

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION 2008

Biology Paper I

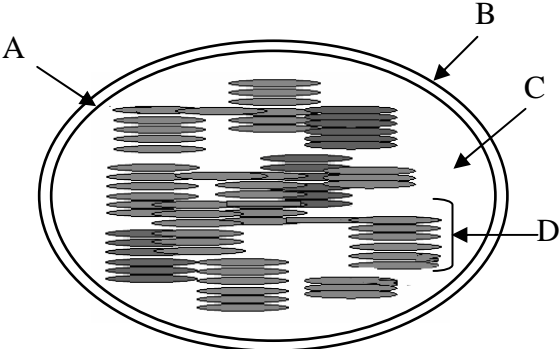
Time allowed: 35 minutes Marks 25

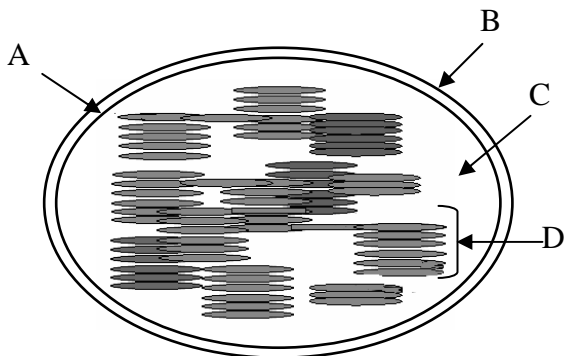
INSTRUCTIONS

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3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 25 only.
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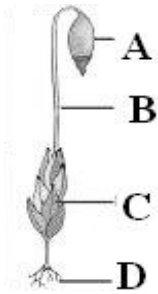
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1. Which of the following branches of biology studies the functions of different parts of an organism?
 - A. Histology
 - B. Physiology
 - C. Morphology
 - D. Cytology
2. Which of the following organisms is the cause of malaria?
 - A. E. coli
 - B. Entamoeba
 - C. Plasmodium
 - D. Trypanosoma
3. Ribosomes are the site for the production of
 - A. fats.
 - B. proteins.
 - C. glycerol.
 - D. carbohydrates.
4. Which of the following is the major component of a cell wall?
 - A. Wax
 - B. Chitin
 - C. Calcium
 - D. Cellulose
5. The diagram of a chloroplast below shows the outer-membrane, inner-membrane, granum and stroma. Which letter labels the stroma?
 



6. Which of the following is a prokaryotic cell?
 - A. Plant cell
 - B. Animal cell
 - C. Cyanobacteria
 - D. Fungi
7. In an onion cell, the $2n$ (diploid) number of chromosomes is 16. What will be the number of chromosomes in a daughter cell produced as a result of meiosis?
 - A. 08
 - B. 16
 - C. 18
 - D. 32
8. Binomial nomenclature was introduced by
 - A. Linnaeus.
 - B. Margulies.
 - C. Schwartz.
 - D. Lamarck.
9. Bacteria which live on dead organic matter are known as
 - A. parasitic bacteria.
 - B. saprophytic bacteria.
 - C. photosynthetic bacteria.
 - D. chemosynthetic bacteria.
10. Mushrooms are examples of
 - A. algae.
 - B. fungi.
 - C. mosses.
 - D. ferns.
11. In Chlamydomonas, which structure is responsible for storing carbohydrates?
 - A. Nucleus
 - B. Vacuole
 - C. Pyrenoid
 - D. Chlorophyllous cells

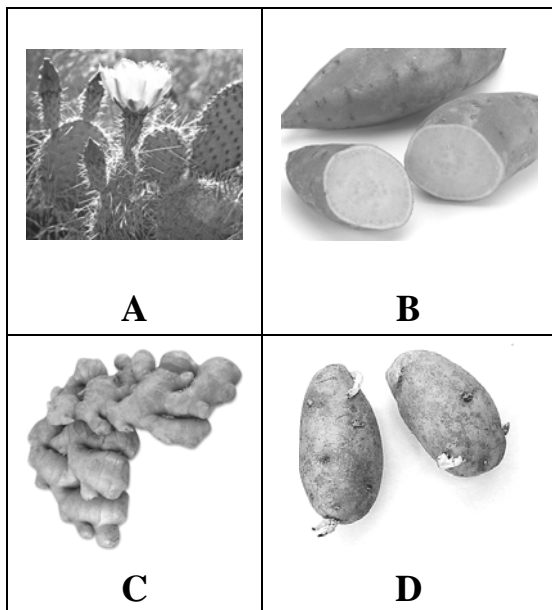
12. In the figure below which label represents the capsule?



13. In ferns the stem is usually underground and is called a

- A. bulb.
- B. tuber.
- C. rhizome.
- D. prothallus.

14. Which of the following figures is an example of a succulent stem?



15. *Ascaris* is a member of the phylum

- A. Annelida.
- B. Nematoda.
- C. Chordata.
- D. Arthropoda.

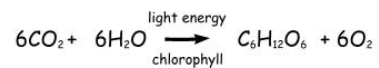
16. Animals that are considered to be closest to the chordates from an evolutionary point of view belong to the phylum

- A. Protozoa.
- B. Arthropoda.
- C. Mollusca.
- D. Echinodermata.

17. The process of hibernation or winter sleep is seen in the class

- A. pisces.
- B. amphibia.
- C. reptilia.
- D. aves.

18. Which of the following processes has been shown in the following equation?



- A. Respiration
- B. Photosynthesis
- C. Chemosynthesis
- D. Photorespiration

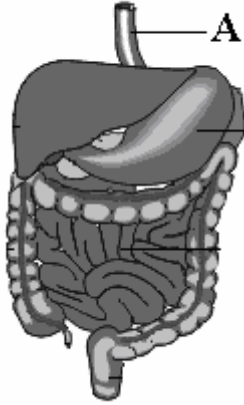
19. Which of the following groups of animals shows the process of regurgitation?

- A. Herbivores
- B. Carnivores
- C. Omnivores
- D. Frugivores

20. Which of the following disorders of the human gut is caused by a shortage of roughage?

- A. Scurvy
- B. Vomiting
- C. Diarrhoea
- D. Constipation

21. Which of the following organs is shown by label A?

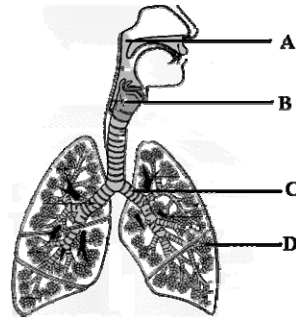


- A. Liver
B. Stomach
C. Oesophagus
D. Small intestine
22. Which of the following is the site of the aerobic respiration?
- A. Ribosome
B. Cytoplasm
C. Mitochondria
D. Golgi Bodies

23. In fish, gaseous exchange takes place through

- A. skin.
B. gills.
C. lungs
D. spiracles.

24. Identify the alveoli in the figure shown below.



25. What is the percentage of oxygen in the expired air?
- A. 04%
B. 16%
C. 21%
D. 79%

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION 2009

Biology Paper I

Time allowed: 35 minutes Marks 25

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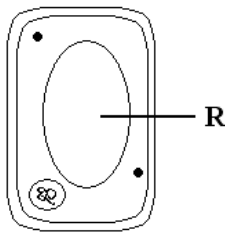
1. Which branch of biology tells us about the functions of different parts of an organism?

- A. Ecology
- B. Taxonomy
- C. Morphology
- D. Physiology

2. Which option shows the correct pathway of the biological method of study?

- A. Hypothesis → theory → experiment → observation
- B. Observation → hypothesis → experiment → theory
- C. Observation → theory → hypothesis → experiment
- D. Hypothesis → observation → experiment → theory

3. The diagram shows a plant cell.



What is the composition of the fluid found in organelle R?

- A. Sugars and lignin
- B. Amino acids and lignin
- C. Minerals and glycogen
- D. Minerals and amino acids

4. Which of the following is correct about rough and smooth endoplasmic reticulum?

	Rough Endoplasmic Reticulum	Smooth Endoplasmic Reticulum
A.	Granular	Granular
B.	Without ribosomes	With ribosomes
C.	Protein synthesis	Lipid synthesis
D.	Digestion	Transportation

5. Eukaryotic cells are similar to prokaryotic cells as they

- A. have a definite nucleus
- B. contain ribosomes in the cytoplasm
- C. are complex and large in size
- D. have cell walls made of cellulose

6. Which of the following processes involve meiosis?

- A. Increase in height
- B. Formation of sperm cells
- C. Growth of hair
- D. Repair of a wound

7. A plant tissue is found with the following characteristics:

- i. It can divide
- ii. It does not have intercellular spaces
- iii. It contains dense cytoplasm

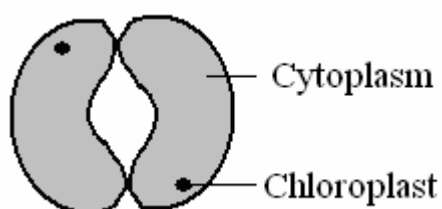
Identify the plant tissue.

- A. Ground tissue
- B. Epidermal tissue
- C. Mechanical tissue
- D. Meristematic tissue

8. Which of the following is a correct example of the type of muscle?

	Type of Muscle	Example
A.	Skeletal	Gut muscle
B.	Smooth	Thigh muscle
C.	Skeletal	Heart muscle
D.	Smooth	Inter coastal muscle

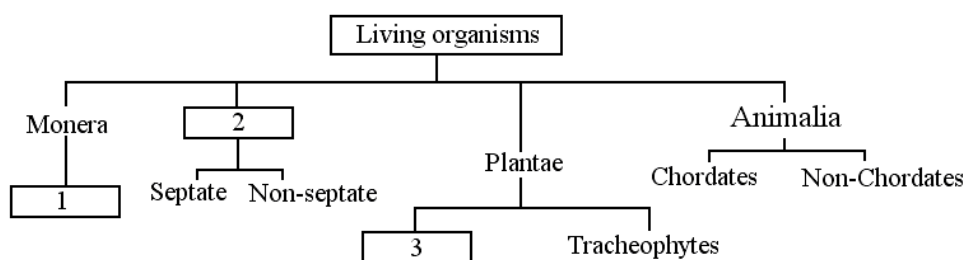
9. The diagram illustrates the structure of one type of plant cell.



What type of cell is it?

- A. Root hair cell
- B. Guard cell
- C. Epidermal cell
- D. Egg cell

10. The chart shows a classification of living organisms.



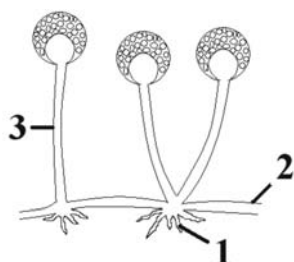
Which of the following correctly shows the missing information in the chart?

	1	2	3
A.	Bacteria	Protoctista	Bryophytes
B.	Protoctista	Bryophytes	Fungi
C.	Bacteria	Fungi	Bryophytes
D.	Protoctista	Bacteria	Fungi

11. Autotrophic bacteria are those which

- A. break complex substances into simpler ones
- B. need a living host for their survival
- C. convert light energy into chemical energy
- D. obtain food from dead organic matter

12. The diagram shows the structure of rhizopus.



Which option is correct?

	Stolon	Rhizoidal hyphae	Sporangiophore
A	1	2	3
B	1	3	2
C	3	2	1
D	2	1	3

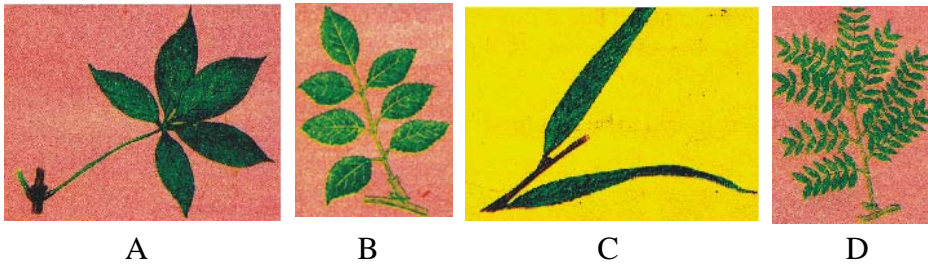
13. Which pairing of type of thallus with algae is correct?

	Types of thallus	Examples of algae
A.	Unicellular	Sargassum
B.	Filamentous	Chlorella
C.	Colonial	Volvox
D.	Filamentous	Chlamydomonas

14. In bryophytes, which part of the sporophyte body is anchored to the female branch?

- A. Capsule
- B. Seta
- C. Antherida
- D. Foot

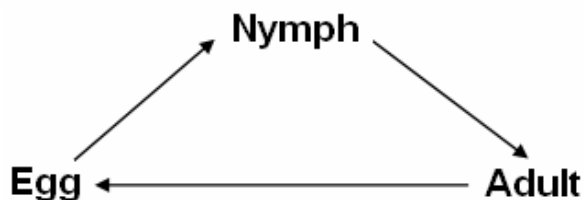
15. Which of the following is an example of a simple leaf?



16. Sycon appears green in colour due to

- A. chlorophyll.
- B. carbon dioxide.
- C. algae.
- D. toxic substances.

17. The following diagram shows the life cycle of an insect.



Which insect is likely to exhibit this life cycle?

- A. Cockroach
- B. Mosquito
- C. Butterfly
- D. Housefly

18. Which of the following is TRUE about amphibians?

- A. They are found in water only.
- B. The females give birth to babies.
- C. They have thick, dry skin.
- D. Their body temperature is not constant.

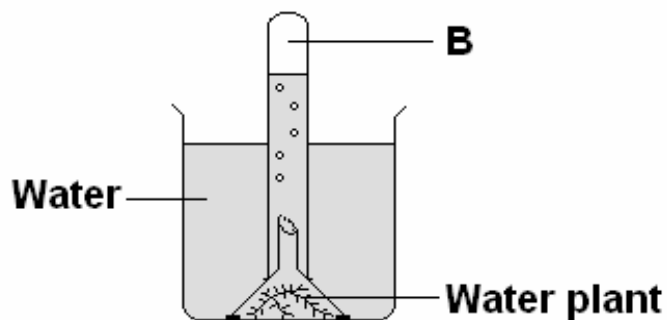
19. Which of the following pairs of animals are nocturnal?

- A. Hedgehog and pangolin
- B. Pangolin and squirrel
- C. Bat and squirrel
- D. Hedgehog and bat

20. Which of the following flora correctly pairs with its climatic region in Pakistan?

	Hilly areas	Plain areas	Fertile plains
A.	Juniper	Kikar	Eucalyptus
B.	Kikar	Bamboo	Juniper
C.	Bamboo	Eucalyptus	Juniper
D.	Kikar	Bamboo	Eucalyptus

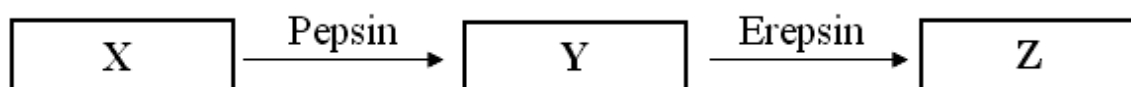
21. The diagram shows an investigation into the effect of light intensity on the rate of photosynthesis.



Which gas is collected in region **B**?

- A. Oxygen
- B. Carbon dioxide
- C. Nitrogen
- D. Hydrogen

22. The diagram shows some stages of digestion.



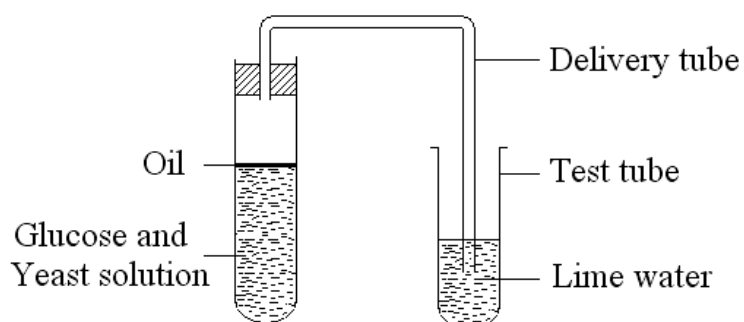
What are substances X, Y and Z?

	X	Y	Z
A.	Proteins	Amino acids	Poly peptides
B.	Poly peptides	Proteins	Amino acids
C.	Proteins	Poly peptides	Amino acids
D.	Poly peptides	Amino acids	Proteins

23. Which of the following is an example of physical digestion?

- A. Release of saliva in mouth
- B. Chewing of food
- C. Conversion of starch to glucose
- D. Removal of feces

24. The diagram shows the set up to demonstrate the process of anaerobic respiration in yeast cells.



With the liberation of CO₂, what other end product is left in the test tube?

- A. Ethanol
- B. Oxygen
- C. Sugar
- D. Lactic acid

PLEASE TURN OVER THE PAGE

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CLASS IX EXAMINATION 2010

Biology Paper I

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1. Jelly fish and Hydra are placed in the same phylum i.e. Coelenterata by
 - A. ecologists.
 - B. biochemists.
 - C. taxonomists.
 - D. physiologists.

2. The bending and straightening of a human arm follows the principle of leverage. Which branch of science seems to be related to biology here?
 - A. Physics
 - B. Economics
 - C. Geography
 - D. Mathematics

3. Which of the following measures controls the increasing rate of pollution?
 - A. Introducing new fishing methods
 - B. Selective breeding of animals
 - C. Controlled use of fertilizers
 - D. Preventing abuses of drugs

4. When a hypothesis is developed, it is
 - A. directly tested through experiments.
 - B. universally accepted by scientists.
 - C. proved through gathered observations.
 - D. used to form deductions.

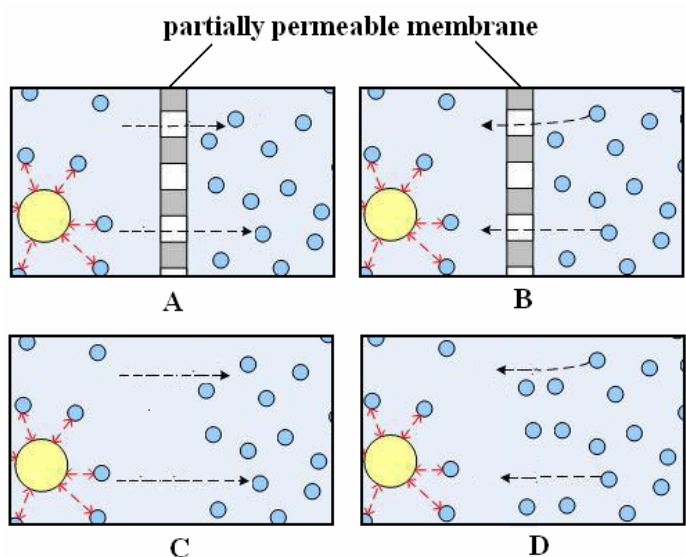
5. According to the five kingdom classification system a cell with cellulose cell wall can be placed in
 - A. Plantae and Animalia.
 - B. Animalia and Fungi.
 - C. Protista and Plantae.
 - D. Fungi and Protista.

6. Which of the following is NOT a characteristic feature of fungi?
 - A. Cell wall is made up of lignin
 - B. Absorptive mode of nutrition
 - C. Body is composed of hyphae
 - D. Act as decomposers in nature

7. Which is the correct representation of naming an organism according to binomial nomenclature?
 - A. Amoeba Proteus
 - B. Amoeba proteus
 - C. amoeba proteus
 - D. amoeba Proteus

8. Lysosomes are most abundant in those cells which perform phagocytic activity. Which of the following cells has more lysosomes?
 - A. Nerve cell
 - B. Epithelial cell
 - C. White blood cell
 - D. Islets of Langerhans

9. Which of the following diagrams best represents the movement of molecules in osmosis?



10. An animal cell is placed in 20% sucrose solution. What will happen to the cell after some time?

- A. Remain unchanged
- B. Decrease in size
- C. Increase in size
- D. Burst

11. A cell has lost its ability to store secretions and convert them into finished products.

In which of the following structures is this defect located?

- A. Golgi bodies
- B. Mitochondria
- C. Cell membrane
- D. Endoplasmic reticulum

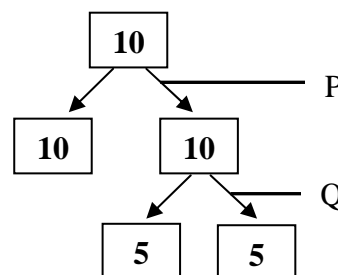
12. During meiosis the process of crossing over takes place in

- A. prophase I.
- B. prophase II.
- C. metaphase I.
- D. metaphase II.

13. Which of the following is an example of apoptosis?

- A. Destruction of cancerous cells
- B. Death of cells by snake venom
- C. Premature death of muscle cells
- D. Degeneration of red blood cells after 120 days

14. The diagram shows cell division.



Identify the types of cell division taking place at P and Q.

	P	Q
A	Mitosis	Meiosis
B	Mitosis	Mitosis
C	Meiosis	Mitosis
D	Meiosis	Meiosis

15. ATP is known as a “high energy” compound because

- A. its one molecule consists of four phosphate groups.
- B. its one molecule produces 4.5 kilocalories.
- C. its phosphate groups are easily removed.
- D. it has strong hydrogen bonding.

16. All the oxygen released during photosynthesis comes from the

- A. conversion of starch into glucose.
- B. splitting of water molecules.
- C. reduction of carbon dioxide.
- D. break down of glucose.

17. Which of the following features is NOT an adaptation of leaves to perform photosynthesis?

- A. Larger number of stomata
- B. Large leaf surface area
- C. Waxy cuticle on the leaf
- D. High concentration of chlorophyll

18. What happens to an enzyme after it has reacted with a substrate?
- A. It is denatured.
 - B. It remains unchanged.
 - C. It is broken into products.
 - D. It requires a co-factor for next reaction.

19. Which of the following is TRUE about anaerobic respiration in humans?

	SITE	END PRODUCT
A	Mitochondria	Lactic acid
B	Mitochondria	Ethanol
C	Cytoplasm	Ethanol
D	Cytoplasm	Lactic acid

20. Which of the following describes the function of proteins in the body?
- A. Solvent for some vitamins
 - B. Instant energy source
 - C. Insulating material
 - D. Growth and repair

21. What should a person suffering with bleeding gums and poor healing of wounds include in his diet?
- A. Dairy products
 - B. Citrus fruits
 - C. Red meat
 - D. Cereals

22. Which of the following characteristics indicate phylum Annelida?

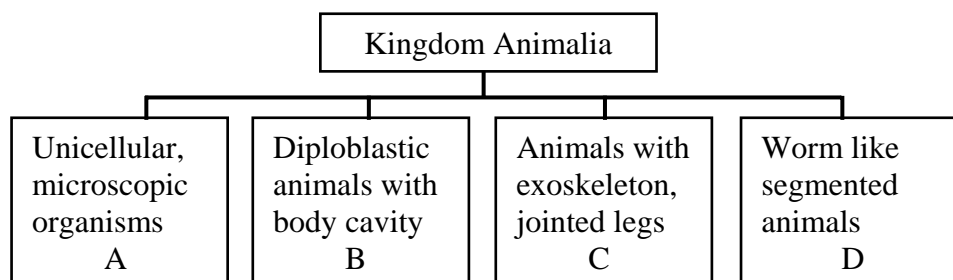
23. The movement of water from roots to all parts of the plant is carried out by all of the following EXCEPT
- A. root pressure.
 - B. capillary action.
 - C. transpiration pull.
 - D. mass flow mechanism.

24. Which statement is FALSE about haemoglobin?

- A. It transports oxygen.
- B. It is found in red blood cells.
- C. Its deficiency causes leukaemia.
- D. It consists of iron and proteins.

25. The blood vessel carrying deoxygenated blood to the lungs is the

- A. pulmonary artery.
- B. pulmonary vein.
- C. coronary artery.
- D. coronary vein.



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CLASS IX EXAMINATION

MAY 2011

Biology Paper I

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1. The role of fungi in the production of various antibiotics is studied in
 - A. taxonomy.
 - B. morphology.
 - C. paleontology.
 - D. pharmacology.

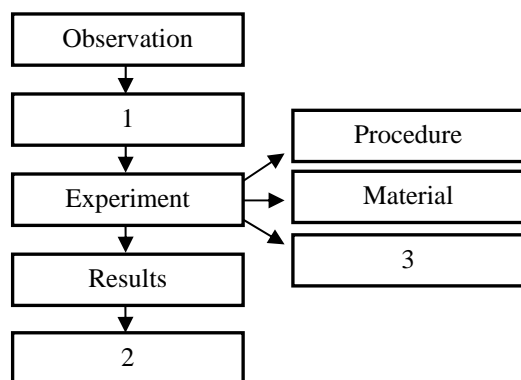
2. The production of insulin on a large scale through bacteria has made insulin inexpensive and easily available to diabetic patients.

The above information shows the relationship of biology with

- A. mathematics.
 - B. economics.
 - C. geography.
 - D. physics.

3. Which of the following is the correct order of levels of organization in plants from simple to complex?
 - A. Xylem, stem, chloroplast
 - B. Chloroplast, xylem, stem
 - C. Xylem, chloroplast, stem
 - D. Chloroplast, stem, xylem

4. In solving a biological problem through a scientific method a number of steps are involved, some of these are shown below.

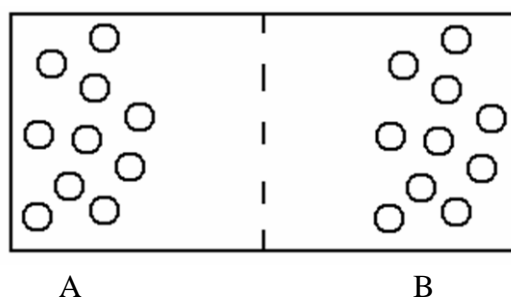


Which of the following correctly identifies 1, 2 and 3?

	1	2	3
A	Hypothesis	Precautions	Conclusion
B	Conclusion	Precautions	Hypothesis
C	Hypothesis	Conclusion	Precautions
D	Conclusion	Hypothesis	Precautions

5. Which of the following characteristics of algae make them similar to fungi?
- A. Unicellular reproductive organs
 - B. Capability of photosynthesis
 - C. Non-septate hyphae
 - D. Cellulose cell wall
6. Which of the following is correct about pteridophytes and spermatophytes?
- A. Vascular plants
 - B. Seed producing
 - C. Thallus body
 - D. Gametophyte dominant
7. The animals included in class Reptilia and Amphibia are in a way similar because both
- A. live in water only.
 - B. are cold blooded animals.
 - C. have thick and dry skin.
 - D. lay their eggs in water.
8. An invertebrate is found with the following characteristics.
- Lives in sea water only.
 - Body is covered with spines.
 - Internal skeleton is present.
- In which phylum will it be placed?
- A. Mollusca
 - B. Nematoda
 - C. Coelenterata
 - D. Echinodermata
9. A long protoplasmic extension is found in
- A. mesophyll cells.
 - B. white blood cells.
 - C. xylem vessels.
 - D. root hair cells.

10. The diagram shows the molecules of two different substances A and B.



Which option is correct about the phenomenon shown above?

	Difference in concentration	Movement of molecules
A	Zero	No movement
B	Higher at A	Towards B
C	Higher at B	Towards A
D	Zero	From A to B and B to A

11. Two different types of cells are placed in a hypotonic solution. Which of the following options is correct about the condition of these cells after some time?

	Red blood cells	Guard cells
A	Flaccid	Turgid
B	Turgid	Flaccid
C	Turgid	Turgid
D	Flaccid	Flaccid

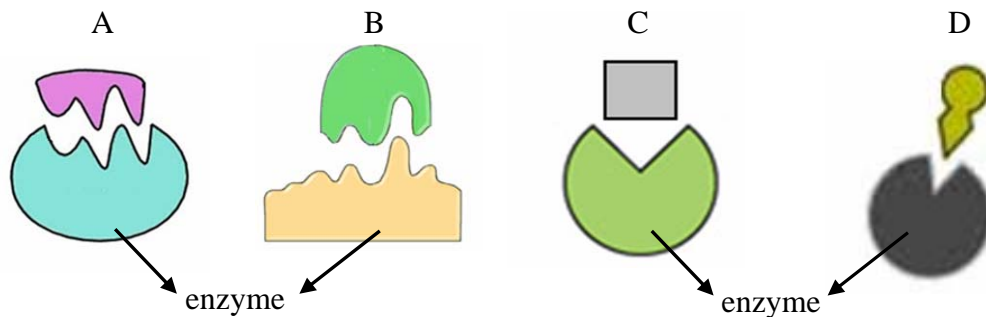
12. Which of the following correctly identifies the examples of soft and hard connective tissues?

	Soft Connective Tissue	Hard Connective Tissue
A	Tendon	Cartilage
B	Cartilage	Bone
C	Fatty tissue	Tendon
D	Bone	Fatty tissue

13. Which phases of the cell cycle are collectively called interphase?

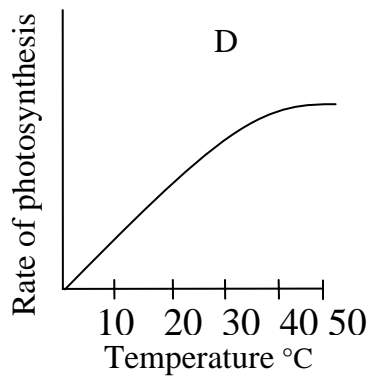
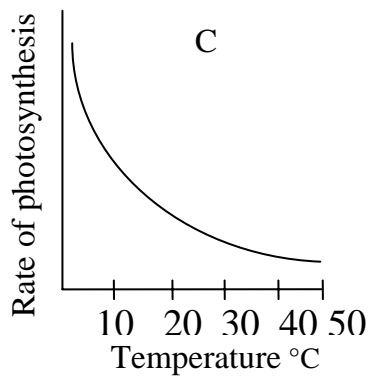
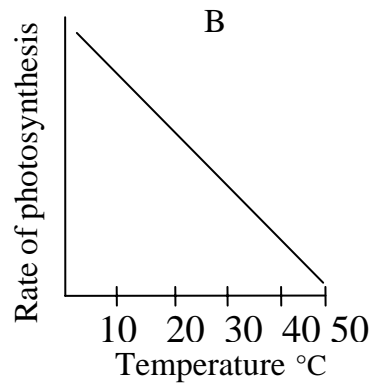
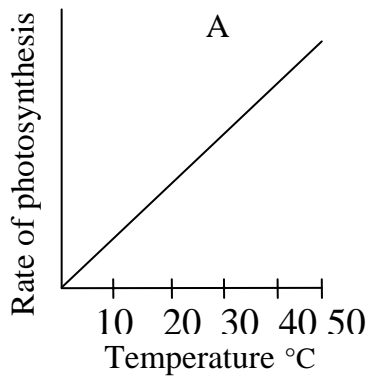
- A. G_1 , G_2 and M
- B. S, G_2 and M
- C. G_1 , G_2 and S
- D. G_1 , M and S

14. The original number of chromosomes in daughter cells is maintained when the parent chromosomes undergo
- A. crossing over.
 - B. condensation.
 - C. cytokinesis.
 - D. replication.
15. All of the following are advantages of mitosis EXCEPT
- A. asexual reproduction.
 - B. genetic variation.
 - C. cell replacement.
 - D. genetic stability.
16. The conversion of insoluble fibrinogen into fibrin threads is carried out by enzyme thrombin which works in the presence of vitamin K only. Here, vitamin K is acting as a/an
- A. substrate.
 - B. active site.
 - C. co-factor.
 - D. inhibitor.
17. Which diagram shows denaturation of an enzyme?



18. The dark stage of photosynthesis is called dark because
- A. it is named after the scientist who discovered it.
 - B. it requires a dark green pigment, chlorophyll.
 - C. it is independent of light energy.
 - D. it takes place only at night.

19. Which of the following graphs shows the effect of temperature on the rate of photosynthesis?



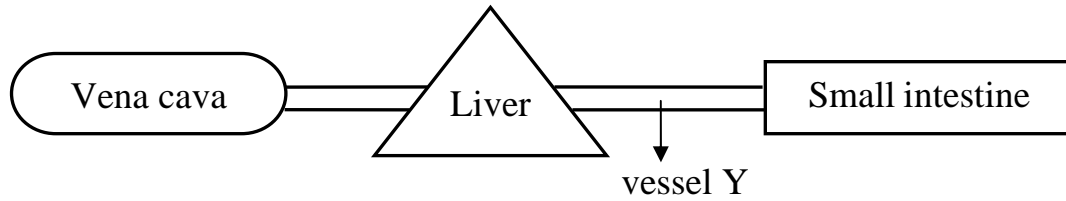
20. During aerobic respiration glucose is

- A. hydrogenated.
- B. hydrolysed.
- C. oxidized.
- D. reduced.

21. The polypeptides are completely digested into amino acids by the enzyme

- A. amylase.
- B. erepsin.
- C. catalase.
- D. lipase.

22. Which of the following is correct about vessel Y?



	Identification of Y	Composition of fluid inside Y
A	Hepatic vein	Glucose
B	Hepatic vein	Glycogen
C	Hepatic portal vein	Glucose
D	Hepatic portal vein	Glycogen

23. Which of the following identifies xylem vessels?

	Transport	Support	Absorption
A	✓	✓	✗
B	✓	✓	✓
C	✓	✗	✗
D	✗	✓	✓

24. White blood cells and platelets are similar in a way that both

- A. are produced in the liver.
- B. live for 120 days in blood.
- C. are smaller than red blood cells.
- D. protect the body against bacteria.

25. A person with blood group A can donate blood to

- A. A only.
- B. A and AB.
- C. AB and O.
- D. A and O.

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CLASS IX EXAMINATION

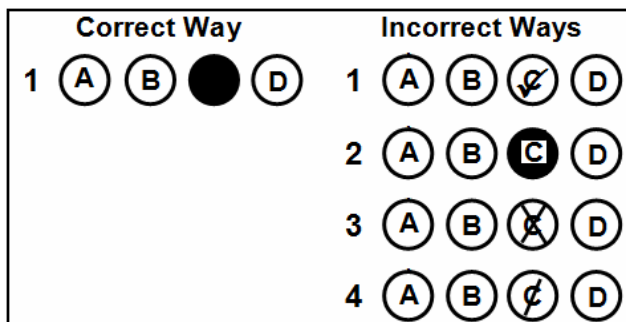
MAY 2012

Biology Paper I

Time allowed: 35 minutes Marks 25

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.
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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.

1. Which of the following is the correct sequence of the level of organisation of life from simple to complex?
 - A. Hydrogen, ribosomes, protein, nervous tissue
 - B. Hydrogen, protein, ribosomes, nervous tissue
 - C. Protein, hydrogen, nervous tissue, ribosomes
 - D. Ribosomes, nervous tissue, hydrogen, protein

2. Which of the following measures controls the increasing rate of pollution?
 - A. Introducing new fishing methods
 - B. Selective breeding of animals
 - C. Controlled use of fertilizers
 - D. Preventing abuses of drugs

3. Mr. Anjum has recently developed skin infection and the doctor has recommended him tissue examination.

Which of the following branches of biology would deal with such a test?

 - A. Morphology
 - B. Histology
 - C. Physiology
 - D. Parasitology

4. A person has kept an indoor plant on his terrace and soon finds it wilting. Which step of the biological research method has he applied?
 - A. Observation
 - B. Hypothesis
 - C. Deduction
 - D. Experiment

5. Which of the following is an example of qualitative observation?
 - A. A litre of water is heavier than a litre of ethanol.
 - B. The boiling point of ethanol is 78°C.
 - C. 70% patients are suffering from malaria.
 - D. Five students are absent from the class.

6. Archaeobacteria and fungi are similar in a way as both are
 - A. prokaryotes.
 - B. heterotrophic.
 - C. multicellular.
 - D. acellular.

7. Which of the following is correct about mushrooms?

	Eukaryotes	Unicellular	Autotroph
A.	×	✓	×
B.	✓	×	✓
C.	✓	×	×
D.	×	✓	✓

8. The process of deforestation results in

- A. loss of habitat.
- B. decrease in pollution.
- C. increase in transpiration.
- D. reduction of carbon dioxide in air.

9. One of the important terms used in microscopy is ‘magnification’ which is the

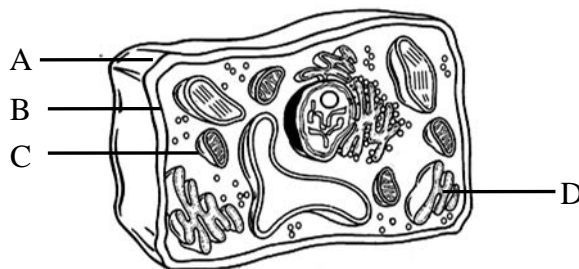
- A. measure of the clarity of an image.
- B. increase in the apparent size of an object.
- C. minimum distance at which two objects are seen.
- D. measure of visible light passing through a specimen.

10. Which of the following is NOT a postulate of the cell theory presented by Schleiden and Schwann?

- A. All organisms are made up of cells.
- B. New cells are formed from pre-existing cells.
- C. Substances found inside the cells are called protoplasm.
- D. Cell is the structural and functional unit of living things.

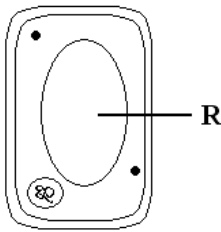
11. The diagram shows a plant cell.

Which of the labelled structures is responsible to control movement of substances across the cell?



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12. The diagram shows a plant cell.



What is the composition of the fluid found in organelle R?

- A. Sugars and lignin
- B. Amino acids and lignin
- C. Minerals and glycogen
- D. Minerals and amino acids

13. A plant tissue is found with the following characteristics.

- I. Found in young herbaceous stems
- II. Made of uneven thick cell wall
- III. Provides flexibility to the plant

Which of the following plant tissues is it?

- A. Collenchyma
- B. Sclerenchyma
- C. Parenchyma
- D. Vascular bundle

14. Which of the following is correct about the duration and rate of metabolism of mitotic phase and interphase?

	Mitotic Phase	Interphase
A.	Short with high metabolic rate	Short with slow metabolic rate
B.	Long with high metabolic rate	Long with slow metabolic rate
C.	Short with slow metabolic rate	Long with high metabolic rate
D.	Long with slow metabolic rate	Short with high metabolic rate

15. The diagram shows an event of prophase I during meiosis.



Which of the following describes the process shown above?

- A. Synapsis between sister chromatids
- B. Synapsis between non-sister chromatids
- C. Crossing over between sister chromatids
- D. Crossing over between non-sister chromatids

16. Which of the following is correct about the nature and effect of an enzyme on the rate of a chemical reaction?

	Nature of Enzyme	Rate of Chemical Reaction
A.	Protein	Decreases
B.	Lipid	Decreases
C.	Protein	Increases
D.	Lipid	Increases

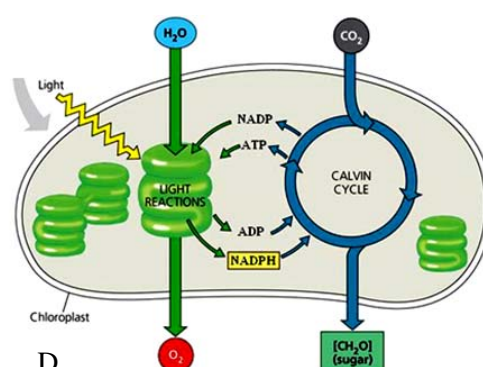
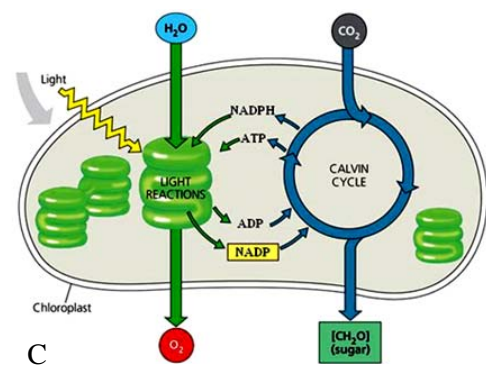
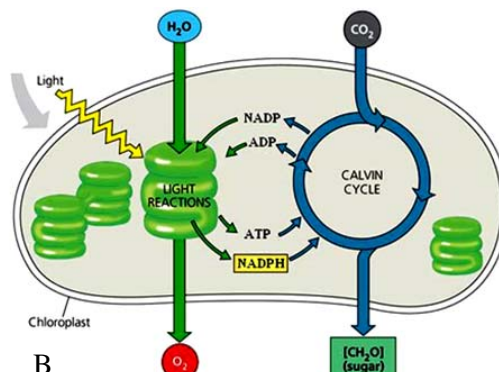
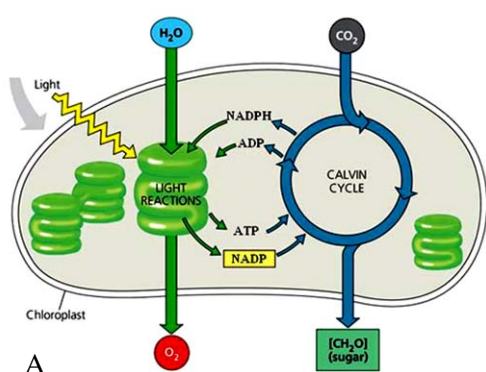
17. What happens to an enzyme after it has reacted with a substrate?

- A. It is denatured.
- B. It remains unchanged.
- C. It is broken into products.
- D. It requires a co-factor for next reaction.

18. Which of the following is the final step of cellular respiration?

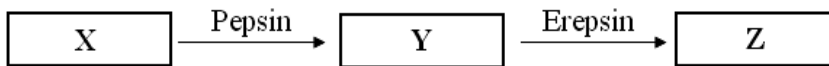
- A. Formation of pyruvic acid
- B. Synthesis of ATP molecules
- C. Conversion of NAD into NADH
- D. Breakdown of carbon dioxide

19. Which of the following diagrams correctly represents the energy molecules of light and dark reactions of photosynthesis?



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20. Aerobic and anaerobic respiration are similar in a way as both
- make use of oxygen.
 - take place in mitochondria.
 - release water.
 - generate energy.
21. Which of the following elements are absorbed from the soil by the plants?
- Carbon and hydrogen
 - Sulphur and oxygen
 - Hydrogen and nitrogen
 - Nitrogen and oxygen
22. The diagram shows some stages of digestion.



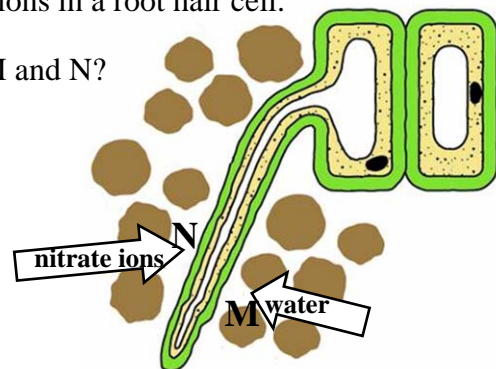
What are substances X, Y and Z?

	X	Y	Z
A.	Proteins	Amino acids	Poly peptides
B.	Poly peptides	Proteins	Amino acids
C.	Proteins	Poly peptides	Amino acids
D.	Poly peptides	Amino acids	Proteins

23. The diagram shows the absorption of water and nitrate ions in a root hair cell.

Which of the following correctly identifies processes M and N?

	M	N
A.	Osmosis	Osmosis
B.	Osmosis	Active transport
C.	Active transport	Active transport
D.	Active transport	Osmosis



24. Which of the following components is found in the smallest amount in plasma?
- Water
 - Oxygen
 - Salts
 - Proteins
25. The blood vessel which collects blood from the posterior parts of the body and brings it to the heart is called
- dorsal aorta.
 - femoral vein.
 - hepatic artery.
 - inferior vena cava.

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CLASS IX EXAMINATION

MAY 2013

Biology Paper I

Time: 35 minutes Marks: 25

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.
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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)

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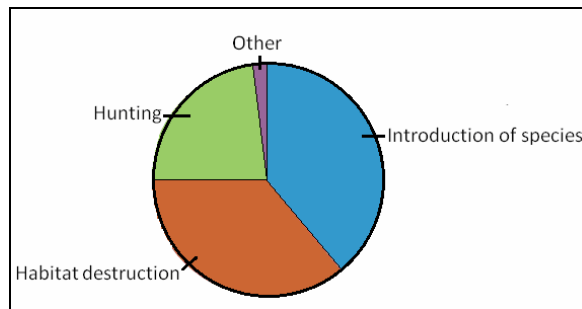
1. Which of the following branches of biology deals with the study of mitosis and meiosis?
- A. Physiology
 - B. Cell biology
 - C. Taxonomy
 - D. Histology

2. For an experiment, a biology student is given a potato cube. He has to find out its surface area to volume ratio.

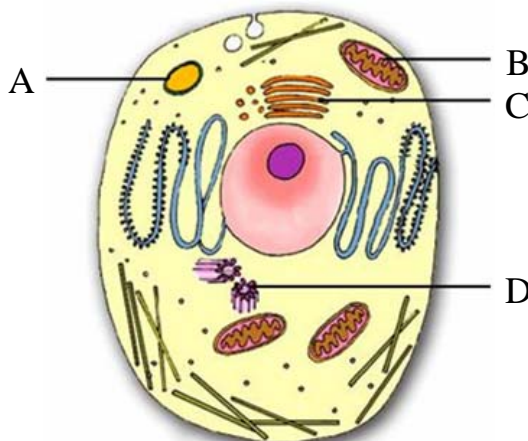
This case reveals the relationship of biology to

- A. chemistry.
 - B. geography.
 - C. economics.
 - D. mathematics.
3. According to the scientific method of solving a biological problem, which of the following can not be opposed or rejected?
- A. Mass-flow hypothesis
 - B. Mendel's laws of inheritance
 - C. Darwin's theory of evolution
 - D. A student's daily observations
4. Which of the following is a characteristic of a hypothesis?
- A. It should be a prediction of what will be observed.
 - B. It should be based on the idea tested earlier.
 - C. It should be written using complex words.
 - D. It should be a very specific statement.
5. Which of the following is NOT a reason for the classification of living organisms?
- A. To highlight similarities among living organisms
 - B. To bring to light differences among living organisms
 - C. To count the total number of living organisms
 - D. To explore evolutionary relationships among living organisms
6. If you have to divide five kingdoms of living organisms into two distinguishing groups, these can be
- A. prokaryotes and eukaryotes.
 - B. autotrophs and heterotrophs.
 - C. plants and animals.
 - D. cellular and acellular.

7. According to the pie chart provided, which of the following measures is the most important to conserve the living organisms?

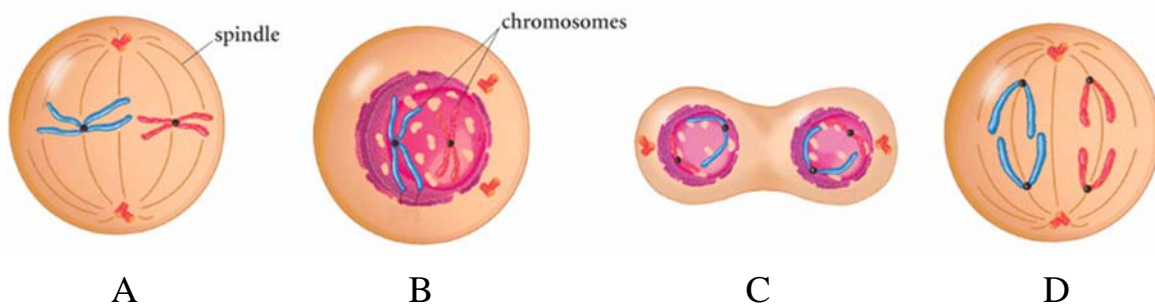


- A. Climatic conditions should be stabilized.
B. Air pollution should be reduced.
C. Cutting of forests should be minimized.
D. Non-native species should be brought in.
8. Which of the labelled parts of an animal cell is responsible for converting molecules, coming from rough endoplasmic reticulum, into furnished products?



9. In the absence of which of the following organelles is a cell unable to breakdown food and waste material?
- A. Golgi apparatus
B. Lysosomes
C. Endoplasmic reticulum
D. Ribosomes

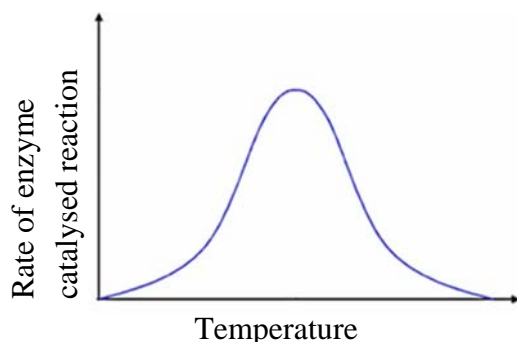
10. Which of the following features of a leaf allows carbon dioxide to reach the inner cells of the leaf rapidly?
- A. Thin Lamina
 - B. More chloroplast
 - C. Lignified xylem vessels
 - D. Large surface
11. Facilitated diffusion takes place through transport proteins. These transport proteins are present in the
- A. cell wall.
 - B. cytoplasm.
 - C. cell membrane.
 - D. nuclear membrane.
12. Which of the following is CORRECT about the cell cycle?
- A. There are three main phases of the cell cycle.
 - B. S phase takes place before G1 phase.
 - C. It takes place in prokaryotic cells only.
 - D. Mitotic phase is shorter than interphase.
13. Skin cells do NOT enter G₀ phase of the cell cycle as
- A. they lack G1 phase.
 - B. they keep on dividing.
 - C. their supply of proteins is stopped.
 - D. their nuclei degenerate forever.
14. Which of the following diagrams shows metaphase of mitosis?



15. Which of the following is CORRECT about the nature of chromosomes and pairing of chromatids during crossing over in meiosis?

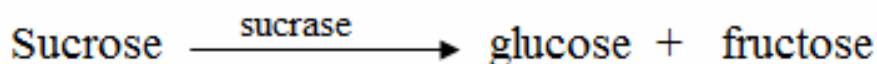
	Nature of Chromosomes	Pairing of Chromatids
A.	Homologous	Non-sister
B.	Homologous	Sister
C.	Non-homologous	Non-sister
D.	Non-homologous	Sister

16. The diagram shows the effect of temperature on an enzyme catalysed reaction.



All of the following statements can be verified through the given graph EXCEPT that

- A. enzymes can be denatured.
 - B. enzymes are protein in nature.
 - C. enzymes are temperature sensitive.
 - D. there is an optimum temperature for every enzyme.
17. In the given reaction, the active site is present in



- A. sucrose.
 - B. sucrase.
 - C. glucose.
 - D. fructose.
18. When a molecule of adenosine diphosphate (ADP) reacts with water it gives
- A. adenosine triphosphate and inorganic phosphate.
 - B. adenosine monophosphate and inorganic phosphate.
 - C. adenosine triphosphate and hydrogen gas.
 - D. adenosine monophosphate and hydrogen gas.

19. Which of the following chemical equations CORRECTLY shows the process of anaerobic respiration in man?

- A. Glucose \rightarrow Ethanol + CO₂ + Energy
- B. Glucose \rightarrow Ethanol + Energy
- C. Glucose \rightarrow Lactic acid + CO₂ + Energy
- D. Glucose \rightarrow Lactic acid + Energy

20. Which of the following may happen in a plant if it is grown without magnesium?

- A. Increased water loss
- B. Slow sugar transport
- C. No chlorophyll formation
- D. Deactivation of enzymes

21. A patient, besides taking basic nutrients, takes the following food items in his diet.

Carrots	Fish	Eggs
---------	------	------



Through this diet, he is overcoming the deficiency of

- A. vitamin E.
- B. vitamin D.
- C. vitamin C.
- D. vitamin A.

22. Which of the following indicates the movement of larynx and state of trachea during the swallowing of food?

	Movement of Larynx	Passage to Trachea
A.	Up	Open
B.	Up	Closed
C.	Down	Open
D.	Down	Closed

23. In plants, water is carried upward by the xylem vessels through transpiration pull.

Which of the following transports water from the roots to the leaves?

- A. Removal of water from the leaves
- B. Repulsion between water molecules
- C. Discontinuous cell wall
- D. Large diameter of xylem vessels

24. Which of the following is CORRECT about eosinophils?

	Granular Cytoplasm	Lobed Nucleus	Form in Lymph Nodes
A.	✓	✓	×
B.	×	✓	✓
C.	✓	×	✓
D.	×	×	✓

25. In humans, the heart is considered as a ‘double pump’ because it

- A. consists of auricles and ventricles.
- B. circulates oxygenated and deoxygenated blood.
- C. prevents backflow of blood by two valves.
- D. possesses arteries and veins.

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CLASS IX EXAMINATION

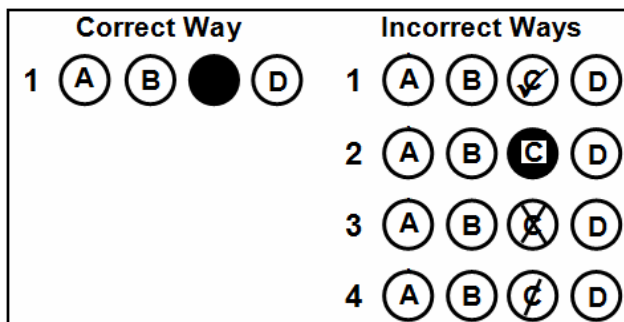
MAY 2014

Biology Paper I

Time: 35 minutes Marks: 25

INSTRUCTIONS

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1. A group of researchers worked on the availability of a less expensive fuel for cars. They came up with the discovery of a gas produced by micro-organisms. To which of the following branches of biology is their research related?

- A. Pharmacology
- B. Biotechnology
- C. Entomology
- D. Taxonomy

2. A student working on World Heart Day found out the average age at which most people are diagnosed with heart disease.

The study shows the link of biology with

- A. mathematics.
- B. physics.
- C. economics.
- D. geography.

3. The diversity of living organisms present on the earth benefits us in all of the following ways EXCEPT

- A. maintaining ecosystems.
- B. recycling nutrients.
- C. reducing drug variety.
- D. producing more food.

4. In which of the following ways do fungi resemble plants?

- A. They are heterotrophs.
- B. They possess cell wall.
- C. They are prokaryotes.
- D. They release digestive enzymes.

5. According to Five Kingdom Classification System bacteria are not placed in Kingdom Plantae because

- A. their cell wall contains chitin.
- B. they lack a nuclear envelope.
- C. they are multicellular.
- D. they prepare their own food.

6. Which of the following CORRECTLY identifies the organelle shown in the diagram?

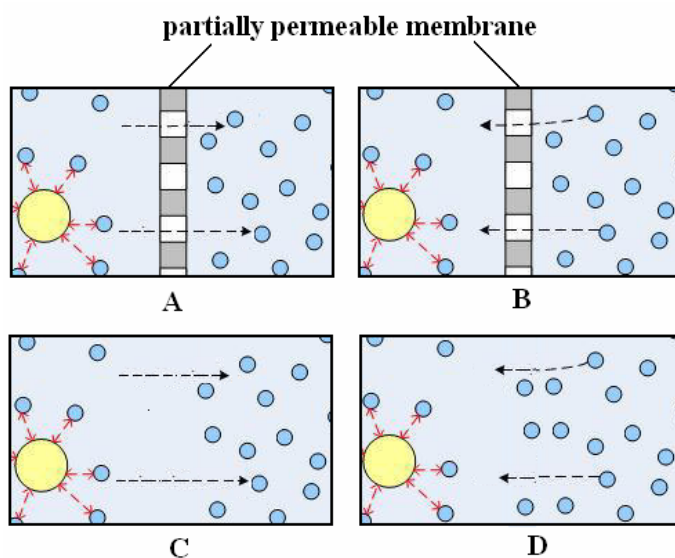
- A. Mitochondria
- B. Endoplasmic reticulum
- C. Ribosome
- D. Chloroplast



7. Lysosomes are most abundant in those cells which perform phagocytic activity. Which of the following cells has more lysosomes?
- A. Nerve cell
 - B. Epithelial cell
 - C. Islets of Langerhans
 - D. White blood cell
8. A type of animal tissue has the following characteristics.
- i. It is found around kidneys.
 - ii. It contains fat droplets.
 - iii. It prevents heat loss.

The given description identifies

- A. cartilage.
 - B. blood.
 - C. adipose tissue.
 - D. fibrous connective tissue.
9. Which of the following diagrams best represents the movement of molecules in osmosis?



10. Quantitative observations are considered more reliable than qualitative observations as quantitative can be
- A. recorded.
 - B. measured.
 - C. tested.
 - D. questioned.

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11. 'When heating a test tube, always point the mouth of the test tube away from you.'
- The above statement represents
- A. an observation.
 - B. a hypothesis.
 - C. a safety measure.
 - D. a conclusion.
12. Two chromosomes together make up a homologous pair where both chromosomes have
- A. different genes at different positions.
 - B. different genes at the same position.
 - C. same genes at different positions.
 - D. same genes at the same position.
13. Which of the following processes involves meiosis?
- A. Increase in height
 - B. Repair of a wound
 - C. Growth of hair
 - D. Formation of sperm cells
14. Which phases of the cell cycle are collectively called interphase?
- A. G₁, G₂ and M
 - B. G₁, G₂ and S
 - C. S, G₂ and M
 - D. G₁, M and S
15. During the development of brain, our body creates millions of cells, more than required. Those cells which do not form synaptic connections undergo death so that the remaining cells can function well. This is an example of
- A. necrosis.
 - B. plasmolysis.
 - C. synapsis.
 - D. apoptosis.
16. Which of the following is an example of anabolism?
- A. Conversion of proteins into amino acids
 - B. Increase in mass of the muscles
 - C. Burning down of fat deposits
 - D. Oxidation of organic substances

17. 'Amylase breaks down starch and lipase breaks down lipids.'

The above statement about enzymes points out that enzymes are

- A. very specific in nature.
 - B. required in small amounts.
 - C. sensitive to high temperature.
 - D. dependent on co-factor.
18. Which of the following features is NOT an adaptation of leaves to perform photosynthesis?
- A. Larger number of stomata
 - B. Waxy cuticle on the leaf
 - C. Large leaf surface area
 - D. High concentration of chlorophyll
19. During strenuous exercises muscle cells carry out anaerobic respiration to meet energy demand. Afterwards, during rest, the lactic acid produced is
- A. transported to the liver.
 - B. given off through lungs.
 - C. removed from the body in urine.
 - D. stored in the muscles permanently.
20. Look at the given food items carefully.



The food items shown above are main sources of

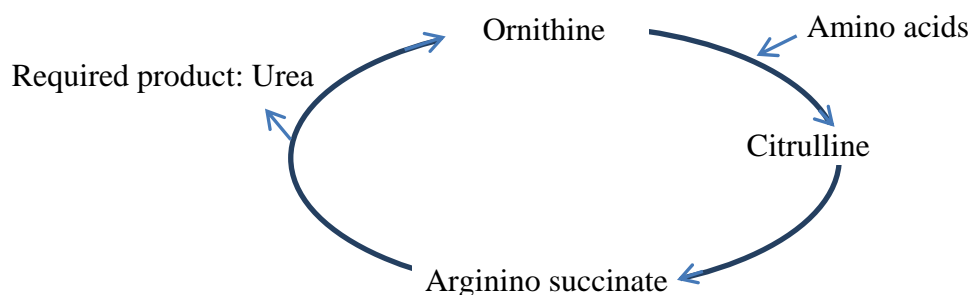
- A. proteins.
- B. fibre.
- C. fats.
- D. carbohydrates.

21. The table below shows estimated energy requirements (in kilocalories) according to age, gender and activity.

Gender	Age (years)	Activity Level		
		Sedentary	Moderately Active	Active
Male	4-8 (young)	1400	1400 – 1600	1600 – 2000
	31-50 (adult)	2200	2400 – 2600	2800 – 3000

The information in the given table implies that

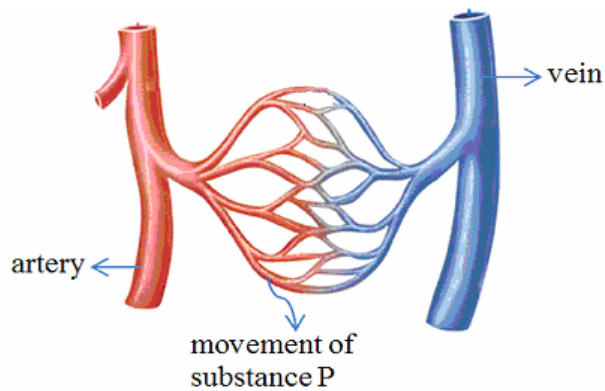
- A. adult males need to do more work than younger males.
 B. adult males should take more carbohydrates than younger males.
 C. the energy requirement of all males is the same.
 D. males need to burn more calories than females.
22. The diagram shows a biochemical cycle.



Looking at the required product of the cycle identify where does the given cycle take place in the human body?

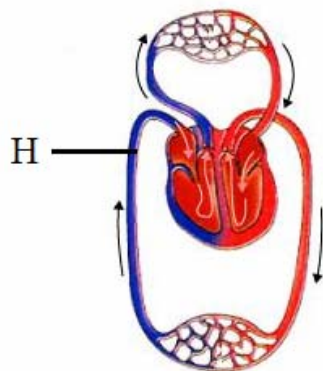
- A. Stomach
 B. Villi
 C. Liver
 D. Pancreas
23. Which of the following statements is TRUE about guard cells? They
- A. are rod-shaped cells.
 B. do not have chloroplast.
 C. are part of the epidermal layer.
 D. become flaccid when they get water.

24. The diagram shows transfer of material through blood capillaries.



Which of the following CORRECTLY identifies substance P?

- A. Glucose
 - B. Carbon dioxide
 - C. Red blood cells
 - D. Urea
25. The diagram shows double circulation in a mammal.



Which of the following CORRECTLY identifies blood vessel H?

- A. Dorsal aorta
- B. Inferior vena cava
- C. Femoral artery
- D. Pulmonary vein

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SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

MAY 2015

Biology Paper I

Time: 35 minutes Marks: 25

INSTRUCTIONS

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					3	(A)	(B)	(C)	(D)
					4	(A)	(B)	(C)	(D)

Candidate's Signature

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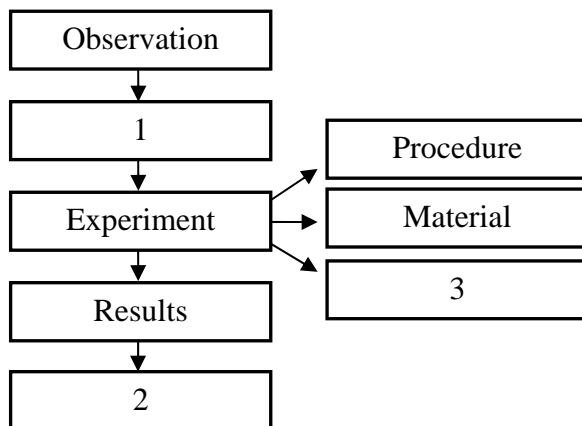
1. The life cycles of houseflies, mosquitoes and butterflies contain four stages. These stages can be studied in detail in
 - A. taxonomy.
 - B. entomology.
 - C. pharmacology.
 - D. biotechnology.

2. Kenya is the world's largest exporter of tea. Tea from Kenya is distributed to various parts of the world.

The above case shows the link of biology with

- A. mathematics.
 - B. geography.
 - C. chemistry.
 - D. physics.

3. In solving a biological problem through a scientific method a number of steps are involved. Some of these are shown below.



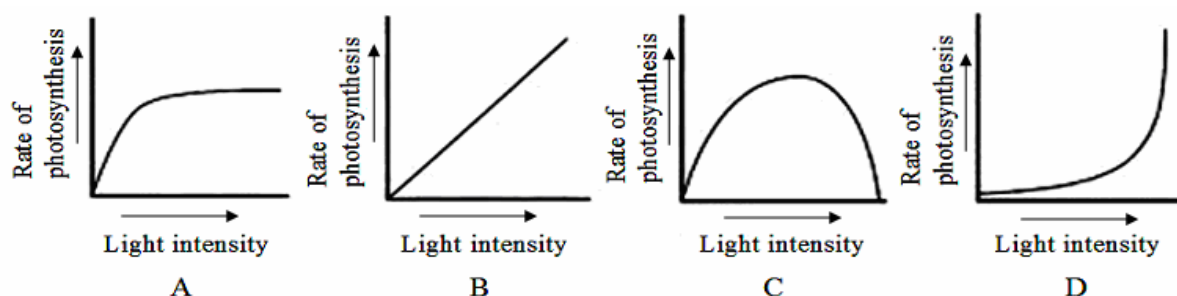
Which of the following CORRECTLY identifies steps 1, 2 and 3?

	Step 1	Step 2	Step 3
A	Hypothesis	Precautions	Conclusion
B	Conclusion	Precautions	Hypothesis
C	Hypothesis	Conclusion	Precautions
D	Conclusion	Hypothesis	Precautions

4. The table below shows that the rate of photosynthesis increases with an increase in the intensity of light.

	Light Intensity (units)	Rate of Photosynthesis (arbitrary units)
1	2	10
2	4	20
3	6	30

Which of the following graphs CORRECTLY represents the given information?



5. Abu Usman Umer Aljahiz contributed to the field of biology by
- discovering microbes in the air which spoil food.
 - describing circulation of blood in the human body.
 - developing a method of classification for organisms.
 - describing characteristics of 350 species of animals.
6. Which of the following is NOT a rule of binomial nomenclature?
- The scientific names of the organisms are written in Greek only.
 - The scientific names of the organisms consist of two parts.
 - The species names of the organisms are written using small letters only.
 - The scientific names of the organisms are italicized.
7. Kudzu is a plant from Japan. It was brought to the United States of America to help stop soil erosion. Kudzu is now a huge problem in some southern states. The plant grows very fast and can completely take over an area and out-compete native plants for space and sunlight.

The above case is an example of

- introduction of new species.
- climate change.
- loss of habitat.
- over-hunting.

8. Which of the following could be seen using a light microscope?

- I. DNA
- II. Bacterial cell
- III. Individual atoms

- A. I only
- B. II only
- C. II and III
- D. I and III

9. The function of bilayered lipids in the cell membrane is to

- A. act as gateways that allow movement of molecules.
- B. maintain the definite shape of the cell.
- C. generate ATP for active transport.
- D. provide elasticity and fluidity.

10. A plant tissue is found with the following characteristics.

- It is flexible.
- It is made of elongated cells with uneven cell wall.
- It is found in the cortex of young herbaceous stems.

Which of the following plant tissues is most likely to have the above characteristics?

- A. Sclerenchyma
- B. Collenchyma
- C. Phloem
- D. Xylem

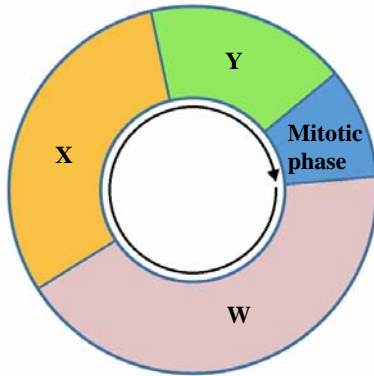
11. The diagram below shows an animal tissue.



Which of the following options describes the characteristics of this animal?

- A. Unstriated and involuntary
- B. Unstriated and voluntary
- C. Striated and involuntary
- D. Striated and voluntary

12. The diagram below shows the cell cycle.

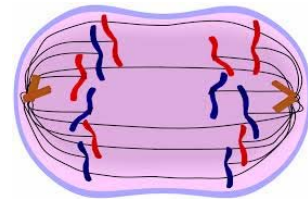


Which of the following may happen if the stage labelled as 'X' does not take place?

- A. Supply of proteins would stop.
- B. Spindle fibres would not be formed.
- C. Synthesis of DNA would stop.
- D. Cell organelles would not be doubled.

13. Which stage of mitosis is shown below?

- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Telophase



14. Which of the following is CORRECT about the examples of haploid and diploid cells in man?

	Example of Haploid Cells	Example of Diploid Cells
A	Nerve cell	Skin cell
B	Sperm cell	Skin cell
C	Sperm cell	Egg cell
D	Nerve cell	Egg cell

15. The second meiotic division mainly ensures that

- A. different daughter cells are produced.
- B. two daughter cells are formed.
- C. four daughter cells are formed.
- D. haploid cells are produced.

16. The conversion of insoluble fibrinogen into fibrin threads is carried out by enzyme thrombin which works in the presence of vitamin K only. Here, vitamin K is acting as a/an

- A. substrate.
- B. active site.
- C. co-factor.
- D. inhibitor.

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17. Optimum temperature of an enzyme can be described as the temperature at which

- A. the enzyme is denatured completely.
- B. the enzyme starts its catalytic activity.
- C. the enzyme activity is at its maximum rate.
- D. all the enzyme molecules turn into product.

18. The ability of ATP to release energy lies in its

- A. three phosphate groups.
- B. five-carbon sugar.
- C. six-carbon deoxyribulose sugar.
- D. double-ringed nitrogenous base.

19. Aerobic and anaerobic respiration are similar in a way as both

- A. take place in mitochondria.
- B. make use of oxygen.
- C. generate energy.
- D. release water.

20. Which of the following is CORRECT about vitamin C?

	Dietary Source	Function
A	Oranges and carrots	Forms rhodopsin
B	Oranges and guava	Forms collagen
C	Carrots and fish	Forms collagen
D	Fish and guava	Forms rhodopsin

21. What happens to pepsin when it enters the small intestine along with partially digested food?

- A. Pepsin is denatured completely.
- B. Pepsin is converted back to pepsinogen.
- C. Pepsin digests proteins into amino acids.
- D. Pepsin destroys the inner lining of the small intestine.

22. A patient has the following symptoms.

- Pain in abdominal region
- Difficulty in expelling faeces
- Infrequent bowel movements

The patient is mostly likely to be suffering from

- A. constipation.
- B. diarrhoea.
- C. typhoid.
- D. ulcer.

23. Which of the following is CORRECT about the condition of guard cells and stoma at the time of transpiration?

	Condition of Guard Cells	Condition of Stoma
A	Turgid	Open
B	Turgid	Closed
C	Flaccid	Open
D	Flaccid	Closed

24. Lysosomes are most abundant in those cells which perform phagocytic activity. Which of the following cells will have most lysosomes?
- A. Nerve cell
 - B. Epithelial cell
 - C. Islets of Langerhans
 - D. White blood cell
25. Which blood vessel collects blood from the lower limbs of the human body and brings it to the heart?
- A. Dorsal aorta
 - B. Femoral vein
 - C. Hepatic artery
 - D. Inferior vena cava

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CLASS IX EXAMINATION

MAY 2016

Biology Paper I

Time: 35 minutes Marks: 25

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Candidate's Signature

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1. Around 1.6 million species for all kingdoms has been classified and named as of April 2015 in 'Catalogue of Life', the most comprehensive and authoritative global index of species.

The above contribution to the field of biology is mainly an effort of

- A. histologists.
- B. taxonomists.
- C. immunologists.
- D. biotechnologists.

2. The wide variety of landscapes and climates in Pakistan allows for a diversity of wild animals and birds. The forests range from coniferous alpine and subalpine trees to deciduous trees in the Sulaiman range in the south.

The above statement shows a link between biology and

- A. chemistry.
- B. geography.
- C. economics.
- D. mathematics.

3. A theory becomes a law when it is

- A. used to form deductions.
- B. followed by further research.
- C. tested on both animals and plants.
- D. universally accepted by the scientists.

4. A scientist investigates the effect of increasing calcium nitrate concentration on the height of two different species of plants at constant temperature. He then organises the data in graphical form.

While drawing the graph, which quantity must he take on y-axis?

- A. Temperature
- B. Height of plants
- C. Species of plants
- D. Concentration of calcium nitrate

5. Flipper of a whale and wing of a bat have similar

- I. internal arrangement.
- II. basic function.
- III. external morphology.

- A. I only
- B. II only
- C. I and II
- D. II and III

6. Two kingdom classification system failed to justify the placement of all living organisms in just two groups. This is because the classification was based on only
- A. mode of nutrition.
 - B. cellular organisation.
 - C. reproductive behaviour.
 - D. geographical distribution.

7. Bryophytes are unable to pull water and nutrients up from the ground to any significant distance due to the absence of
- A. true roots.
 - B. chlorophyll.
 - C. epidermal layer.
 - D. vascular tissues.

8. The scientific classification of a plant is given below.

Order: Asparagales

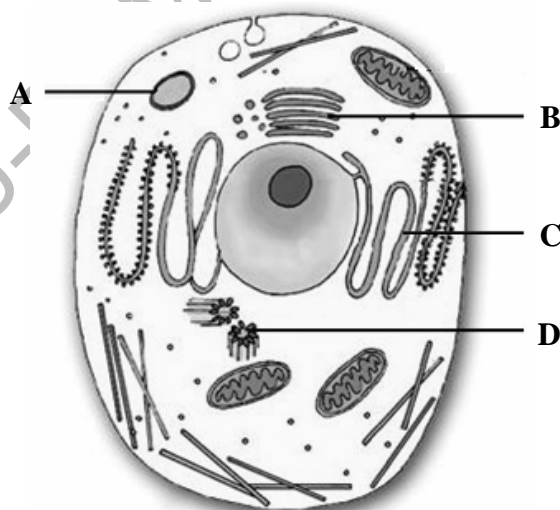
Genus: *Allium*

Division: Angiosperm

Family: Amaryllidaceae

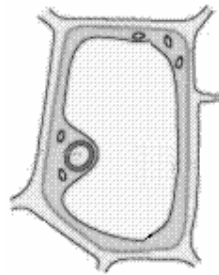
Following the rules of binomial nomenclature, the species of the plant would be

- A. *Allium cepa*.
 - B. *Angiosperm cepa*.
 - C. *Asparagales cepa*.
 - D. *Amaryllidaceae cepa*.
9. Which of the labelled organelles of the given animal cell is made up of microtubules?

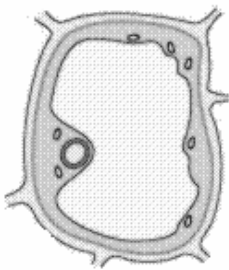


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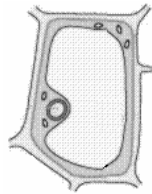
10. The diagram below shows a plant cell when placed in an isotonic solution.



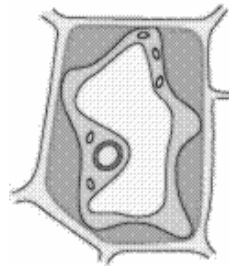
Which of the following diagrams shows the state of the plant cell after it is placed in a hypertonic solution for two hours?



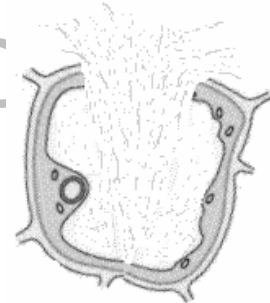
A



B



C



D

11. Companion cells are different from phloem tissues due to the presence of
- A. sieve plates.
 - B. nucleic acid.
 - C. lignified walls.
 - D. little protoplasm.
12. Skin cells do NOT enter G_0 phase of the cell cycle as
- A. they lack G_1 phase.
 - B. they keep on dividing.
 - C. their nuclei degenerate forever.
 - D. their supply of proteins is stopped.
13. The original number of chromosomes in daughter cells is maintained when the parent chromosomes undergo
- A. replication.
 - B. cytokinesis.
 - C. condensation.
 - D. crossing over.

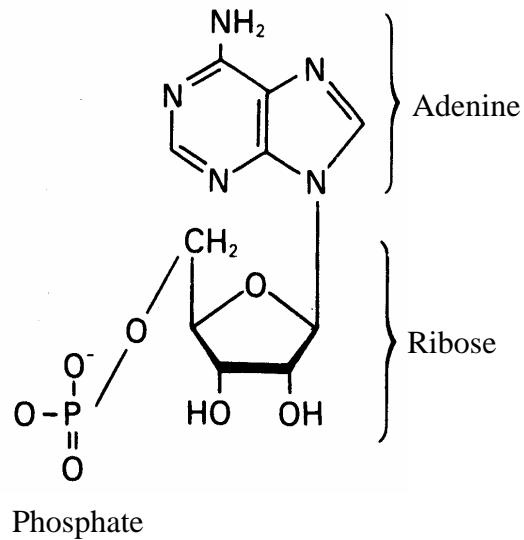
14. Synapsis is defined as the pairing of two
- sister chromatids of homologous chromosomes.
 - sister chromatids of non-homologous chromosomes.
 - non-sister chromatids of homologous chromosomes.
 - non-sister chromatids of non-homologous chromosomes.
15. The table below shows the mass of DNA in some cells of the human body.

Cell Type	Mass of DNA in Cell (picogram)
Kidney	6.6
Liver	6.6
X	3.3

Cell **X** is most likely to be a

- skin cell.
 - lung cell.
 - nerve cell.
 - sperm cell.
16. An enzyme, tyrosinase, acts on tyrosine to catalyse the production of melanin in animal tissues. The enzyme can work in the presence of copper ions only.
- In the given case, copper is acting as a/ an
- inhibitor.
 - co-factor.
 - substrate.
 - active site.
17. An enzyme catalyses a chemical reaction by lowering the
- amount of enzyme consumed.
 - optimum yield of the product.
 - pH of the surrounding medium.
 - energy requirement of the reaction.

18. The diagram shows a nucleotide known as the chief currency of all cells.



In the given state, the above nucleotide is capable of

- A. gaining one adenine molecule.
 - B. releasing one adenine molecule.
 - C. gaining one inorganic phosphate.
 - D. releasing one inorganic phosphate.
19. Which of the following is the final step of cellular respiration?
- A. Formation of pyruvic acid
 - B. Synthesis of ATP molecules
 - C. Breakdown of carbon dioxide
 - D. Conversion of NAD into NADH
20. Wholemeal bread, banana, lettuce and cabbage are good sources of
- A. fat.
 - B. fibre.
 - C. water.
 - D. protein.
21. The example of assimilation of food in the body is
- A. release of bile by the liver.
 - B. use of glucose in respiration.
 - C. entry of fatty acids into lacteal.
 - D. breakdown of starch into glucose.

22. Which of the following indicates the movement of larynx and state of trachea during the swallowing of food?

	Movement of Larynx	Passage to Trachea
A	Up	Open
B	Up	Closed
C	Down	Open
D	Down	Closed

23. A patient is found with the following symptoms.

- Abdominal pain
- Nausea
- Loss of appetite
- Regurgitation
- Abdominal burning

He is most likely to be suffering from

- A. diarrhoea.
 - B. peptic ulcer.
 - C. constipation.
 - D. nutritional anaemia.
24. Xylem vessels are long, narrow and hollow tubes. These structural features of xylem vessels help to transport water from roots to leaves through
- A. translocation.
 - B. root pressure.
 - C. capillary action.
 - D. transpiration pull.
25. The purpose of bicuspid and tricuspid valves in the heart is to
- A. prevent the backflow of blood.
 - B. push blood with immense force.
 - C. reduce friction during heart contractions.
 - D. separate oxygenated and deoxygenated blood.

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CLASS IX EXAMINATION

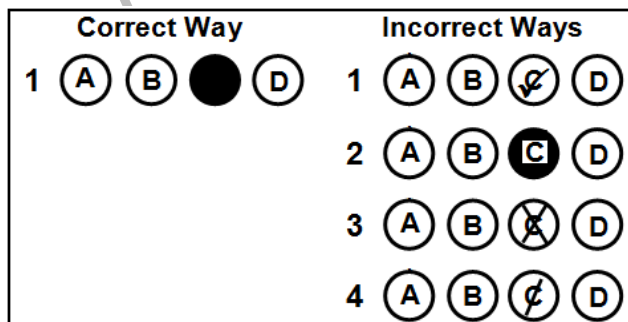
APRIL/ MAY 2017

Biology Paper I

Time: 35 minutes Marks: 25

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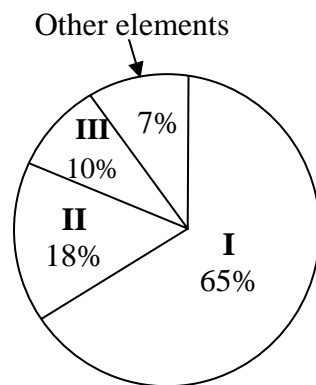
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1. A group of students investigated the chemical composition of soil from different cities of Pakistan. The students gathered data about the presence of relative percentage of nutrients in the soil and presented the data in the form of tables and graphs.

The branch of biology involved in the presentation of data in the given scenario is

- A. biochemistry.
- B. biogeography.
- C. bioeconomics.
- D. biomathematics.

2. The given pie chart shows the distribution of bio-elements in the human body.



The elements represented by I, II and III are

	I	II	III
A	Oxygen	Carbon	Hydrogen
B	Carbon	Oxygen	Hydrogen
C	Hydrogen	Carbon	Oxygen
D	Carbon	Hydrogen	Oxygen

3. Four different levels of biological organisation are represented in the given diagrams.



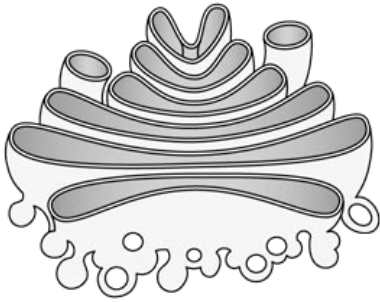
The CORRECT sequence in the descending order of biological organisation is

- A. III, II, I, IV
- B. IV, I, II, III
- C. III, I, II, IV
- D. IV, II, I, III

4. According to the scientific method of solving a biological problem, which of the following CANNOT be opposed or rejected?
- A. Mass-flow hypothesis
 - B. Mendel's laws of inheritance
 - C. Darwin's theory of evolution
 - D. A student's daily observations
5. A scientist is conducting an experiment to test the hypothesis that a species of plant will produce more fruits when exposed to blue wavelength of light at night. The scientist takes 20 experimental plants that are exposed to blue light at night. The control group should
- A. be exposed to blue light all the time.
 - B. not be exposed to blue light at night.
 - C. not be exposed to blue light during the day.
 - D. be exposed to a different wavelength of light, like red.
6. Biodiversity in an ecosystem is advantageous because it
- A. decreases rainfall in plains.
 - B. increases productivity of food.
 - C. increases competition for food.
 - D. decreases decomposition of organic matter.
7. Biological classification of pea is given in sequence.
- Plantae
 - Magnoliophyta
 - Magnoliopsida
 - Fabales
 - Fabaceae
 - *Pisum*
- The order to which pea belongs is
- A. Fabales.
 - B. Fabaceae.
 - C. Magnoliopsida.
 - D. Magnoliophyta.
8. A biology student observes a plant with the following features.
- It contains rhizoids.
 - It reproduces by spores.
 - It contains vascular tissues.
- The plant is identified as a
- A. fern.
 - B. moss.
 - C. dicot.
 - D. monocot.

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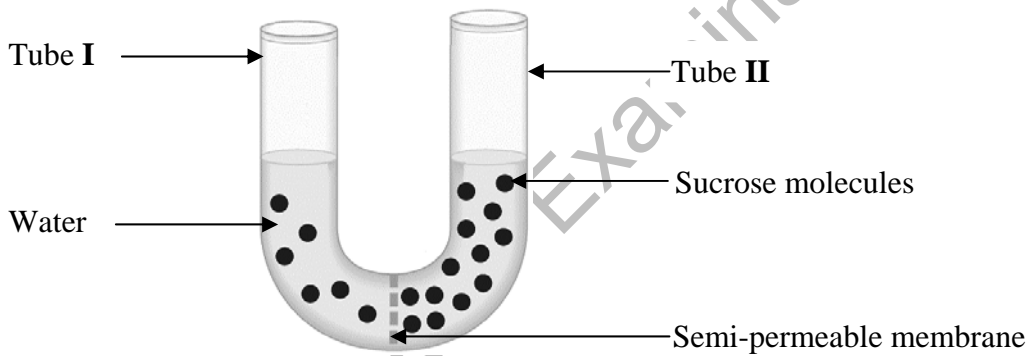
9.



Which organelle is shown in the given diagram?

- A. Centrioles
- B. Golgi bodies
- C. Rough endoplasmic reticulum
- D. Smooth endoplasmic reticulum

10. The given apparatus shows a setup to study the movement of material across a semi-permeable membrane.



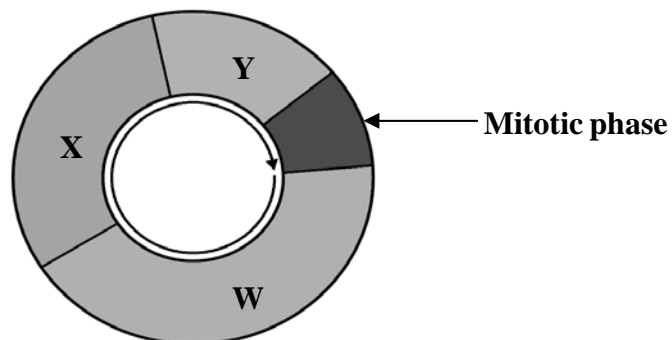
After three hours, the

- A. level of water in tube I will rise.
- B. level of water in tube II will rise.
- C. number of sucrose molecules in tube I will increase.
- D. number of sucrose molecules in tube II will increase.

11. The CORRECT examples of simple and compound tissues in plants are

	Simple Tissue	Compound Tissue
A	Collenchyma	Xylem
B	Phloem	Epidermis
C	Epidermis	Collenchyma
D	Xylem	Phloem

12. The given diagram shows the cell cycle in an animal.



If the stage labelled as X does NOT take place, then the

- A. synthesis of DNA would stop.
- B. supply of proteins would stop.
- C. spindle fibres would not be formed.
- D. cell organelles would not be doubled.

13. Which of the given diagrams represent **prophase II** of meiosis?



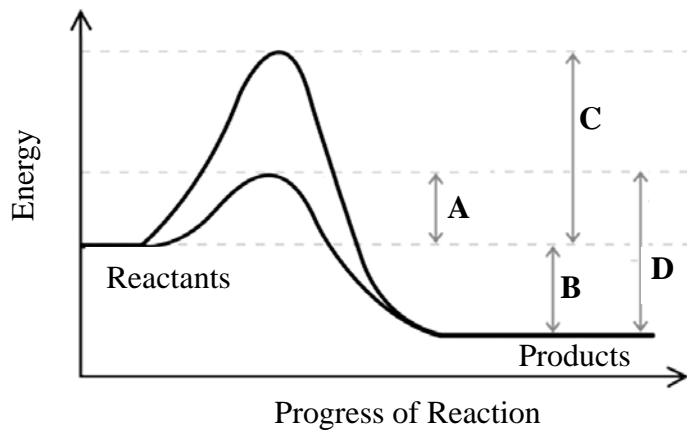
14. When a human germ cell undergoes the process of meiosis, in the end, each cell contains 23

- A. homologous chromosomes with one chromatid each.
- B. homologous chromosomes with two chromatids each.
- C. non-homologous chromosomes with one chromatid each.
- D. non-homologous chromosomes with two chromatids each.

15. Which of the following represents the characteristics of necrosis?

	Cell Shrinkage	Chromatin Condensation	Lysosomal Leakage
A	×	×	✓
B	×	✓	✓
C	✓	✓	×
D	✓	×	×

16. Which of the following shows the activation energy of an enzyme catalysed reaction?



17. The chemical reaction that requires extra-cellular enzymes is the

- A. breakdown of fats.
- B. oxidation of glucose.
- C. synthesis of proteins.
- D. reduction of carbon dioxide.

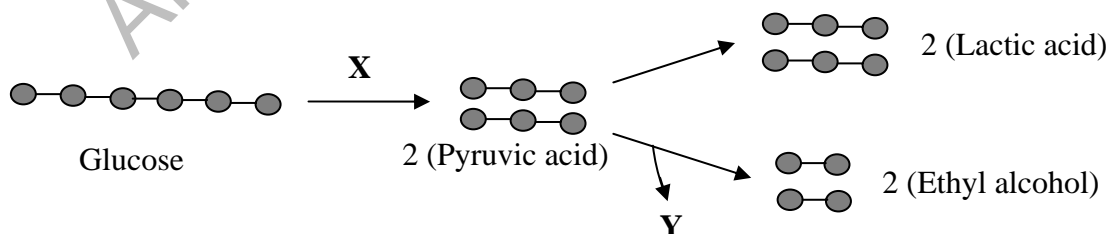
18. When a molecule of adenosine diphosphate reacts with water, it gives

- A. adenosine triphosphate and hydrogen gas.
- B. adenosine monophosphate and hydrogen gas.
- C. adenosine triphosphate and inorganic phosphate.
- D. adenosine monophosphate and inorganic phosphate.

19. How many water molecule(s) are involved in light dependent reactions to produce TWO oxygen molecules by the end of photosynthesis?

- A. 1
- B. 2
- C. 3
- D. 4

20. The given diagram shows some events of anaerobic respiration.



Which process and by-product formation occurs at X and Y respectively?

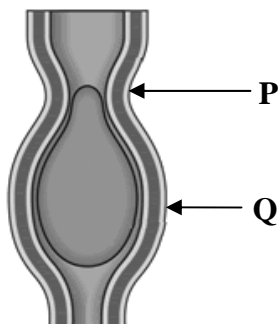
	X	Y
A	Glycolysis	Carbon dioxide
B	Glycolysis	Adenosine triphosphate
C	Alcoholic fermentation	Carbon dioxide
D	Alcoholic fermentation	Adenosine triphosphate

21. The given table shows estimated energy requirements (in kilocalories) according to age, gender and activity.

Gender	Age (years)	Activity Level		
		Sedentary	Moderately Active	Active
Male	4-8 (child)	1,400 (kcal)	1,400-1,600 (kcal)	1,600-2,000 (kcal)
	31-50 (adult)	2,200 (kcal)	2,400-2,600 (kcal)	2,800-3,000 (kcal)

The information in the given table implies that

- A. the energy requirement of all males is the same.
 - B. adult males need to do more work than children.
 - C. children need to burn more calories than adult males.
 - D. adult males should take more carbohydrates than children.
22. The given diagram shows peristalsis in oesophagus.



The condition of longitudinal muscles at points **P** and **Q** would be

	P	Q
A	Contract	Relax
B	Relax	Contract
C	Contract	Contract
D	Relax	Relax

23. Diagram I represents a plant in wilted state while diagram II represents the same plant in the normal state.



Diagram I

Diagram II

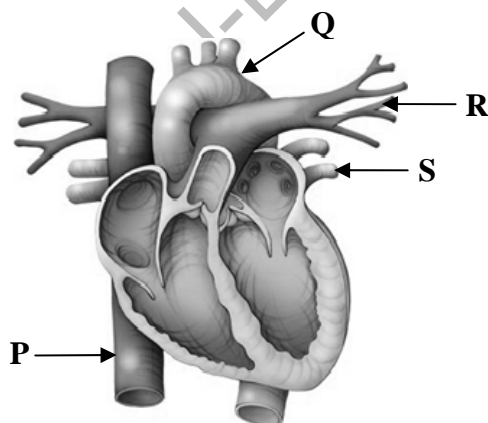
Which of the following are required for the plant shown in diagram I to regain condition shown in diagram II?

	Rate of Absorption	Rate of Transpiration
A	Increase	Decrease
B	Decrease	Increase
C	Decrease	Decrease
D	Increase	Increase

24. Which of the following is CORRECT about thrombocytes?

	Nucleus	Pigment	Life span
A	Absent	Absent	7-8 days
B	Present	Absent	120 days
C	Absent	Present	7-8 days
D	Present	Present	120 days

25. The given diagram represents the human heart.



The blood vessel that receives the oxygenated blood from lungs is

- A. P
- B. Q
- C. R
- D. S

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SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

APRIL/ MAY 2018

Biology Paper I

Time: 35 minutes Marks: 25

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 25 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	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

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.

1. A group of researchers worked on the availability of a less expensive fuel for cars. They came up with a conclusion to produce a gas using micro-organisms. To which of the following branches of biology is their research related?
 - A. Taxonomy
 - B. Entomology
 - C. Pharmacology
 - D. Biotechnology

2. Which of the following is an example of quantitative observations?
 - 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.

3. A student extracts saliva (pH 7) from the mouth of a mammal, mixes it with some fine pieces of bread and keeps the mixture at 32°C. After three hours, a positive result is obtained, i.e. the pieces of bread disappear from the mixture.

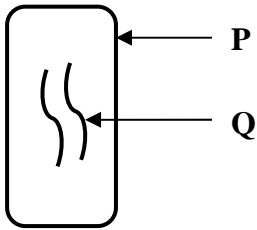
A positive result can also be obtained by

 - A. repeating the procedure at 36°C.
 - B. conducting the experiment at pH 2.
 - C. using distilled water instead of saliva.
 - D. repeating the experiment after boiling saliva.

4. According to the two-kingdom classification system of living organisms, algae were placed in kingdom plantae because of their
 - A. eukaryotic cell.
 - B. unicellular body.
 - C. mode of nutrition.
 - D. mode of reproduction.

5. The similarity between fungi and plants is that both
 - A. are prokaryotes.
 - B. are heterotrophs.
 - C. possess cell wall.
 - D. release digestive enzymes.

6. The given diagram shows the structure of a virus.



Which of the following CORRECTLY identifies **P** and **Q**?

	P	Q
A	Lipid bilayer	Nucleic acid
B	Protein coat	Nucleic acid
C	Protein coat	Glycolipid
D	Lipid bilayer	Glycolipid

7. The scientific classification of a plant is as follows.

Order: Asparagales

Genus: Allium

Division: Angiosperm

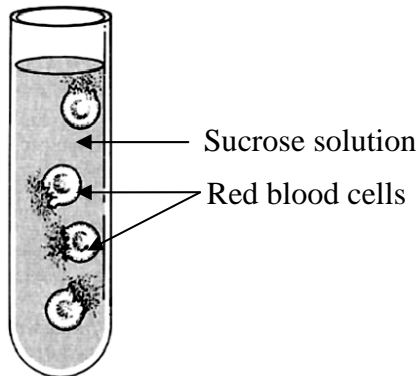
Family: Amaryllidaceae

Following the rules of binomial nomenclature, the species of the plant would be

- A. Allium cepa.
 B. Angiosperm cepa.
 C. Asparagales cepa.
 D. Amaryllidaceae cepa.
8. In plant cells, adenosine triphosphate (ATP) is synthesised by
- A. ribosomes.
 B. chloroplasts.
 C. mitochondria.
 D. chromoplasts.
9. The function of smooth endoplasmic reticulum in an animal cell is the
- A. storage of enzymes.
 B. metabolism of lipids.
 C. formation of glucose.
 D. synthesis of proteins.

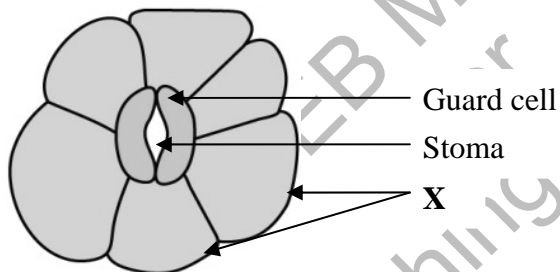
10. The given diagram shows the condition of human red blood cells when kept in a sucrose solution.

(Note: The internal concentration of human red blood cells is 0.9%.)



The concentration of sucrose solution in the given situation would be

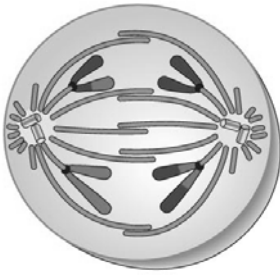
- A. 3%
 - B. 5%
 - C. 0.9%
 - D. 0.1%
11. The given diagram shows the transverse section of a leaf.



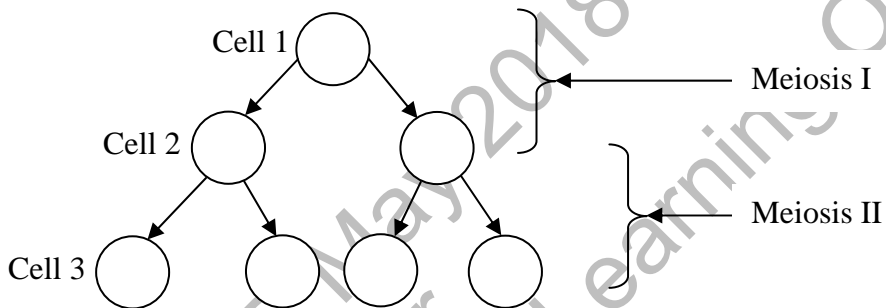
The cells represented by X are

- A. phloem cells.
 - B. epidermal cells.
 - C. parenchymal cells.
 - D. collenchymal cells.
12. All of the following statements are TRUE about crossing over in meiosis EXCEPT that it
- A. occurs during prophase II.
 - B. leads to variation in the resulting cell.
 - C. occurs between two homologous chromosomes.
 - D. involves exchange of deoxy ribonucleic acid (DNA) fragments.

13. The phase of meiosis in an animal cell illustrated in the given diagram is



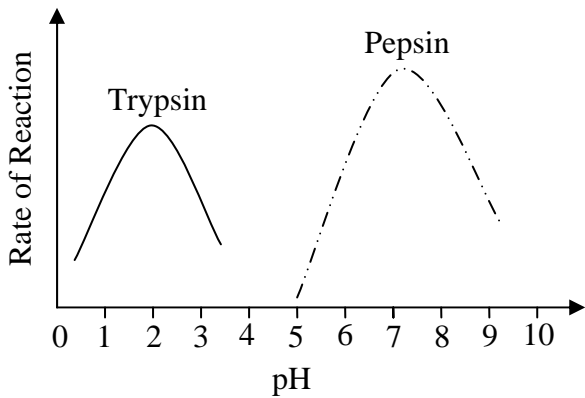
- A. anaphase of meiosis I.
 B. telophase of meiosis I.
 C. anaphase of meiosis II.
 D. telophase of meiosis II.
14. The given diagram illustrates the process of meiosis.



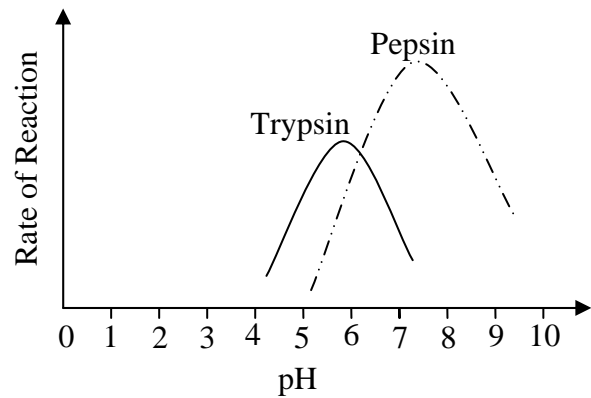
The haploid cell(s) in the given diagram is/ are

- A. cell 1 only.
 B. cell 2 only.
 C. cell 1 and cell 3.
 D. cell 2 and cell 3.
15. Necrosis is a type of cell death characterised by
- A. formation of cell blebs.
 B. condensation of chromatin.
 C. leakage of lysosomal enzymes.
 D. breaking of nuclear membrane.
16. Asif goes for a morning walk where the temperature of the surrounding is 13°C.
 In this situation, enzymes in Asif's body would work best at a body temperature of
- A. 13°C
 B. 23°C
 C. 30°C
 D. 37°C

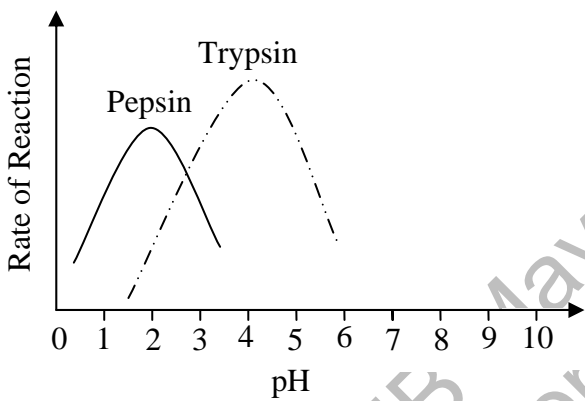
17. Which of the given graphs CORRECTLY represents the activity of pepsin and trypsin at their respective pH?



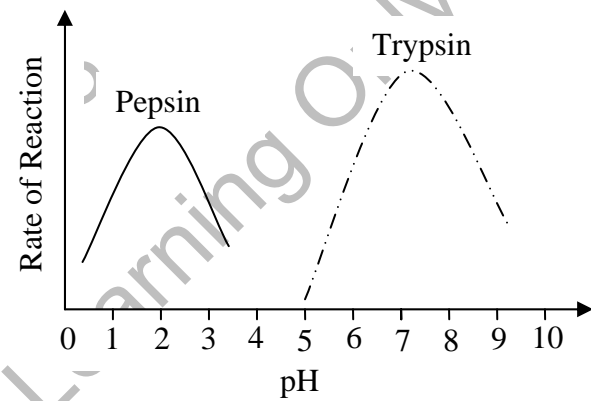
A



B

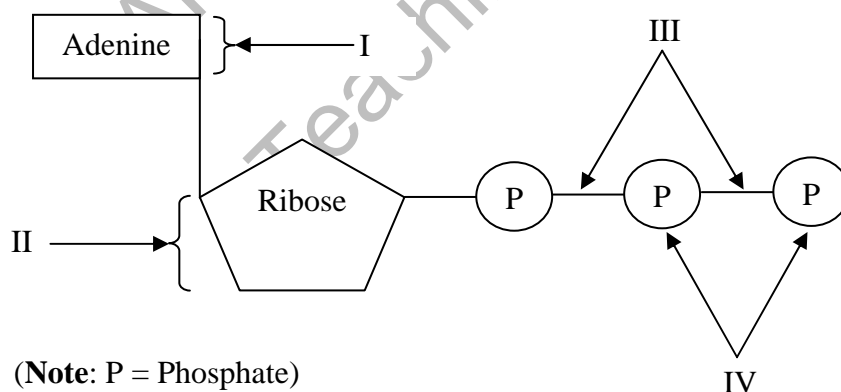


C



D

18. The given diagram illustrates the chemical structure of adenosine tri phosphate (ATP).



(Note: P = Phosphate)

Which labelled part of ATP provides energy when broken?

- A. I
- B. II
- C. III
- D. IV

19. The reduction of nicotinamide adenine dinucleotide phosphate (NADP⁺) takes place during the light reactions of photosynthesis by
- gaining two electrons and one hydrogen ion.
 - gaining one electron and two hydrogen ions.
 - removing two electrons and one hydrogen ion.
 - removing one electron and two hydrogen ions.
20. The similarity between aerobic and anaerobic respiration is the
- complete oxidation of glucose.
 - production of equal amount of energy.
 - involvement of mitochondria in reactions.
 - occurrence of oxidation reduction reactions.
21. The given table shows the daily diet of Sania.

Breakfast	Lunch	Dinner
A fried egg and 2 slices of bread	Boiled rice, chicken and fruit salad	Pasta and vegetables

This diet could be considered balanced because it includes

- less fats.
 - three meals.
 - variety of food.
 - more carbohydrates.
22. The given diagram illustrates a process occurring in the digestive system of human beings.



Fat drop

Fat droplets

This process is called

- assimilation.
- deamination.
- emulsification.
- chemical digestion.

23. A patient has the following symptoms.

- Pain in abdominal region
- Difficulty in expelling faeces
- Infrequent bowel movements

The patient is MOST likely to be suffering from

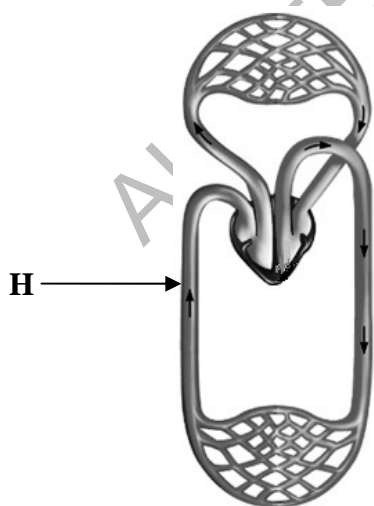
- A. ulcer.
- B. typhoid.
- C. diarrhoea.
- D. constipation.

24. Saima, who has blood group **B**, needs blood.

People with which of the following blood groups can donate blood to Saima?

	Blood group A	Blood group B	Blood group AB	Blood group O
A	Yes	No	Yes	No
B	Yes	No	No	Yes
C	No	Yes	Yes	No
D	No	Yes	No	Yes

25. The given diagram shows double circulation of blood in a mammal.



The blood vessel **H** represents

- A. vena cava.
- B. dorsal aorta.
- C. femoral artery.
- D. pulmonary vein.

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CLASS IX EXAMINATION

APRIL/ MAY 2019

Biology Paper I

Time: 45 minutes Marks: 30

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 30 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.

1. Akber studies the processes of transpiration and translocation in plants as a part of his research work.

His work is related to which branch of biology?

- A. Histology
- B. Physiology
- C. Taxonomy
- D. Morphology

2. The level of organisation of life to which deoxy ribonucleic acid (DNA) belongs is

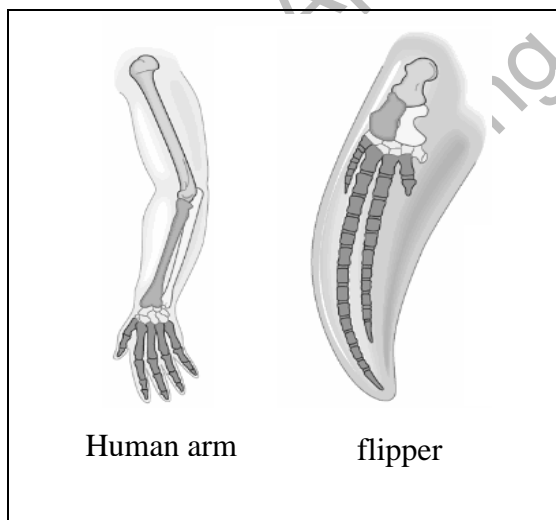
- A. tissue level.
- B. cellular level.
- C. organelle level.
- D. molecular level.

3. Kashif wants to investigate the effect of different factors on the activity of salivary amylase. He designs an experiment in order to reach a conclusion.

The MOST appropriate first step for Kashif to undertake is to

- A. test a variable.
- B. put forward a theory.
- C. formulate a hypothesis to test.
- D. gather and set up the required material.

4. The arrangement of bones in the given diagrams show homology because they have



- A. same structure same function.
- B. different structure same function.
- C. same structure different function.
- D. different structure different function.

5. The given table shows the biological classification of *Amanita*, a fungus, in the hierarchical order.

I	Fungi
II	Basidiomycota
III	Homobasidiomycetae
IV	Agaricales
V	Amanitaceae
VI	<i>Amanita</i>
VII	<i>Amanita muscari</i>

With reference to the given hierarchy, the level that represents the class of *Amanita* is

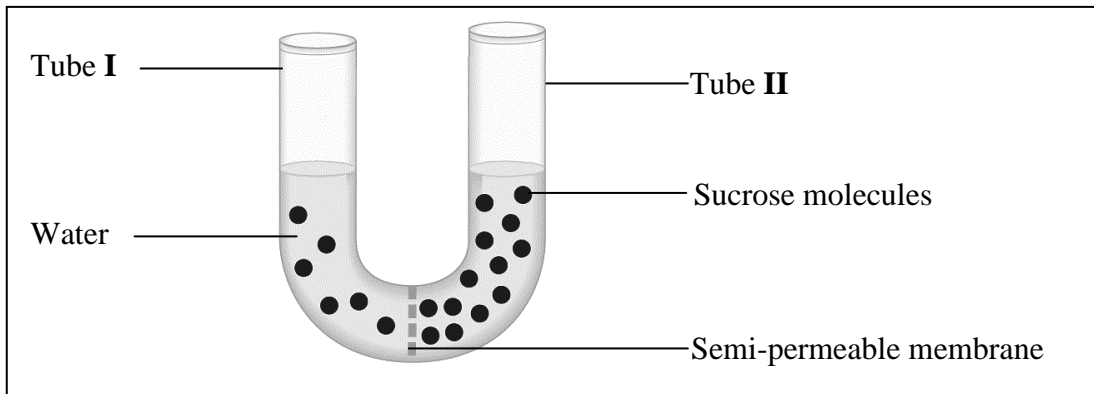
- A. II
 B. III
 C. IV
 D. V
6. The given table shows structural characteristics of an organism.

Property	Present or Absent
Cell wall	Present
Nuclear membrane	Present
Ribosomes	Present
Multi-cellularity	Absent

On the basis of the given characteristics, the organism could be placed in kingdom

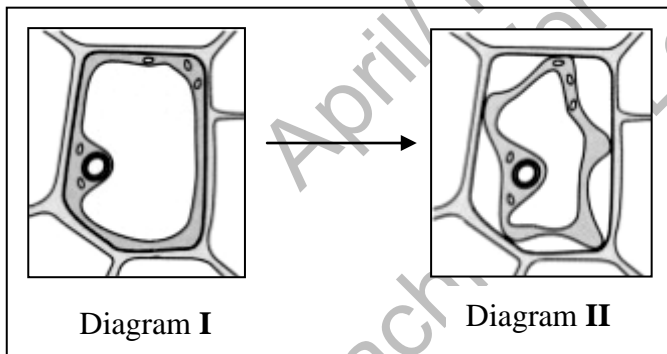
- A. Fungi.
 B. Plantae.
 C. Protista.
 D. Prokaryotae.
7. In living cells, the function of ribosomes is the
- A. synthesis of proteins.
 B. metabolism of lipids.
 C. production of energy.
 D. recycling of material.

8. The given apparatus shows a setup to study the movement of material across a semi-permeable membrane.



After three hours, the

- A. level of water in tube I will rise.
 - B. level of water in tube II will rise.
 - C. number of sucrose molecules in tube I will increase.
 - D. number of sucrose molecules in tube II will increase.
9. Diagram I shows the structure of a plant cell under normal conditions. When this cell is placed in a solution, its structure changes as shown in diagram II.



The solution in which the cell was placed would be

- A. distilled water.
 - B. isotonic to the cell.
 - C. hypotonic to the cell.
 - D. hypertonic to the cell.
10. Cells in the skin epithelium of human beings are closely packed together. The closely packed cells are significant for
- A. secretion of mucus.
 - B. absorption of material.
 - C. protection of inner parts.
 - D. conduction of nerve impulse.

11. A scientist wants to study the effect of different minerals on the growth of plants. For this purpose, she selects meristematic tissues from plants.

These tissues are best suited for her study because they

- A. cover the plant body.
 - B. have the ability to divide.
 - C. can produce food for plants.
 - D. support the plant's structure.
12. The process of breathing involves
- A. inhalation and exhalation of gases.
 - B. diffusion of oxygen into body cells.
 - C. breakdown of glucose in body cells.
 - D. movement of gases from blood to alveoli.
13. 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.

14. The part of the respiratory system of human beings which is responsible for the production of sound is the
- A. glottis.
 - B. larynx.
 - C. pharynx.
 - D. epiglottis.
15. In the cells of human beings, one of the functions of enzymes is the conversion of toxic chemicals into harmless products. This should happen quickly; so that, there is no accumulation of toxic chemicals in the cells.

The property of enzymes depicted in the given information is

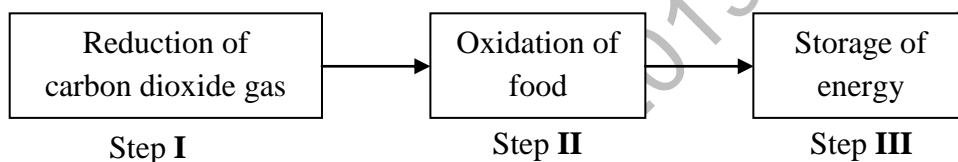
- A. greater specificity.
- B. higher reaction rate.
- C. requirement in less amounts.
- D. sensitivity to changing conditions.

16. During the process of cellular respiration, glucose is converted into glucose-6-phosphate with the utilisation of a molecule of adenosine triphosphate (ATP). The process takes less time in the presence of glucokinase.

The substrate and enzyme used in the given reaction are

	Substrate	Enzyme
A	glucose-6-phosphate	ATP
B	glucose-6-phosphate	glucokinase
C	glucose	glucokinase
D	glucose	ATP

17. The given flowchart shows three steps of energy transformation in living organisms.



The biological processes that occur at steps I and II are

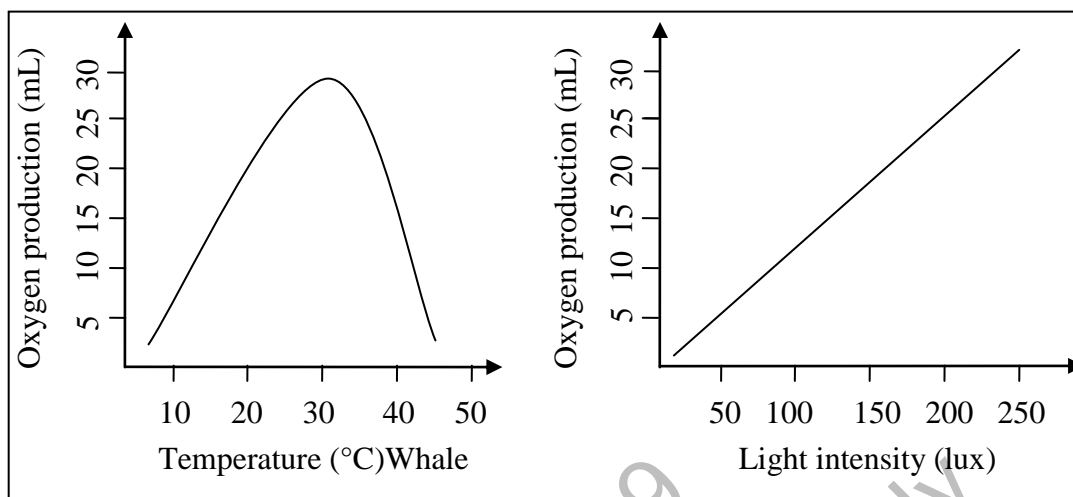
	Biological Process at Step I	Biological Process at Step II
A	respiration	photosynthesis
B	photosynthesis	respiration
C	photosynthesis	photosynthesis
D	respiration	respiration

18. The dark reactions of photosynthesis are not dependent on light. If plants are deprived of light, then dark reactions would NOT occur because they use

(Note: NADPH = Nicotinamide adenine dinucleotide phosphate)

- water formed in the presence of light.
- oxygen gas formed in the presence of light.
- carbon dioxide formed in the presence of light.
- ATP and NADPH formed in the presence of light.

19. The given graphs show the effect of temperature and light intensity on the rate of photosynthesis in plants.



With reference to the given graphs, which of the following conditions is best for plants to perform photosynthesis?

- A. Temperature around 20°C with light intensity of 150 lux
 B. Temperature around 30°C with light intensity of 250 lux
 C. Temperature around 40°C with light intensity of 150 lux
 D. Temperature around 50°C with light intensity of 250 lux
20. In the cells of human beings, the product(s) formed after complete oxidation of glucose along with ATP is/ are
- A. lactic acid.
 B. pyruvic acid.
 C. carbon dioxide gas and water.
 D. ethyl alcohol and carbon dioxide gas.
21. The step(s) of cellular respiration that produce(s) energy in the form of ATP and nicotinamide adenine dinucleotide (NADH) is/ are
- I. glycolysis
 II. Krebs cycle
 III. electron transport chain
- A. I only.
 B. III only.
 C. I and II.
 D. II and III.

22. Which of the following is CORRECT about iron?

	Dietary Source	Function
A	Red meat and egg yolk	Helps in healing of wounds
B	Cheese and cabbage	Helps in healing of wounds
C	Cheese and cabbage	Helps in transport of oxygen
D	Red meat and egg yolk	Helps in transport of oxygen

23. A child visits a doctor with the following symptoms.

- Dry skin
- Poor growth
- Night blindness

The vitamin which is deficient in his body would be

- A. Vitamin A.
- B. Vitamin C.
- C. Vitamin D.
- D. Vitamin K.

24. The example of assimilation of food in the human body is

- A. release of bile by the liver.
- B. use of glucose in respiration.
- C. breakdown of starch into glucose.
- D. entry of food from oesophagus to stomach.

25. In the digestive system of human beings, the digestive enzymes are secreted by

- A. liver, pancreas and gall bladder.
- B. stomach, liver and large intestine.
- C. stomach, pancreas and small intestine.
- D. gall bladder, small intestine and large intestine.

26. In the alimentary canal of human beings, the molecules of starch are converted into maltose in

- I. mouth
 - II. stomach
 - III. duodenum
- A. I only.
 - B. II only.
 - C. I and III.
 - D. II and III.

27. Emulsification is a process which occurs in the human digestive system to convert
- A. protein molecules to amino acids molecules.
 - B. larger fat molecules to smaller fat molecules.
 - C. fat molecules to fatty acids and glycerol molecules.
 - D. larger protein molecules to smaller protein molecules.
28. Xylem vessels are long, narrow and hollow tubes. These structural features of xylem vessels help to transport water from roots to leaves through
- A. translocation.
 - B. root pressure.
 - C. capillary action.
 - D. transpiration pull.
29. The types of white blood cells that kill germs by producing antibodies are
- A. basophils.
 - B. monocytes.
 - C. neutrophils.
 - D. lymphocytes.
30. The right side of the human heart is completely separated from the left side by means of atrioventricular septum. This is to
- A. allow easy flow of blood to the lungs.
 - B. reduce friction when the heart is beating.
 - C. avoid mixing oxygenated blood with deoxygenated blood.
 - D. prevent backflow of blood from the ventricles to the auricles.

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CLASS IX

ANNUAL EXAMINATIONS 2021

Biology

Total Time: 1 hour 40 minutes

Total Marks: 50 (40-Theory & 10-Alternate to Practical)

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 50 only.

4. Question Distribution:

Theory	Alternate to Practical (ATP)
40 MCQs	10 MCQs

5. 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) (C) (D)	1 (A) (B) (C) (D)
	2 (A) (B) (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

Candidate's Signature

6. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
7. DO NOT write anything in the answer grid. The computer only records what is in the circles.
8. The marks obtained on the 40 MCQs will be equated to the total marks of 65 for the theory examination results.
9. You may use a simple calculator if you wish.

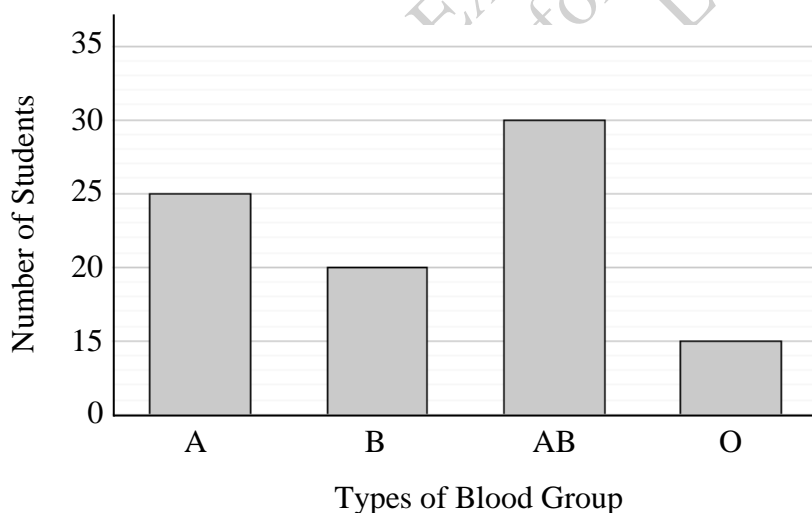
THEORY (Questions 1-40)

1. Sara wants to study the toxic effect of two different types of insecticides (M and N) on insects in stored grains. The given table shows the experimental set-up.

	Container X Insecticide M	Container Y Insecticide N
Amount of grain	200 grams	200 grams
Amount of insecticide applied	0.25 mL	0.25 mL
Number of insect treated	10	10

To complete the experimental set-up, Sara should design the control group by treating insects with

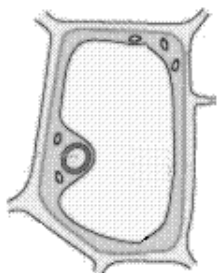
- A. insecticide N.
 - B. insecticide M.
 - C. distilled water.
 - D. mixture of insecticides M and N.
2. The given graph shows the number of students having different blood groups in a class.



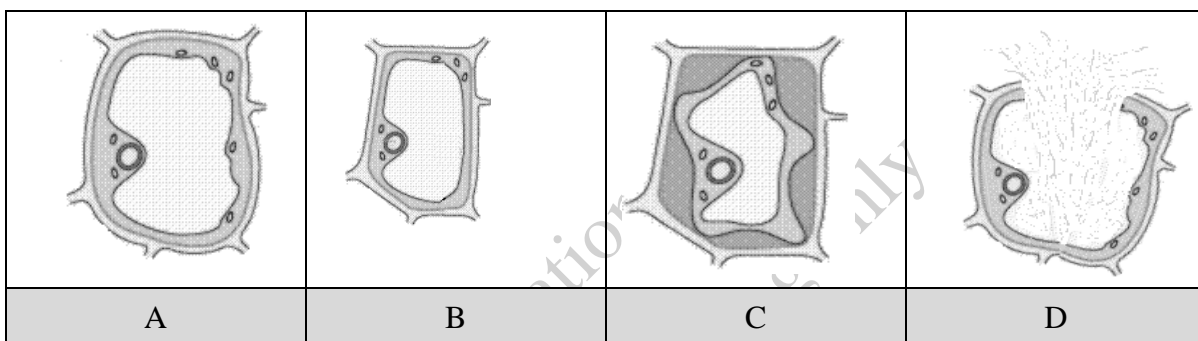
If three students with blood group A and four students with blood group B leave the class while two students with blood group O join the class, then which blood group students are present least in number?

- A. O
- B. A
- C. B
- D. AB

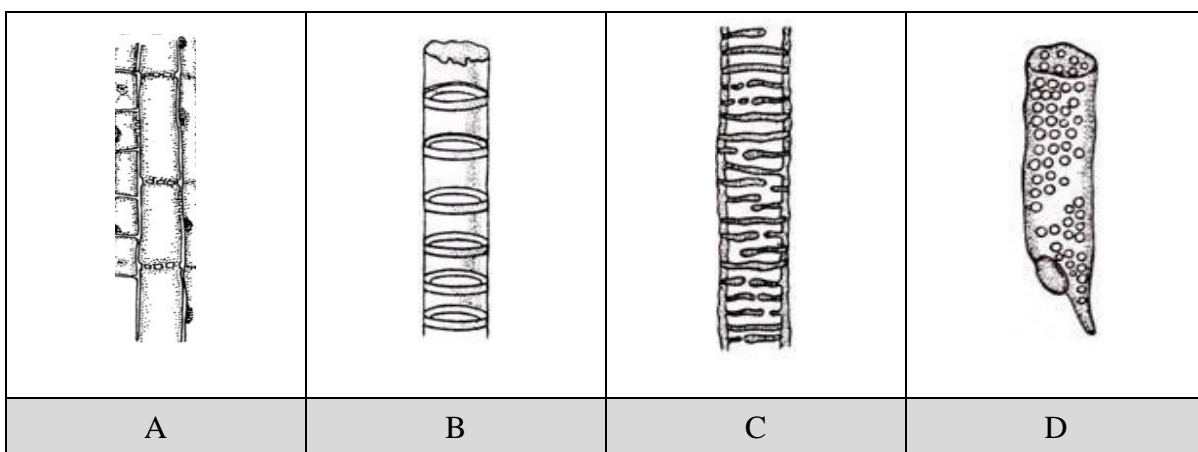
3. The diagram below shows a plant cell when placed in an isotonic solution.



If the same cell is placed in a hypertonic solution for two hours, then the state of the plant cell is diagrammatically represented as is



4. The cell organelle which forms a network of interconnecting canals and continues with the nuclear envelope is identified as the
- ribosome.
 - mitochondrion.
 - Golgi apparatus.
 - endoplasmic reticulum.
5. In the cell, Golgi apparatus lies near the endoplasmic reticulum because Golgi apparatus
- provides mechanical strength to the endoplasmic reticulum.
 - receives and utilises ATP molecules from the endoplasmic reticulum.
 - modifies and packages proteins produced by the endoplasmic reticulum.
 - controls the movement of substances in and out of the endoplasmic reticulum.
6. The diagram that represents phloem vessels in plants is

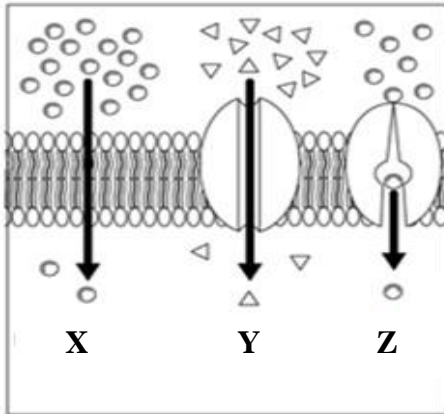


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7. The organelle which is ABSENT in the root hair cell is

- A. nucleus.
- B. vacuole.
- C. cell wall.
- D. chloroplast.

8. The given diagram represents different transport mechanisms across the plasma membrane.



In the given diagram, facilitated diffusion is represented as

- A. X only.
- B. Z only.
- C. Y and Z.
- D. X and Y.

9. The option that is CORRECT about the number and function of vacuole in an animal cell is

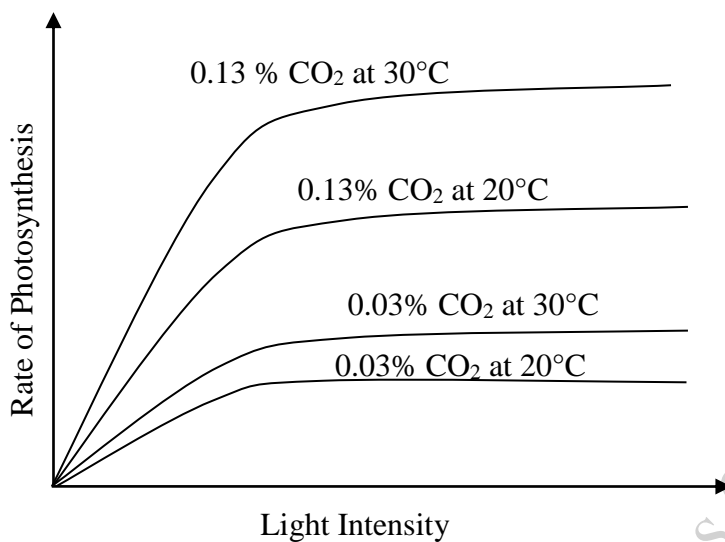
	Number	Function
A	single	transports nutrients throughout the cell
B	multiple	maintains the cell shape
C	multiple	stores nutrients
D	single	synthesises enzymes

10. In the mitochondria of a cell, the presence of inner membrane with large surface area is significant for the

- A. storage of lipids.
- B. removal of waste materials.
- C. protection of cell organelles.
- D. occurrence of chemical reactions.

11. In the chloroplast of a plant cell, if thylakoid membrane is damaged, then this will directly affect the
- A. Krebs cycle.
 - B. Calvin cycle.
 - C. process of glycolysis.
 - D. light dependent reactions.
12. During a strenuous exercise, ATP (adenosine triphosphate) helps in the
- A. contraction of skeletal muscles.
 - B. transportation of oxygen to muscles.
 - C. storage of glucose in the muscle fibres.
 - D. conversion of amino acids into proteins.
13. Dark reactions of photosynthesis involve the
- A. utilisation of ATP.
 - B. photolysis of water.
 - C. liberation of oxygen.
 - D. production of NADPH.
14. During photosynthesis, oxygen gas is released by the splitting of
- A. pyruvic acid.
 - B. water molecules.
 - C. glucose molecules.
 - D. carbon dioxide gas.
15. In the absence of Calvin cycle of photosynthesis, the plant will be unable to
- A. synthesise glucose.
 - B. reduce NADP to NADPH.
 - C. breakdown water molecules.
 - D. synthesise ATP and NADPH.
16. In anaerobic respiration, the total net yield of ATP molecules after the oxidation of a glucose molecule is
- A. 2
 - B. 4
 - C. 36
 - D. 38

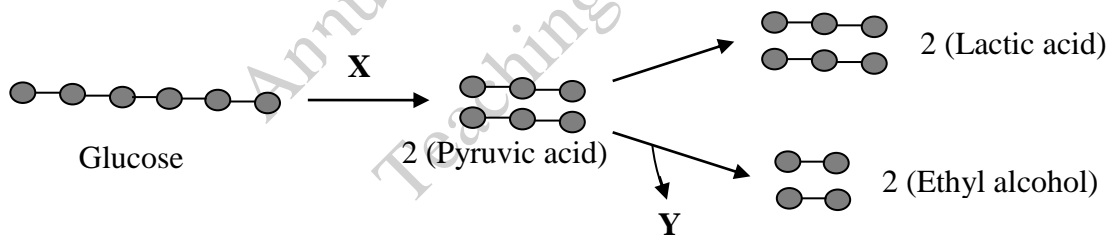
17. The given graph shows the effects of different levels of factors on the rate of photosynthesis.



Based on the given graph, it can be inferred that the rate of photosynthesis

- A. increases with the decrease in temperature.
- B. is inversely proportional to the light intensity.
- C. increases significantly with the increase in CO₂ concentration and temperature.
- D. increases continuously with the increase in the light intensity and CO₂ concentration.

18. The given diagram shows some events of anaerobic respiration.



Which process and by-product formation occurs at X and Y, respectively?

	X	Y
A	Glycolysis	Carbon dioxide
B	Glycolysis	Water
C	Alcoholic fermentation	Carbon dioxide
D	Alcoholic fermentation	Water

19. In the human respiratory system, gaseous exchange takes place between the
- alveoli and capillaries.
 - trachea and capillaries.
 - alveoli and bronchioles
 - trachea and bronchioles.
20. The respiratory disorder in which bronchioles become inflamed and narrow is
- asthma.
 - pneumonia.
 - emphysema.
 - tuberculosis.
21. In the human respiratory system, the function of epiglottis is to
- moist and warm the incoming air.
 - keep the air ways open all the time.
 - filter dust particles and kill the bacteria.
 - prevent the food particles from entering the trachea.
22. Which of the following is CORRECT about the change in the pressure and volume of thoracic cavity during exhalation?

	Pressure in Thoracic Cavity	Volume of Thoracic Cavity
A	Increases	Increases
B	Increases	Decreases
C	Decreases	Increases
D	Decreases	Decreases

23. Phosphorus is classified as a macronutrient for plants because it is
- required in large amount.
 - abundantly present in the soil.
 - present in large molecular size.
 - produced by plants in large amount.
24. Phytonadione is a medicine that is prescribed to patients with blood clotting problems.
- The vitamin which plays a similar function to phytonadione is
- vitamin A.
 - vitamin C.
 - vitamin D.
 - vitamin K.

25. Sarosh eats a slice of white bread with butter and grilled beef in her breakfast.

The nutrient which is present in LEAST amount in her breakfast is

- A. lipids.
- B. fibres.
- C. proteins.
- D. carbohydrates.

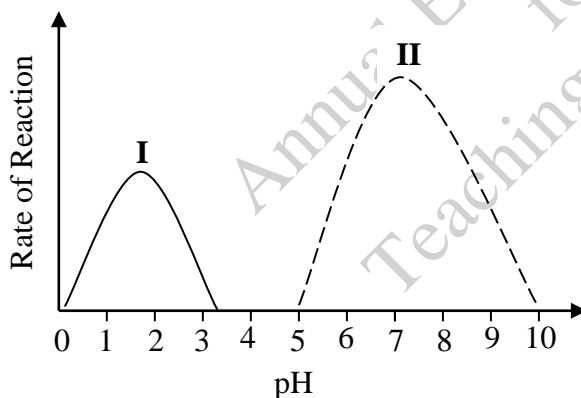
26. The part of the human digestive system where the digestion of proteins begin is

- A. Ileum.
- B. mouth.
- C. stomach.
- D. duodenum.

27. The CORRECT pathway for the food bolus to enter stomach is

- A. oesophagus → pyloric sphincter.
- B. oesophagus → cardiac sphincter.
- C. pyloric sphincter → oesophagus.
- D. cardiac sphincter → oesophagus.

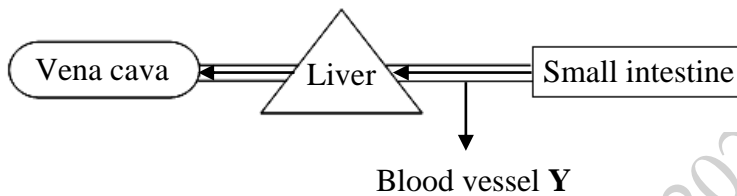
28. The given graph shows the optimum activity of two enzymes at different pH in the human digestive system.



The option that CORRECTLY identifies the parts of digestive system where enzymes (I and II) work is

	Enzyme I	Enzyme II
A	stomach	mouth
B	mouth	duodenum
C	duodenum	stomach
D	duodenum	mouth

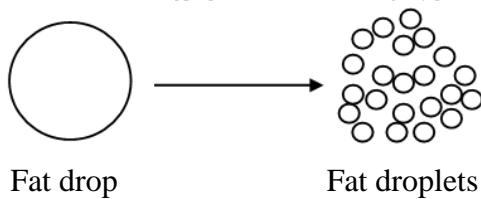
29. The part(s) of the human digestive system where both chemical and mechanical digestion of food take place is/ are
- large intestine only.
 - small intestine only.
 - stomach and mouth.
 - small intestine and stomach.
30. The given diagram represents the pathway of blood flow from the small intestine to the vena cava.



The option that is CORRECT about vessel Y is

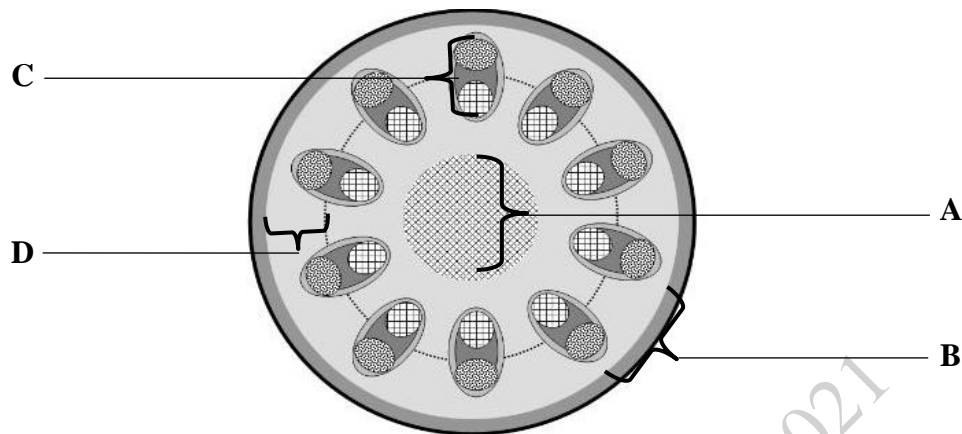
	Identification of Y	Composition of Fluid Inside Y
A	hepatic vein	glucose
B	hepatic vein	glycogen
C	hepatic portal vein	glucose
D	hepatic portal vein	glycogen

31. The given diagram illustrates a process that occurs in the digestive system of human beings. This process is called



- assimilation.
- deamination.
- emulsification.
- chemical digestion.

32. The given diagram represents cross section through a young non-woody dicot stem. In this diagram, the vascular bundle is labelled as



33. In an experiment a thin layer of petroleum jelly (Vaseline) is used to cover the underside of leaves.

How does this application affect the plant's physiology?

- A. It strengthens cuticles.
 - B. It inhibits ATP formation.
 - C. It reduces transpiration rate.
 - D. It increases sunlight absorption.
34. Following are the parts of a growing plant.

- I. Roots
- II. Mature leaves
- III. Tubers

In the middle of growing season, the part(s) which act(s) as source is/ are

- A. I only.
- B. II only.
- C. I and II.
- D. II and III.

35. Diagram I represents a plant in wilted state, while diagram II represents the same plant in the normal state.



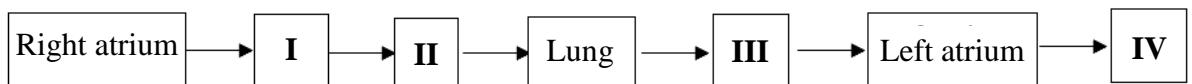
Diagram I

Diagram II

Which of the following conditions are required for the plant shown in diagram I to regain the state shown in diagram II?

	Rate of Absorption	Rate of Transpiration
A	Decreased	Increased
B	Increased	Decreased
C	Decreased	Decreased
D	Increased	Increased

36. The given flow chart shows the pathway of blood through heart and lungs.



The part of heart which has the thickest walls and the highest internal pressure is labelled as

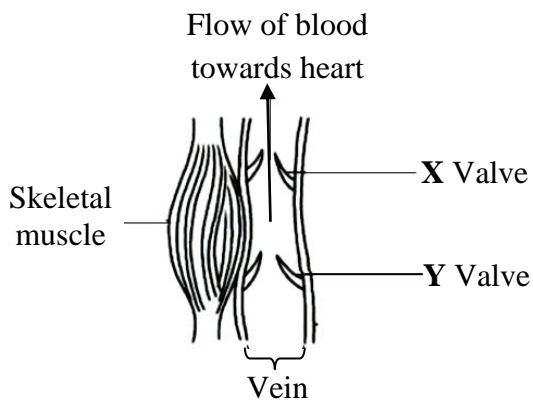
- A. I.
 B. II.
 C. III.
 D. IV.
37. Consider the given characteristics of a blood vessel.

Blood Pressure	Concentration of Oxygen	Target Organ
Low	High	Heart

The blood vessel identified is

- A. renal artery.
 B. femoral vein.
 C. hepatic artery.
 D. pulmonary vein.

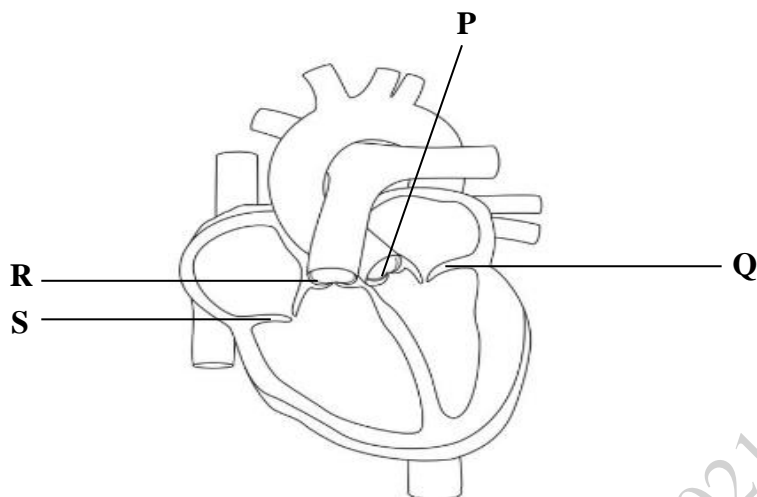
38. In the human circulatory system, the blood vessel which has the highest blood pressure is the
- A. aorta.
 - B. venules.
 - C. arterioles.
 - D. vena cava.
39. The given diagram represents the regulation of blood flow in a vein.



What would be the condition of valves **X** and **Y** when the adjacent skeletal muscles are contracted and the flow of blood is towards the heart?

	X	Y
A	Open	Open
B	Close	Open
C	Close	Close
D	Open	Close

40. The given diagram represents the human heart.

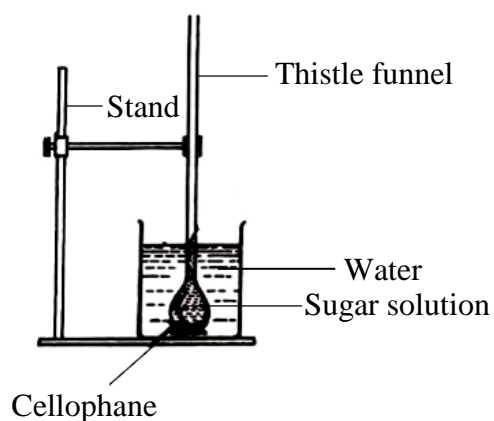


Which of these labelled valves are CORRECTLY aligned with their function?

Allows Flow of Blood from		
	Right Ventricle to Pulmonary Trunk	Left Ventricle to Aorta
A	S	Q
B	P	R
C	R	P
D	Q	S

ALTERNATE TO PRACTICAL (ATP: Questions 41-50)

41. The diagram represents an experimental set-up for the demonstration of osmosis.



In contrast to the solution in the beaker, the solution in the thistle funnel is

- A. dilute.
- B. isotonic.
- C. hypotonic.
- D. hypertonic.

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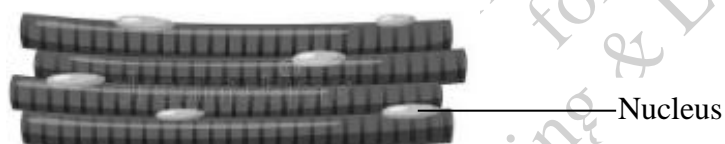
42. Four potato cubes (**W**, **X**, **Y** and **Z**) were immersed in separate beakers, each containing iodine solution. After fifteen minutes, they were taken out. All cubes were then cut into half to see the depth of diffusion.

The given table shows the result of this experiment.

Potato Cubes	Length of One Side of Potato Cube (cm)	Surface Area to Volume Ratio	Depth of Diffusion (cm)
W	0.6	10	0.5
X	1	6	0.4
Y	2	3	0.3
Z	4	1.5	0.12

The cube that has absorbed the iodine solution at the **MOST** efficient rate is

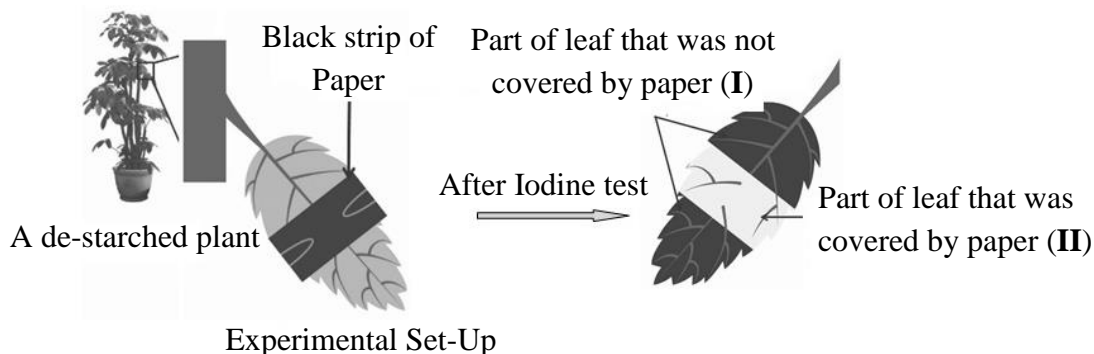
- A. W.
 B. X.
 C. Y.
 D. Z.
43. The given diagram represents a microscopic view of one of the types of muscle tissues.



This type of muscle tissue is present in

- A. eyes.
 B. triceps.
 C. ear pinnae.
 D. blood vessels.

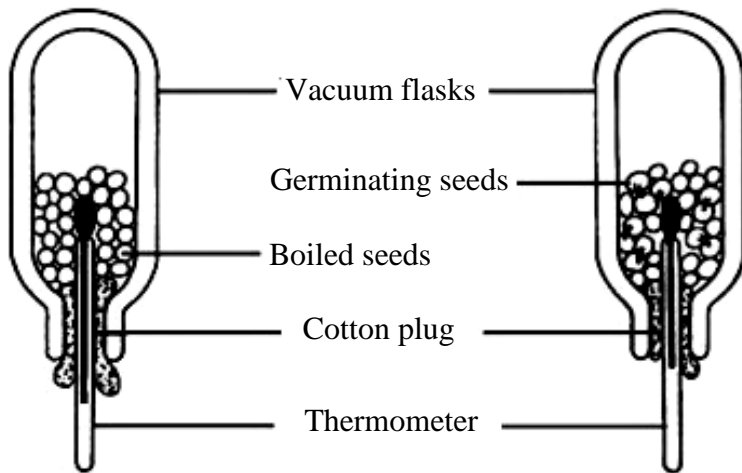
44. The given image shows an experimental set-up in which a de-starched plant is kept in the sunlight for a day and an iodine test was conducted on the experimental leaf.



The option that CORRECTLY identifies the part of experimental leaf which shows the presence of starch and the reason of this result is

	Identification	Reason
A	I	It obtained required sunlight to synthesise starch.
B	I	Stored starch is converted into maltose.
C	II	It obtained required carbon dioxide to form sucrose.
D	II	Stored starch is used by the plant.

45. The given experimental set-up shows that heat is produced during respiration in germinating peas.



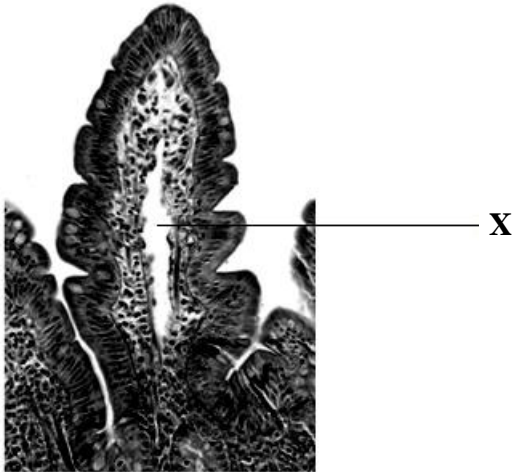
The given result is obtained after keeping this set-up for 3-4 days which is inaccurate.

	Vacuum Flask Containing Boiled Seeds	Vacuum Flask Containing Germinating Seeds
Temperature	25°C	24°C

Which of the following would be the possible reason for increased temperature in the vacuum flask containing boiled seeds?

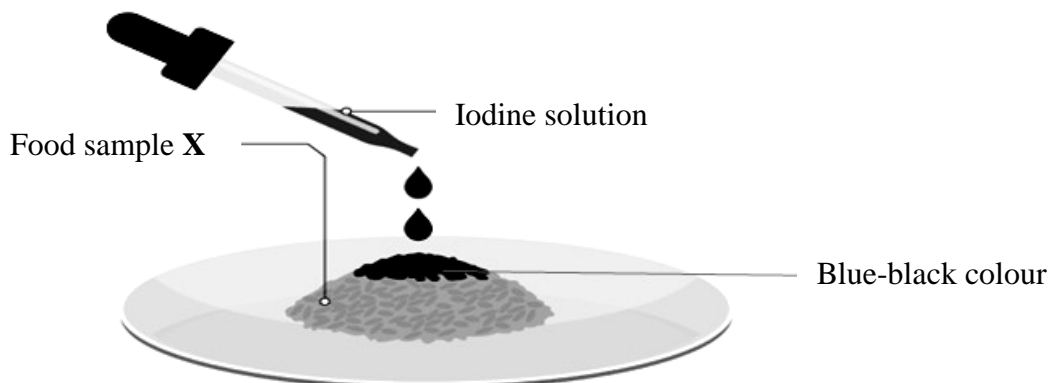
- A. Some bacteria might be present in the flask.
 - B. Carbon dioxide content in the flask might be increased.
 - C. Cotton wool might prevent the escape of heat from the flask.
 - D. A vacuum flask might have increased the internal temperature.
46. A variegated leaf is used to investigate the factor necessary for photosynthesis because a variegated leaf
- A. synthesises glucose at a high rate.
 - B. contains large amount of chlorophyll.
 - C. absorbs maximum amount of sunlight.
 - D. contains some green and white patches.

47. Given is the microscopic image of the transverse section of a part of the human small intestine.



The labelled part **X** is identified as

- A. lacteals.
 - B. Goblet cells.
 - C. blood vessels.
 - D. smooth muscles.
48. A pregnant woman's urine sample was tested positive for Benedict's test.
- This positive result indicates that the urine sample contains
- A. lipid.
 - B. glucose.
 - C. proteins.
 - D. sodium ions.
49. The given diagram shows iodine test performed on a food sample.

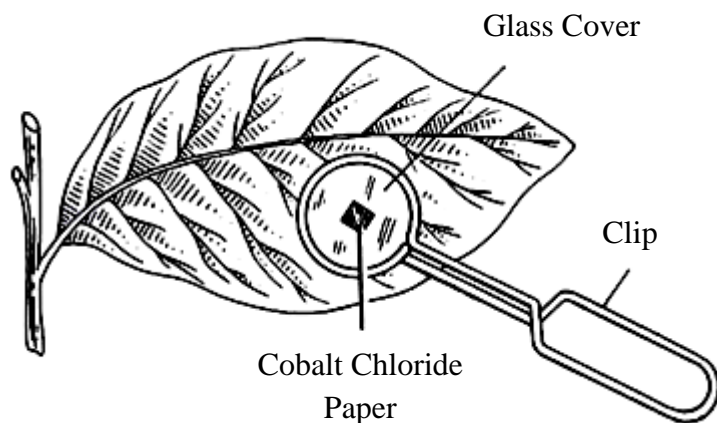


The food sample **X** would be

- A. cheese.
- B. nuts powder.
- C. breadcrumbs.
- D. scrambled egg.

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50. The given image shows an experimental set-up to investigate transpiration in plants. After few hours, the colour of cobalt chloride paper changes from blue to pink.



This change of colour is due to the

- A. presence of chlorophyll in the leaf.
- B. water vapours produced by the leaf.
- C. pressure exerted by the clip on the paper.
- D. blockage of light by cobalt chloride paper.

AGA KHAN UNIVERSITY EXAMINATION BOARD
SECONDARY SCHOOL CERTIFICATE
CLASS IX
ANNUAL EXAMINATIONS 2022

Biology

Total Time: 1 hour 40 minutes

Total Marks: 50 (40-Theory & 10-Alternate to Practical)

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 50 only.
4. Question Distribution:

Theory	Alternate to Practical (ATP)
40 MCQs	10 MCQs

5. 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) (C) (D)	1 (A) (B) (C) (D)
	2 (A) (B) (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

<u>Candidate's Signature</u>

6. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
7. DO NOT write anything in the answer grid. The computer only records what is in the circles.
8. The marks obtained on the 40 MCQs will be equated to the total marks of 65 for the theory examination results.
9. You may use a simple calculator if you wish.

THEORY (Questions 1-40)

1. Asif wants to investigate the effect of different factors on the activity of salivary amylase. The most appropriate **FIRST** step for Asif to undertake is to

A. test a variable.
 B. put forward a theory.
 C. formulate a hypothesis to test.
 D. gather and set up the required materials.

2. A scientist conducts an experiment to test the given hypothesis.

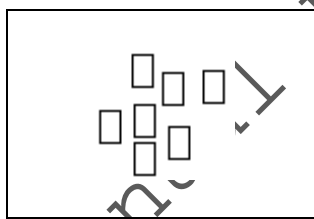
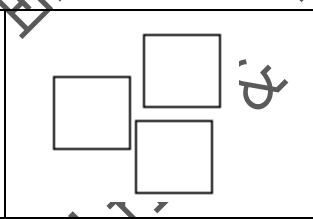
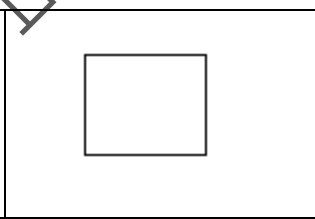
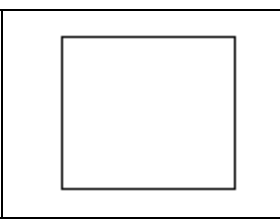
‘A species of a plant produces more fruits when exposed to blue wavelength of light at night.’

In the experimental group, the scientist exposes 20 plants to blue light at night.

What should the scientist do with the same number and species of plants used in the control group?

A. Expose them to blue light all the time
 B. Do not expose them to blue light at night
 C. Do not expose them to blue light during the day
 D. Expose them to a different wavelength of light like red

3. In the given table, different sizes of blocks represent nutrients. Which of the following nutrients will be efficiently absorbed by the villi?

			
A	B	C	D

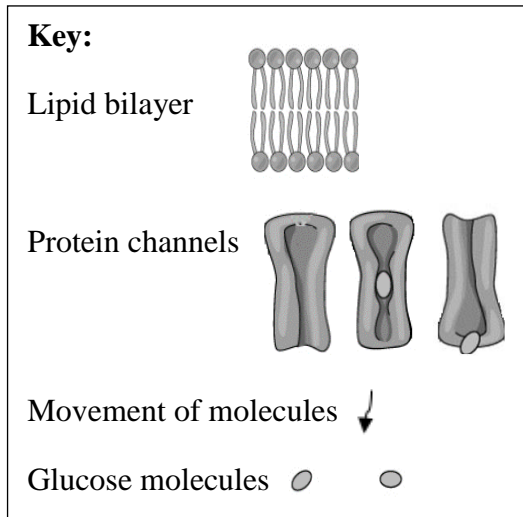
4. The layers of flat and closely packed cells of stratified squamous epithelium are **MAINLY** significant to

A. secrete chemical substances into the blood.
 B. provide protection against mechanical injury.
 C. allow the exchange of materials with tissue fluid.
 D. prevent the accumulation of mucous in the windpipe.

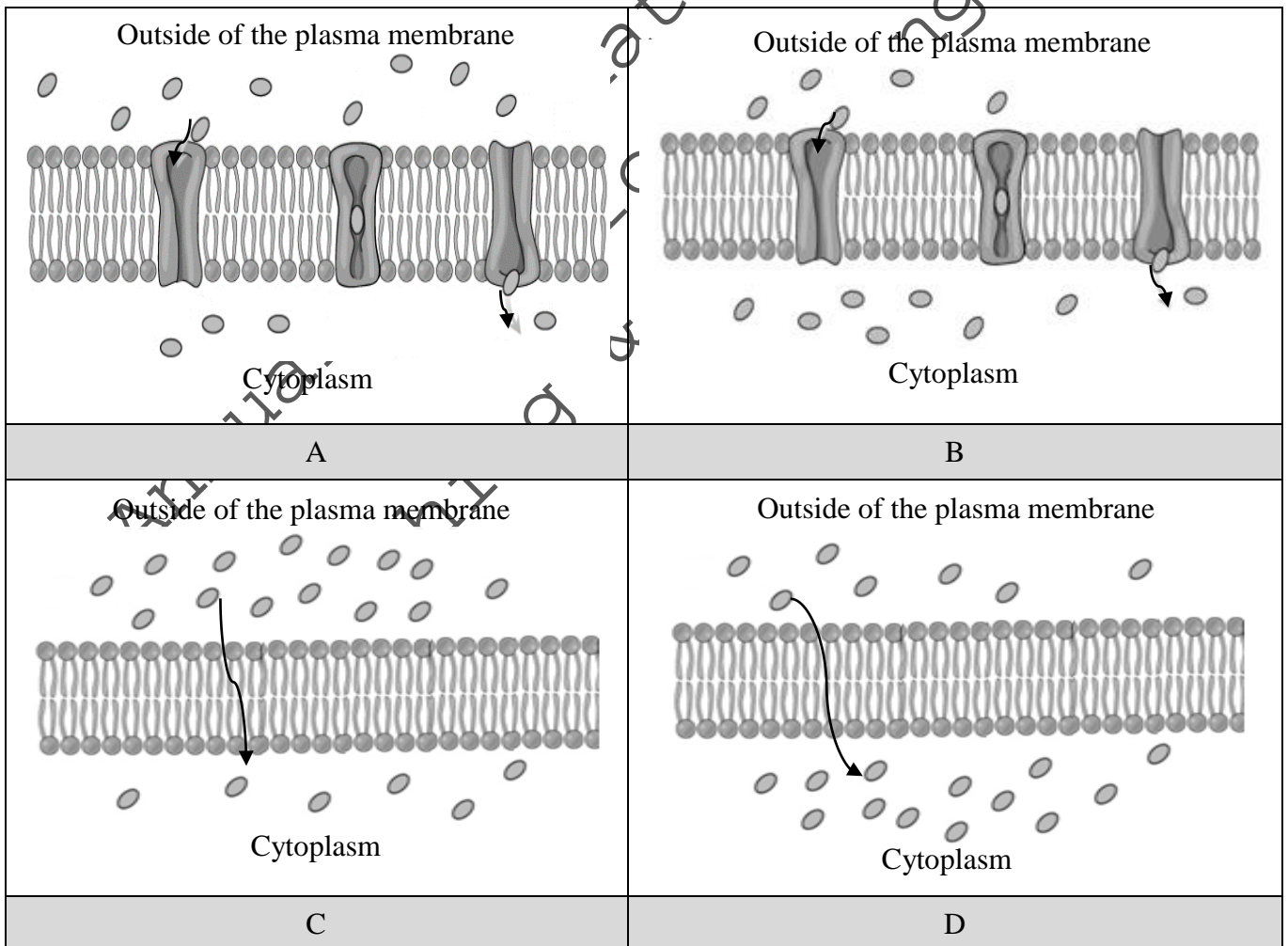
5. Which of the following characteristics of a cell determine its size and shape?

A. Location and function
 B. DNA content and size of the nucleus
 C. Structure of cellular organelles and their functions
 D. Composition of cell membrane and cellular organelles

6. Use the given key to answer the following question.

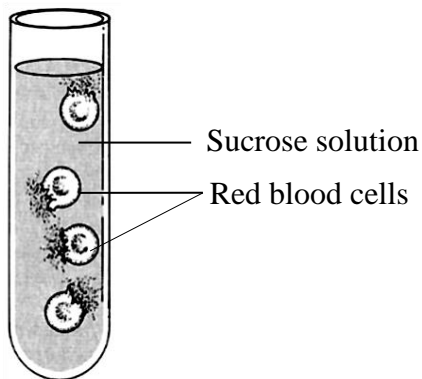


The diagram that CORRECTLY represents the movement of glucose molecules into red blood cells through the process of facilitated diffusion is



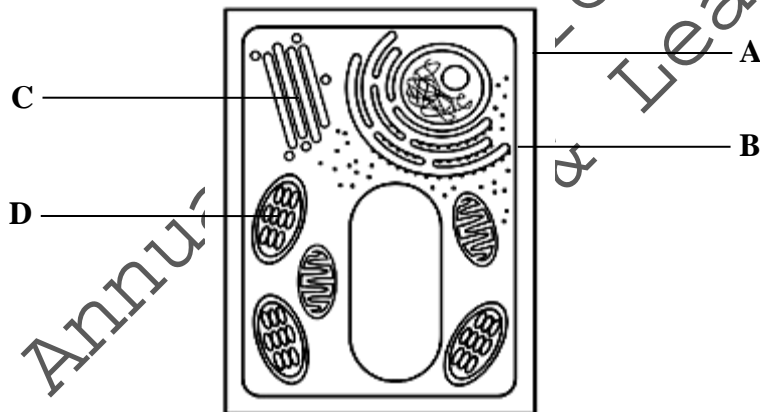
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7. The given diagram shows the condition of human red blood cells when kept in sucrose solution.
(**Note:** The internal concentration of red blood cells is 0.9%.)



The concentration of sucrose solution in this situation would be

- A. 3%.
 - B. 5%.
 - C. 0.9%.
 - D. 0.1%.
8. The given diagram represents a plant cell. The part of the cell which is composed of cellulose is labelled as



9. ATP hydrolysis provides energy to transport the substances against their concentration gradient.
If ATP hydrolysis is inhibited, then which of the following will NOT be able to transport through the cell?
- A. Vitamin D
 - B. Sodium ions
 - C. Oxygen molecules
 - D. Carbon dioxide molecules

10. Following are the structural features of three different organelles.

- I. Its outer membrane is smooth, but the inner membrane forms many infoldings.
- II. It is composed of nine triplets of microtubules.
- III. It consist of a set of flattened sacs that are stacked over each other.

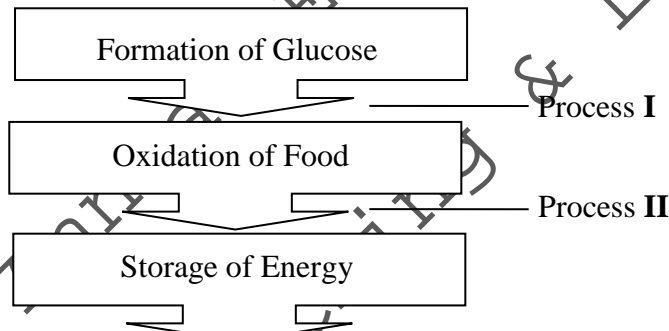
The option that CORRECTLY identifies organelles **I**, **II** and **III** is

	I	II	III
A	ribosome	smooth endoplasmic reticulum	centriole
B	smooth endoplasmic reticulum	Golgi apparatus	ribosomes
C	Golgi apparatus	ribosome	mitochondria
D	mitochondria	centriole	Golgi apparatus

11. In light-dependent reactions of photosynthesis, the number of water molecules that produces TWO oxygen molecules during photolysis is

- A. 2
- B. 3
- C. 4
- D. 6

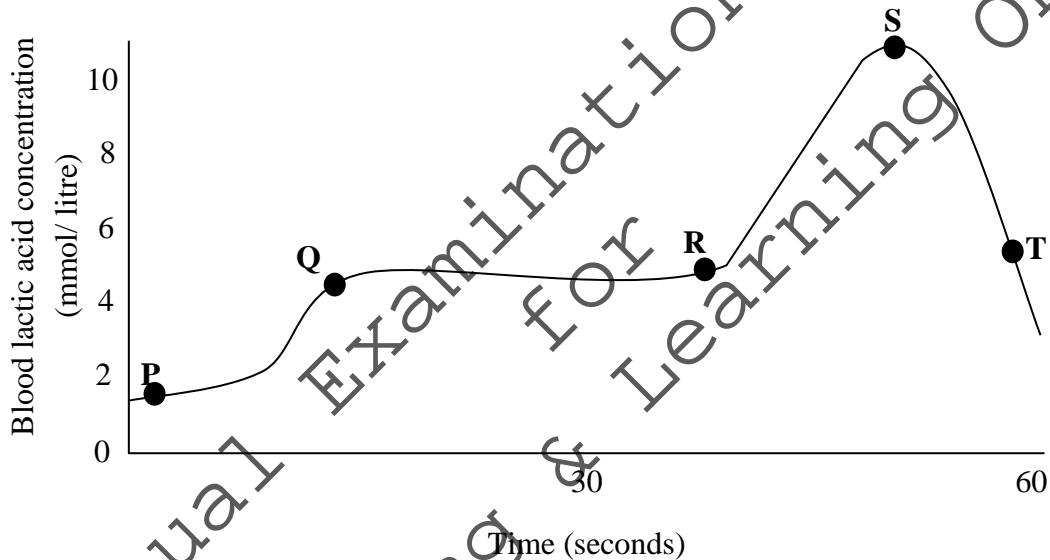
12. The given flow chart shows different processes involved in the energy transformation in plants.



Which of the following is CORRECT about the flow of energy at process **I** and **II**?

	Process I	Process II
A	Input of light energy	Release of heat energy
B	Input of light energy	Input of light energy
C	Release of heat energy	Release of heat energy
D	Release of heat energy	Input of light energy

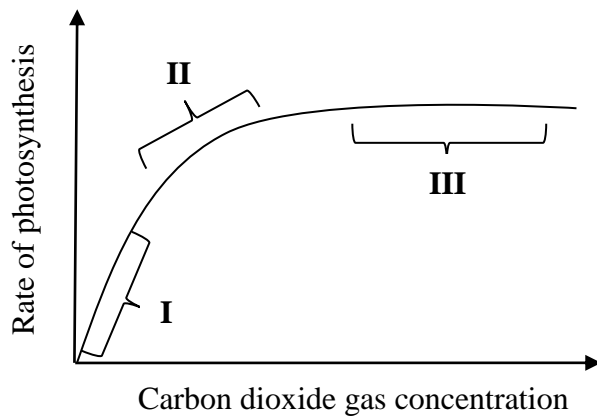
13. Which of the following conditions causes the accumulation of ATP and NADPH in the stroma of an illuminated chloroplast?
- Addition of water
 - Absence of oxygen
 - Addition of glucose
 - Absence of carbon dioxide
14. In light-dependent reactions of photosynthesis, the source of electrons for NADPH is
- ATP.
 - NAD.
 - water.
 - carbon dioxide gas.
15. The given graph shows the blood lactic acid concentration of an athlete before, during and after a race.



The sections of graph which show anaerobic respiration during the race are

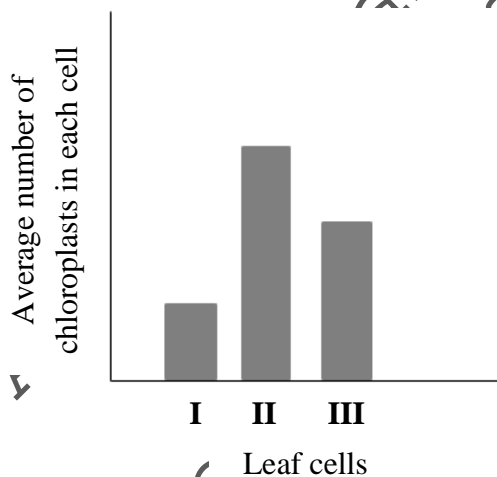
- Q to R and S to T.
- P to Q and Q to R.
- P to Q and R to S.
- Q to R and R to S.

16. The given graph illustrates the effect of carbon dioxide gas (CO₂) concentration on the rate of photosynthesis.



The region(s) at which the CO₂ concentration do(es) NOT act as a limiting factor is/ are

- A. I only.
 - B. I and II.
 - C. III only.
 - D. II and III.
17. The given bar graph shows the average number of chloroplasts in three different types of leaf cells, I, II and III.



Based on the average number of chloroplasts, the option that identifies leaf cells I, II and III is

	I	II	III
A	palisade mesophyll cell	spongy mesophyll cell	guard cell
B	guard cell	palisade mesophyll cell	spongy mesophyll cell
C	spongy mesophyll cell	guard cell	palisade mesophyll cell
D	spongy mesophyll cell	palisade mesophyll cell	guard cell

18. If the inner membrane of chloroplast is damaged in a newly developed cell, then the structure(s) which will be immediately affected due to this damage is/ are
- DNA.
 - stroma.
 - thylakoid.
 - ribosomes.
19. The given table shows the composition of inspired and expired air in humans.

Gas	Inspired Air Approx. %	Expired Air Approx. %
O ₂	20.95	16
CO ₂	0.04	4
N ₂	79	?

The percentage of N₂ in expired air is

- 95%.
 - 79%.
 - 35%.
 - 0%.
20. In the human respiratory system, the structure X warms and filter the inspired air, whereas, the structure Y is associated with the gaseous exchange

The option which CORRECTLY identifies the structure X and Y is

	X	Y
A	nasal cavity	alveoli
B	epiglottis	trachea
C	trachea	epiglottis
D	alveoli	nasal cavity

21. Which of the following physiological conditions can block the upper respiratory passages in the human respiratory system?
- Severely swollen epiglottis
 - Growth of large number of hair in nostrils
 - Accumulation of pleural fluid around the lungs
 - Secretion of less amount of mucous in the trachea

22. Given are some of the features of an organ involved in the breathing mechanism of humans.

- It is located below lungs.
- It is composed of skeletal muscles.
- It contracts and relax while breathing.

Based on the given features, this organ is identified as

- A. trachea.
- B. bronchus.
- C. diaphragm.
- D. inter coastal muscles.

23. The option which CORRECTLY identifies the component of a secretion which neutralises the acidic chyme in duodenum and the source of this secretion is

	Component of a Secretion	Source of Secretion
A	mucous	stomach
B	trypsinogen	pancreas
C	bicarbonates	pancreas
D	pepsinogen	stomach

24. A nutritionist recommends a male adult to consume liver, beans and red meat regularly in his diet to overcome the following symptoms.

- Pale skin
- Shortness of breath
- Tiredness and lethargy

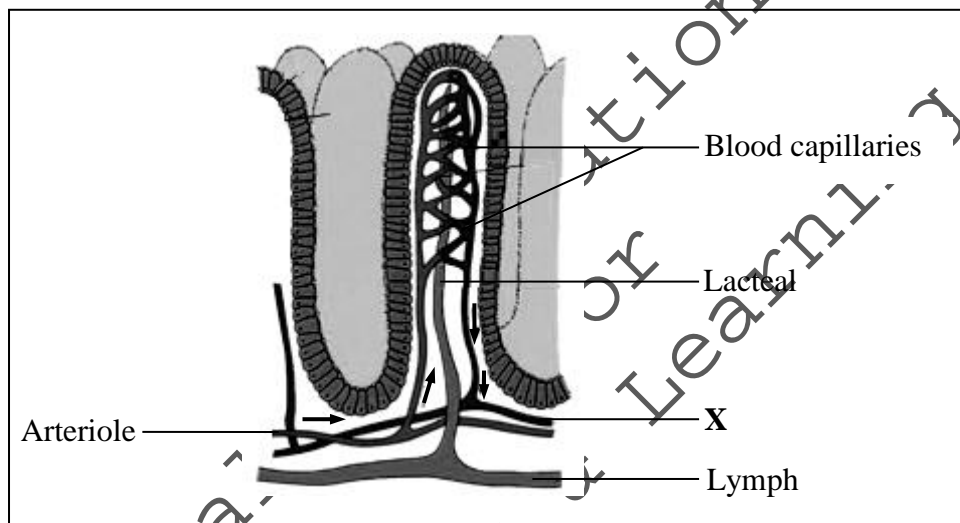
With reference to the given information, the adult person's body has a deficiency of

- A. iron.
- B. calcium.
- C. vitamin C.
- D. vitamin D.

25. Which of the following characteristics of the human digestive system provides protection against pathogens?

- A. The release of acid in the stomach
- B. The presence of villi in the intestine
- C. The secretion of bile into duodenum
- D. The formation of vitamin K in the large intestine

26. The acidic nature of chyme is changed to alkaline in order to
- stimulate emulsification.
 - kill harmful microorganisms.
 - prevent the secretion of intestinal juices.
 - provide optimum pH for trypsin to work.
27. Which of the following statements is CORRECT about the chemical digestion in the human alimentary canal?
- Digestion of carbohydrate starts in the stomach.
 - Proteins are digested in the stomach and small intestine.
 - Inactive forms of amylase and lipase are produced by the pancreas.
 - Esophageal wall produces active enzymes for the digestion of starch.
28. The given diagram represents the longitudinal section of a human villus.



Blood from the vessel X enters into the

- aorta.
 - femoral artery.
 - hepatic portal vein.
 - superior vena cava.
29. Which of the following options is CORRECT about the movement of the soft palate and the larynx during swallowing?

Movement of the		
	Soft Palate	Larynx
A	Up	Up
B	Up	Down
C	Down	Up
D	Down	Down

30. All of the following minerals are examples of macronutrients required for plants EXCEPT
- A. nitrogen.
 - B. potassium.
 - C. manganese.
 - D. phosphorus.
31. In the human digestive system, **X** is a chemical secretion that contains enzyme which digests fats.

The option which CORRECTLY identifies **X**, the enzyme it contains and the site of action for the enzyme is

	Chemical Secretion X	Enzyme Present in X	Site of Action for the Enzyme
A	bile	lipase	liver
B	pancreatic juice	lipase	duodenum
C	gastric juice	amylase	stomach
D	saliva	amylase	mouth

32. The laboratory test of a blood sample reveals the presence of anti-B antibodies in the blood plasma.
- This blood sample can be successfully transfused into a person having blood group
- A. A or O.
 - B. O or B.
 - C. A or AB.
 - D. B or AB.
33. In the human blood, the antigens for Rh factor are present
- A. in the blood serum.
 - B. in the blood plasma.
 - C. on the plasma membrane of red blood cells.
 - D. on the plasma membrane of white blood cells.
34. The normal pulse rate for a healthy adult, in a resting condition, ranges from
- A. 30 to 50
 - B. 60 to 100
 - C. 90 to 130
 - D. 100 to 150
35. During blood circulation through atria and ventricles, valves open or close. The opening or closing of valves is MAINLY due to the
- A. recoiling of stretched elastic layer of the aorta.
 - B. pressure differences on either side of the valves.
 - C. relaxation of smooth muscles of the pulmonary artery.
 - D. difference in solute concentration of the blood between chambers.

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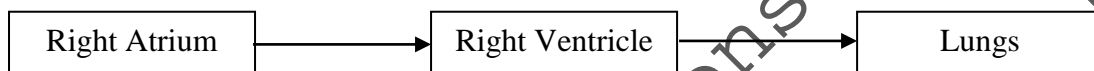
36. The given events occur during the circulation of blood through atria and ventricles of the heart.

- I. Blood is pushed into the aorta.
- II. Aortic semilunar valves are opened.
- III. Pulmonary semilunar valves are closed.
- IV. Atrioventricular valves are pushed open.

Which of these given events occur when the left atrium contracts?

- A. I and II
- B. I and IV
- C. II and III
- D. III and IV

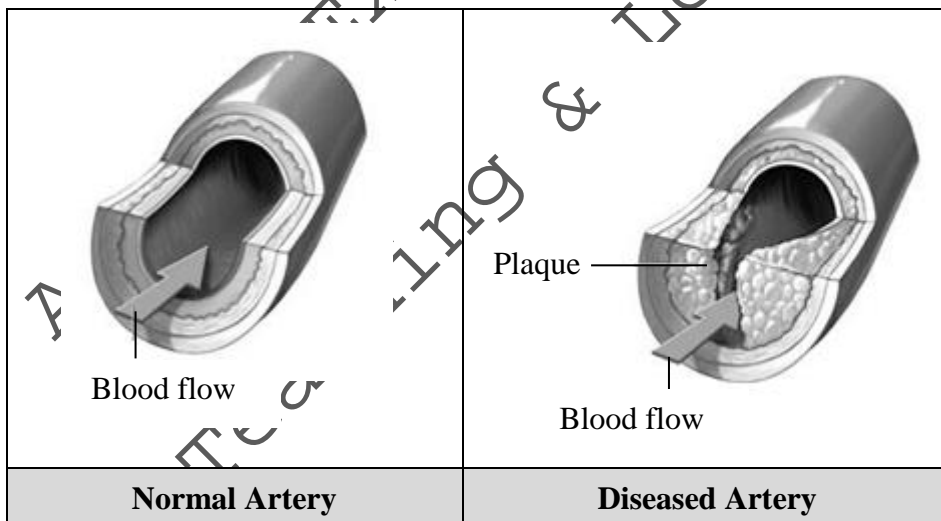
37. Given is the pathway of blood in the circulatory system of the human body.



The given pathway shows the circulation of

- A. oxygenated blood from the lungs to heart.
- B. oxygenated blood from the heart to lungs.
- C. deoxygenated blood from the heart to lungs.
- D. deoxygenated blood from the lungs to heart.

38. Consider the given images.



The image of diseased artery represents

- A. leukaemia.
- B. thalassemia.
- C. atherosclerosis.
- D. myocardial infarction.

39. The cells that transport organic nutrients from leaves to the other parts of a plant are
- vessels and tracheids.
 - sieve tubes and tracheids.
 - companion cells and vessels.
 - sieve tubes and companion cells.
40. Which of the following options is CORRECT about thrombocytes?

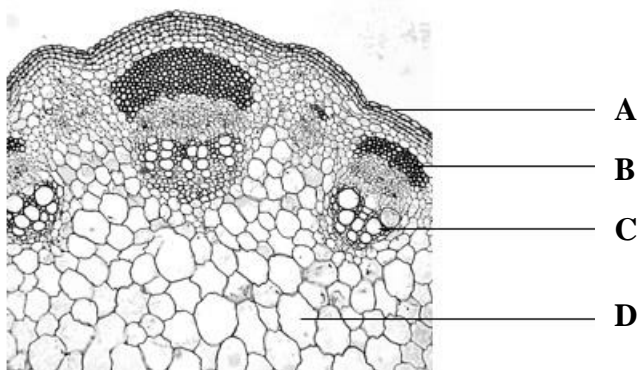
	Nucleus	Pigment	Life span
A	Absent	Absent	7-8 days
B	Present	Absent	120 days
C	Absent	Present	7-8 days
D	Present	Present	120 days

ALTERNATE TO PRACTICAL (ATP: Questions 41-50)

41. Samreen is given three objective lenses with magnification powers 10X, 100X and 40X, respectively to observe a specimen under the light microscope.

The CORRECT order of magnification that Samreen should use to observe the specimen is

- 10X, 40X and 100X.
 - 40X, 100X and 10X.
 - 40X, 10X and 100X.
 - 100X, 40X and 10X.
42. In the given diagram of the transverse section of a dicot stem, parenchyma tissues are labelled as



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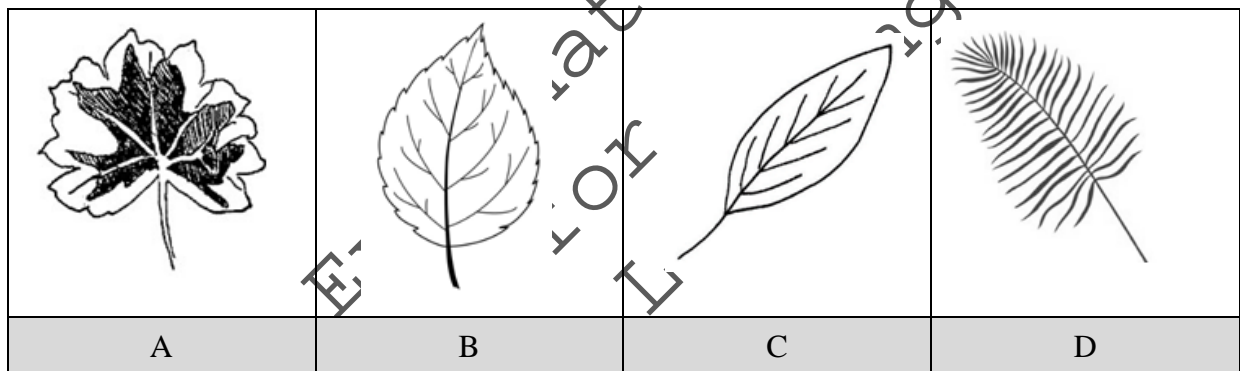
43. The given table represents initial and final masses of potato cubes, before and after keeping them in four different concentrations of salt solutions labelled as, **I, II, III** and **IV**.

The salt solution that is hypotonic to the potato cubes is

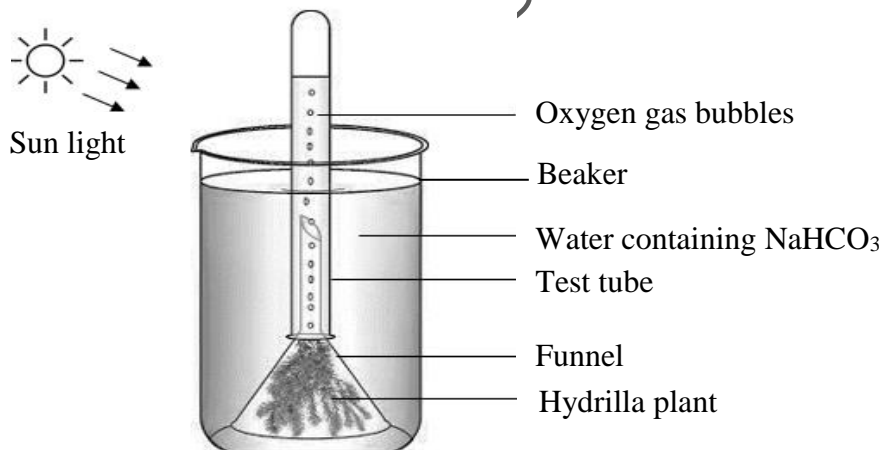
	Salt Solution	Initial Mass (g)	Final Mass (g)
A	I	12	15
B	II	12	12
C	III	12	8
D	IV	12	6

44. Salma wants to conduct an experiment to investigate that chlorophyll is necessary for photosynthesis. To carry out the experiment, she takes four different leaves labelled as, **A, B, C** and **D**.

Which of the following leaves should Salma select to carry out the experiment?



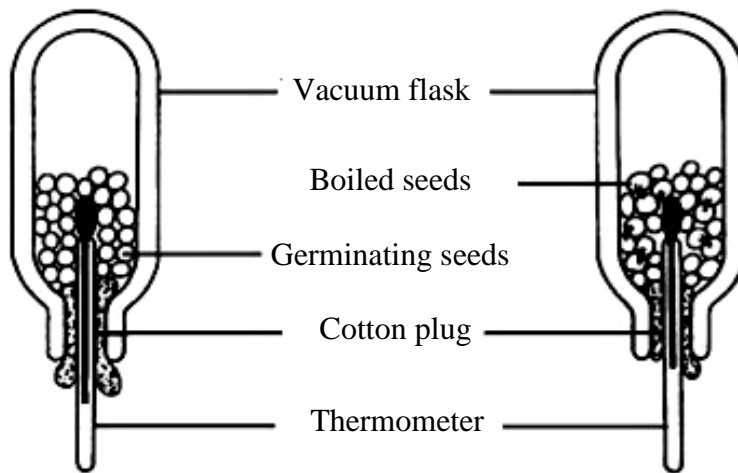
45. Consider the given experimental setup,



Oxygen gas bubbles will NOT be produced in the test tube if the

- A. beaker is filled with distilled water.
- B. test tube is covered by the black paper.
- C. hydrilla plant is replaced with a fresh aquatic plant.
- D. potassium bicarbonate is added in the beaker containing water.

46. Misbah has set the apparatus in the following way to investigate the release of heat during aerobic respiration in germinating seeds.



Vacuum flask I

Vacuum flask II

Which of the following reactions will take place in the vacuum flask I?

- A. $2C_3H_4O_3 + 4H \rightarrow 2C_3H_6O_3$
 B. $2C_3H_4O_3 + 4H \rightarrow 2C_2H_5OH + 2CO_2$
 C. $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$
 D. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$

$C_6H_{12}O_6$ = Glucose
 $C_3H_4O_3$ = Pyruvic acid
 $C_3H_6O_3$ = Lactic acid
 C_2H_5OH = Ethyl alcohol

47. The given table represents the results obtained after the biochemical tests that were carried out on different food samples.

Sample	Benedict's Test	Biuret Test
W	Positive	Negative
X	Negative	Negative
Y	Negative	Positive
Z	Positive	Positive

The inference that is BEST supported by the given table is that the food sample

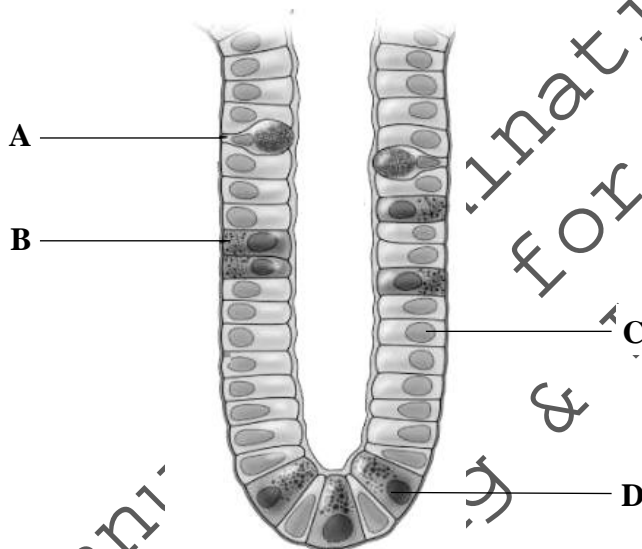
- A. X is egg white.
 B. Z is coconut oil.
 C. Y is an apple juice.
 D. W is an orange juice.

48. A student performs Benedict's test on four different samples in test tubes labelled as, **A, B, C** and **D**, containing varied concentrations of reducing sugars.

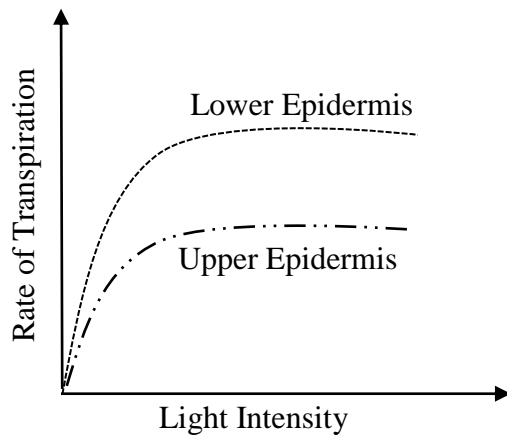
Based on the test result in the given table, the test tube which contains the **HIGHEST** concentration of reducing sugar is

Test Tube	Colour of Precipitates
A	green
B	yellow
C	brown
D	red

49. A student observes the given microscopic image of a human villus. The labelled part that represents a mucous secreting cell is



50. A student performs an experiment to investigate the rate of transpiration at the upper and lower epidermis of a leaf by using a cobalt chloride paper. All the environmental conditions are kept constant. The result of the experiment is illustrated using the given graph.



Which of the following statements CORRECTLY infers the graph?

- A. The upper epidermis is more exposed to light.
- B. The lower epidermis has large number of stomata.
- C. The upper epidermis has large number of chloroplasts.
- D. The lower epidermis requires high light intensity for transpiration.

Annual Examinations 2022
Teaching & Learning Only

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

<table border="1"> <thead> <tr> <th>Organisms</th> <th>Classified into</th> </tr> </thead> <tbody> <tr> <td>Algae</td> <td>Kingdom fungi</td> </tr> <tr> <td>Bacilli</td> <td>Kingdom protista</td> </tr> <tr> <td>Mushrooms</td> <td>Kingdom plantae</td> </tr> <tr> <td>Jelly fish</td> <td>Kingdom animalia</td> </tr> </tbody> </table>	Organisms	Classified into	Algae	Kingdom fungi	Bacilli	Kingdom protista	Mushrooms	Kingdom plantae	Jelly fish	Kingdom animalia	<table border="1"> <thead> <tr> <th>Organisms</th> <th>Classified into</th> </tr> </thead> <tbody> <tr> <td>Algae</td> <td>Kingdom protista</td> </tr> <tr> <td>Bacilli</td> <td>Kingdom monera</td> </tr> <tr> <td>Mushrooms</td> <td>Kingdom fungi</td> </tr> <tr> <td>Jelly fish</td> <td>Kingdom animalia</td> </tr> </tbody> </table>	Organisms	Classified into	Algae	Kingdom protista	Bacilli	Kingdom monera	Mushrooms	Kingdom fungi	Jelly fish	Kingdom animalia
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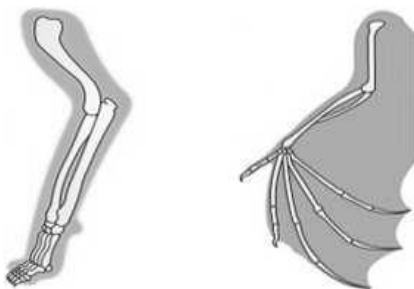
6. Sana examined a specimen in the laboratory and made the following observations.

- 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

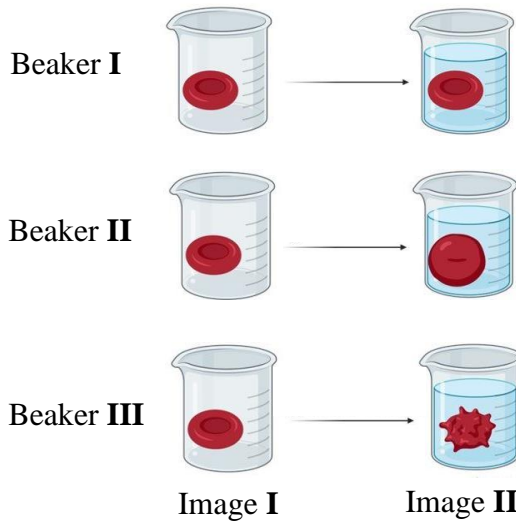
The animals that belong to the same family are

- 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.

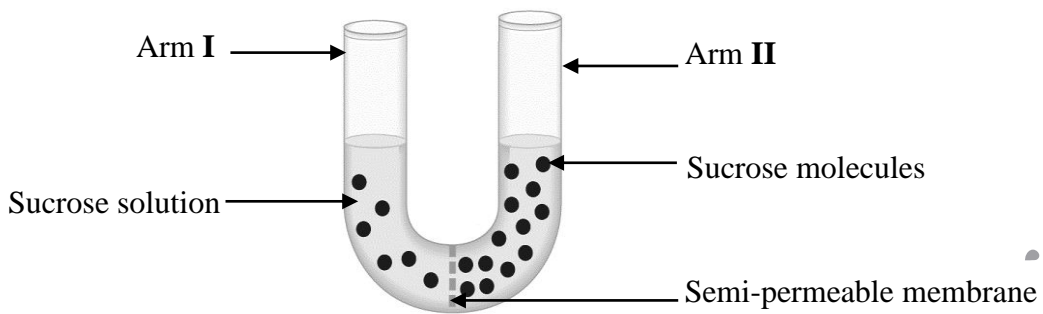
12. An experiment is conducted to determine the effect of tonicity of the solutions on red blood cells. Image II represents the condition of RBCs after keeping them in different concentration of solutions in beaker I, II and III for a particular time.



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:

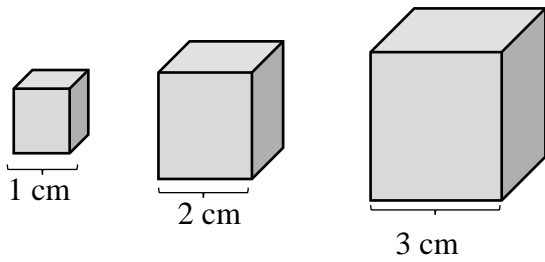
Sucrose molecule

Water molecule

Semipermeable membrane

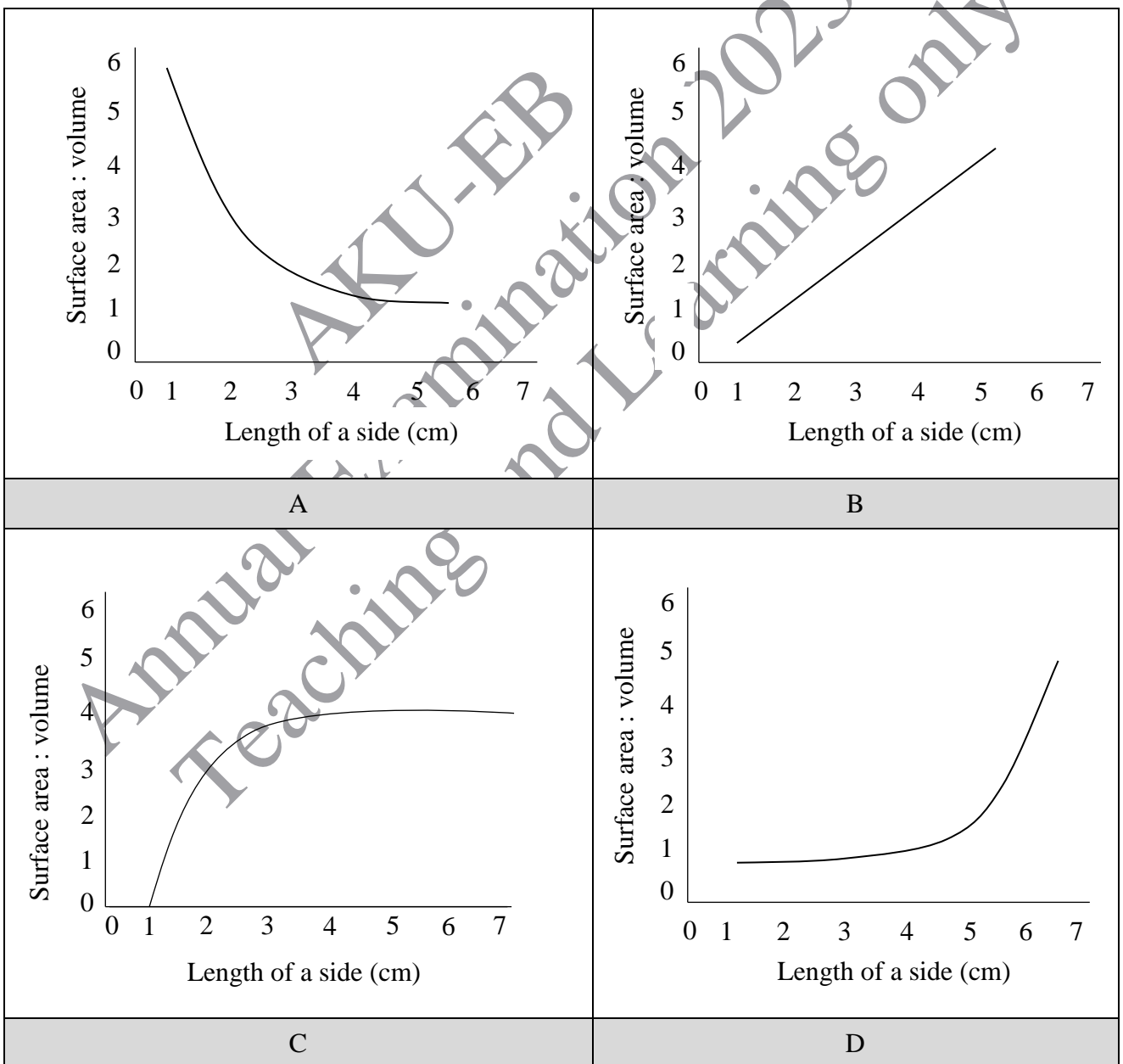
Arm I	Arm II	Arm I	Arm II
A		B	
Arm I	Arm II	Arm I	Arm II
C		D	

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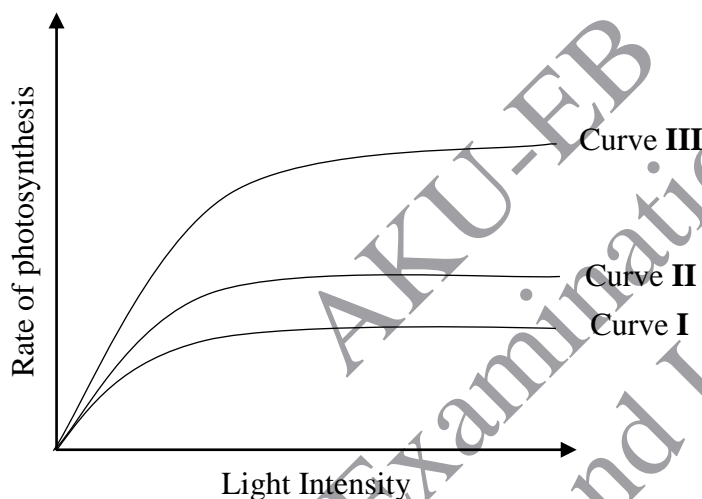
15. In the body of human beings, adenosine triphosphate (ATP) is used to

- 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.

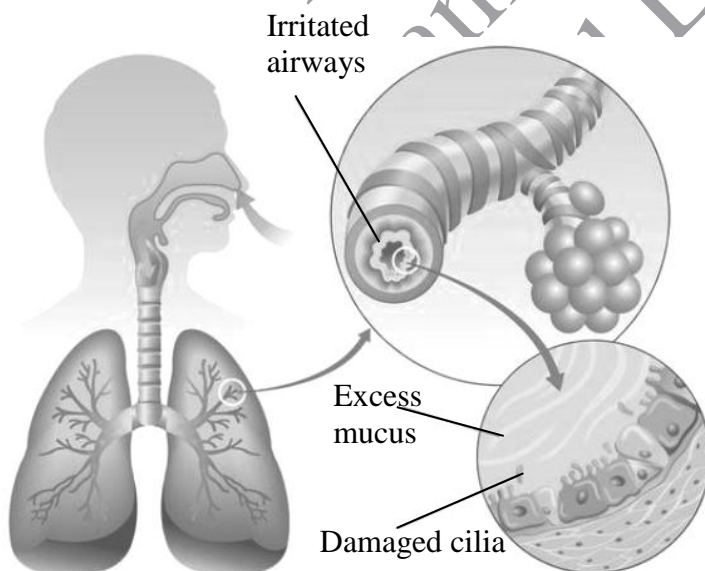
24. The given table shows the concentration of different gases in inspired air of a healthy person.

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.

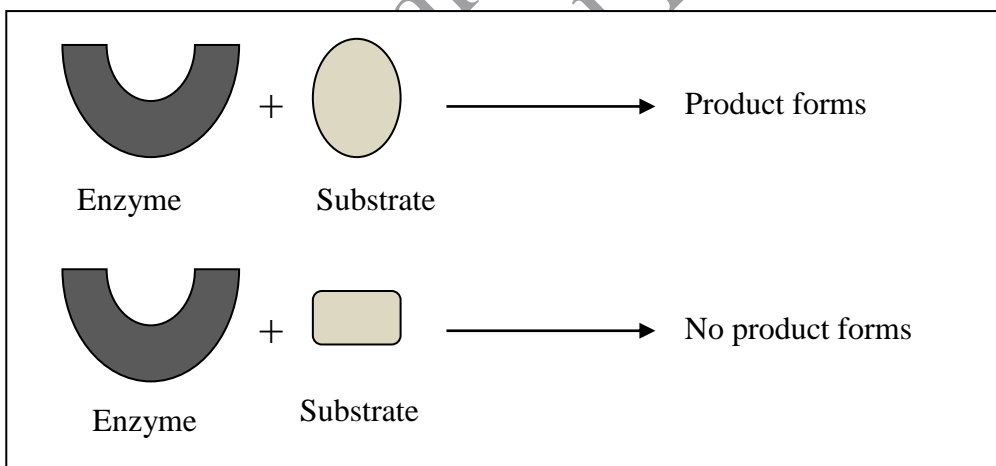
Which of the following conditions will occur due to this drastic change in pH?

- 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.

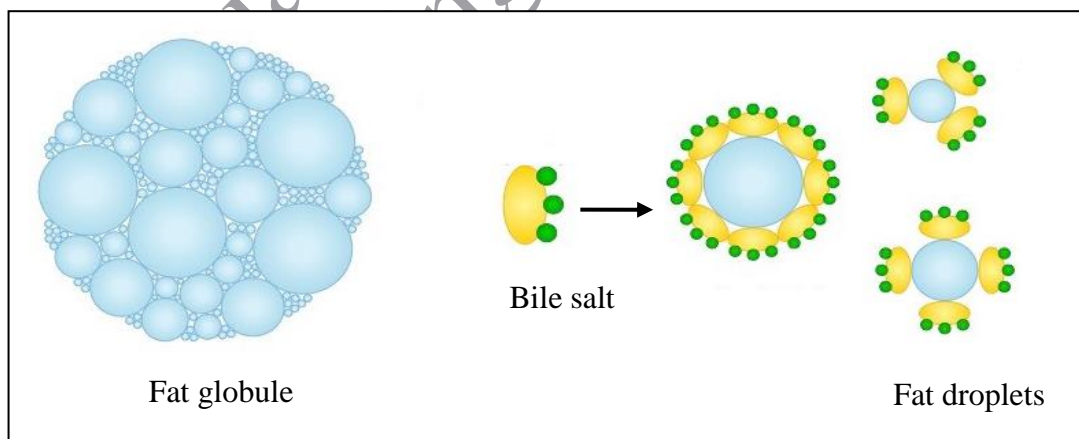
Use of water from these polluted wells can cause diseases in humans and animals because organic fertilisers

- 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.

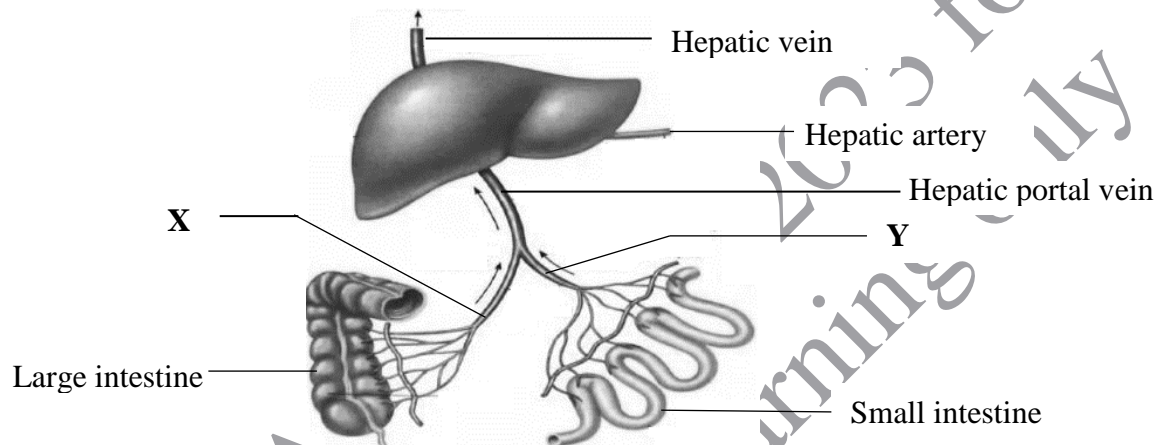


The structure where the given process takes place is

- 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.

PLEASE TURN OVER THE PAGE

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.

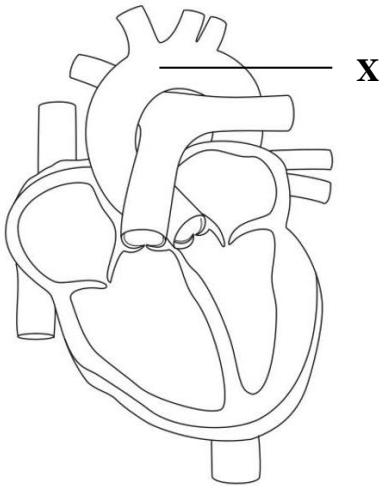
The presence of this clot in the pulmonary trunk will cause the blockage of blood circulation from

- 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

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CLASS IX

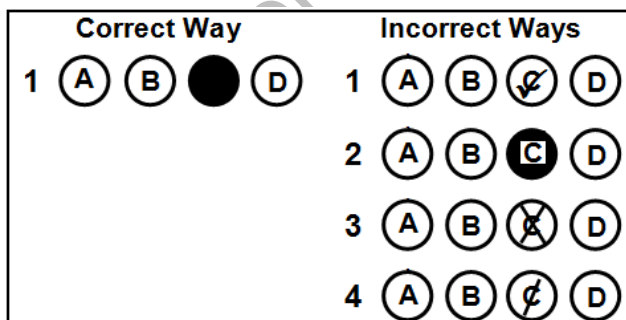
ANNUAL EXAMINATIONS (THEORY) 2024

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.



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. Consider the given image.



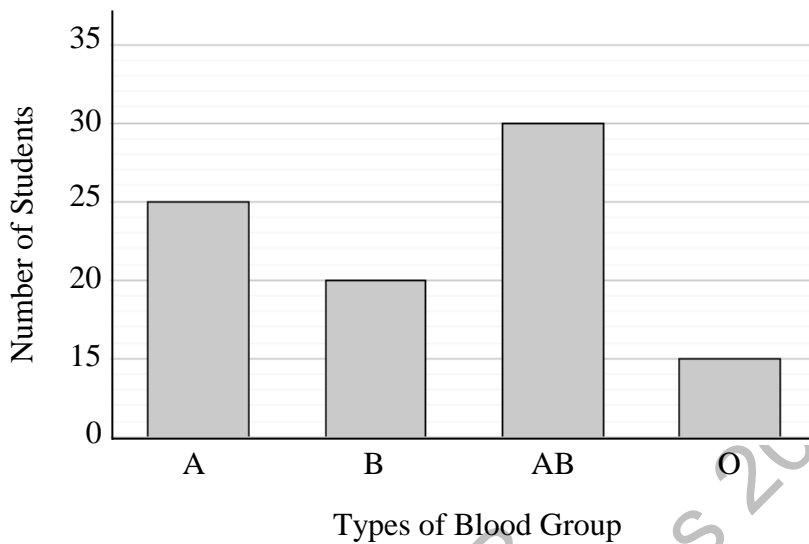
The researcher in the given image can be identified as a

- A. histologist.
 - B. taxonomist.
 - C. palaeontologist.
 - D. biotechnologist.
2. In contrast to multicellular organisms, unicellular organisms
- A. show division of labour at organ system level.
 - B. are entirely exposed to the environment.
 - C. have complex body organisation.
 - D. always reproduce sexually.
3. Consider the following observations.
- I. The temperature of a room increases by 5°C .
 - II. Flowers in an orchard have round shaped petals.
 - III. The growth of fungus on a piece of bread indicates that it is stale.
 - IV. The rate of reaction increases twice by increasing the enzyme concentration.

The CORRECT pair of qualitative observations is

- A. I and II.
- B. I and IV.
- C. II and III.
- D. III and IV.

4. The given graph shows the number of students having different blood groups in a class.



If three students with blood group A and four students with blood group B leave the class while two students with blood group O join the class, then which blood group students are present least in number?

- A. Blood Group O
 - B. Blood Group A
 - C. Blood Group B
 - D. Blood Group AB
5. The given table shows structural characteristics of an organism.

Property	Present or Absent
Cell wall	Present
Nuclear membrane	Present
Ribosomes	Present
Multi-cellularity	Absent

Based on the given characteristics, the organism could be placed in kingdom

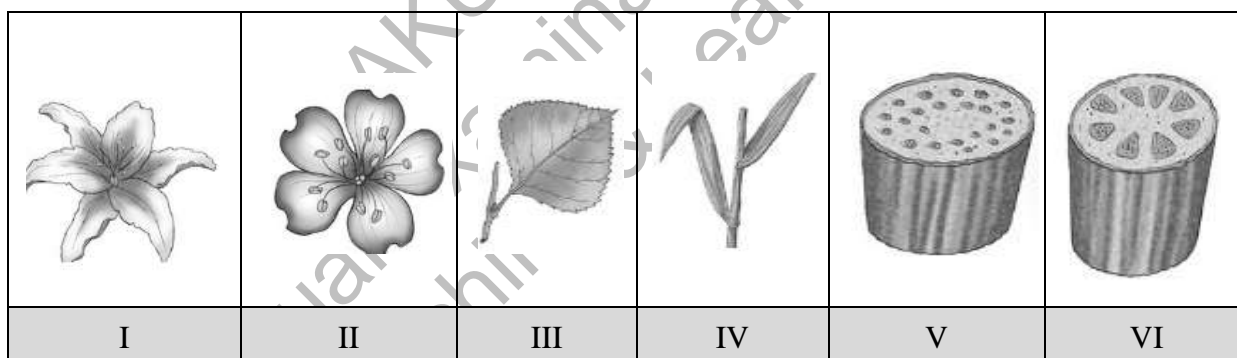
- A. Protista.
- B. Monera.
- C. Plantae.
- D. Fungi.

6. Consider the given table.

Unit of Classification	Example
Kingdom ---- Animalia	housefly, butterfly, whale, frog, snake, bush fly, fruit fly, mayfly
Phylum ---- Arthropoda	housefly, butterfly, fruit fly, bush fly, mayfly
Genus ---- Musca	housefly, bush fly
Species ---- domestica	housefly

According to the given classification, the animal which shares the MOST common characteristics with housefly is a

- A. mayfly.
 B. fruit fly.
 C. bush fly.
 D. butterfly.
7. The set of structures, which represent monocot plants, is



- A. I, III and V.
 B. I, IV and V.
 C. II, IV and VI.
 D. II, III, and VI.
8. In 2011, Western black rhinoceros were declared as critically endangered animals due to their over-hunting.

Which of the following conservation measures is the MOST effective in preventing the rhinoceros from extinction?

- A. Vaccinating them regularly
 B. Introducing different species in their habitat
 C. Attaching metal tags to identify them as endangered animals
 D. Establishing sanctuaries where human interference would be limited

9. Which of the following CORRECTLY identifies the organelle shown in the diagram?



- A. Ribosome
B. Chloroplast
C. Mitochondria
D. Endoplasmic reticulum
10. In the cell, Golgi apparatus lies near the endoplasmic reticulum because Golgi apparatus
- A. provides mechanical strength to the endoplasmic reticulum.
B. receives and utilises ATP molecules from the endoplasmic reticulum.
C. modifies and packages proteins produced by the endoplasmic reticulum.
D. controls the movement of substances in and out of the endoplasmic reticulum.
11. Which of the following options exemplifies the process of exocytosis in a cell?
- A. Phagocytosis of bacteria by white blood cells
B. Secretion of digestive enzymes by pancreatic cells
C. Movement of glucose against the gradient with the help of membrane-bound proteins
D. Movement of sodium and potassium ions from a neuron through sodium-potassium pump
12. The specimens that can be observed under electron microscope are
- I. a sample of epithelial layer
II. a culture of reproducing bacteria
III. a moving amoeba in a drop of water
IV. a piece of tissue taken from mammary gland
- A. I and II.
B. I and IV.
C. II and III.
D. III and IV.

13. The given table shows function of structures, P, Q and R in living things.

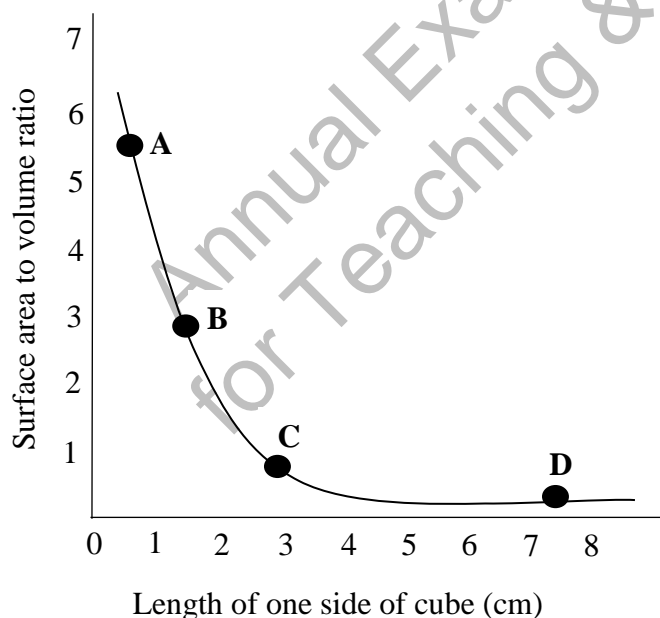
Structure	Function
P	Transport water molecules
Q	Transport oxygen molecules
R	Absorb surrounding water through osmosis

The option which CORRECTLY identifies the structures P, Q and R is

	P	Q	R
A	xylem vessels	red blood cells	root hair cells
B	red blood cells	root hair cells	xylem vessels
C	root hair cells	xylem vessels	red blood cells
D	root hair cells	red blood cells	xylem vessels

14. Jamal calculated the surface area to volume ratio of four different sizes of potato cubes (A, B, C and D) and he plotted the given graph to analyse the results.

With reference to the graph, the potato cube that has more efficient rate of diffusion is



15. Consider the given chemical reaction of water breakdown.



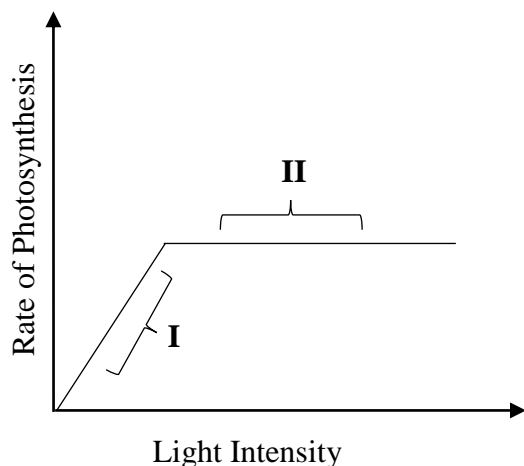
The electrons resulted in the given reaction are gained by

- A. CO_2 in the carbon fixation.
 - B. O_2 during cellular respiration.
 - C. chlorophyll in the photosystem.
 - D. ADP in electron transport chain.
16. Suppose ATP synthesis is stopped in an illuminated chloroplast. This may happen due to
- A. damaged thylakoid membrane.
 - B. denaturation of enzymes present in stroma.
 - C. excessive absorption of light by chloroplast.
 - D. excessive transfer of protons from stroma to thylakoid space.
17. When a molecule of adenosine diphosphate reacts with water, it gives
- A. adenosine triphosphate and hydrogen gas.
 - B. adenosine monophosphate and hydrogen gas.
 - C. adenosine triphosphate and inorganic phosphate.
 - D. adenosine monophosphate and inorganic phosphate.
18. Consider the given word equations.
- I. glucose \rightarrow lactic acid + energy
 - II. glucose \rightarrow ethanol + carbon dioxide + energy
 - III. glucose + oxygen \rightarrow carbon dioxide + water + energy
 - IV. carbon dioxide + water + energy \rightarrow glucose + oxygen

The option that shows the equation for anaerobic respiration in humans and in yeast is

	Anaerobic Respiration in Human	Anaerobic Respiration in Yeast
A	I	II
B	I	III
C	II	IV
D	III	IV

19. The given graph shows one of the factors affecting rate of photosynthesis.

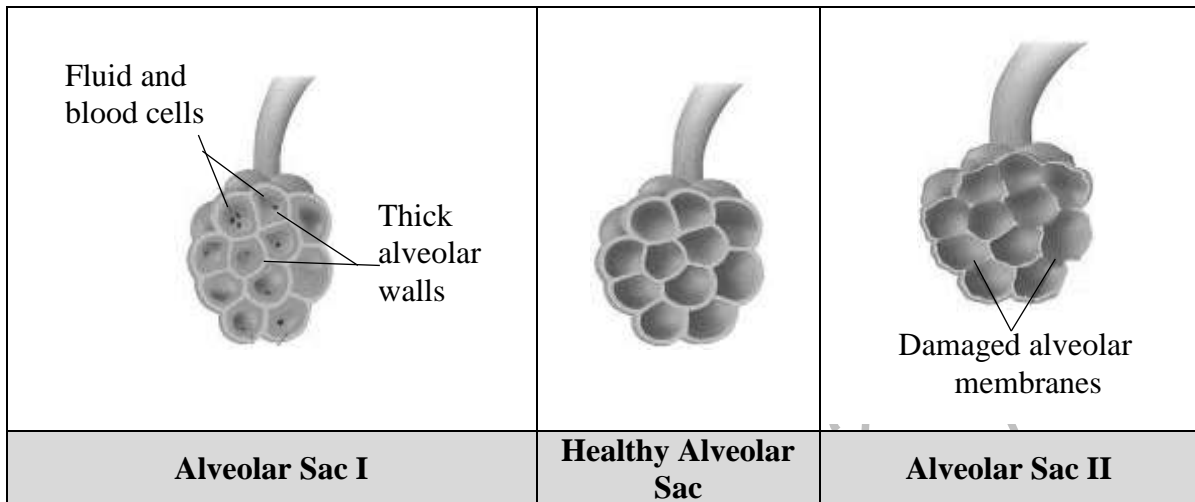


The option that CORRECTLY identifies the limiting factor(s) in the labelled parts **I** and **II** is

	I	II
A	light intensity	carbon dioxide and temperature
B	carbon dioxide and temperature	light intensity
C	light intensity and carbon dioxide	water
D	water	light intensity and carbon dioxide

20. Calvin cycle occurs in the stroma of chloroplast because the stroma contains
- required enzymes.
 - DNA and ribosomes.
 - photosynthetic pigments.
 - ATP synthase complexes.
21. In the human respiratory system, the function of epiglottis is to
- moist and warm the incoming air.
 - keep the air ways open all the time.
 - filter dust particles and kill the bacteria.
 - prevent the food particles from entering the trachea.
22. In the human respiratory system, the hypersecretion (increased production) of mucus causes development of respiratory diseases such as bronchitis.
- All of the following factors cause over-production of mucus EXCEPT
- viral infections.
 - bacterial infections.
 - malfunctioning of cilia.
 - hyperactivity of goblet cells.

23. The given images show the comparison of healthy and diseased alveolar sacs (**I** and **II**) in humans.



The alveolar sacs **I** and **II** represent

	Alveolar Sac I	Alveolar Sac II
A	emphysema	pneumonia
B	pneumonia	emphysema
C	asthma	bronchitis
D	bronchitis	asthma

24. The given steps occur during breathing mechanism in the human respiratory system.

- I. Size of chest cavity decreases
- II. Pressure in the lungs decreases
- III. The muscles of diaphragm relax
- IV. Ribs move upwards and outwards

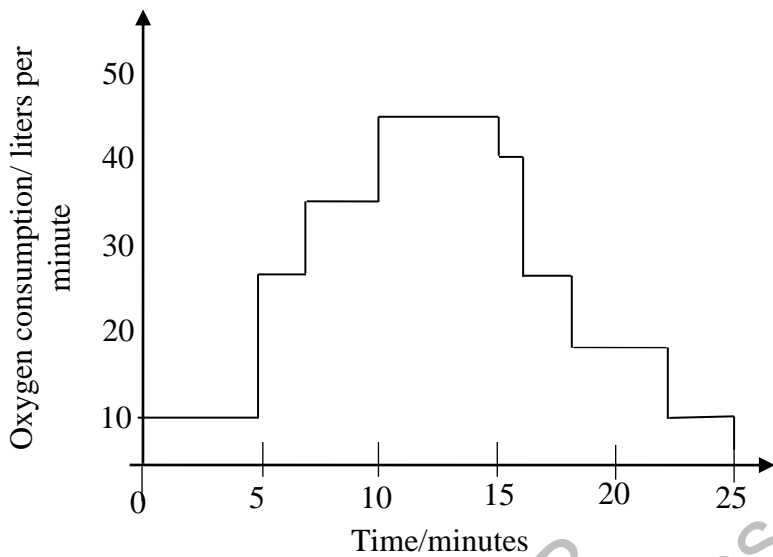
The steps which take place during exhalation are

- A. I and II.
- B. I and III.
- C. II and IV.
- D. III and IV.

25. The chemical reaction that requires extra-cellular enzymes is

- A. breakdown of fats.
- B. oxidation of glucose.
- C. synthesis of proteins.
- D. reduction of carbon dioxide.

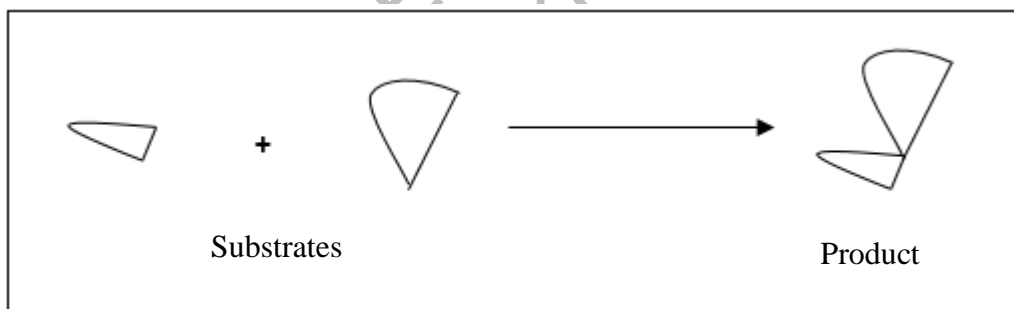
26. The given graph shows the oxygen consumption during and after exercise.



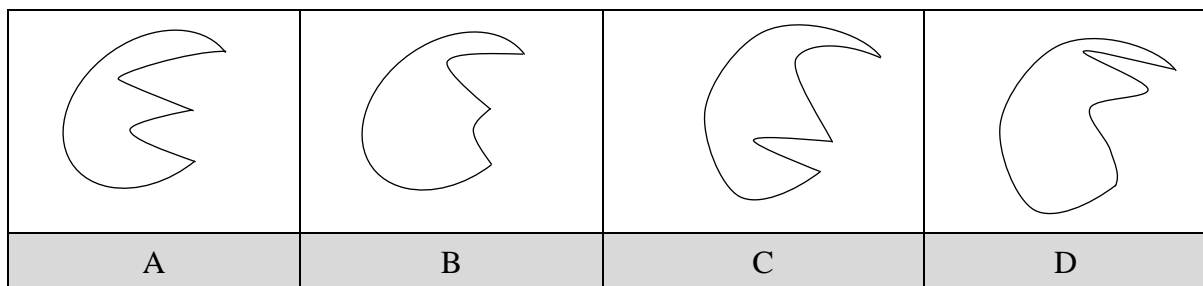
With reference to the given graph, the period of strenuous exercise would be from

- A. 5 to 10 minutes.
- B. 10 to 15 minutes.
- C. 15 to 20 minutes.
- D. 20 to 25 minutes.

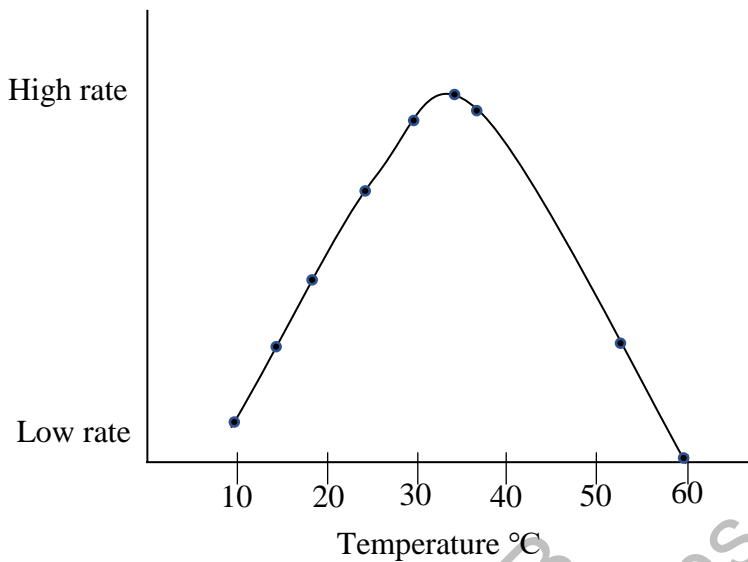
27. The given diagram represents an enzyme-catalysed reaction.



With reference to lock and key model, the enzyme that can catalyse this reaction is



28. The given graph shows the effect of temperature on the enzyme activity.



The temperature range at which the substrate molecules will no longer fit into enzyme is

- A. 10 – 20 °C.
- B. 20 – 30 °C.
- C. 30 – 40 °C.
- D. 50 – 60 °C.

29. Which of the following indicates the movement of larynx and state of trachea during the swallowing of food?

	Movement of Larynx	Passage to Trachea
A	Up	Open
B	Up	Closed
C	Down	Open
D	Down	Closed

30. In plants, the molecule that will be DIRECTLY affected by the deficiency of magnesium ions in soil is

- A. starch.
- B. cellulose.
- C. chlorophyll.
- D. carbon dioxide.

31. What will happen if the human stomach is unable to secrete hydrochloric acid?

- A. Lipid digestion will inhibit
- B. Amylase enzyme will denature
- C. Stomach muscles will destruct
- D. Pepsinogen will remain inactive

32. Following are diseases that are related to dietary habits.

- Heart diseases
- Constipation
- Inflammation of colon
- Irritated bowl syndrome

Which of the following diets is MOST likely to develop the given diseases?

- A. A diet with low fiber
- B. A diet with low sodium level
- C. A diet with moderate sugar content
- D. A diet with moderate unsaturated fats

33. Zaheer's gut is unable to absorb mineral salts and water from the undigested food because of an abnormality in his

- A. stomach.
- B. oesophagus.
- C. large intestine.
- D. small intestine.

34. Which of the following CORRECTLY identifies the site of action of trypsin and pepsin in the alimentary canal of human?

	Trypsin	Pepsin
A	Ileum	Colon
B	Stomach	Duodenum
C	Colon	Ileum
D	Duodenum	Stomach

35. The cells that transport organic nutrients from leaves to the other parts of a plant are

- A. vessels and tracheids.
- B. sieve tubes and tracheids.
- C. companion cells and vessels.
- D. sieve tubes and companion cells.

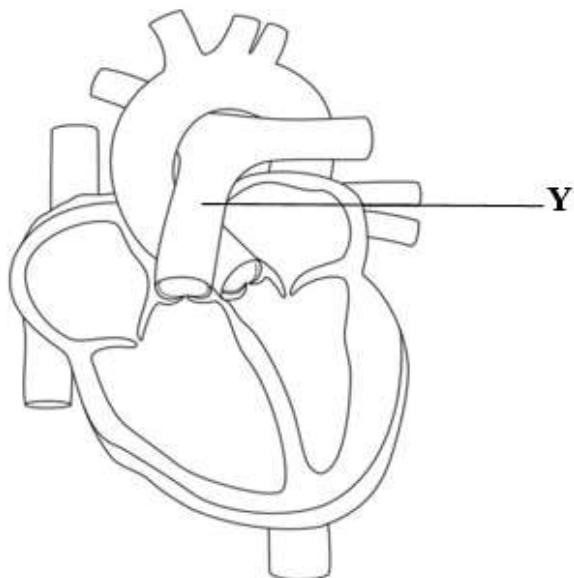
36. During the circulation of blood through atria and ventricles of human heart, atrioventricular valves close when blood pressure is
- higher in atria than aorta.
 - higher in ventricles than atria.
 - lower in aorta than pulmonary arteries.
 - lower in ventricles than pulmonary arteries.
37. In plants, excessive transpiration causes
- loss of turgidity in leaves cells.
 - increase in the cellular respiration.
 - increase in the rate of photosynthesis.
 - loss of water from phloem to xylem tissues.
38. The blood vessel which carries deoxygenated blood from lower body parts to heart is
- pulmonary vein.
 - inferior vena cava.
 - hepatic portal vein.
 - superior vena cava.
39. The given table shows blood reports of four individuals (A, B, C and D).

With reference to changes in the count of blood cells, the blood report of the individual that indicates the presence of a bacterial infection is

<table border="1"> <thead> <tr> <th>Test</th> <th>Result</th> <th>Reference Range</th> </tr> </thead> <tbody> <tr> <td>WBCs</td> <td>14,000/mm³</td> <td>4,000-11,000</td> </tr> <tr> <td>Neutrophils</td> <td>88</td> <td>50-70%</td> </tr> <tr> <td>Lymphocytes</td> <td>13</td> <td>25-40%</td> </tr> </tbody> </table> <p style="text-align: center;">A</p>	Test	Result	Reference Range	WBCs	14,000/mm ³	4,000-11,000	Neutrophils	88	50-70%	Lymphocytes	13	25-40%	<table border="1"> <thead> <tr> <th>Test</th> <th>Result</th> <th>Reference Range</th> </tr> </thead> <tbody> <tr> <td>WBCs</td> <td>10,000/mm³</td> <td>4,000-11,000</td> </tr> <tr> <td>Neutrophils</td> <td>61</td> <td>50-70%</td> </tr> <tr> <td>Lymphocytes</td> <td>32</td> <td>25-40%</td> </tr> </tbody> </table> <p style="text-align: center;">B</p>	Test	Result	Reference Range	WBCs	10,000/mm ³	4,000-11,000	Neutrophils	61	50-70%	Lymphocytes	32	25-40%
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40. The given diagram shows longitudinal section of the human heart.



Which of the following options is CORRECT about the concentration of carbon dioxide and blood pressure in the vessel labelled as Y?

	Concentration of Carbon dioxide	Blood Pressure
A	High	High
B	Low	High
C	High	Low
D	Low	Low

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CLASS IX

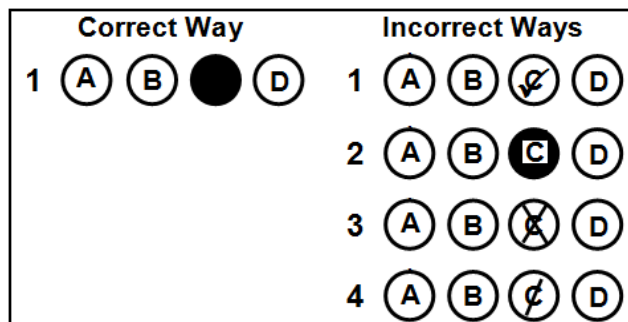
ANNUAL EXAMINATIONS (THEORY) 2025

Biology Paper I

Time: 1 hour 10 minutes Marks: 40

INSTRUCTIONS

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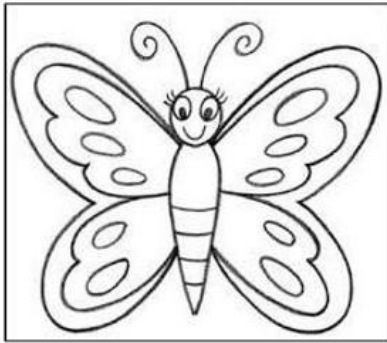
1. The level of organisation of life to which deoxyribonucleic acid (DNA) belongs is
 - A. tissue level.
 - B. cellular level.
 - C. organelle level.
 - D. molecular level.
2. Consider the given image.



The given image depicts the relationship of biology with

- A. chemistry
 - B. geography.
 - C. economics.
 - D. mathematics.
3. A student wants to perform Benedict's test to confirm the presence of glucose in the urine of diabetic patients. He uses the urine sample of 20 diabetic patients in the experimental group.
To setup a control group for the above experiment, he/ she should mix and heat Benedict's reagent with
 - A. patient's urine and glucose solution.
 - B. healthy individual's urine.
 - C. diabetic patient's urine.
 - D. glucose solution.

4. A student is provided the given image of a butterfly to write qualitative and quantitative observations.



Which of the following observations is categorised as qualitative observations?

- A. It has a pair of eyes.
 - B. It has a pair of antennae.
 - C. Its body has three segments.
 - D. Its wings have similar pattern.
5. The given table shows the biological classification of *Amanita*, a fungus, in the hierarchal order.

I	Fungi
II	Basidiomycota
III	Homobasidiomycetae
IV	Agaricales
V	Amanitaceae
VI	<i>Amanita</i>
VII	<i>Amanita muscari</i>

With reference to the given hierarchy, the level that represents the taxon, class, of *Amanita* is

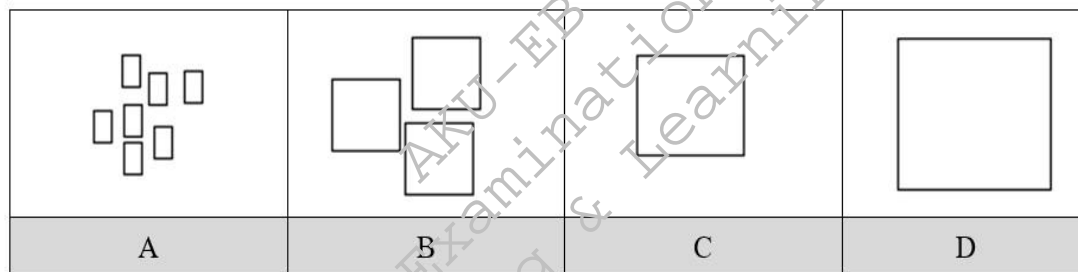
- A. II.
 - B. III.
 - C. IV
 - D. V.
6. All of the following are characteristics of viruses EXCEPT that they
- A. have ribosomes.
 - B. are obligate parasites.
 - C. are sub-cellular particles.
 - D. require living cells to reproduce.

7. The hierarchical unit (taxon) of classification that LEAST likely helps to differentiate among vertebrates is
- order.
 - genus.
 - family.
 - kingdom.

8. In contrast to jellyfish, sycon has
- soft body.
 - porous body.
 - numerous tentacles.
 - umbrella-shaped body.

9. In the given table, different sizes of blocks represent the nutrients.

Which of the following nutrients will be efficiently absorbed by the villi?



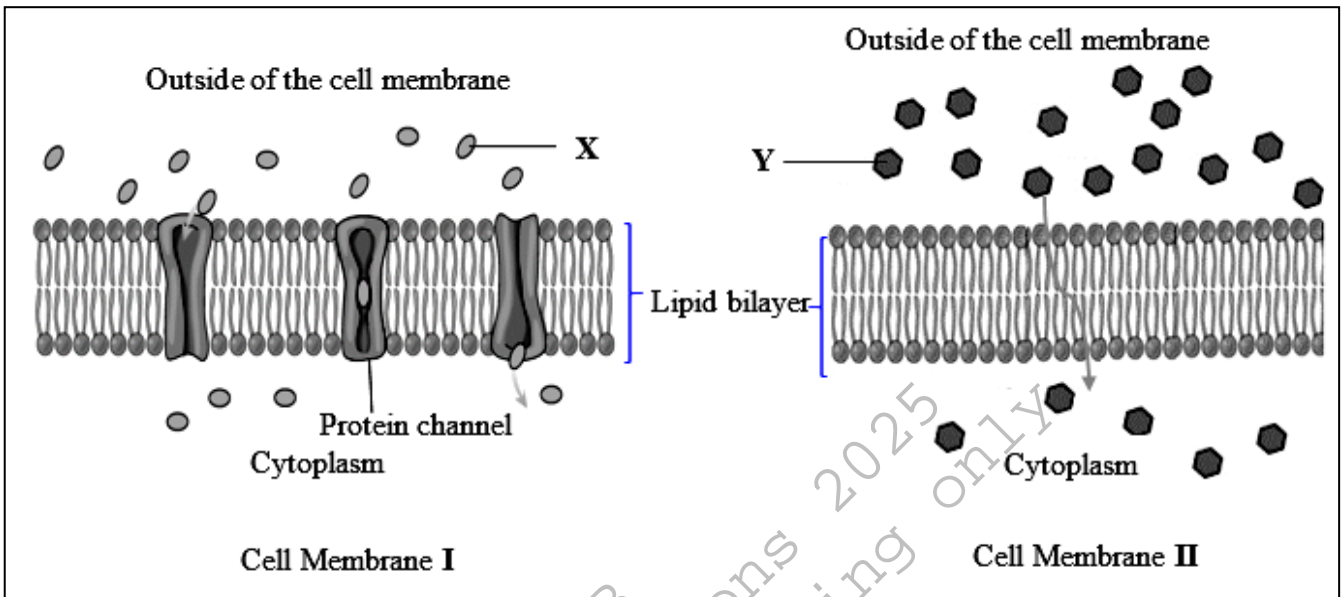
10. In living organisms, the structure of a specialised cell is determined by
- its location and function.
 - its DNA content and size of nucleus.
 - the number of amino acids in its cytoplasm.
 - the orientation of phospholipids in its cell membrane.

11. In the human body, certain cells synthesise and secrete numerous proteins.

Based on the given functions, this cell is expected to contain a large number of

- ribosomes and mitochondria.
 - ribosomes and Golgi bodies.
 - mitochondria and vacuoles.
 - centrioles and vacuoles.
12. In a properly stained slide of epithelial cells of frog, the cell organelle that can be observed prominently under the light microscope is
- vacuole.
 - nucleus.
 - centriole.
 - ribosome.

13. The given diagrammatic representations of fluid mosaic model of cell membrane **I** and **II** show the movement of **X** and **Y** ions/ molecules from outside of cell membrane into cytoplasm.



The option which CORRECTLY identifies **X** and **Y** is

	X	Y
A	oxygen molecule	potassium ion
B	water molecule	potassium ion
C	sodium ion	glucose molecule
D	glucose molecule	oxygen molecule

14. During the ripening of mangoes, the colour of the fruit wall changes from green to yellow.

This change in colour is due to the

- A. conversion of starch into sucrose.
 B. conversion of chromoplast into chloroplast.
 C. activation of enzymes in the embryo of the seed.
 D. presence of different pigments in the chromoplast.
15. In the light dependent reactions of photosynthesis, the source of electrons for NADPH (reduced nicotinamide adenine dinucleotide phosphate) is
- A. ATP.
 B. NAD.
 C. water.
 D. carbon dioxide.

16. A patient with high level of lactic acid in his body indicates
- A. damaged villi.
 - B. liver dysfunction.
 - C. inactivation of digestive enzymes.
 - D. hypersensitive mucous secreting cells in stomach.
17. A scientist performs an experiment in a greenhouse to study the rate of photosynthesis in cucumber plants.

The given table shows the results of this investigation.

Percentage (%) Concentration of Carbon dioxide in the Air	Rate of Photosynthesis (arbitrary units)
0.00	0
0.02	5
0.04	16
0.06	19
0.08	20
0.10	20
0.12	20

The range of carbon dioxide concentrations between which the rate of photosynthesis changes the MOST is

- A. 0.00% and 0.02%
 - B. 0.02% and 0.04%
 - C. 0.04% and 0.06%
 - D. 0.06% and 0.08%
18. The part of chloroplast that contains the enzymes required for carbon fixation is
- A. stroma.
 - B. granum.
 - C. thylakoid lumen.
 - D. thylakoid membrane.

19. In a plant cell, the major sites for ATP synthesis driven by the electron transport chain are
- I. cristae of the mitochondria
 - II. thylakoid of the chloroplast
 - III. stroma of chloroplast
 - IV. mitochondrial matrix
- A. I and II.
 - B. I and IV.
 - C. II and III.
 - D. III and IV.
20. The function of NADPH (reduced nicotinamide adenine dinucleotide phosphate) in photosynthesis is to
- A. facilitate the breakdown of water molecules.
 - B. excite the electrons of chlorophyll molecules.
 - C. carry the electrons from light reactions to Calvin cycle
 - D. help in the absorption of sunlight by chloroplast during light reactions.
21. All of the following characteristics of alveoli help lungs in the diffusion of gases EXCEPT
- A. large surface area.
 - B. continuous blood flow
 - C. moistened inner lining.
 - D. drum shaped epithelial cells.
22. A person is showing the following symptoms of a respiratory disorder.
- High fever
 - Cough with sputum
 - Lungs filled with pus
- Which of the following disorders is the person suffering from?
- A. Asthma
 - B. Pneumonia
 - C. Lung cancer
 - D. Emphysema
23. In the human respiratory system, the structure which connects the pharynx with the trachea is
- A. larynx.
 - B. bronchi.
 - C. esophagus.
 - D. pyloric sphincter.

24. Carbon monoxide present in cigarette smoke is harmful to human health because it
- increases allergies.
 - destroys cilia in trachea.
 - binds with haemoglobin.
 - increases secretion of mucus.
25. During breathing, the relaxation of the diaphragm causes a/ an
- increase in the volume of thoracic cavity.
 - decrease in the pressure of thoracic cavity.
 - expulsion of air from lungs into the atmosphere.
 - inflation of lungs to receive air from atmosphere.
26. In the cells of human body, enzymes continuously convert toxic chemicals into harmless products to prevent the accumulation of toxic chemicals.

This process occurs efficiently inside the cells because enzymes

- work best in neutral pH.
 - have higher reaction rate.
 - are required in less amounts.
 - are sensitive to changing conditions.
27. The process which exemplifies anabolism is
- glycolysis.
 - hydrolysis.
 - emulsification.
 - photosynthesis.
28. A group of students investigated the action of amylase enzyme on starch solution at constant temperature (37 °C) in four test tubes (**I**, **II**, **III** and **IV**) having different pH values.

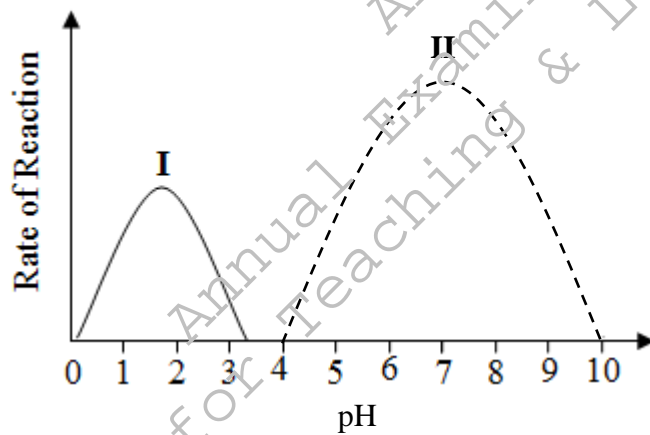
The test tube having optimum pH is

	Test Tube	pH of the Solution	Time Taken for the Complete Breakdown of Starch (seconds)
A	I	4	310
B	II	5	240
C	III	6	120
D	IV	7	60

29. In plants, the macronutrient that is required for opening and closing of stomata is
- carbon.
 - nitrogen.
 - potassium.
 - magnesium.
30. A person suffers from the following disorders due to long term consumption of unbalanced diet.
- Constipation
 - Haemorrhoids
 - Irritable bowel syndrome

Based on the given disorders, the nutrient that is deficient in his/ her diet is

- fat.
 - fibre.
 - protein.
 - carbohydrate.
31. The given graph shows the optimum rate of reaction of enzymes (I and II) at different pH in the human digestive system.



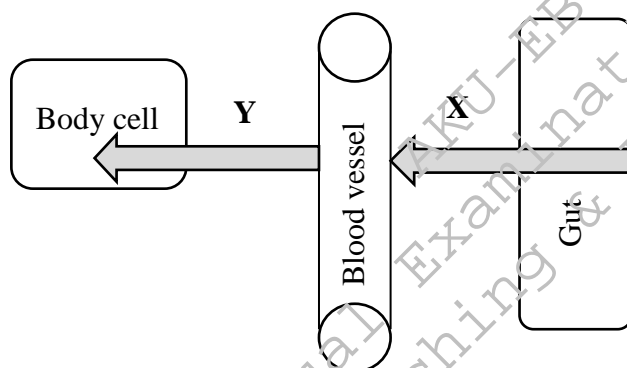
The CORRECT option that identifies the parts of digestive system where enzymes I and II work is

	Enzyme I	Enzyme II
A	stomach	mouth
B	mouth	duodenum
C	duodenum	stomach
D	duodenum	mouth

32. Blood diagnostic test of a patient revealed excessive concentrations of amylase and lipase enzymes. Based on the result of blood test, the doctor diagnoses the malfunctioning of a digestive organ that secrete these enzymes.

This digestive organ is identified as

- A. liver.
 - B. pancreas.
 - C. esophagus.
 - D. large intestine.
33. The nutrient ion deficiency that decreases the overall protein content of a plant is
- A. zinc.
 - B. nitrate.
 - C. copper.
 - D. magnesium.
34. The given schematic diagram represents processes **X** and **Y** in the human digestive system.



The processes **X** and **Y** are identified as

	X	Y
A	digestion	assimilation
B	absorption	emulsification
C	digestion	emulsification
D	absorption	assimilation

35. The concentration of ions inside the root hair cells is normally greater than that of the soil.

The transportation method used by the root hair cells to absorb further ions from the soil is

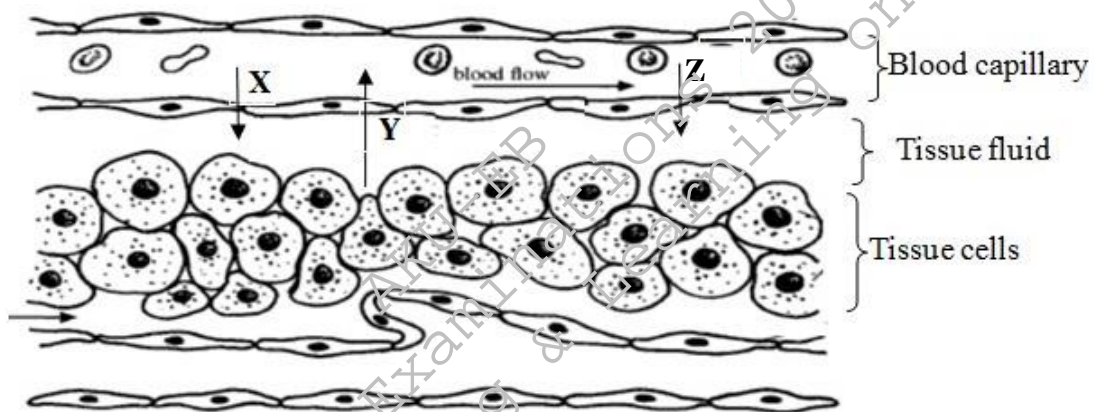
- A. endosmosis.
- B. active transport.
- C. simple diffusion.
- D. facilitated diffusion.

36. Saima, who has blood group B, needs blood.

People with which of the following blood groups can donate blood to Saima?

	Blood Group A	Blood Group B	Blood Group AB	Blood Group O
A	Yes	No	Yes	No
B	Yes	No	No	Yes
C	No	Yes	Yes	No
D	No	Yes	No	Yes

37. The given diagram represents the transfer of materials between blood capillary and tissue fluid.



The option which CORRECTLY identifies X, Y and Z is

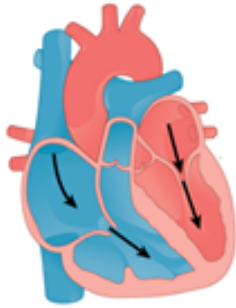
	X	Y	Z
A	white blood cells	waste materials	glucose
B	waste materials	white blood cells	glucose
C	glucose	waste materials	red blood cells
D	glucose	red blood cells	waste materials

38. In plants, the rate of transpiration increases when the relative atmospheric humidity and temperature is

	Relative Atmospheric Humidity	Atmospheric Temperature
A	high	low
B	low	high
C	high	high
D	low	low

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39. The mammalian heart chamber which initially receives blood from pulmonary circulation is the
- A. left atrium.
 - B. right atrium.
 - C. left ventricle.
 - D. right ventricle.
40. The given diagram shows one of the phases of the cardiac cycle.



The events that simultaneously occur in the given phase are

- I. atrial and ventricular muscles are relaxed.
 - II. aortic and pulmonary semilunar valves are closed.
 - III. atrial muscles are contracted and ventricular muscles are relaxed.
 - IV. aortic semilunar valves are closed and pulmonary semilunar valves are open.
- A. I and II.
 - B. I and IV.
 - C. II and III.
 - D. III and IV.

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

MODEL EXAMINATION PAPER 2026 AND ONWARDS

Biology Paper I

Time: 1 hour 10 minutes Marks: 40

INSTRUCTIONS:

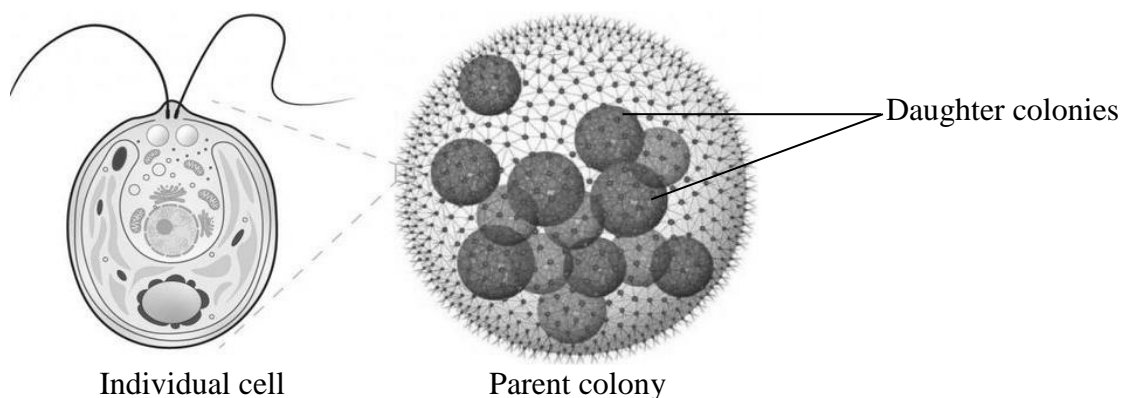
1. Check your name and school information on the question paper and Optical Mark Recognition (OMR) sheet. Sign on both if the information is correct.
2. Read each question carefully.
3. Answer all questions on the provided OMR sheet within the allotted time. DO NOT mark your answers on the question paper.
4. There are 100 answer numbers on the OMR sheet. Use answer numbers 1 to 40 only.
5. Each question has four choices: A, B, C, and D. Choose ONE correct answer only. On the OMR sheet, completely fill in the circle corresponding to your choice with a pencil as shown in the example below.

Correct Way	Incorrect Ways
1 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D	1 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D
	2 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D
	3 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D
	4 <input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D

Candidate's Signature

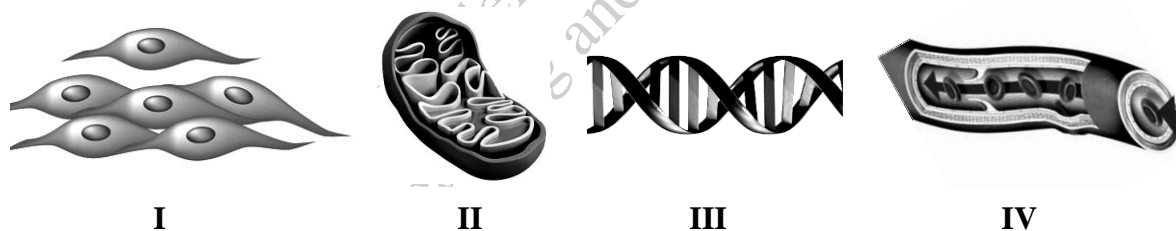
6. If you want to change your answer, ERASE the first answer completely with an eraser, before filling in the new circle. Ensure your marks are dark and clear. Do not make stray marks or leave incomplete fillings as the OMR machine ONLY records what is in the circles.
7. Do not fold, tear, or damage the OMR sheet. Damaged sheets may be scanned incorrectly.
8. You may use a simple calculator if you wish.

1. The given diagram shows an individual cell, daughter and parent colonies of *Volvox*.



If an individual cell is isolated from its daughter colony, then this cell will

- A. survive independently as a complete organism.
 - B. form a hard covering around it to remain dormant.
 - C. lose the flagella and remain sessile in unfavourable conditions.
 - D. lose the cytoplasm and become shrunk to protect itself from predators.
2. Four different levels of biological organisation are represented in the given diagrams.



The CORRECT sequence in the descending order of biological organisation is

- A. III, II, I, IV
 - B. IV, I, II, III
 - C. III, I, II, IV
 - D. IV, II, I, III
3. A scientist investigates the effect of increasing calcium nitrate concentration on the height of two different species of plants at constant temperature. He/ she then presents the data in graphical form.

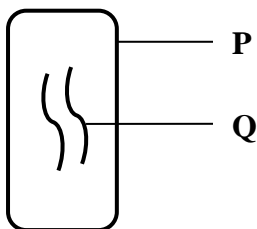
While drawing the graph, which quantity must he/ she place on y-axis?

- A. Temperature
- B. Height of plants
- C. Species of plants
- D. Concentration of calcium nitrate

4. A student extracts saliva (pH 7) from the mouth of a mammal, mixes it with some fine pieces of bread and keeps the mixture at 32°C. After three hours, a positive result is obtained, i.e., the pieces of bread disappear from the mixture.

The same positive result can also be obtained by

- A. performing the procedure at 36°C.
 - B. conducting the experiment at pH 2.
 - C. using distilled water instead of saliva.
 - D. repeating the experiment with boiled saliva.
5. According to the two-kingdom classification system of living organisms, algae were placed in kingdom plantae because of their
- A. eukaryotic cell.
 - B. unicellular body.
 - C. mode of nutrition.
 - D. mode of reproduction.
6. The given diagram shows the structure of a virus.



The labelled structures **P** and **Q** are identified as

	P	Q
A	lipid bilayer	nucleic acid
B	protein coat	nucleic acid
C	protein coat	glycolipid
D	lipid bilayer	glycolipid

7. The classification of a plant species is as follows.

Species: *Asparagales*
 Genus: *Allium*
 Division: Angiosperm
 Family: Amaryllidaceae

Based on the given classification, the scientific name of this plant would be

- A. *Allium cepa*.
- B. *Allium asparagales*.
- C. *Asparagales allium*.
- D. *Amaryllidaceae cepa*.

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8. Flipper of a whale and wing of a bat have the similar

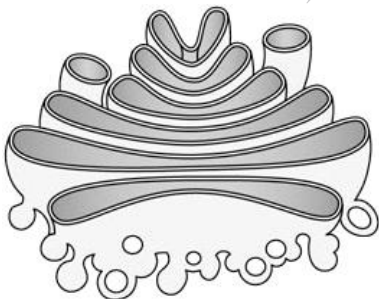
- I. basic function
- II. external morphology
- III. pattern of bone arrangement

- A. I only.
- B. III only.
- C. I and II.
- D. II and III.

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

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Organisms</th> <th style="text-align: left;">Classified into</th> </tr> </thead> <tbody> <tr> <td>Algae</td> <td>Kingdom fungi</td> </tr> <tr> <td>Bacilli</td> <td>Kingdom protista</td> </tr> <tr> <td>Mushrooms</td> <td>Kingdom plantae</td> </tr> <tr> <td>Jelly fish</td> <td>Kingdom animalia</td> </tr> </tbody> </table>	Organisms	Classified into	Algae	Kingdom fungi	Bacilli	Kingdom protista	Mushrooms	Kingdom plantae	Jelly fish	Kingdom animalia	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Organisms</th> <th style="text-align: left;">Classified into</th> </tr> </thead> <tbody> <tr> <td>Algae</td> <td>Kingdom protista</td> </tr> <tr> <td>Bacilli</td> <td>Kingdom monera</td> </tr> <tr> <td>Mushrooms</td> <td>Kingdom fungi</td> </tr> <tr> <td>Jelly fish</td> <td>Kingdom animalia</td> </tr> </tbody> </table>	Organisms	Classified into	Algae	Kingdom protista	Bacilli	Kingdom monera	Mushrooms	Kingdom fungi	Jelly fish	Kingdom animalia
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Jelly fish	Kingdom animalia																				
C	D																				

10. Which of the following organelles is shown in the given diagram?

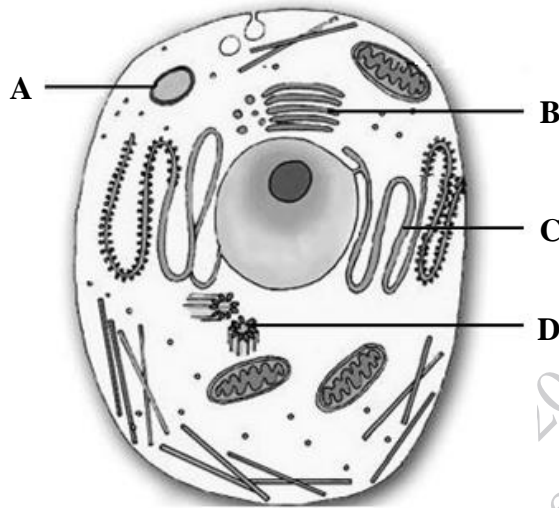


- A. Centrioles
- B. Golgi bodies
- C. Rough endoplasmic reticulum
- D. Smooth endoplasmic reticulum

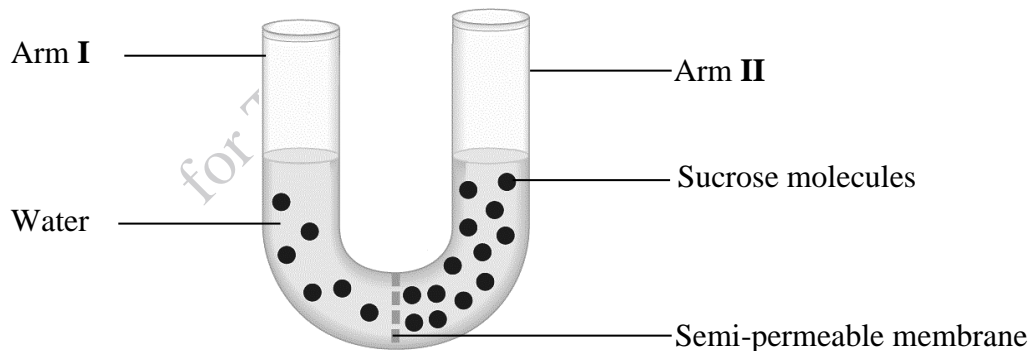
11. The MAIN function of smooth endoplasmic reticulum in an animal cell is the

- A. synthesis of lipids.
- B. storage of enzymes.
- C. formation of glucose.
- D. production of proteins.

12. The organelle of the given animal cell that is made up of microtubules is labelled as



13. The given apparatus shows a setup to study the movement of molecules across a semi-permeable membrane.



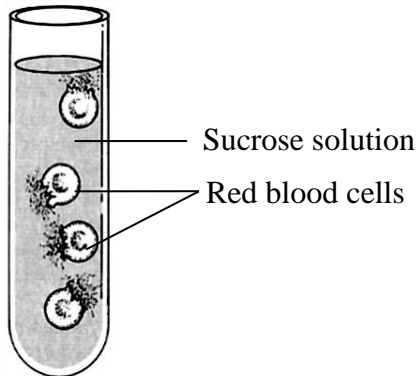
What will happen if the setup is left for three hours?

- A. The level of water in arm I will rise.
- B. The level of water in arm II will rise.
- C. The number of sucrose molecules in arm I will increase.
- D. The number of sucrose molecules in arm II will increase.

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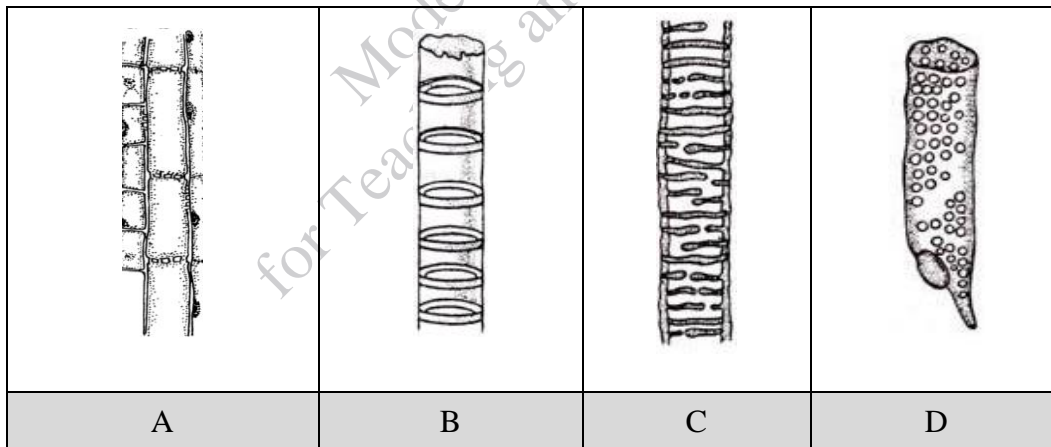
14. The given diagram shows the condition of human red blood cells when kept in a sucrose solution.

(Note: The internal concentration of human red blood cells is 0.9%.)

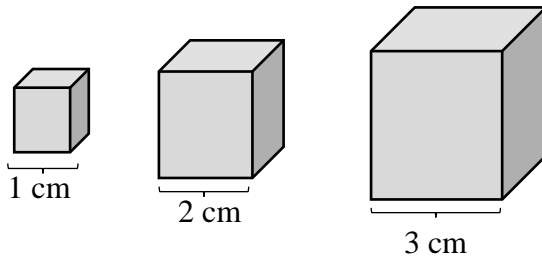


The concentration of sucrose solution in the given situation would be

- A. 3%.
 - B. 5%.
 - C. 0.9%.
 - D. 0.1%.
15. The diagram that represents phloem vessels in plants is

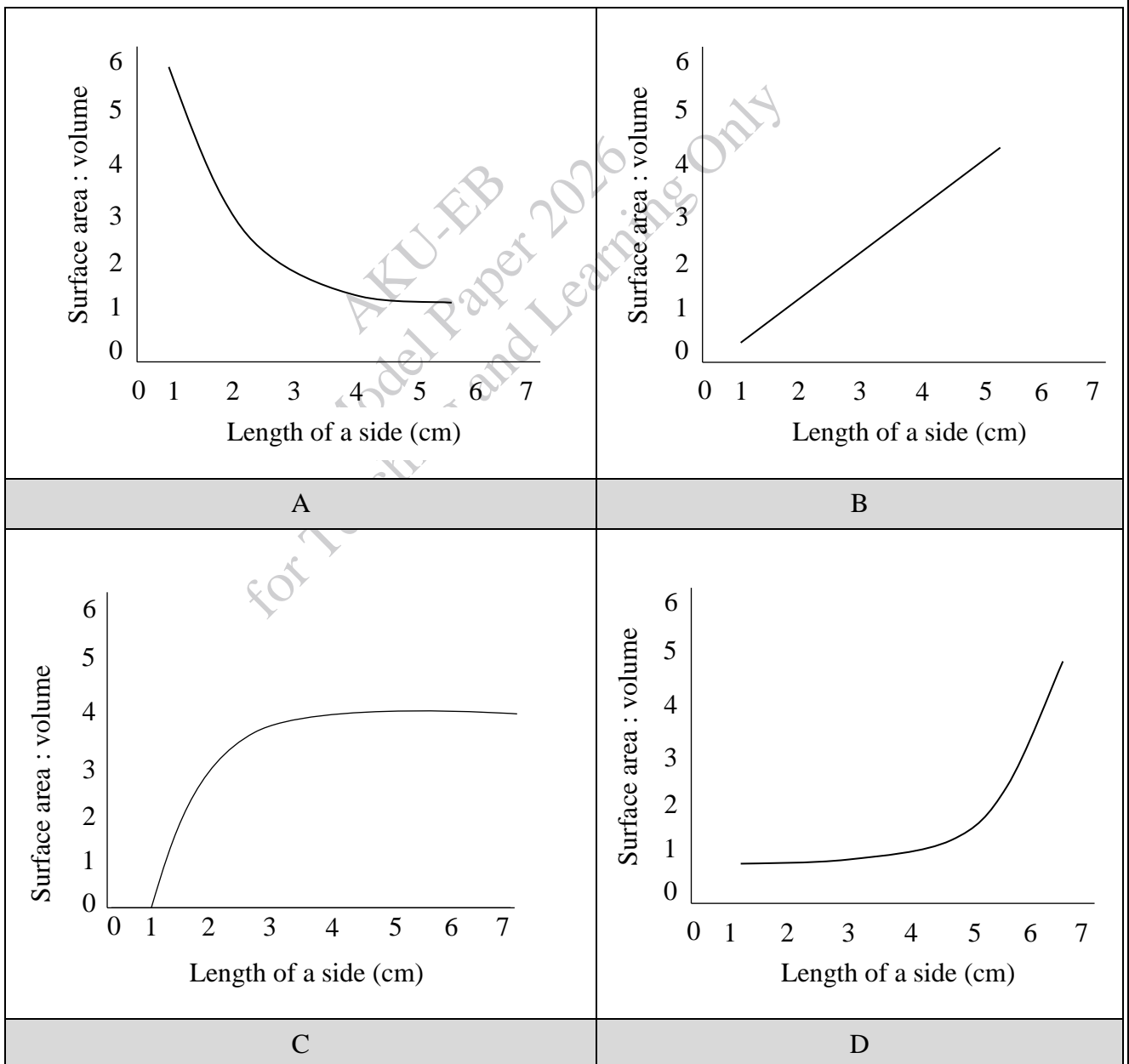


16. Consider the given cubes as cells.



The graph that CORRECTLY represents the relationship between the side length of cells and their surface area to volume ratio is

(Note: Graphs are not to scale.)



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17. The given table differentiates between an organelle in the animal and plant cells.

Animal Cell	Plant Cell
Occurs in multiple numbers	Present only one in number
Stores nutrients	Helps in water regulation and maintains turgidity

Based on the given differentiation, this organelle is identified as

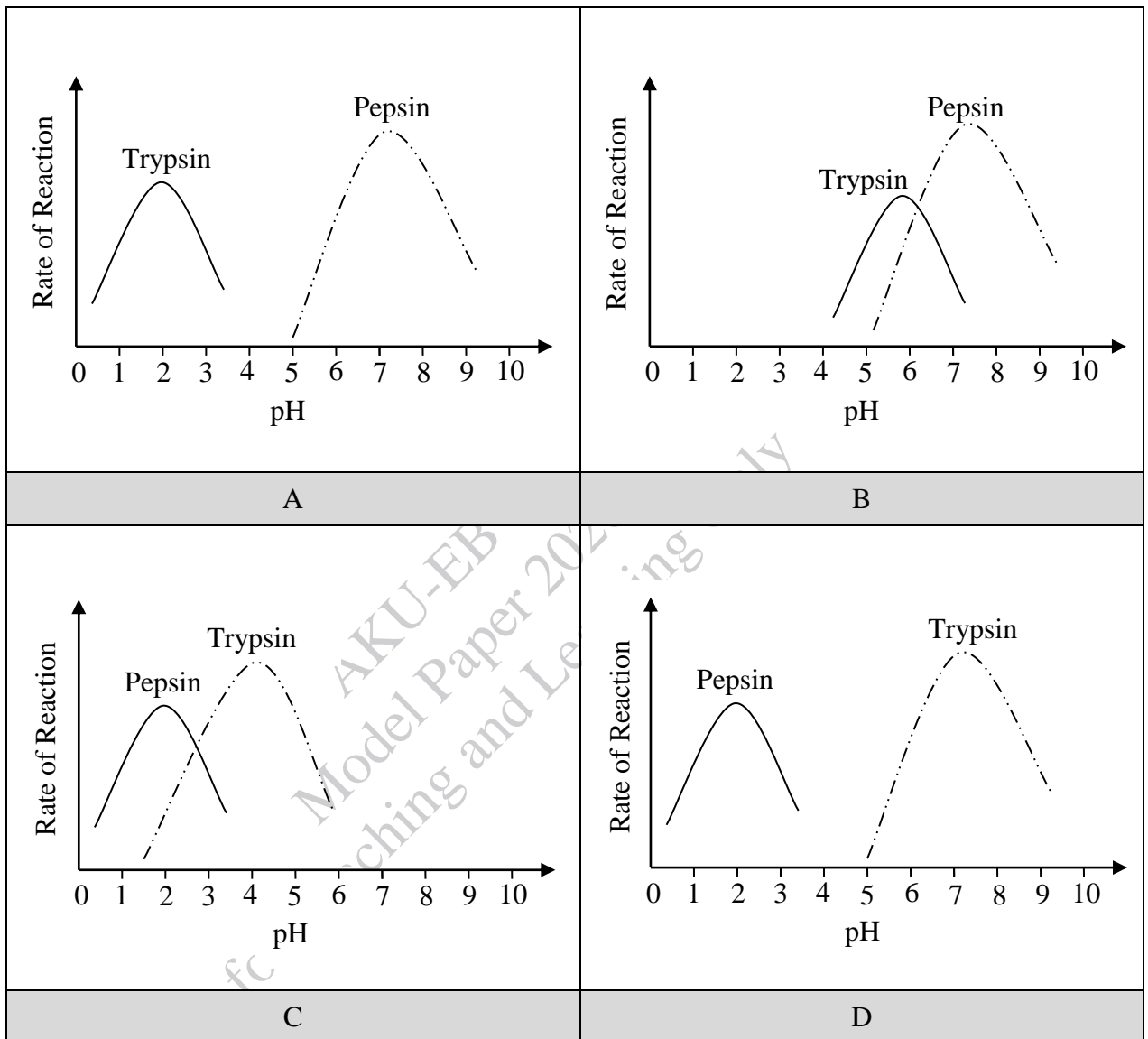
- A. vacuole.
 B. lysosome.
 C. mitochondria.
 D. endoplasmic reticulum.
18. In the human respiratory system, gaseous exchange (carbon dioxide and oxygen gas) takes place between
- A. alveoli and capillaries.
 B. trachea and capillaries.
 C. alveoli and bronchioles.
 D. trachea and bronchioles.
19. Breathlessness, a major symptom of emphysema, occurs because the
- A. patient suffers from cough.
 B. air spaces of alveoli are enlarged.
 C. walls of bronchioles become thin.
 D. heart fails to pump enough oxygenated blood.
20. Respiration is different from gaseous exchange because respiration
- A. consists of a series of chemical reactions.
 B. requires a concentration gradient to occur.
 C. involves lungs and its associated structures.
 D. takes place in higher multicellular organisms.
21. The given table shows the percentage of oxygen gas in inspired and expired air.

Oxygen in	
Inspired Air (%)	Expired Air (%)
21.0	16.4

The difference in the percentage of oxygen gas is due to its

- A. storage in lung tissues.
 B. non-reactivity with the blood.
 C. liberation as a metabolic waste.
 D. utilisation in energy production.

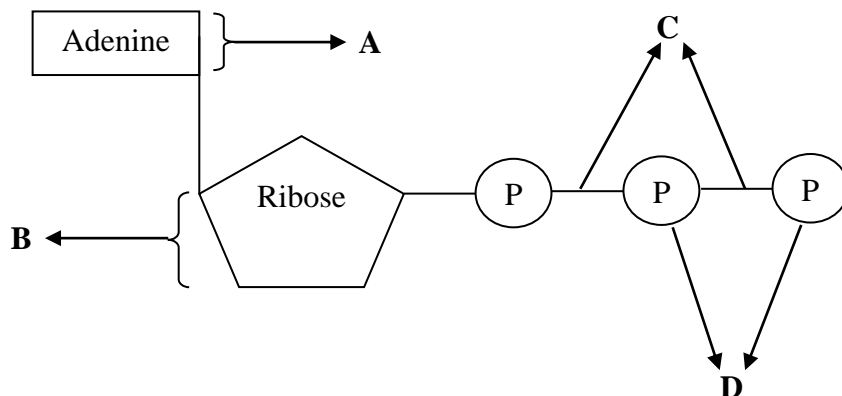
22. Which of the given graphs CORRECTLY represents the activity of pepsin and trypsin at their respective optimum pH?



23. The chemical reaction that requires extra-cellular enzymes is the
- breakdown of fats.
 - oxidation of glucose.
 - synthesis of proteins.
 - reduction of carbon dioxide.

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24. The given diagram illustrates the chemical structure of adenosine triphosphate (ATP).
Which labelled part of ATP provides energy when broken?



25. The reduction of nicotinamide adenine dinucleotide phosphate (NADP^+) takes place during the light reactions of photosynthesis by
- gaining two electrons and one hydrogen ion.
 - gaining one electron and two hydrogen ions.
 - removing two electrons and one hydrogen ion.
 - removing one electron and two hydrogen ions.
26. The function of vitamin K in the human body is
- clotting of blood.
 - oxidation of glucose.
 - absorption of calcium.
 - synthesis of eye pigments.
27. The given table shows estimated energy requirements (in kilocalories) according to age, gender and activity.

Gender	Age (years)	Activity Level		
		Sedentary	Moderately Active	Active
Male	4-8	1,400 (kcal)	1,400-1,600 (kcal)	1,600-2,000 (kcal)
	31-50	2,200 (kcal)	2,400-2,600 (kcal)	2,800-3,000 (kcal)

The information in the given table implies that

- adult males are more active than children.
- children need to burn more calories than adult males.
- adult males should take more carbohydrates than children.
- caloric needs vary based on age and activity level in males.

28. The given table shows the daily diet of an individual.

Breakfast	Lunch	Dinner
A fried egg and 2 slices of bread	Boiled rice, chicken and fruit salad	Pasta and vegetables

This diet could be considered balanced because it includes

- A. less fats.
- B. three meals.
- C. variety of food.
- D. more carbohydrates.

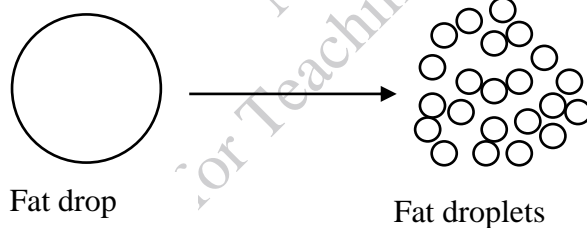
29. A patient has the following symptoms.

- Difficulty in expelling faeces
- Infrequent bowel movements

The patient is MOST likely to be suffering from

- A. ulcer.
- B. typhoid.
- C. diarrhoea.
- D. constipation.

30. The given diagram illustrates a process occurring in the digestive system of human beings.

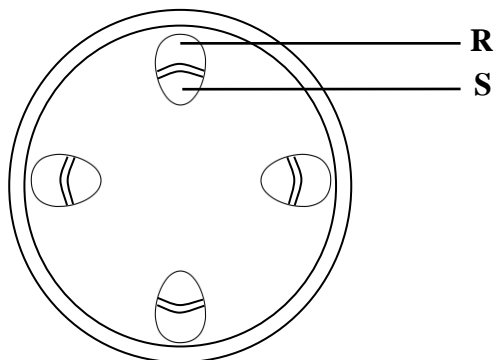


This process is called

- A. assimilation.
- B. deamination.
- C. emulsification.
- D. chemical digestion.

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31. The given diagram shows a cross section of a plant stem.



The structures labelled as **R** and **S** are

	R	S
A	cambium	phloem
B	xylem	pith
C	phloem	xylem
D	cambium	pith

32. Diagram **I** represents a plant in wilted state while diagram **II** represents the same plant in the normal state.



Diagram **I**

Diagram **II**

Plant shown in diagram **I** will regain condition shown in diagram **II** when the rates of absorption and transpiration will

	Rate of Absorption	Rate of Transpiration
A	decrease	increase
B	increase	decrease
C	decrease	decrease
D	increase	increase

33. Which of the following characteristics represents a thrombocyte?

	Nucleus	Pigment	Life Span (Days)
A	Absent	Absent	7-8
B	Present	Absent	120
C	Absent	Present	7-8
D	Present	Present	120

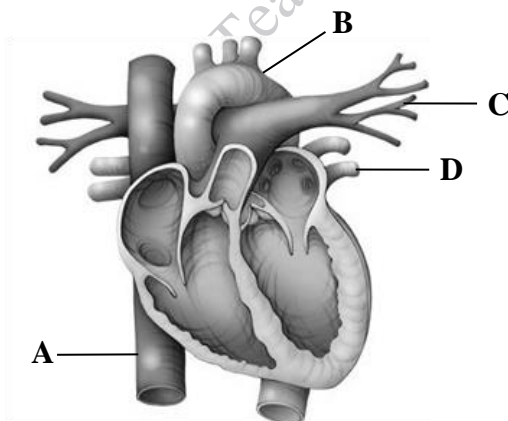
34. Saima, with blood group **B**, needs blood.

People with which of the following blood groups can donate blood to Saima?

	Blood Group A	Blood Group B	Blood Group AB	Blood Group O
A	Yes	No	Yes	No
B	Yes	No	No	Yes
C	No	Yes	Yes	No
D	No	Yes	No	Yes

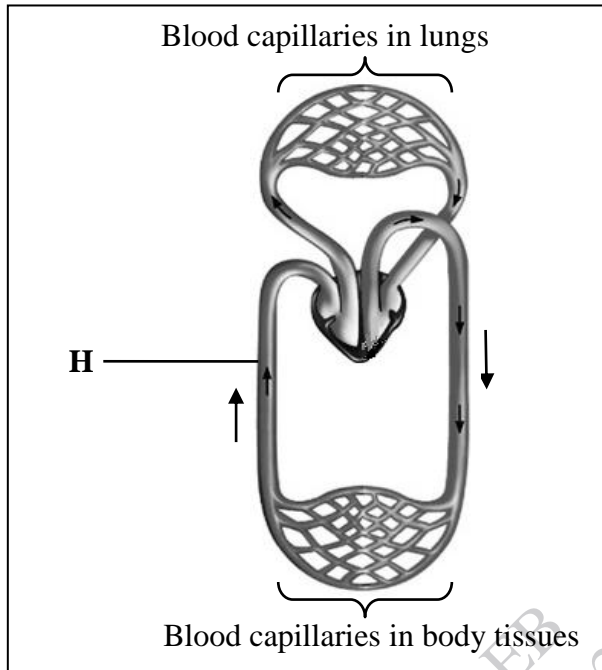
35. The given diagram represents the human heart.

The blood vessel that receives the oxygenated blood from lungs is



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36. The given diagram shows double circulation of blood in a mammal.



The blood vessel **H** represents

- A. vena cava.
 - B. dorsal aorta.
 - C. femoral artery.
 - D. pulmonary vein.
37. Aiman, a 45-year-old woman, is a food lover and has a sedentary life style. Her recent diagnostic reports reveal that she is at the risk of developing coronary heart disease (CHD).
To reduce her risk, she should
- A. reduce sugar intake but remain sedentary.
 - B. exercise regularly and eat foods rich in fibre.
 - C. avoid all fats and skip meals for quick weight loss.
 - D. take weight-loss supplements and retain her current diet.
38. A child falls while playing and bruises his knee. Within minutes, his immune system sends white blood cells to engulf and digest harmful microbes at the site of injury.
Based on the given function, these white blood cells are
- A. eosinophils.
 - B. macrophages.
 - C. B-lymphocytes.
 - D. T-lymphocytes.

39. How does plaque buildup in coronary arteries contribute to heart failure?
- A. It narrows arteries and ensures a stronger blood flow to the body.
 - B. It restricts oxygen supply and weakens the heart's ability to pump.
 - C. It raises blood pressure and causes the heart to pump more rapidly.
 - D. It increases the cholesterol level and makes the heart muscles thicker.
40. In the human immune system, the third line of defence is categorised as specific immunity because it
- A. has memory for faster response upon reinfection.
 - B. enhances the body's general resistance to infections over time.
 - C. works the same way against all types of harmful microorganisms.
 - D. acts as the primary barrier to prevent pathogens from entering the body.

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END OF PAPER