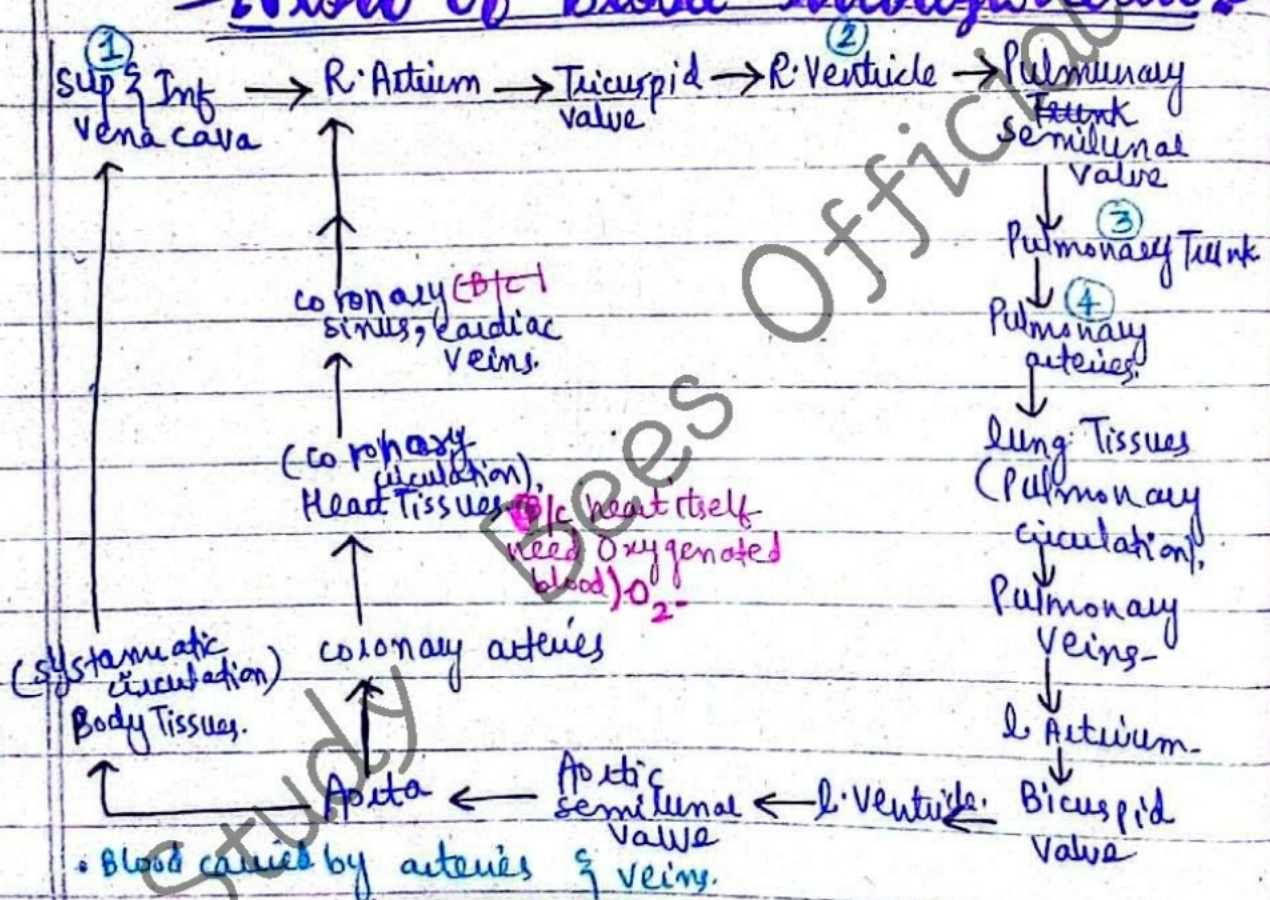
(ii) → Myocardium

(iii) → Endocardium.

Deoxygenated ($O_2 \times$)
 Oxygenated (O_2)



Flow of blood Through heart



- Normal arteries $\rightarrow O_2$ blood -
- Normal Veins $\rightarrow$ Deo ($O_2 \times$) / (CO_2) blood -
- Pulmonary arteries $\rightarrow$ Deo ($O_2 \times$) / (CO_2) blood -
- Pulmonary Veins $\rightarrow O_2$ blood -

Circulation

Date: _____

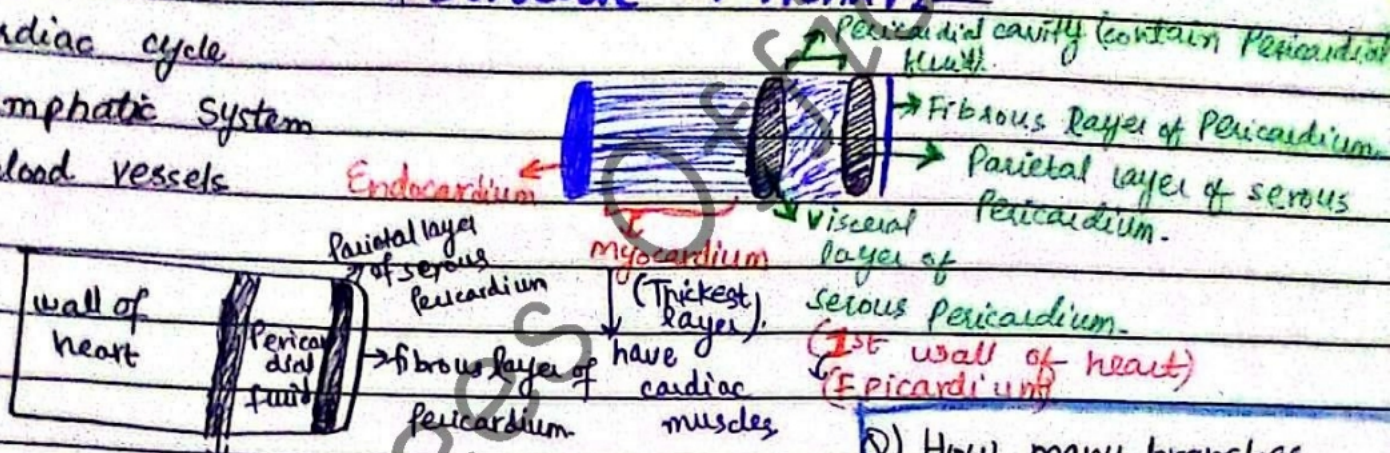
→ Heart structure

→ cardiac cycle

→ lymphatic system

→ Blood vessels

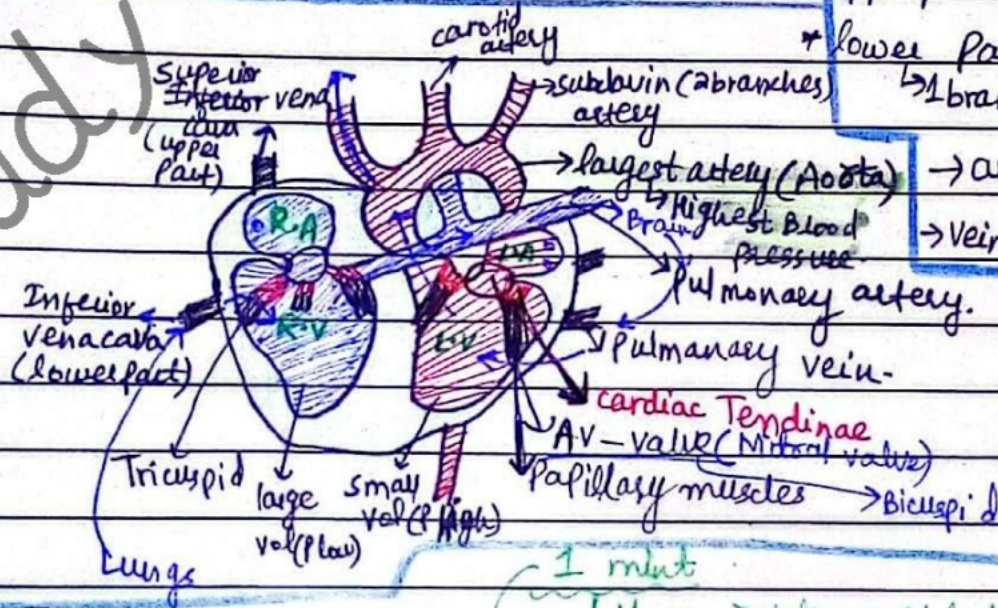
* Structure OF HEART



Epicardium (visceral layer of serous pericardium) is in b/w the wall of heart & pericardium.

Q) How many branches Produced by aortic Arch (3)

3 branch
* upper part (hand, feet) etc Brain
* lower part (kidney, liver) etc 1 branch.



→ Arteries send blood
→ Veins receive blood.

- (oxygenated blood)
- (deoxygenated blood)

$$P \propto \frac{1}{V}$$

Time period of Heart Beat = 0.8 sec

frequency of Heart Beat = 72 per minute

No. of Heart beat
72

Time
0.8 sec

No. of Heart beat

72

M.Z ? 0.8 sec

Page No.

LUBB

DUBB

Date: _____

→ 1st Heart Beat

→ During Early Vs phase

→ Due to closure of AV valve

→

→ 2nd Heart Beat

→ During Early VD phase

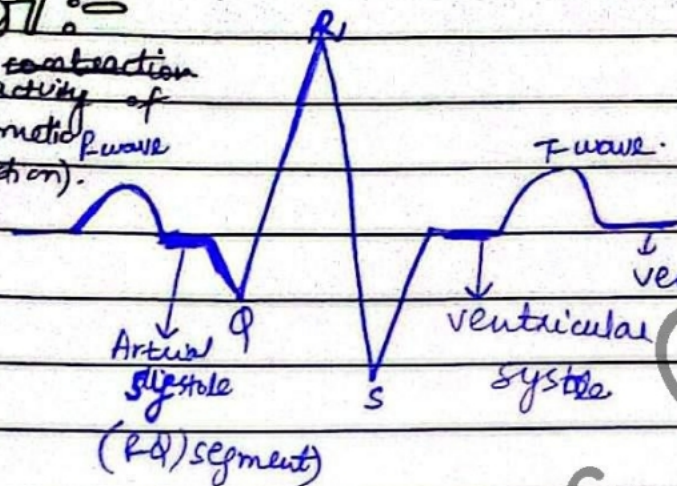
→ Due to closure of semilunar valve

SA node → AV node → Bundle of His → Purkinji fibres →

0.1 sec

ECG:-

Normal contraction
Electrical activity of
heart (Rhythmic P wave
contraction)



* P wave occurs just prior/before
atrial systole

* QRS segment " " " " to
ventricular systole

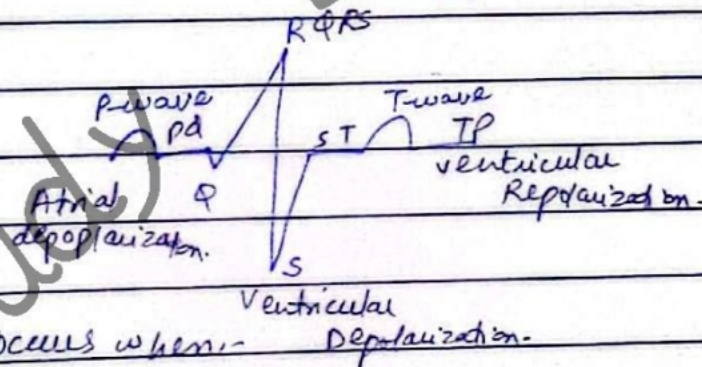
* T wave " " " " ventricular
diastole

→ Stimulation of SA node → due to the contraction of

→ " " AV node → " " contraction of ventricle

• Depolarization → stimulus → Contraction

• Repolarization → without stimulus → Relaxation



Q) Which of the following
diagram represent
atrial depolarization

A)

B)

C)

D)

Q) Atrial systole occurs when - Depolarization

A) atrial depolarization starts

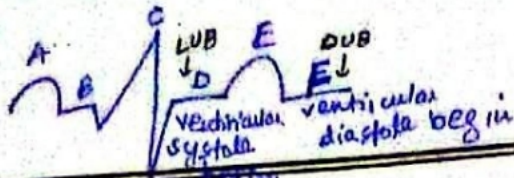
B) atrial repolarization starts

C) atrial depolarization complete

D) atrial repolarization complete

M.Z

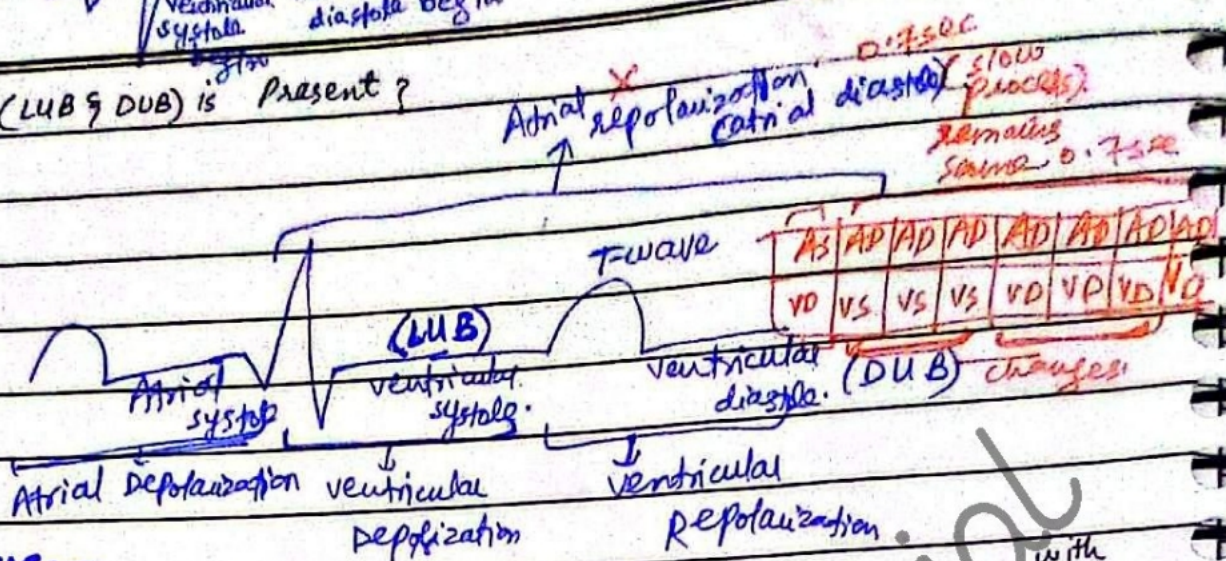
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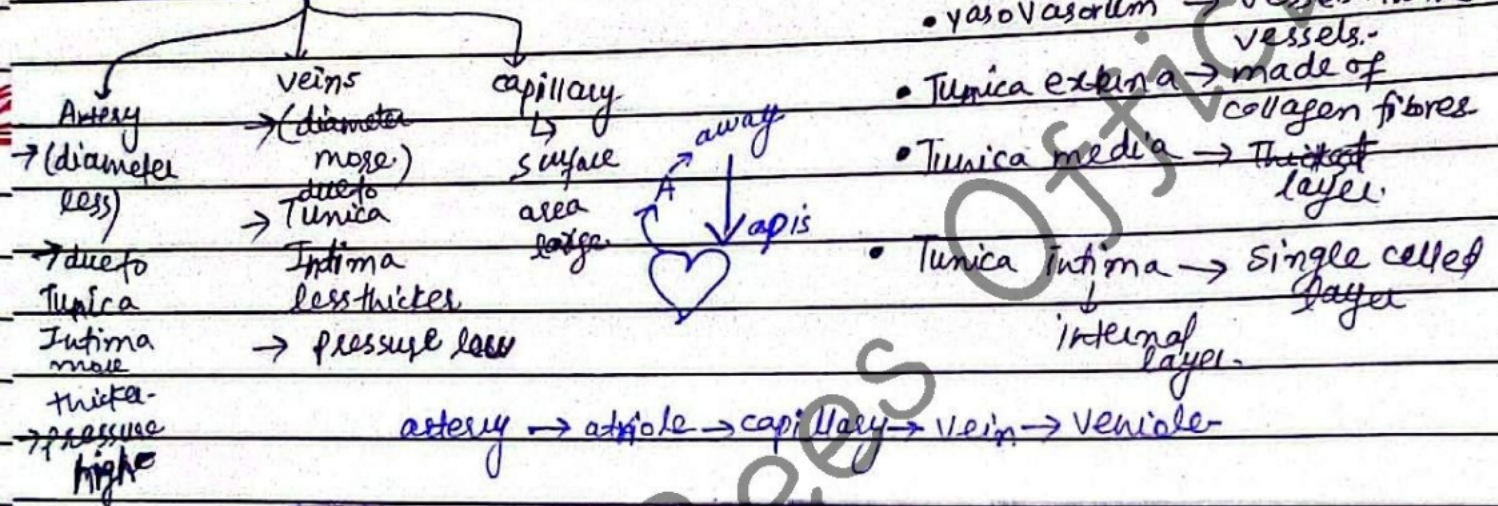
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Q) In which part (LUB & DUB) is present?

- A) A & C
B) B & D
C) B & F
D) D & F



BLOOD VESSELS:-



	Artery	Veins	Capillary
Function	Send blood from heart Transports blood from the heart to organs	Transports blood from organs to heart	Carries blood to organs where gas exchange occurs (Material exchange with tissues)
Thickness of wall	Thick	Thin	Very thin (1 cell thick)
Elasticity	Elastic walls	Less elastic walls	Inelastic walls
Size of lumen	Narrow lumen	Large lumen	Very narrow lumen (one cell wide)
Valves	No valves	Valves	No valves
Pressure of blood	Very high	Very low	Low
Wall layers	Three layers: Tunica adventitia Tunica media Tunica intima	Three layers: Tunica adventitia Tunica media Tunica intima	One layer: Tunica intima
Muscle & Elastic fibres	Large amounts	Small amounts	None

largest organ of lymphatic system (spleen)

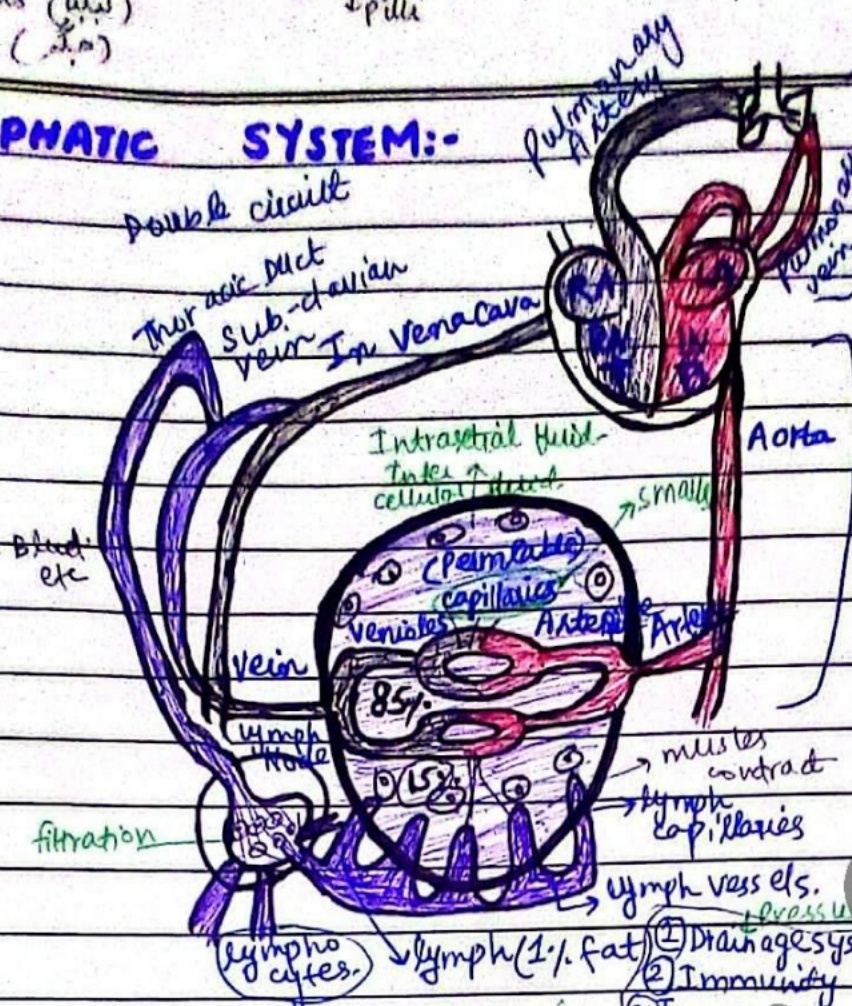
→ Pancreas (L.I.)
→ Liver (L.I.)

blood form
old RBCs are decomposed
↓
Pilli

Adenoid (Tonsil) → W.B.
Thymus (Gland)
region (Pituitary) Throat
Small Intestine (Pituitary)

Date: _____

LYMPHATIC SYSTEM:-



Thoracic duct (largest)
Subclavian vein
He H. is inferior to the clavicle

Appendix (passive organ) to digestive system
Appendix (active) to lymphatic system

5 litre / 60 kg = 1/12

Hb(O₂) (oxy)

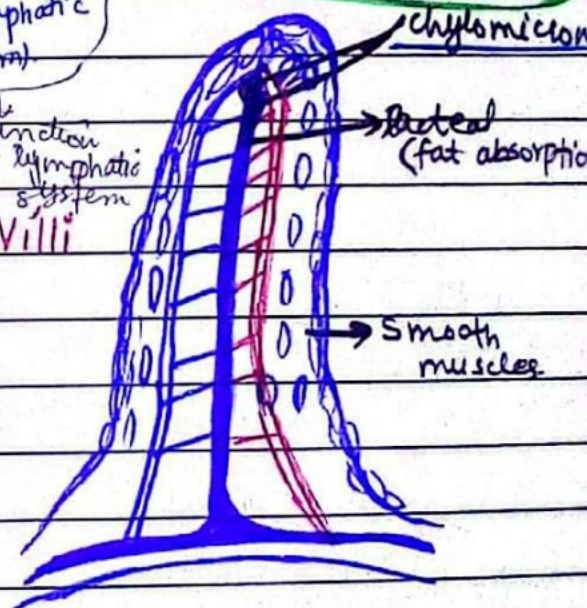
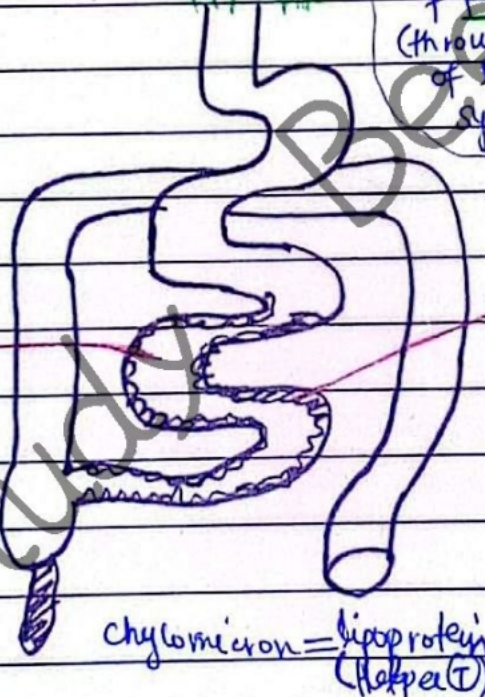
99% fat
1% protein
Fatty acids + Glycerol

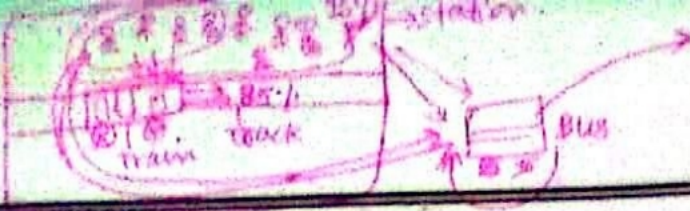
Protein + Triglyceride

- 1) Drainage system
- 2) Immunity
- 3) Transportation of Fat (through lactal of lymphatic system)

function of lymphatic system
↓
Villi

Jejunum (start food absorption)





Date: _____

Lymphatic System

* Primary Lymphoid Tissues

⇒ (Formation of WBCs)

→ Bone marrow

→ Thy mus.

* Secondary Lymphoid Tissues

⇒ (make do use of WBCs)

→ Pail patches -

→ Tonsils

→ Adenoid -

→ spleen

→ lymph Nodes.

→ Appendix.