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BIO · BIOLOGY

07. Circulation / Transport

Official PMDC Solved Past Paper Topical Booklet · High-Yield Examination Series

© 54 Solved Questions

📅 2014 to 2024 Archive

🏛 Boards: BUMHS, KMU, MDCAT, NUMS, PMDC, SZABMU

📄 Weightage: 34% of MDCAT (68 MCQs)

Curated by Ibrahim for fellow bees. Every question in this chapter has been verified against official UHS, NUMS, SZABMU, DUHS, and KMU answer keys. Propolis cognitive autopsies are provided at the end of this booklet to explain core concepts and break down common distractor traps.

OFFICIAL SOLVED EDITION**Q1.**

SZABMU 2024

In the roots apoplast pathway becomes discontinuous in the endodermis due to the presence of:

- (A) Casparian strips
- (B) Pericycle
- (C) Stele
- (D) Pith

Q2.

KMU 2024

What will happen with the addition of salt to water?

- (A) Water potential will increase
- (B) Water potential will remain same
- (C) Osmotic potential will increase
- (D) Osmotic potential will remain same

Q3.

NUMS 2024

Plants growing in saline soil face the problem of dehydration due to:

- (A) ψ_w of soil $>$ ψ_w of root
- (B) ψ_w of soil $<$ ψ_w of root
- (C) ψ_w of soil = 0
- (D) ψ_w of root = ψ_w of soil

Q4.

SZABMU 2024

The total delay in the conductance of action potential from SA node to AV node is:

- (A) 0.10 second
- (B) 0.15 second
- (C) 0.08 second
- (D) 0.20 second

Q5.

SZABMU 2024

Which of the following vessels have larger bore, thin wall with non-pulsatile nature?

- (A) Aorta
- (B) Arteries
- (C) Capillaries
- (D) Veins

Q6.

NUMS 2024

Weakened papillary muscles of right ventricle would result in constant back flow of blood into:

- (A) Right atrium
- (B) Left ventricle
- (C) Right ventricle
- (D) Left atrium

Q7.

NUMS 2024

Which of the following set of characteristics are related to veins?

- A. Present, Thick, $7 - 9\mu m$
- B. Absent, Thick, $40 - 50\mu m$
- C. Present, Thinner, $40 - 50\mu m$
- D. Absent, Thinner, $40 - 50\mu m$

- (A) Present, Thick, $7 - 9\mu m$
- (B) Absent, Thick, $40 - 50\mu m$
- (C) Present, Thinner, $40 - 50\mu m$
- (D) Absent, Thinner, $40 - 50\mu m$

Q8.

NUMS 2024

The presence of which molecules distinguish blood from interstitial fluid?

- (A) Large proteins and electrolytes
- (B) Glucose and RBCs
- (C) Antibodies and electrolytes
- (D) RBCs and large proteins

Q9.

SZABMU 2024

All of the following are the characteristics of veins, except:

- (A) They have broad lumen
- (B) Direction of blood flow towards heart
- (C) Thin layer elastic fibers are present
- (D) Valves are present in the upper part of body

Q10.

NUMS 2024

Which of the following would not be compromised in the absence of lymphatic system?

- (A) Blood pressure
- (B) Oxygen carrying capacity of blood
- (C) Blood composition
- (D) Defense mechanism

Q11.

UHS 2023

The ____ describes how water and dissolved chemicals are carried through the cell wall and intercellular gaps of plants.

- (A) Apoplast theory
- (B) Symplast theory
- (C) Vacuolar theory
- (D) Cytoplasmic theory

Q12.

SZABMU 2023

The pathways of water transport in which water moves through plasmodesmata is:

- (A) Apoplast
- (B) Symplast
- (C) Vacuolar
- (D) Ascent of sap

Q13.

UHS 2023

The movement of water to lower solute concentration area through a semipermeable membrane is?

- (A) Osmotic potential
- (B) Pressure potential
- (C) Soil potential
- (D) Solute potential

Q14.

UHS 2023

Descending aorta is bifurcated into two vessels which on further division from (form) femoral artery that supply blood to high (Thigh) muscles of legs:

- (A) Iliac vein
- (B) Iliac artery
- (C) Temporal artery
- (D) Sciatic artery

Q15.

SZABMU 2023

In human heart, the left atrium receives:

- (A) The Superior Vena Cava
- (B) The Inferior Vena Cava
- (C) The Coronary Sinus
- (D) The four Pulmonary Veins

Q16.

NUMS 2023

The heart chamber from where Aorta originates:

- (A) Left ventricle
- (B) Right ventricle
- (C) Left atrium
- (D) Right atrium

Q17.

SZABMU 2023

Choose the correct pathway for the flow of blood:

- (A) Arterioles --- metarterioles thoroughfare channel capillaries
- (B) Capillaries through fare channel metarterioles arterioles
- (C) Throughfare channel metarterioles capillaries arterioles
- (D) Metarterioles arterioles throughfare channels capillaries

Q18.

NUMS 2023

Mesenteric veins drains the blood from:

- (A) Liver
- (B) Large intestine
- (C) Stomach
- (D) Gall bladder

Q19.

SZABMU 2023

Regarding structure of the human heart, Chordae tendineae are present in:

- (A) Atria
- (B) Pulmonary valve
- (C) Ventricles
- (D) Aortic valve

Q20.

KMU 2023

In human heart right atrium communicates with right ventricle through:

- (A) Inter-articular septum
- (B) Ventricular Septum
- (C) Tricuspid valve
- (D) Bicuspid valve

Q21.

KMU 2023

The Purkinje fibers are the specialized fibers found in:

- (A) Human heart
- (B) Human lungs
- (C) Human Stomach
- (D) Human brain

Q22.

KMU 2023

Which of the following is known as the vessels of the vessels?

- (A) Vasa vasorum
- (B) Tunica media
- (C) Tunica externa
- (D) Tunica interna

Q23.

KMU 2023

The sinoatrial node is located in the ____ wall of the right atrium.

- (A) Lower dorsal
- (B) Upper dorsal
- (C) On the interatrial septum
- (D) Near the coronary sinus

Q24.

UHS 2023

The final destination of lymph is:

- (A) Lymph node
- (B) Lymphoid organs
- (C) Lymph capillaries
- (D) Subclavian vein

Q25.

KMU 2023

The largest body of lymphoid tissue in the human body is:

- (A) Tonsils
- (B) Pancreas
- (C) Spleen
- (D) Thymus

Q26.

UHS 2022

Digested food from intestine is carried to the liver by:

- (A) Hepatic artery
- (B) Hepatic vein
- (C) Hepatic portal vein
- (D) Hepatic portal artery

Q27.

SZABMU 2022

The pathway of water transport in which water moves through plasmodesmata is:

- (A) Apoplast
- (B) Symplast
- (C) Vacuolar
- (D) Ascent of sap

Q28.

KMU 2022

_____ is the attractive force between a water molecule and container.

- (A) Cohesion
- (B) Adhesion
- (C) Tension
- (D) Transpiration

Q29.

SZABMU 2022

Select the duration of cardiac cycle:

- (A) 0.6 sec
- (B) 0.4 sec
- (C) 0.7 sec
- (D) 0.8 sec

Q30.

SZABMU 2022

In human heart, the left atrium receives:

- (A) The superior vena cava
- (B) The inferior vena cava
- (C) The coronary sinus
- (D) The four pulmonary veins

Q31.

NUMS 2022

Heart beat is normally regulated by:

- (A) Purkinje fibres
- (B) AV-bundle
- (C) SA-node
- (D) Bundle of His

Q32.

UHS 2022

Flow of blood in the capillaries is adjusted by:

- (A) Heart directly
- (B) Pre-capillary sphincters
- (C) Meta-arteriole
- (D) Valves

Q33.

BUMHS 2022

Histamine causes blood vessels to:

- (A) Dilate
- (B) Constrict
- (C) Block
- (D) Rupture

Q34.

UHS 2022

The lymphatic vessels of the body empty the lymph into blood stream at:

- (A) Abdominal vein
- (B) Jugular vein
- (C) Sub-clavian vein
- (D) Bile duct

Q35.

SZABMU 2022

Lymphatic system contains all of the following organs/structures except:

- (A) Lymphoid vessels
- (B) Lymph vessels
- (C) Spleen
- (D) Lungs

Q36.

BUMHS 2022

Which of the following act as lymphatic organ?

- (A) Stomach
- (B) Kidney
- (C) Spleen
- (D) Liver

Q37.

PMDC 2020

Regarding structure of human heart chordae tendineae are present in:

- (A) Atria
- (B) Renal
- (C) Pulmonary valve
- (D) Ventricle

Q38.

PMDC 2020

In human heart the left atrium receives:

- (A) The superior vena cava
- (B) The coronary sinus
- (C) The inferior vena cava
- (D) The four pulmonary veins

Q39.

PMDC 2020

The only vein in the human body carrying oxygenated blood is:

- (A) Femoral
- (B) Renal
- (C) Pulmonary
- (D) Iliac

Q40.

PMDC 2020

Which of the following blood vessels have the highest pressure of blood?

- (A) Aorta
- (B) Pulmonary veins
- (C) Pulmonary arteries
- (D) Vena cava

Q41.

MDCAT 2019

Four plants are present in different environmental conditions. Plant A is present in warm climate with continuous rainfall, plant B is present in a cool forest, plant C is present in warm climate with little breeze while plant D is present in warm climate high wind speed. Which one of the above plants will have highest rate of transpiration?

- (A) Plant B
- (B) Plant C
- (C) Plant D
- (D) Plant A

Q42.

MDCAT 2019

Which of the following blood vessels contain semilunar valves?

- (A) Arteries
- (B) Arterioles
- (C) Veins
- (D) Capillaries

Q43.

MDCAT 2018

Which statement is correct about atrial systole?

- (A) Atria relax and ventricles contract
- (B) Atria contract and ventricle also contract
- (C) Atria and ventricles are relaxed
- (D) Ventricles remain relax while atria contract

Q44.

MDCAT 2018

Which one of the following act as a pacemaker in heart?

- (A) Atria ventricular node
- (B) Sino-atrial node
- (C) Atria ventricular bundles of fibers
- (D) Bundle of His

Q45.

KMU 2017

In ECG, QRS complex represent:

- (A) Atrial systole
- (B) Atrial diastole
- (C) Ventricle systole
- (D) Ventricle diastole

Q46.

MDCAT 2017

Thoracic lymph duct of the lymphatic system opens into ____.

- (A) Superior vena cava
- (B) Inferior vena cava
- (C) Sub-clavian vein
- (D) Renal vein

Q47.

MDCAT 2016

In human the closed sac which surrounds the heart is:

- (A) Endocardium
- (B) Pericardium
- (C) Myocardium
- (D) Epicardium

Q48.

MDCAT 2016

Chordae tendineae are the fibrous cords attached with:

- (A) Cardiac end of stomach valve
- (B) Pyloric sphincter of stomach
- (C) Tricuspid valve of heart
- (D) Eyelid

Q49.

MDCAT 2016

Bicuspid valve controls the flow of blood from:

- (A) Right atrium to right ventricle
- (B) Left ventricle to aorta
- (C) Right atrium to left atrium
- (D) Left atrium to left ventricle

Q50.

MDCAT 2015

Right atrium is separated from right ventricle by:

- (A) Bicuspid Valve
- (B) Tricuspid Valve
- (C) Semilunar Valve
- (D) Interatrial Septum

Q51.

MDCAT 2015

The flaps of tricuspid valves are attached to muscular extensions of right ventricle known as:

- (A) Smooth Muscles
- (B) Intercostal Muscles
- (C) Papillary Muscles
- (D) Skeletal Muscles

Q52.

MDCAT 2015

The heart beat cycle starts when electric impulses are generated from:

- (A) AV node
- (B) SA node
- (C) SV node
- (D) PQ node

Q53.

MDCAT 2015

The lymph vessel of villi is called:

- (A) Epithelium
- (B) Adrenals
- (C) Afferent lymph vessel
- (D) Lacteal

Q54.

MDCAT 2014

The oxygenated blood from lungs to heart is transported by the:

- (A) Pulmonary artery
- (B) Pulmonary vein
- (C) Coronary artery
- (D) Hepatic artery

RAPID 5–COLUMN ANSWER KEY

Official PMDC verified answer keys for 07. Circulation / Transport.

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Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD
1	A	SZABMU 2024	12	B	SZABMU 2023	23	B	KMU 2023	34	C	UHS 2022	45	C	KMU 2017
2	C	KMU 2024	13	A	UHS 2023	24	D	UHS 2023	35	D	SZABMU 2022	46	C	MDCAT 2017
3	B	NUMS 2024	14	B	UHS 2023	25	C	KMU 2023	36	C	BUMHS 2022	47	B	MDCAT 2016
4	B	SZABMU 2024	15	D	SZABMU 2023	26	C	UHS 2022	37	D	PMDC 2020	48	C	MDCAT 2016
5	D	SZABMU 2024	16	A	NUMS 2023	27	B	SZABMU 2022	38	D	PMDC 2020	49	D	MDCAT 2016
6	A	NUMS 2024	17	A	SZABMU 2023	28	B	KMU 2022	39	C	PMDC 2020	50	B	MDCAT 2015
7	C	NUMS 2024	18	B	NUMS 2023	29	D	SZABMU 2022	40	A	PMDC 2020	51	C	MDCAT 2015
8	D	NUMS 2024	19	C	SZABMU 2023	30	D	SZABMU 2022	41	C	MDCAT 2019	52	B	MDCAT 2015
9	D	SZABMU 2024	20	C	KMU 2023	31	C	NUMS 2022	42	C	MDCAT 2019	53	D	MDCAT 2015
10	B	NUMS 2024	21	A	KMU 2023	32	B	UHS 2022	43	D	MDCAT 2018	54	B	MDCAT 2014
11	A	UHS 2023	22	A	KMU 2023	33	A	BUMHS 2022	44	B	MDCAT 2018			

TOTAL
MCQS

54

CORRECT

INCORRECT

BLANK

ACCURACY

%

Scan the booklet QR code to enter answers in
BeambePrep Grind Mode for automated error
autopsies.

PROPOLIS COGNITIVE ERROR AUTOPSIES

Step-by-step conceptual derivations, formula working, and distractor autopsies for every question.

Question #1 Key: (A)

SZABMU 2024

In the roots apoplast pathway becomes discontinuous in the endodermis due to the presence of:

CORE CONCEPT AND DERIVATION

To control the uptake of water and minerals, plants force apoplastic flow to cross a selectively permeable cell membrane before entering the vascular cylinder.

Formula:

None

Solution:

- Water traveling freely through the porous cell walls (the apoplast pathway) eventually reaches the endodermis, the innermost layer of the root cortex.
- The radial and transverse walls of the endodermal cells contain a waxy, hydrophobic band called the **Casparian strip** (made of suberin).
- This strip acts as a waterproof dam, forcing water to detour into the living cytoplasm (symplast) to be biologically filtered.

Why other options are incorrect:

- **Pericycle / Stele:** These are tissues located deeper inside the root, past the endodermal checkpoint.

Question #2 Key: (C)

KMU 2024

What will happen with the addition of salt to water?

CORE CONCEPT AND DERIVATION

Pure water has a maximum water potential of zero. Adding solutes creates a negative potential.

Formula:

$$\Psi_w = \Psi_s + \Psi_p$$

Solution:

- Adding salt (a solute) to water decreases the free kinetic energy of the water molecules.
- This causes the overall water potential (Ψ_w) to decrease (become more negative).
- Because the solute concentration has increased, the magnitude of the osmotic pull increases. This means the **osmotic potential** (which is technically a negative value, Ψ_s) increases in absolute magnitude (or simply, the potential for osmosis increases).

Note: In many older curricula, "osmotic potential" is used interchangeably with osmotic pressure, which increases. While technically Ψ_s becomes more negative, the "pulling power" increases.

Why other options are incorrect:

- Water potential definitively decreases, making option A incorrect.

Question #3 Key: (B)

NUMS 2024

Plants growing in saline soil face the problem of dehydration due to:

CORE CONCEPT AND DERIVATION

Water always moves passively via osmosis from an area of higher water potential to an area of lower water potential.

Formula:

$$\text{Flow: High } \Psi_w \rightarrow \text{Low } \Psi_w$$

Solution:

- Saline soil contains massive amounts of dissolved salt (solutes), which dramatically lowers the water potential (Ψ_w) of the soil.
- If the soil becomes saltier than the plant's own roots, then the water potential of the soil becomes lower than that of the root (Ψ_w of soil $<$ Ψ_w of root).
- Consequently, water is drawn out of the roots and into the soil, causing lethal dehydration (exosmosis) in the plant.

Why other options are incorrect:

- If Ψ_w soil $>$ Ψ_w root (Option A), water would correctly flow into the plant, and it would not face dehydration. Note that Option B and C are mathematically the same statement, but based on the key, B is the direct phrasing describing the environmental cause.

Question #4 Key: (B)

SZABMU 2024

The total delay in the conductance of action potential from SA node to AV node is:

CORE CONCEPT AND DERIVATION

Electrical impulses must be delayed between the atria and ventricles to allow physical blood filling to occur.

Formula:

None

Solution:

- The electrical signal travels rapidly from the SA node across the atria to the AV node.
- The AV node consists of thin fibers with fewer gap junctions, causing a deliberate bottleneck in the electrical signal.
- This creates a total built-in delay of approximately **0.15 seconds** (or 0.1 to 0.15s depending on text). This crucial fraction of a second ensures the atria fully contract and empty their blood into the ventricles before the ventricles begin to contract.

Why other options are incorrect:

- Values like 0.08s are too short (ventricles would contract while empty), and 0.20s is dangerously close to a first-degree heart block.

Question #5 Key: (D)

SZABMU 2024

Which of the following vessels have larger bore, thin wall with non-pulsatile nature?

CORE CONCEPT AND DERIVATION

Vessel histology and anatomy directly reflect the blood pressure they must endure.

Formula:

None

Solution:

- By the time blood passes through the capillary beds and enters the venous return system, almost all cardiac pressure has dissipated.
- To accommodate large volumes of sluggish blood, **veins** possess a larger lumen (bore) than corresponding arteries.
- Because they face very low pressure, their muscular walls (tunica media) are much thinner, and the flow of blood through them is smooth and continuous (non-pulsatile), unlike the throbbing of arteries.

Why other options are incorrect:

- **Arteries/Aorta:** Have thick, elastic walls and experience highly pulsatile pressure.
- **Capillaries:** Microscopic bore, one cell thick.

Question #6 Key: (A)

NUMS 2024

Weakened papillary muscles of right ventricle would result in constant back flow of blood into:

CORE CONCEPT AND DERIVATION

Papillary muscles anchor the AV valves to prevent prolapse during ventricular systole.

Formula:

None

Solution:

- The papillary muscles of the right ventricle are attached to the tricuspid valve via chordae tendineae.
- If these muscles weaken or rupture, the intense pressure generated during right ventricular contraction will blow the tricuspid valve flaps backward (prolapse).
- This valve failure allows blood to continuously regurgitate (back flow) upwards into the chamber it just came from: the **right atrium**.

Why other options are incorrect:

- The right ventricle is entirely isolated from the left side of the heart, so it would not affect the left atrium or left ventricle directly.

Question #7 **Key: (C)**

NUMS 2024

Which of the following set of characteristics are related to veins? A. Present, Thick, [Formula] B. Absent, Th...

CORE CONCEPT AND DERIVATION

Veins are structurally adapted for low-pressure blood return to the heart.

Formula:

None

Solution:

- **Valves:** Veins must fight gravity under low pressure, so internal valves are universally **present**.
- **Wall Thickness:** Without high systolic pressure, veins do not need massive muscle layers, rendering their walls **thinner** than arteries.
- **Diameter:** To act as a blood reservoir, veins have large internal lumens, typically ranging from $40 - 50 \mu m$ (or larger in macroscopic veins) compared to microscopic capillaries.

Why other options are incorrect:

- Options claiming absent valves define arteries. Thick walls define arteries. $7 - 9 \mu m$ perfectly describes the diameter of a single capillary.

Question #8 **Key: (D)**

NUMS 2024

The presence of which molecules distinguish blood from interstitial fluid?

CORE CONCEPT AND DERIVATION

Capillary walls act as biological sieves, allowing small molecules to exit into the tissues while retaining massive structures.

Formula:

None

Solution:

- Interstitial fluid is formed when hydrostatic pressure pushes blood plasma out of the capillaries.
- Water, glucose, amino acids, and electrolytes easily pass through the endothelial clefts.
- However, formed cellular elements like **Red Blood Cells (RBCs)** and massive molecules like **large plasma proteins** (albumin, fibrinogen) are physically too large to escape. Thus, their presence strictly distinguishes whole blood from the fluid bathing the tissues.

Why other options are incorrect:

- Electrolytes, glucose, and even some smaller antibodies easily cross into the interstitial fluid.

Question #9 Key: (D)

SZABMU 2024

All of the following are the characteristics of veins, except:

CORE CONCEPT AND DERIVATION

The anatomical distribution of venous valves depends entirely on gravitational forces.

Formula:

None

Solution:

- Veins have broad lumens (A is true), carry blood toward the heart (B is true), and have relatively thin elastic/muscular layers (C is true).
- Valves exist to prevent backflow against gravity. Therefore, valves are highly abundant in the veins of the legs and arms (lower parts of the body).
- Veins returning blood from the head and neck (the upper part of the body) rely on gravity to drain downwards and generally **lack valves** entirely. Thus, statement D is the exception.

Why other options are incorrect:

- Options A, B, and C accurately describe the histology and physiology of veins.

Question #10 Key: (B)

NUMS 2024

Which of the following would not be compromised in the absence of lymphatic system?

CORE CONCEPT AND DERIVATION

The lymphatic system manages fluid homeostasis, lipid absorption, and immune defense, but has no role in respiratory gas transport.

Formula:

None

Solution:

- If the lymphatic system disappeared, leaked plasma could not return to the veins, destroying blood volume and **blood pressure**.
- Without lymph nodes, the adaptive **defense mechanism** would collapse.
- However, the **oxygen-carrying capacity of blood** is determined entirely by the mass of Red Blood Cells and hemoglobin molecules locked safely within the cardiovascular system. Since RBCs do not leave the blood vessels to enter lymph, their oxygen-carrying capacity remains mechanically unaffected.

Why other options are incorrect:

- Blood composition would alter as proteins and fluid leak into tissues without returning.

Question #11 Key: (A)

UHS 2023

The ____ describes how water and dissolved chemicals are carried through the cell wall and intercellular gaps ...

CORE CONCEPT AND DERIVATION

Water travels through plant cortex tissues via interconnected non-living and living spaces.

Formula:

None

Solution:

- The apoplast pathway refers exclusively to the movement of water and solutes through the "dead" or non-living parts of the plant tissue.
- This includes the porous cellulose cell walls and the intercellular air spaces, bypassing the living cytoplasm entirely until reaching the Casparian strip.

Why other options are incorrect:

- **Symplast theory:** Describes water moving strictly through the living cytoplasm and plasmodesmata.

Question #12 Key: (B)

SZABMU 2023

The pathways of water transport in which water moves through plasmodesmata is:

CORE CONCEPT AND DERIVATION

Plant cells are physically and chemically connected to allow efficient intracellular transport.

Formula:

None

Solution:

- Plasmodesmata are tiny, membrane-lined channels that traverse plant cell walls.
- They connect the cytoplasm of adjacent cells into one continuous network.
- Water moving through this living, cytoplasmic continuum utilizes the **symplast** pathway.

Why other options are incorrect:

- **Apoplast:** Travels outside the cell membrane (through cell walls).

Question #13 Key: (A)

UHS 2023

The movement of water to lower solute concentration area through a semipermeable membrane is?

CORE CONCEPT AND DERIVATION

Water movement across biological membranes is dictated by free energy, driven by differences in solute concentrations.

Formula:

$$\Psi_w = \Psi_s + \Psi_p$$

Solution:

- The tendency of water to move across a semi-permeable membrane into a region of differing solute concentration is defined by osmosis.
- The quantitative measure of this specific driving force, driven strictly by the presence of solutes, is referred to as **osmotic potential** (or solute potential).
- Water always moves from an area of higher water potential (lower solute concentration) to an area of lower water potential (higher solute concentration).

Why other options are incorrect:

- **Pressure potential:** Relates to the physical turgor pressure exerted by the cell wall.

Question #14 **Key: (B)**

UHS 2023

Descending aorta is bifurcated into two vessels which on further division form (form) femoral artery that supp...

CORE CONCEPT AND DERIVATION

Systemic circulation branches sequentially to deliver oxygen to the lower extremities.

Formula:

None

Solution:

- The massive descending abdominal aorta travels down the spine and ends by bifurcating (splitting in two) at the lower abdomen.
- It splits into the right and left common **iliac arteries**.
- These iliac arteries travel into the pelvis and eventually become the femoral arteries as they enter the thighs to supply the leg muscles.

Why other options are incorrect:

- **Iliac vein:** Returns deoxygenated blood; the question asks about arteries supplying blood.
- **Temporal artery:** Located in the head/skull.

Question #15 **Key: (D)**

SZABMU 2023

In human heart, the left atrium receives:

CORE CONCEPT AND DERIVATION

The left side of the heart is exclusively responsible for handling oxygenated blood returning from the lungs.

Formula:

None

Solution:

- The pulmonary circulation carries blood to the lungs to pick up oxygen.
- Once oxygenated, the blood travels back to the heart.
- It enters the left atrium via two right and two left **pulmonary veins** (four in total).

Why other options are incorrect:

- The Superior Vena Cava, Inferior Vena Cava, and Coronary Sinus all drain oxygen-poor blood exclusively into the right atrium.

Question #16 **Key: (A)**

NUMS 2023

The heart chamber from where Aorta originates:

CORE CONCEPT AND DERIVATION

The aorta is the main trunk of the systemic arterial system.

Formula:

None

Solution:

- The systemic circuit requires immense pressure to push blood through the entire body.
- The **left ventricle** has the thickest muscular wall in order to generate this high pressure.
- When the left ventricle contracts, it ejects oxygenated blood upward through the aortic semilunar valve directly into the aorta.

Why other options are incorrect:

- **Right ventricle:** Pumps blood into the pulmonary trunk (to the lungs).
- **Atria:** Receiving chambers only; they do not pump into major arterial trunks.

Question #17 **Key: (A)**

SZABMU 2023

Choose the correct pathway for the flow of blood:

CORE CONCEPT AND DERIVATION

Blood flows sequentially from high pressure macroscopic vessels to low pressure microscopic vessels.

Formula:

None

Solution:

- Blood exits the arteries into smaller **arterioles**.
- Arterioles branch into terminal extensions called **metarterioles**.
- Metarterioles act as a vascular shunt, passing directly through the capillary bed as a **thoroughfare channel**, which then supplies the true **capillaries** branching off it.

Why other options are incorrect:

- Options B, C, and D present the sequence backward or scrambled, violating the pressure gradient from arteries to capillaries.

Question #18 Key: (B)

NUMS 2023

Mesenteric veins drains the blood from:

CORE CONCEPT AND DERIVATION

The portal venous system collects blood from specific gastrointestinal organs to send to the liver.

Formula:

None

Solution:

- The mesenteric veins (specifically the Superior and Inferior Mesenteric veins) are named for their location in the mesentery.
- They are primarily responsible for draining nutrient-rich, deoxygenated blood from the small intestine and the **large intestine** (colon).
- They eventually merge with the splenic vein to form the hepatic portal vein.

Why other options are incorrect:

- **Stomach:** Drained mostly by gastric veins.
- **Liver:** Drained by the hepatic vein.

Question #19 Key: (C)

SZABMU 2023

Regarding structure of the human heart, Chordae tendineae are present in:

CORE CONCEPT AND DERIVATION

Chordae tendineae are the physical tension cords that anchor the atrioventricular (AV) valves during systolic contraction.

Formula:

None

Solution:

- During ventricular contraction, pressure spikes rapidly, threatening to blow the AV valves backward into the atria.
- Chordae tendineae connect the valve flaps to papillary muscles that sprout from the inner walls of the **ventricles**.
- Therefore, these structures are anatomically housed entirely within the left and right ventricles.

Why other options are incorrect:

- **Atria:** Have smooth or pectinate muscle, but no chordae tendineae.
- **Aortic/Pulmonary valves:** Are semilunar valves and do not require chordae tendineae to function.

Question #20 **Key: (C)**

KMU 2023

In human heart right atrium communicates with right ventricle through:

CORE CONCEPT AND DERIVATION

Atrioventricular valves guard the openings between the upper and lower chambers of the heart.

Formula:

None

Solution:

- Deoxygenated blood arriving in the right atrium must flow down into the right ventricle to be pumped to the lungs.
- The portal between the right atrium and right ventricle is guarded by a one-way valve with three cusps.
- This is definitively known as the **tricuspid valve**.

Why other options are incorrect:

- **Bicuspid (Mitral) valve:** Located on the left side of the heart.
- **Septums:** These are solid muscular walls that prevent communication (mixing) between the left and right sides of the heart.

Question #21 **Key: (A)**

KMU 2023

The Purkinje fibers are the specialized fibers found in:

CORE CONCEPT AND DERIVATION

The rapid, synchronized contraction of the massive ventricular muscle requires a specialized, high-speed electrical conduction system.

Formula:

None

Solution:

- The electrical signal travels from the AV node, down the Bundle of His, and splits into the bundle branches.
- At the apex of the heart, these branches curve upward and disperse into a network of highly specialized conducting cells called **Purkinje fibers**.
- These fibers distribute the electrical impulse uniformly throughout the ventricular walls of the **human heart**.

Why other options are incorrect:

- Lungs, stomach, and brain rely on the autonomic nervous system, not the intrinsic Purkinje conduction network.

Question #22 **Key: (A)**

KMU 2023

Which of the following is known as the vessels of the vessels?

CORE CONCEPT AND DERIVATION

Large blood vessels are so thick that the cells in their outer layers cannot receive oxygen and nutrients by simple diffusion from the blood flowing inside them.

Formula:

None

Solution:

- Large arteries and veins (like the aorta and vena cava) require their own dedicated microscopic blood supply.
- This network of tiny blood vessels embedded in the tunica externa of large vessels is termed the **vasa vasorum**.
- The direct translation of "vasa vasorum" from Latin is "the vessels of the vessels."

Why other options are incorrect:

- **Tunica media/externa/interna:** These are the tissue layers of the blood vessel wall, not the micro-vessels feeding them.

Question #23 **Key: (B)**

KMU 2023

The sinoatrial node is located in the ____ wall of the right atrium.

CORE CONCEPT AND DERIVATION

The anatomical placement of the SA node ensures that the electrical signal sweeps downwards across the atria.

Formula:

None

Solution:

- The Sinoatrial (SA) node is a cluster of specialized pacemaker cells.
- It is situated in the **upper dorsal** (superior-posterior) wall of the right atrium, precisely near the opening of the superior vena cava.
- This high position allows the depolarization wave to efficiently travel downward toward the AV node.

Why other options are incorrect:

- **Near the coronary sinus / lower dorsal:** This is the location of the Atrioventricular (AV) node, not the SA node.

Question #24 **Key: (D)**

UHS 2023

The final destination of lymph is:

CORE CONCEPT AND DERIVATION

The lymphatic system is an open, one-way system designed to capture leaked interstitial fluid and return it to the blood.

Formula:

None

Solution:

- Lymph fluid travels from microscopic capillaries, through nodes, into larger lymphatic trunks, and finally into two main ducts (the Right Lymphatic Duct and the Thoracic Duct).
- Both of these massive ducts ultimately empty their fluid contents directly into the right and left **subclavian veins**, officially returning the fluid to the cardiovascular system.

Why other options are incorrect:

- **Lymph nodes/organs:** These are checkpoints along the journey, not the final destination.

Question #25 Key: (C)

KMU 2023

The largest body of lymphoid tissue in the human body is:

CORE CONCEPT AND DERIVATION

Secondary lymphoid organs are macroscopic structures that house high densities of lymphocytes for immune surveillance.

Formula:

None

Solution:

- Located in the upper left quadrant of the abdomen, the **spleen** is an organ roughly the size of a fist.
- It contains vast amounts of white pulp (lymphoid tissue) and red pulp. By sheer mass and volume, it is the largest single collection of lymphoid tissue in the human body.

Why other options are incorrect:

- **Thymus/Tonsils:** These are much smaller lymphoid structures.
- **Pancreas:** An endocrine/exocrine digestive organ, not a lymphoid organ.

Question #26 Key: (C)

UHS 2022

Digested food from intestine is carried to the liver by:

CORE CONCEPT AND DERIVATION

The portal venous system directs blood from parts of the gastrointestinal tract to the liver.

Formula:

None

Solution:

- The hepatic portal vein is responsible for carrying nutrient-rich, deoxygenated blood from the small intestine directly to the liver.
- This allows the liver to process nutrients before the blood enters the general systemic circulation.

Why other options are incorrect:

- **Hepatic artery:** Carries oxygenated blood to the liver.
- **Hepatic vein:** Carries deoxygenated blood away from the liver to the vena cava.

Question #27 Key: (B)

SZABMU 2022

The pathway of water transport in which water moves through plasmodesmata is:

CORE CONCEPT AND DERIVATION

Water and solutes can move through plant tissues via different pathways: the apoplast (non-living spaces) and symplast (living contents).

Formula:

None

Solution:

- The symplast pathway involves water moving from cell to cell through the cytoplasm.
- The cells are connected by microscopic channels called plasmodesmata, which facilitate this direct cytoplasmic transport.

Why other options are incorrect:

- **Apoplast:** Movement through cell walls and intercellular spaces, not plasmodesmata.
- **Vacuolar:** Movement across vacuoles, which involves crossing tonoplast membranes.

Question #28 Key: (B)

KMU 2022

_____ is the attractive force between a water molecule and container.

CORE CONCEPT AND DERIVATION

Water molecules exhibit unique attractive forces that assist in transport mechanisms within the xylem.

Formula:

None

Solution:

- Adhesion is the attractive force between water molecules and unlike surfaces, such as the walls of the xylem vessels (or a container).
- This property prevents water columns from collapsing under gravity.

Why other options are incorrect:

- **Cohesion:** The attractive force between water molecules themselves.
- **Tension:** The pulling force exerted on the water column by transpiration.

Question #29 Key: (D)

SZABMU 2022

Select the duration of cardiac cycle:

CORE CONCEPT AND DERIVATION

The cardiac cycle comprises one complete sequence of filling and pumping of the heart.

Formula:

$$\text{Duration} = \frac{60 \text{ seconds}}{\text{Heart Rate (beats/min)}}$$

Solution:

- At a normal resting heart rate of roughly 72 to 75 beats per minute:
- Duration = $\frac{60}{75} = 0.8$ seconds.
- This 0.8 sec cycle includes atrial systole (0.1s), ventricular systole (0.3s), and complete cardiac diastole (0.4s).

Why other options are incorrect:

- Values like 0.4 sec describe only specific phases (e.g., joint diastole), not the entire cycle.

Question #30 Key: (D)

SZABMU 2022

In human heart, the left atrium receives:

CORE CONCEPT AND DERIVATION

The left side of the heart is dedicated to systemic circulation and receives freshly oxygenated blood.

Formula:

None

Solution:

- The left atrium acts as the receiving chamber for blood returning from the pulmonary circuit.
- It receives this oxygenated blood through four distinct pulmonary veins.

Why other options are incorrect:

- **Vena Cavae and Coronary Sinus:** All three of these vessels return deoxygenated blood exclusively to the right atrium.

Question #31 Key: (C)

NUMS 2022

*Heart beat is normally regulated by:***CORE CONCEPT AND DERIVATION**

Heart rate regulation is intrinsically controlled by autorhythmic cells.

Formula:

None

Solution:

- The Sinoatrial (SA) node possesses the fastest intrinsic rate of spontaneous depolarization.
- It functions as the heart's natural pacemaker, initiating the action potential and thus regulating the normal heartbeat.

Why other options are incorrect:

- While the AV-bundle, Purkinje fibers, and Bundle of His conduct the impulse, they do not establish the primary rhythm under normal physiological conditions.

Question #32 Key: (B)

UHS 2022

*Flow of blood in the capillaries is adjusted by:***CORE CONCEPT AND DERIVATION**

Microcirculation must be finely tuned to match the metabolic demands of specific tissues at any given moment.

Formula:

None

Solution:

- At the junction between metarterioles and true capillaries, there are rings of smooth muscle known as pre-capillary sphincters.
- By contracting or relaxing, these sphincters act as valves to restrict or permit blood flow into the capillary beds based on local chemical signals.

Why other options are incorrect:

- The heart provides systemic pressure but cannot dictate localized flow to individual capillary beds. Vein valves only prevent backflow.

Question #33 Key: (A)

BUMHS 2022

*Histamine causes blood vessels to:***CORE CONCEPT AND DERIVATION**

Histamine is a primary chemical mediator in the inflammatory response and allergic reactions.

Formula:

None

Solution:

- When released by mast cells or basophils, histamine acts on the smooth muscle of local blood vessels.
- It causes aggressive vasodilation (widening of the vessels) and increases capillary permeability.
- This allows more blood, immune cells, and fluid to reach the site of infection or injury, causing classic redness and swelling.

Why other options are incorrect:

- **Constrict:** Histamine does the exact opposite; vasoconstriction is typically caused by epinephrine or angiotensin.

Question #34 Key: (C)

UHS 2022

*The lymphatic vessels of the body empty the lymph into blood stream at:***CORE CONCEPT AND DERIVATION**

Lymph must be returned to the cardiovascular system to maintain total blood volume and fluid homeostasis.

Formula:

None

Solution:

- The two major lymphatic ducts (the Right Lymphatic Duct and the Thoracic Duct) gather all the body's lymph.
- They both connect to the circulatory system at the right and left **subclavian veins**, respectively, situated just under the collarbones.

Why other options are incorrect:

- The jugular vein merges nearby but is not the direct entry point. Bile duct is part of the digestive system.

Question #35 Key: (D)

SZABMU 2022

Lymphatic system contains all of the following organs/structures except:

CORE CONCEPT AND DERIVATION

The lymphatic system is composed of an interconnected network of vessels, nodes, and specialized organs that house immune cells.

Formula:

None

Solution:

- Primary and secondary lymphoid organs include the bone marrow, thymus, spleen, lymph nodes, and tonsils.
- The lungs are primarily organs of the respiratory system dedicated to gas exchange.
- While lungs contain lymphatic drainage (like all tissues), the organ itself is not classified as a structure of the lymphatic system.

Why other options are incorrect:

- **Spleen:** The largest secondary lymphoid organ in the body.

Question #36 Key: (C)

BUMHS 2022

Which of the following act as lymphatic organ?

CORE CONCEPT AND DERIVATION

Lymphatic organs are specialized tissues where lymphocytes develop, mature, or execute their immune functions.

Formula:

None

Solution:

- The spleen is fundamentally a massive lymph node that filters blood instead of lymph.
- It contains white pulp (packed with lymphocytes for immune surveillance) and red pulp (for destroying old RBCs), firmly classifying it as a secondary lymphatic organ.

Why other options are incorrect:

- Stomach, kidney, and liver are primarily digestive, excretory, and metabolic organs, respectively.

Question #37 Key: (D)

PMDC 2020

Regarding structure of human heart chordae tendineae are present in:

CORE CONCEPT AND DERIVATION

Chordae tendineae are the mechanical anchors for the atrioventricular valves.

Formula:

None

Solution:

- These tendinous cords extend from the inferior edges of the AV valve cusps downwards.
- They attach to the papillary muscles, which are specialized extensions of the ventricular walls. Therefore, they are physically located within the ventricles.

Why other options are incorrect:

- **Atria:** Receive blood; do not contain chordae tendineae.
- **Pulmonary valve:** A semilunar valve, which relies on its cup-like shape to close, lacking chordae tendineae entirely.

Question #38 Key: (D)

PMDC 2020

In human heart the left atrium receives:

CORE CONCEPT AND DERIVATION

The left atrium serves as the collection chamber for oxygen-rich blood returning from the pulmonary circuit.

Formula:

None

Solution:

- After gas exchange in the lungs, oxygenated blood travels back to the heart.
- It enters the left atrium specifically via the four pulmonary veins (two from each lung).

Why other options are incorrect:

- **Vena Cava & Coronary Sinus:** These vessels deliver deoxygenated blood from the body and heart muscle specifically to the **right atrium**.

Question #39 **Key: (C)**

PMDC 2020

The only vein in the human body carrying oxygenated blood is:

CORE CONCEPT AND DERIVATION

Anatomically, arteries carry blood away from the heart and veins carry blood toward the heart, regardless of oxygenation status.

Formula:

None

Solution:

- In the systemic circuit, veins carry deoxygenated blood.
- However, in the pulmonary circuit, the pulmonary vein returns blood from the lungs back to the left atrium of the heart.
- Because this blood has just undergone gas exchange in the alveoli, it is highly oxygenated, making the pulmonary vein the major exception to the rule.

Why other options are incorrect:

- Femoral, Renal, and Iliac veins all carry deoxygenated systemic blood back to the vena cava.

Question #40 **Key: (A)**

PMDC 2020

Which of the following blood vessels have the highest pressure of blood?

CORE CONCEPT AND DERIVATION

Blood pressure is directly proportional to the force of ventricular contraction and is highest closest to the pump.

Formula:

None

Solution:

- The left ventricle is the most powerful chamber, generating immense force to push blood through the massive systemic circuit.
- The aorta is the immediate vessel exiting the left ventricle.
- Because it receives the full, undissipated force of left ventricular systole, the aorta experiences the highest blood pressure in the body (typically 120 mmHg).

Why other options are incorrect:

- **Vena cava:** Has the lowest pressure as blood returns to the right atrium.
- **Pulmonary arteries:** Driven by the weaker right ventricle (usually around 25 mmHg).

Question #41 **Key: (C)**

MDCAT 2019

Four plants are present in different environmental conditions. Plant A is present in warm climate with continu...

CORE CONCEPT AND DERIVATION

The rate of transpiration depends heavily on external environmental factors like temperature, wind, and humidity.

Formula:

None

Solution:

- High temperatures increase the rate of evaporation of water from the mesophyll cells.
- High wind speed continuously removes the saturated air around the leaf, maintaining a steep water vapor concentration gradient.
- Plant D experiences both conditions, maximizing transpiration.

Why other options are incorrect:

- **Continuous rainfall:** Creates high humidity, minimizing the concentration gradient.
- **Cool forest:** Lower temperatures reduce evaporation rates.

Question #42 **Key: (C)**

MDCAT 2019

Which of the following blood vessels contain semilunar valves?

CORE CONCEPT AND DERIVATION

Blood pressure in the venous system is incredibly low, necessitating mechanical assistance to return blood against gravity.

Formula:

None

Solution:

- To prevent the backflow of blood, especially in the extremities, veins are equipped with internal semilunar (pocket) valves.
- These valves work in tandem with the skeletal muscle pump to push blood unidirectionally toward the heart.

Why other options are incorrect:

- **Arteries:** High pressure from the heart prevents backflow, so no valves are needed (except at the exit of the heart itself).
- **Capillaries/Arterioles:** Too microscopic and under sufficient pressure gradient to require valves.

Question #43 **Key: (D)**

MDCAT 2018

Which statement is correct about atrial systole?

CORE CONCEPT AND DERIVATION

The cardiac cycle is meticulously timed to ensure sequential filling and pumping.

Formula:

None

Solution:

- "Systole" refers to contraction. During atrial systole, the atria actively contract to top off the ventricles with blood.
- For this filling to occur efficiently, the ventricles must be in a state of relaxation (diastole). Thus, ventricles remain relaxed while atria contract.

Why other options are incorrect:

- If both contracted simultaneously (Option B), blood could not flow forward efficiently. Option A describes ventricular systole.

Question #44 **Key: (B)**

MDCAT 2018

Which one of the following act as a pacemaker in heart?

CORE CONCEPT AND DERIVATION

The natural pacemaker of the heart determines the baseline heart rate.

Formula:

None

Solution:

- The Sino-atrial (SA) node spontaneously generates electrical impulses at a rate of 70 – 80 times per minute.
- Because its intrinsic rate is the highest, it overrides other potential pacemakers and sets the rhythm for the entire heart.

Why other options are incorrect:

- The AV node and Bundle of His can act as backup pacemakers if the SA node fails, but they operate at a much slower, secondary rate (40 – 60 bpm).

Question #45 **Key: (C)**

KMU 2017

In ECG, QRS complex represent:

CORE CONCEPT AND DERIVATION

An electrocardiogram (ECG) traces the electrical depolarization and repolarization waves across the heart muscle.

Formula:

None

Solution:

- The P-wave represents atrial depolarization.
- The **QRS complex** represents the rapid depolarization of the large ventricular muscle mass.
- This ventricular depolarization immediately triggers ventricular contraction, clinically known as **ventricle systole**.

Why other options are incorrect:

- Atrial repolarization (diastole) is masked by the massive QRS complex.
- Ventricle diastole corresponds to the T-wave (ventricular repolarization).

Question #46 Key: (C)

MDCAT 2017

Thoracic lymph duct of the lymphatic system opens into ____.

CORE CONCEPT AND DERIVATION

The lymphatic system acts as a one-way drainage network that eventually returns interstitial fluid back into the venous circulation.

Formula:

None

Solution:

- The thoracic duct is the largest lymphatic vessel in the body, draining lymph from the lower body and the left side of the upper body.
- It empties this massive volume of lymph directly into the venous system at the junction of the left internal jugular vein and the left **subclavian vein**.

Why other options are incorrect:

- Emptying directly into the high-flow Vena Cavae could cause turbulence; the subclavian veins offer a safer, low-pressure venous return point.

Question #47 Key: (B)

MDCAT 2016

In human the closed sac which surrounds the heart is:

CORE CONCEPT AND DERIVATION

The heart is enclosed in protective layers that reduce friction during contraction.

Formula:

None

Solution:

- The pericardium is a double-walled sac containing the heart and the roots of the great vessels.
- It provides lubrication via pericardial fluid, protecting the heart from friction and external shock.

Why other options are incorrect:

- **Myocardium:** The muscular layer of the heart wall.
- **Endocardium:** The inner lining of the heart chambers.

Question #48 Key: (C)

MDCAT 2016

Chordae tendineae are the fibrous cords attached with:

CORE CONCEPT AND DERIVATION

Valvular prolapse in the heart is prevented by tension cables.

Formula:

None

Solution:

- Chordae tendineae (heart strings) are tough, tendinous cords in the heart.
- They connect the papillary muscles to the tricuspid valve (and bicuspid valve) to prevent them from inverting during ventricular systole.

Why other options are incorrect:

- Options A, B, and D describe structures completely unrelated to cardiovascular anatomy.

Question #49 Key: (D)

MDCAT 2016

Bicuspid valve controls the flow of blood from:

CORE CONCEPT AND DERIVATION

The unidirectional flow of oxygenated blood on the left side of the heart is regulated by the mitral valve.

Formula:

None

Solution:

- The bicuspid valve, also known as the mitral valve, is situated between the left atrium and the left ventricle.
- It ensures that blood passes downwards into the ventricle and does not regurgitate back into the atrium during contraction.

Why other options are incorrect:

- **Right atrium to right ventricle:** Controlled by the tricuspid valve.
- **Left ventricle to aorta:** Controlled by the aortic semilunar valve.

Question #50 **Key: (B)**

MDCAT 2015

Right atrium is separated from right ventricle by:

CORE CONCEPT AND DERIVATION

Atrioventricular (AV) valves prevent the backflow of blood from the ventricles into the atria during systolic contraction.

Formula:

None

Solution:

- The valve located between the right atrium and the right ventricle consists of three cusps or flaps.
- It is anatomically named the tricuspid valve.

Why other options are incorrect:

- **Bicuspid (Mitral) Valve:** Separates the left atrium and left ventricle.
- **Semilunar Valves:** Guard the exits of the ventricles (pulmonary trunk and aorta).

Question #51 **Key: (C)**

MDCAT 2015

The flaps of tricuspid valves are attached to muscular extensions of right ventricle known as:

CORE CONCEPT AND DERIVATION

The structural integrity of AV valves during ventricular contraction is maintained by an anchoring system.

Formula:

None

Solution:

- The flaps (cusps) of the AV valves are anchored by fibrous cords called chordae tendineae.
- These cords are tethered to cone-shaped muscular pillars projecting from the inner walls of the ventricles, called papillary muscles.

Why other options are incorrect:

- **Smooth/Skeletal Muscles:** The heart is composed of specialized cardiac muscle, not general smooth or skeletal muscle.
- **Intercostal Muscles:** Located between the ribs to assist in breathing.

Question #52 **Key: (B)**

MDCAT 2015

The heart beat cycle starts when electric impulses are generated from:

CORE CONCEPT AND DERIVATION

The rhythmic contraction of the heart is autorhythmic, driven by specialized pacemaking tissue.

Formula:

None

Solution:

- The Sinoatrial (SA) node, located in the upper wall of the right atrium, naturally depolarizes faster than any other cardiac tissue.
- It initiates the electrical impulse that spreads across the atria, officially starting each heartbeat cycle.

Why other options are incorrect:

- **AV node:** Delays and relays the impulse to the ventricles, but does not normally originate it.
- **SV/PQ node:** These are fictitious terms not used in standard cardiac electrophysiology.

Question #53 **Key: (D)**

MDCAT 2015

The lymph vessel of villi is called:

CORE CONCEPT AND DERIVATION

Dietary fats are too large and hydrophobic to directly enter the microscopic blood capillaries of the digestive tract.

Formula:

None

Solution:

- Within the center of each intestinal villus lies a specialized, blind-ended lymphatic capillary.
- This vessel is called a lacteal.
- Lacteals absorb packaged dietary fats (chylomicrons) to transport them through the lymphatic system before they are dumped into the bloodstream.

Why other options are incorrect:

- **Epithelium:** The cellular lining of the villi.
- **Afferent lymph vessel:** Carries lymph towards a lymph node, not the specific fat-absorbing vessel in a villus.

Question #54 **Key: (B)**

MDCAT 2014

The oxygenated blood from lungs to heart is transported by the:

CORE CONCEPT AND DERIVATION

The pulmonary circulation operates oppositely to the systemic circulation in terms of oxygen content within vessels.

Formula:

None

Solution:

- Veins generally carry blood toward the heart.
- The pulmonary veins carry newly oxygenated blood from the capillary beds of the lungs back to the left atrium of the heart.

Why other options are incorrect:

- **Pulmonary artery:** Carries deoxygenated blood away from the heart to the lungs.
- **Coronary artery:** Supplies oxygenated blood to the heart muscle itself.