

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

ANNUAL EXAMINATIONS (THEORY) 2023

Biology Paper I

Time: 1 hour 10 minutes Marks: 40

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 40 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

Correct Way	Incorrect Ways
1 (A) (B) ● (D)	1 (A) (B) (C) (D)
	2 (A) (B) (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

Candidate's Signature

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a simple calculator if you wish.

1. Kidney is considered as a body organ because it is composed of
 - A. same type of cells performing different functions.
 - B. same type of tissues performing a specific function.
 - C. different types of cells performing different functions.
 - D. different types of tissues performing specific functions.
2. In China, mulberry silkworms are used to produce silk at a large scale. This raw silk is distributed to various parts of the world and gives export worth of \$315 million.

The given information MAINLY highlights the relationship of Biology with

- A. Chemistry.
 - B. Economics.
 - C. Geography.
 - D. Mathematics.
3. Which of the following is an example of quantitative observation?
 - A. The most complex phase of cell cycle is interphase.
 - B. The epithelial cells of trachea are columnar in shape.
 - C. The nuclei of leucocytes appear dark under the microscope.
 - D. The average life span of thrombocytes is about seven to eight days.
 4. In a science laboratory, four students were asked to write their observations about the plant in the given image.



The given table represents the statements of each student regarding the image. With reference to the steps of biological method of study, which of the following students' statements will be categorised as 'observation'?

Student	Statement
A	The plant is in wilted condition.
B	The plant is provided with excessive nutrients.
C	Insufficient water is provided to the plant.
D	Transpiration has occurred in the plant.

5. The option which shows the CORRECT classification of organisms according to the five kingdom classification system is

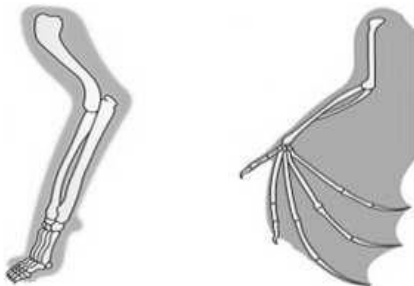
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6. Sana examined a specimen in the laboratory and made the following observations.

- It has three pairs of legs.
- It has a pair of eyes and antennae.
- Its body is divided into head, thorax and abdomen.

Based on the given observations, the specimen is identified as

- A. snail.
 B. sycon.
 C. butterfly.
 D. earthworm.
7. The given images show the forelimbs of two different vertebrates.



In these forelimbs, the pattern of arrangement of bones indicates that these vertebrates

- A. live in the same habitat.
 B. share a common ancestor.
 C. have same mode of locomotion.
 D. are produced by artificial selection.

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8. The given table shows the classification of four animals (W, X, Y and Z).

W	X	Y	Z
animalia	animalia	animalia	animalia
mammalia	mammalia	mammalia	mammalia
chordata	chordata	chordata	chordata
carnivora	carnivora	chiroptera	carnivora
canidae	felidae	furipteridae	canidae
lycaon	felis	furipterus	canis
pictus	silvestris	horrens	rufus

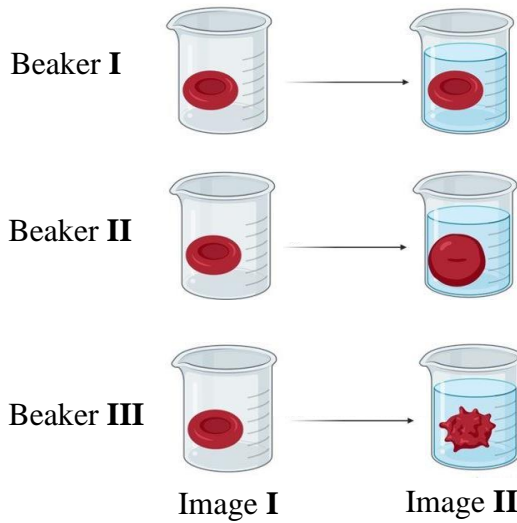
The animals that belong to the same family are

- A. W and X.
 B. W and Z.
 C. X and Y.
 D. Y and Z.
9. In contrast to electron microscope, the light microscope enables the user to observe the
- A. DNA molecules.
 B. matrix of mitochondria.
 C. natural colour of a specimen.
 D. distinct layers of cell organelles.
10. In a human body, epithelial cells are located throughout the body and perform different functions based on their location.
- The epithelial cells that have both absorptive and secretory properties are located in
- A. cartilages.
 B. blood vessels.
 C. the spinal cord.
 D. the alimentary canal.
11. One of the parts of mitochondria that performs the following functions.
- It is the part where electron transport chain takes place.
 - It greatly increases the surface area by forming cristae.

This part of mitochondria is identified as the

- A. matrix.
 B. inner membrane.
 C. external membrane.
 D. inter-membrane space.

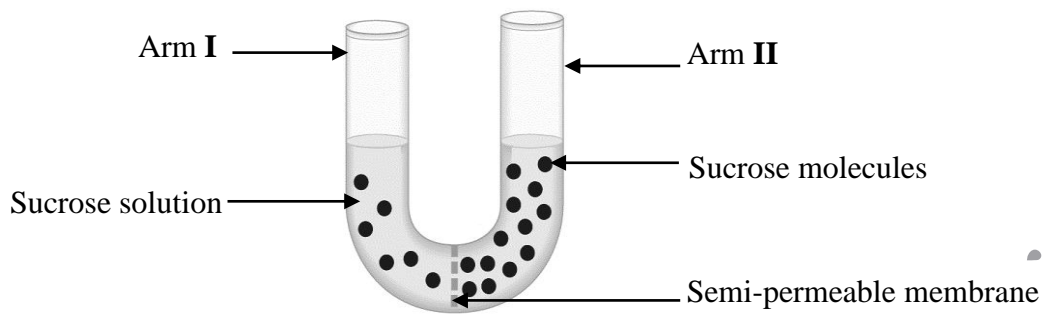
12. An experiment is conducted to determine the effect of tonicity of the solutions on red blood cells. Image II represents the condition of RBCs after keeping them in different concentration of solutions in beaker I, II and III for a particular time.



The option that CORRECTLY identifies the tonicity of the solutions in beaker I, II and III is

	Tonicity of the Solution Present in Beaker		
	I	II	III
A	hypertonic	hypotonic	isotonic
B	isotonic	hypotonic	hypertonic
C	hypotonic	hypertonic	isotonic
D	isotonic	hypertonic	hypotonic

13. The given diagram represents the experimental set-up to determine the process of osmosis.



The diagram that CORRECTLY shows the molecular view of arm I and II of the tube is

Key:

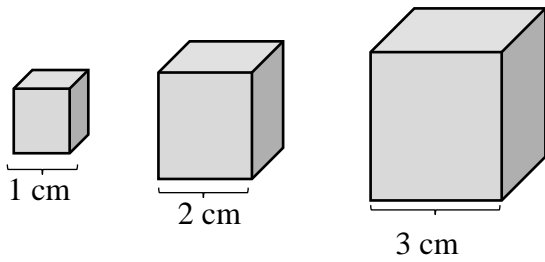
Sucrose molecule

Water molecule

Semipermeable membrane

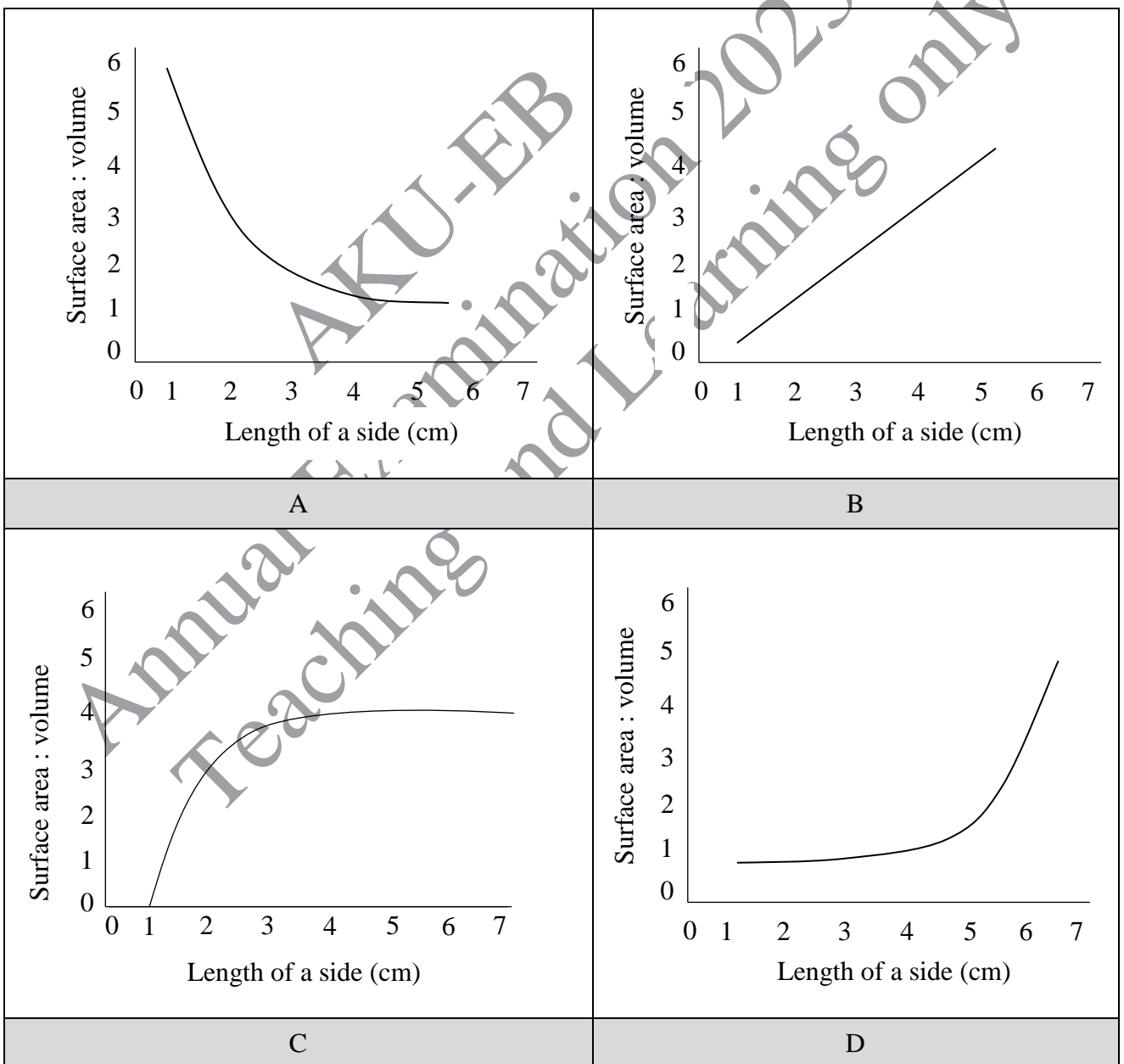
Arm I	Arm II	Arm I	Arm II
A		B	
Arm I	Arm II	Arm I	Arm II
C		D	

14. Consider the given cubes as cells.



Which of the following graphs CORRECTLY represents the relationship between the side length of cells and their surface area to volume ratio?

(Note: Graphs are not to scale.)



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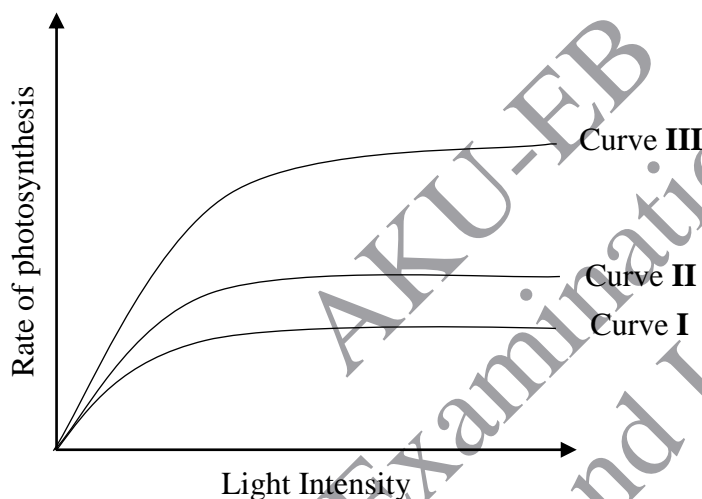
15. In the body of human beings, adenosine triphosphate (ATP) is used to

- A. conduct nerve impulse.
- B. bind oxygen with haemoglobin.
- C. absorb water in the large intestine.
- D. transport carbon dioxide gas to alveoli.

16. The role of oxygen in cellular aerobic respiration is to

- A. convert glucose into lactic acid.
- B. cause phosphorylation of 6-sugar molecule.
- C. link the reactions of glycolysis and Krebs cycle.
- D. accept electrons at the end of electron transport chain.

17. The given graph shows the effect of light intensity on the rate of photosynthesis.



With reference to factors affecting rate of photosynthesis, curve **III** is obtained by

- A. increasing temperature and light intensity.
- B. decreasing light intensity and water supply.
- C. increasing temperature and carbon dioxide concentration.
- D. decreasing water supply and carbon dioxide concentration.

18. Which of the following adaptations of leaves provide short distance for efficient diffusion of gases?

- A. Dense network of veins
- B. Reduced thickness of lamina
- C. Presence of stomata on the upper surface
- D. Presence of large number of chlorophyll molecules

19. In the cells of human beings, the product(s) formed after complete oxidation of glucose along with ATP is/ are
- lactic acid.
 - pyruvic acid.
 - carbon dioxide gas and water.
 - ethyl alcohol and carbon dioxide gas.
20. All of the following are produced in light-dependent reactions of photosynthesis EXCEPT
- O₂.
 - ATP.
 - NADPH (Nicotinamide adenine dinucleotide phosphate).
 - C₆H₁₂O₆ (Glucose).
21. In the human respiratory system, accumulation of mucus in trachea occurs due to the damage of
- cilia.
 - cartilage.
 - blood capillaries.
 - mucous membrane.
22. Which of the following is the CORRECT difference between respiration and photosynthesis?

	Respiration	Photosynthesis
A	It is a catabolic process.	It is an anabolic process.
B	It takes place in animals only.	It takes place in plants only.
C	It produces oxygen gas as a by-product.	It requires oxygen gas as a reactant.
D	It occurs in the presence of darkness only.	It occurs in the presence of light only.

23. In the human respiratory system, all of the following structures facilitate the passage of air towards lungs EXCEPT
- larynx.
 - alveoli.
 - bronchi.
 - pharynx.

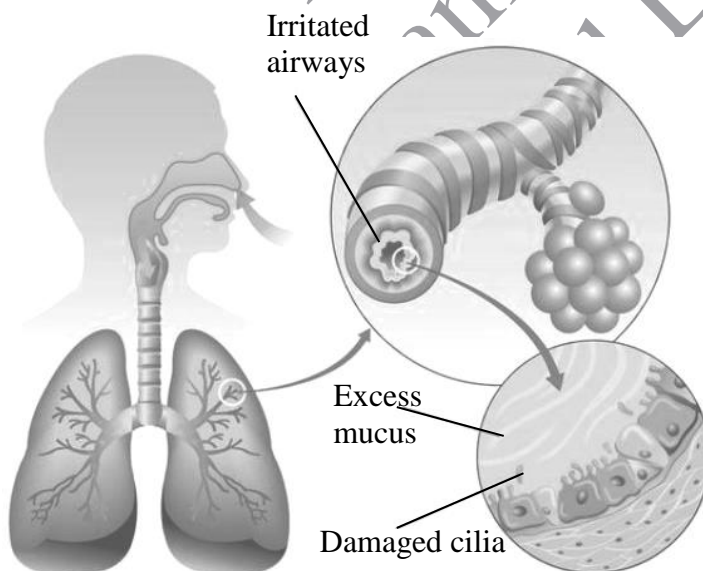
24. The given table shows the concentration of different gases in inspired air of a healthy person.

Percentage (%) Composition by Volume	
Gas	Inspired Air
Carbon dioxide	0.03
Oxygen	21
Nitrogen	78.0

The option that CORRECTLY identifies the percentage of the given gases in expired air of a healthy person is

	Carbon dioxide (%)	Oxygen (%)	Nitrogen (%)
A	0.03	30	26
B	0.06	11	90
C	0.01	0	39.5
D	4.0	16.4	78.0

25. The given diagram represents the deteriorated physiological condition of one of the human respiratory structures caused by chain smoking.



Based on the given diagram, the disease is identified as

- A. bronchitis.
- B. pneumonia.
- C. emphysema.
- D. tuberculosis.

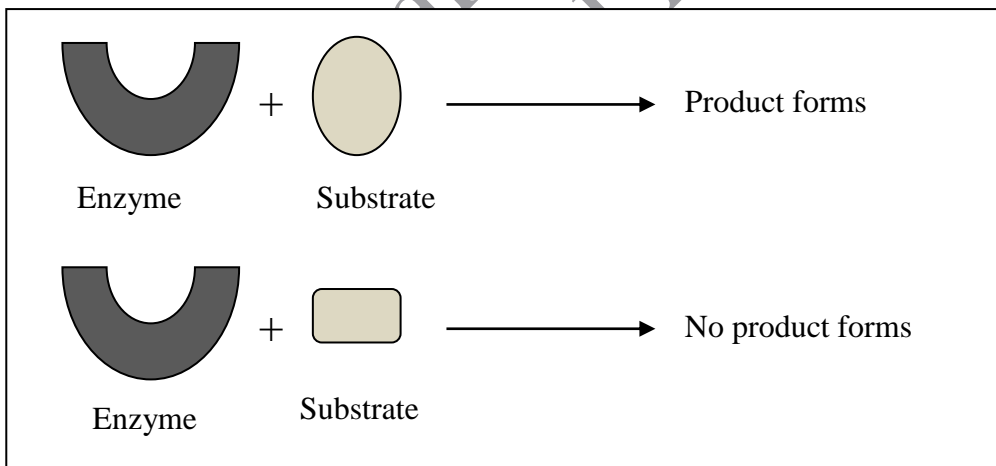
26. In a laboratory, a group of students was investigating the action of amylase on starch solution keeping the pH neutral. They used iodine as a chemical indicator. One of the group members added a chemical that drastically decreased the pH of solution in the test tube.

Which of the following conditions will occur due to this drastic change in pH?

- A. Amylase will denature.
 - B. Starch will convert into maltose.
 - C. Starch and amylase will bind strongly.
 - D. Iodine colour will change into dark blue.
27. The given table shows enzymes (A, B, C and D) and their site of action.
- With reference to the site of action, which of the following enzymes is classified as extracellular enzyme?

Enzyme	Site of Action
A	Duodenal lumen
B	Stroma of chloroplast
C	Mitochondrial matrix
D	Liver cells

28. The property of enzymes shown in the given diagram of enzyme-catalysed reaction is



- A. specificity.
- B. high rate of reaction.
- C. requirement of co-factor.
- D. sensitivity to changing pH.

29. In villages, the application of organic fertilisers (manure) may cause contamination of drinking water bodies such as wells.

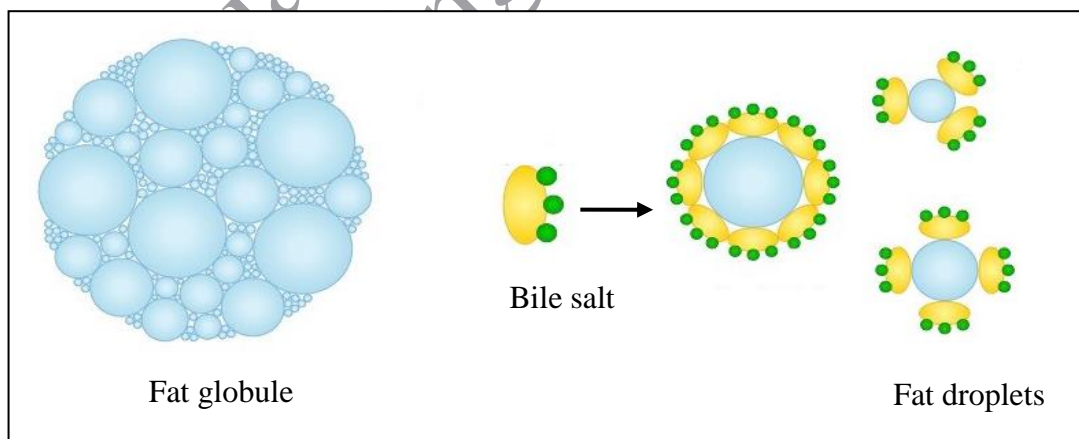
Use of water from these polluted wells can cause diseases in humans and animals because organic fertilisers

- A. are water-soluble and leach easily.
 - B. are rich in nitrates and phosphates.
 - C. contain pathogenic microorganisms.
 - D. contain minerals that cause algal blooms.
30. A patient complains of excessive bleeding from gums, nose and wounds. His/ her blood test report indicates deficiency of a vitamin that promotes blood clotting. The doctor recommends the patient to eat leafy green vegetables such as spinach, broccoli and cabbage.

Based on the patient's symptoms and doctor's recommendation, the vitamin deficient in the patient is identified as

- A. vitamin C.
 - B. vitamin A.
 - C. vitamin D.
 - D. vitamin K.
31. In humans, one of the benefits of dietary fibre is that it helps to reduce the risk of developing cardiovascular diseases because dietary fibres
- A. increases calcium absorption.
 - B. prevents and relieves constipation.
 - C. reduces the reabsorption of cholesterol.
 - D. remains undigested in the digestive system.

32. The given diagram represents the process that facilitates the digestion of fats in the human body.

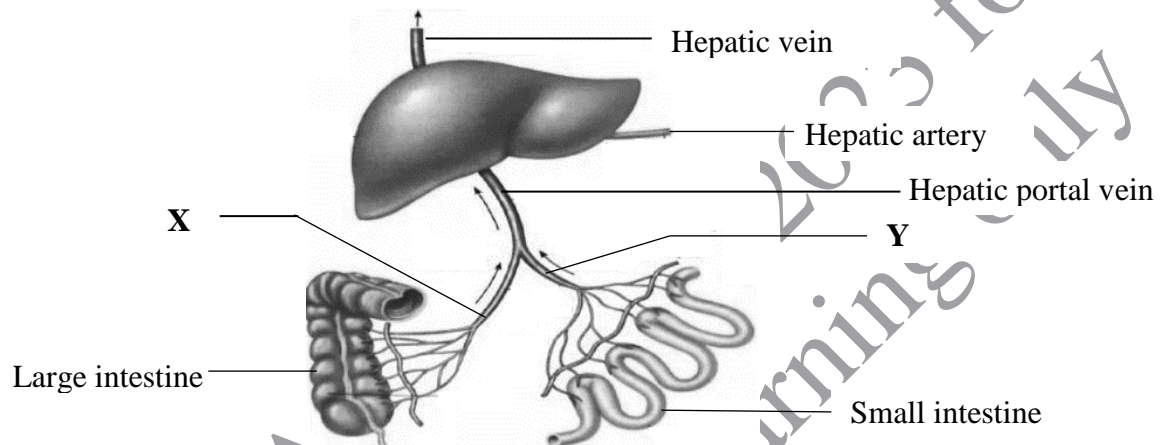


The structure where the given process takes place is

- A. villi.
- B. liver.
- C. stomach.
- D. duodenum.

33. In human stomach, the factor that makes salivary amylase dysfunctional is the
- acidic pH of stomach.
 - secretion of pepsinogen from the stomach wall.
 - churning and mixing action of stomach muscles.
 - formation of protection barrier by mucus in the stomach wall.
34. The given diagram shows the circulatory route of absorbed materials in the small intestine and large intestine.

(Note: Arrows (→) show flow of blood)











The substances MAINLY present in blood vessels X and Y respectively are

	X	Y
A	fibres and enzymes	fat soluble vitamins and water
B	glucose and amino acids	water and mineral salts
C	fat soluble vitamins and water	fibres and enzymes
D	water and mineral salts	glucose and amino acids

35. Transpiration in plants creates a pulling force that MAINLY causes
- rapid photolysis in leaves.
 - the synthesis of food in mesophyll cells.
 - transportation of water from roots to leaves.
 - translocation of glucose from leaves to roots.
36. The type of white blood cells that kills germs by producing antibodies is
- basophils.
 - monocytes.
 - neutrophils.
 - lymphocytes.

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37. Which of the following options indicates the blood group AB?

	Antigen on the Red Blood Cells	Antibody in the Plasma
A		 Anti-A
B		 Anti-B
C		None
D		  Anti-A Anti-B

38. A blood clot is found in the pulmonary trunk of heart in a patient.

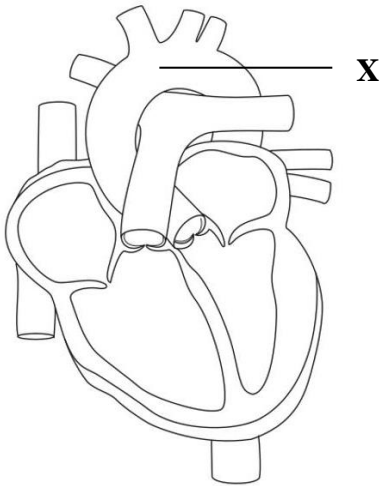
The presence of this clot in the pulmonary trunk will cause the blockage of blood circulation from

- A. lungs to left atrium.
- B. left ventricles to aorta.
- C. right ventricle to lungs.
- D. right atrium to right ventricle.

39. In contrast to the blood pressure in aorta, the blood pressure in the pulmonary arteries is lower because

- A. pulmonary arteries carry blood away from the heart.
- B. the distance between the lungs and the heart is short.
- C. the size of lumen of the pulmonary arteries is narrow.
- D. pulmonary arteries originate from the pulmonary arch.

40. The given diagram shows the longitudinal section of a human heart.



Which of the following options is CORRECT about the concentration of oxygen and blood pressure in the vessel labelled as X?

	Concentration of Oxygen	Blood Pressure
A	High	High
B	Low	High
C	High	Low
D	Low	Low

Please use this page for rough work

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