AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

ANNUAL EXAMINATIONS 2022

Biology

Total Time: 1 hour 40 minutes

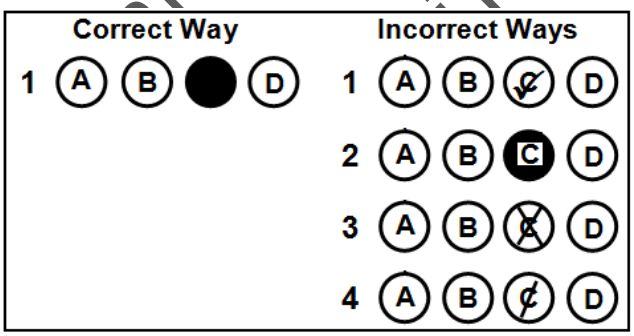
Total Marks: 50 (40-Theory & 10-Alternate to Practical)

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.



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. 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.

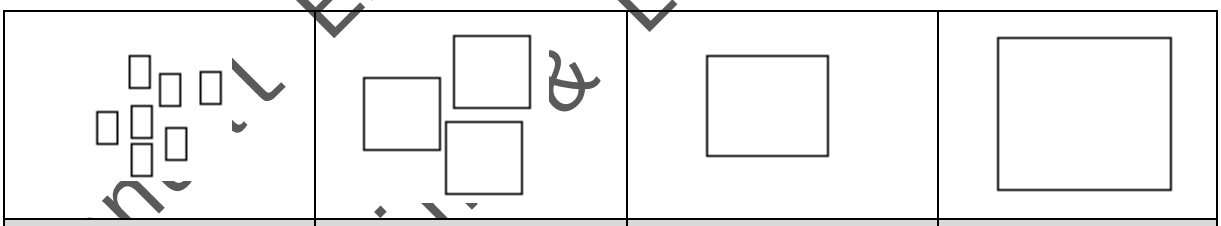
   'A species of a plant produces more fruits when exposed to blue wavelength of light at night.'

   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

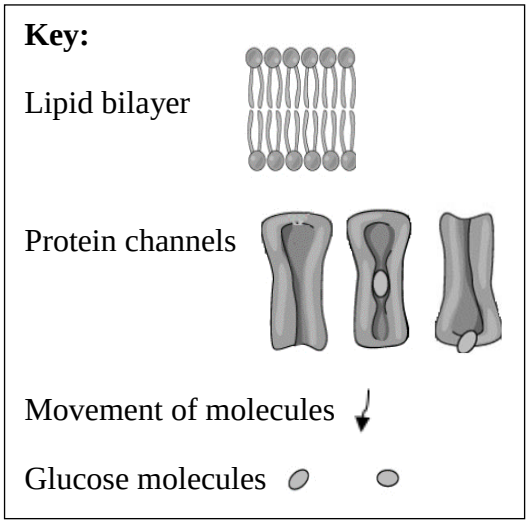
4. The layers of flat and closely packed cells of stratified squamous epithelium are MAINLY significant to

   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.

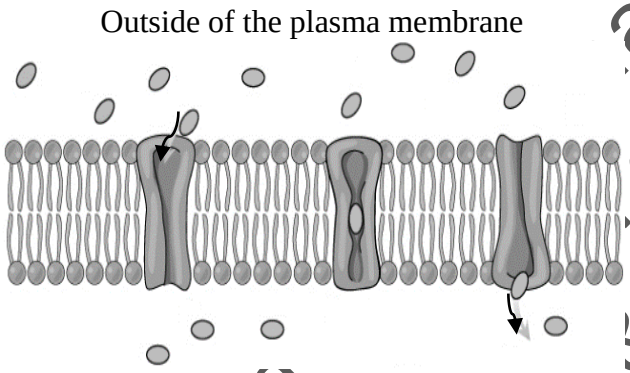
5. Which of the following characteristics of a cell determine its size and shape?

   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

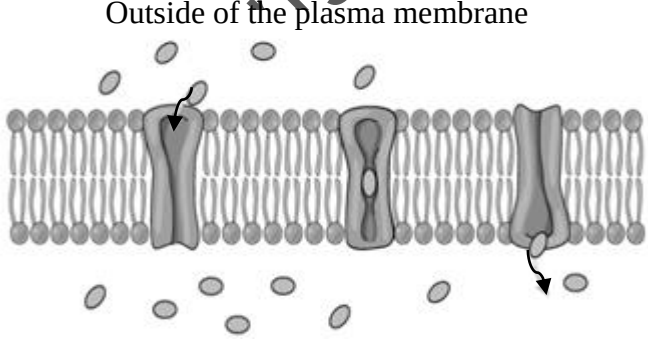
6. Use the given key to answer the following question.



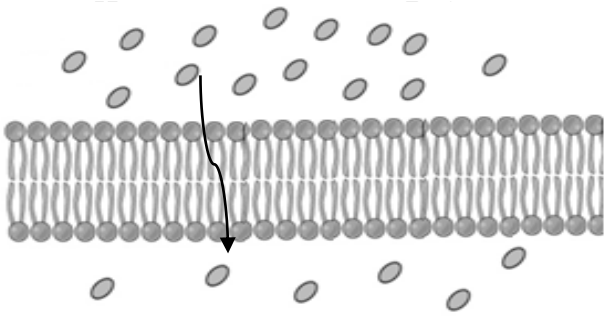
The diagram that CORRECTLY represents the movement of glucose molecules into red blood cells through the process of facilitated diffusion is



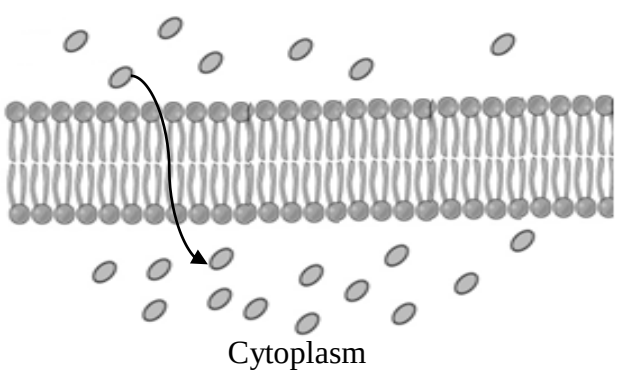
A



B



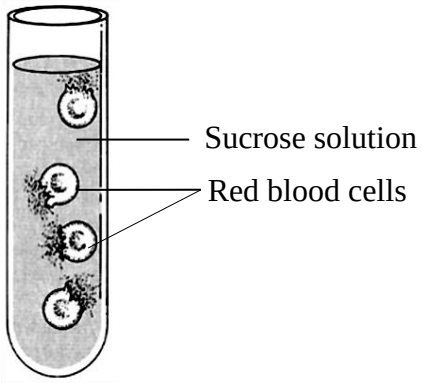
C



D

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

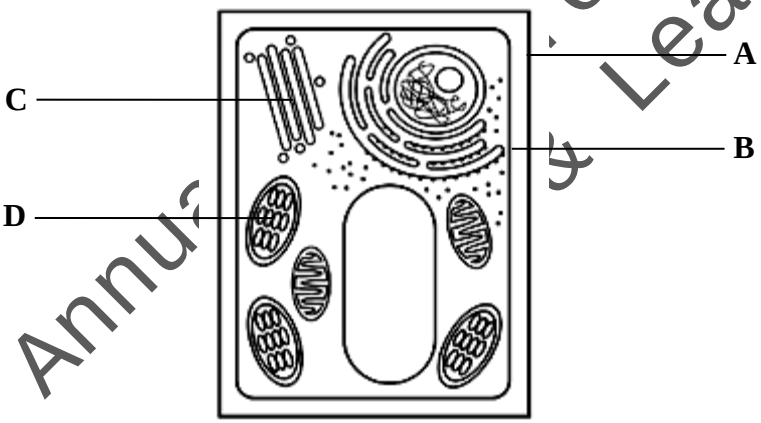
(**Note**: The internal concentration of red blood cells is 0.9%.)



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.

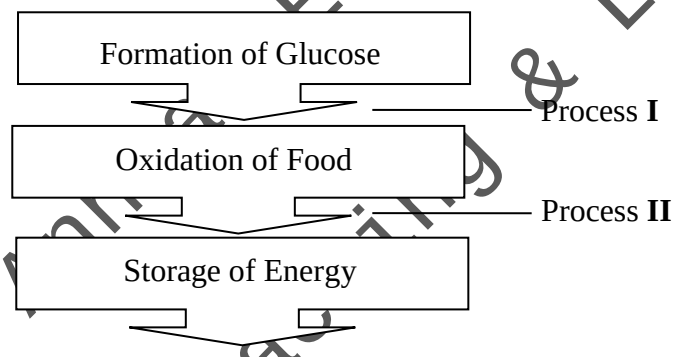
The option that CORRECTLY identifies organelles **I**, **II** and **III** is

	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

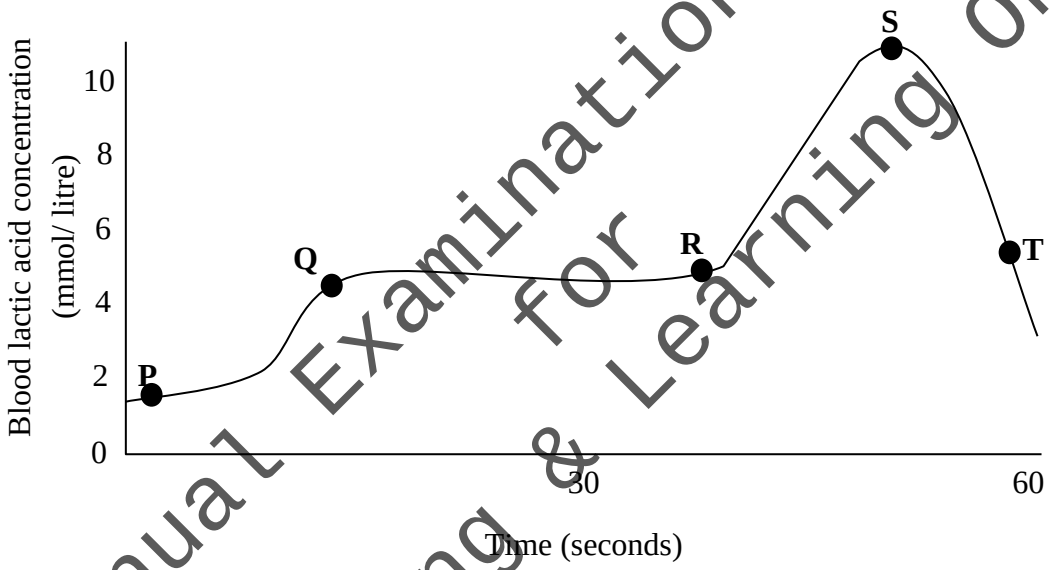
13. Which of the following conditions causes the accumulation of ATP and NADPH in the stroma of an illuminated chloroplast?

A. Addition of water
B. Absence of oxygen
C. Addition of glucose
D. Absence of carbon dioxide

14. In light-dependent reactions of photosynthesis, the source of electrons for NADPH is

A. ATP.
B. NAD.
C. water.
D. carbon dioxide gas.

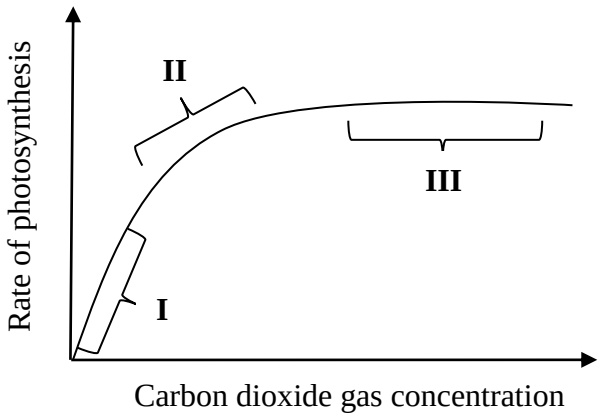
15. The given graph shows the blood lactic acid concentration of an athlete before, during and after a race.



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

A. Q to R and S to T.
B. P to Q and Q to R.
C. P to Q and R to S.
D. Q to R and R to S.

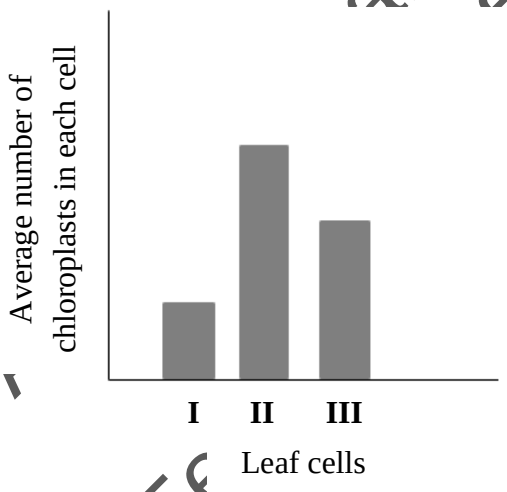
16. The given graph illustrates the effect of carbon dioxide gas (CO_2) concentration on the rate of photosynthesis.



The regions(s) at which the CO_2 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

A. DNA.
B. stroma.
C. thylakoid.
D. 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 N_2 in expired air is

A. 95%.
B. 79%.
C. 35%.
D. 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?

A. Severely swollen epiglottis
B. Growth of large number of hair in nostrils
C. Accumulation of pleural fluid around the lungs
D. 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

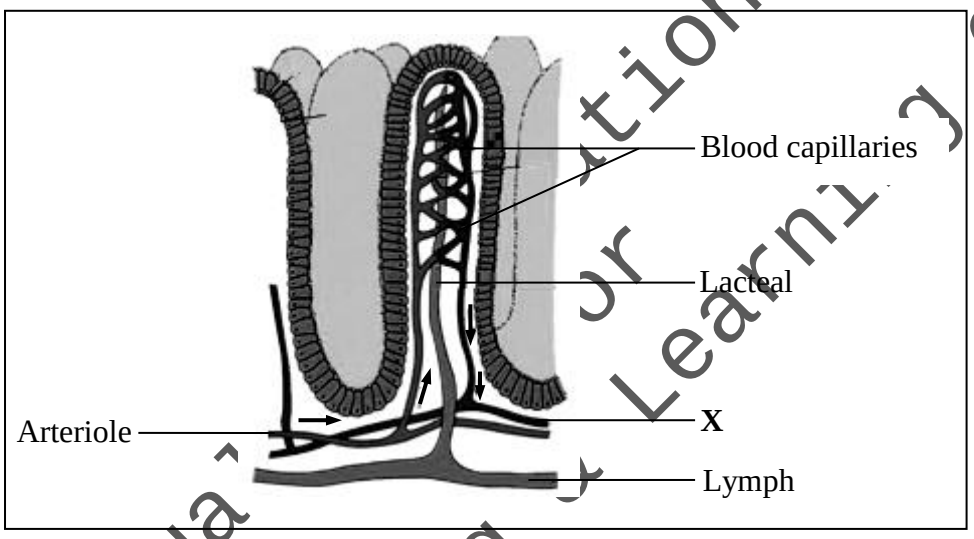
26. The acidic nature of chyme is changed to alkaline in order to

A. stimulate emulsification.
B. kill harmful microorganisms.
C. prevent the secretion of intestinal juices.
D. provide optimum pH for trypsin to work.

27. Which of the following statements is CORRECT about the chemical digestion in the human alimentary canal?

A. Digestion of carbohydrate starts in the stomach.
B. Proteins are digested in the stomach and small intestine.
C. Inactive forms of amylase and lipase are produced by the pancreas.
D. 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

A. aorta.
B. femoral artery.
C. hepatic portal vein.
D. 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.

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?

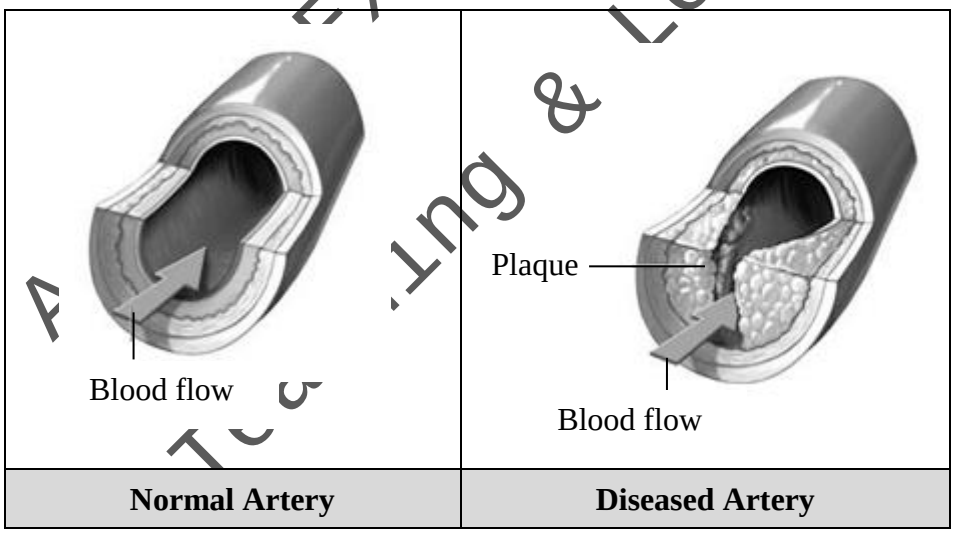
A. I and II
B. I and IV
C. II and III
D. III and IV

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

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

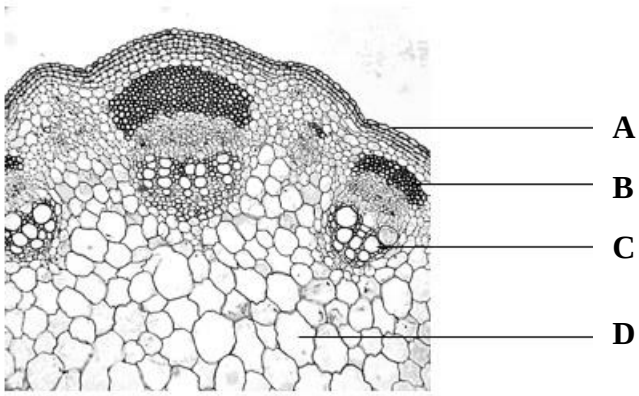
ALTERNATE TO PRACTICAL (ATP: Questions 41-50)

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

A. 10X, 40X and 100X.
B. 40X, 100X and 10X.
C. 40X, 10X and 100X.
D. 100X, 40X and 10X.

42. In the given diagram of the transverse section of a dicot stem, parenchyma tissues are labelled as



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

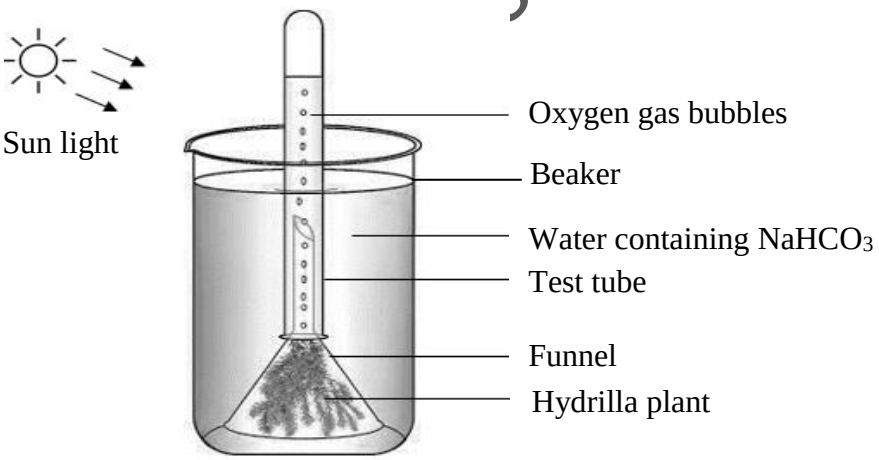
	Salt Solution	**Initial Mass (g)**	**Final Mass (g)**
A	I	12	15
B	II	12	12
C	III	12	8
D	IV	12	6

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?

			
A	B	C	D

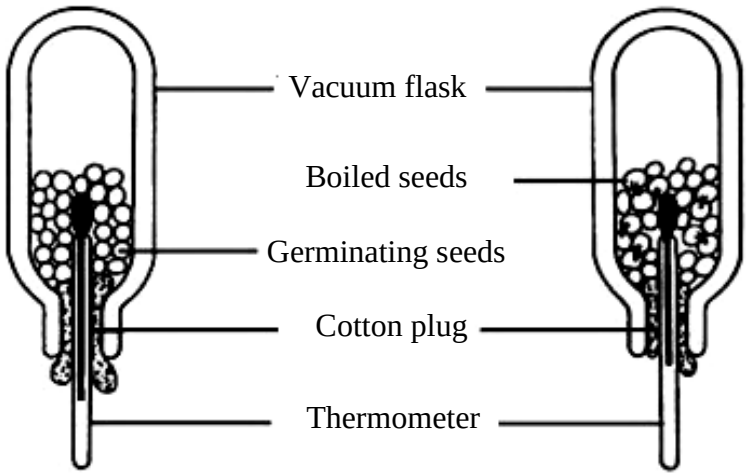
45. Consider the given experimental setup.



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

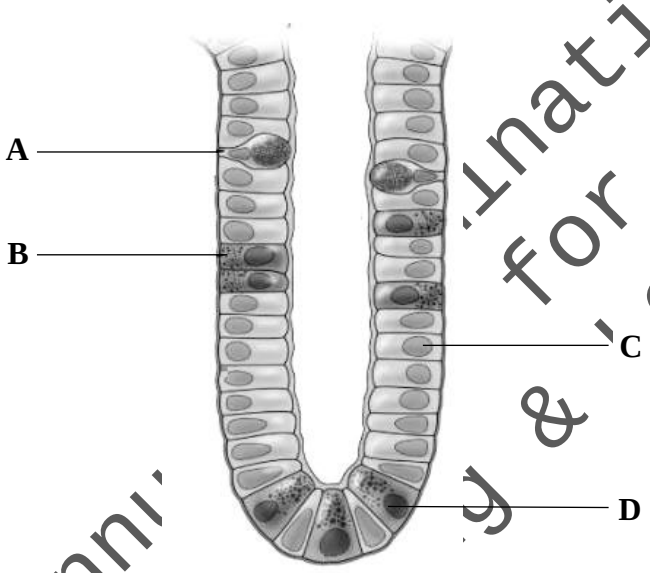
A. X is egg white.
B. Z is coconut oil.
C. Y is an apple juice.
D. W is an orange juice.

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.

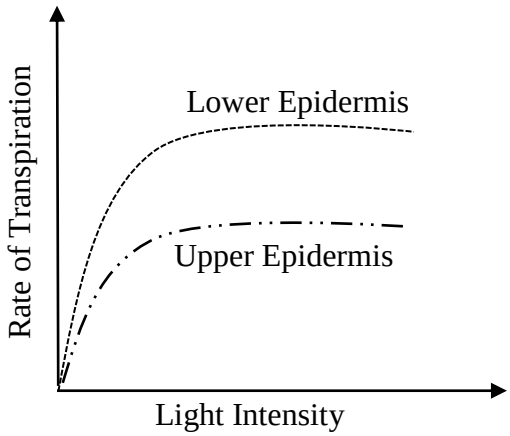
Based on the test result in the given table, the test tube which contains the HIGHEST concentration of reducing sugar is

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.

END OF PAPER

Please use this page for rough work

Please use this page for rough work

Please use this page for rough work