AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

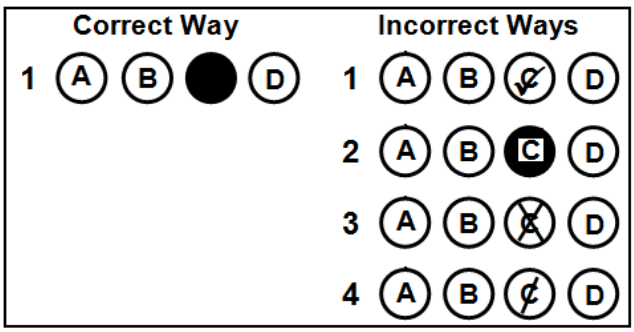
MODEL EXAMINATION PAPER 2023 AND ONWARDS

Biology Paper I

Time: 1 hour 10 minutes Marks: 40

INSTRUCTIONS

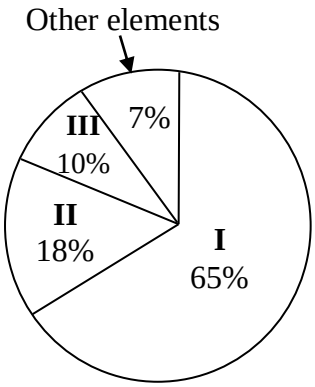
1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 40 only.
4. In each question there are four choices A, B, C, D. Choose ONE. On 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.

1. 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

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

I **II** **III** **IV**

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 organises the data in graphical form.

While drawing the graph, which quantity must he/ she take 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.

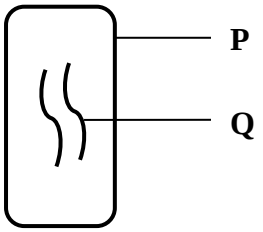
   A positive result can also be obtained by

   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 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.



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

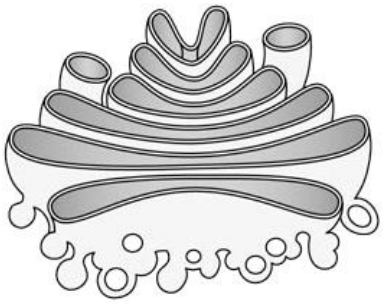
   A. *Allium cepa.*
   B. *Asparagales cepa.*
   C. *Angiosperm cepa.*
   D. *Amaryllidaceae cepa.*

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

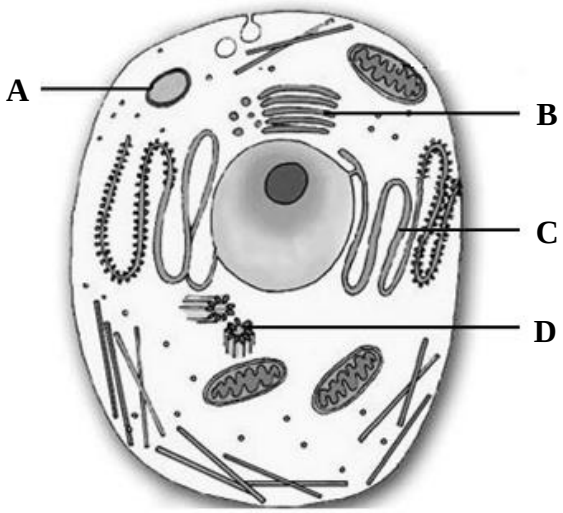


A. Centrioles
B. Golgi bodies
C. Rough endoplasmic reticulum
D. Smooth endoplasmic reticulum

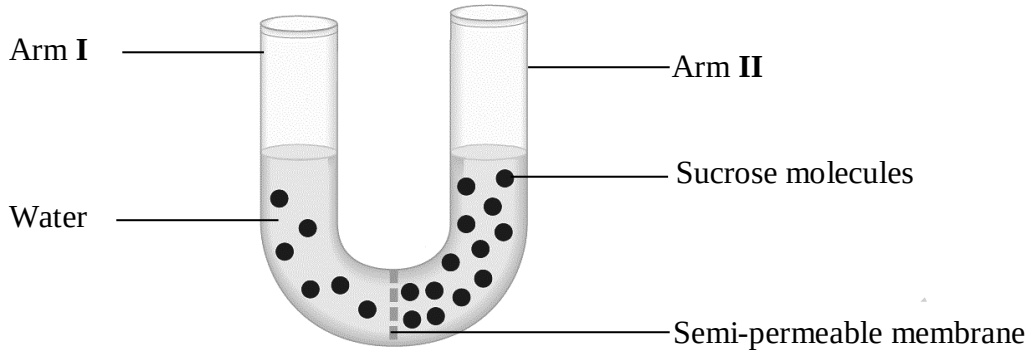
10. The MAIN function of smooth endoplasmic reticulum in an animal cell is the

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

11. Which of the labelled organelles of the given animal cell is made up of microtubules?



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

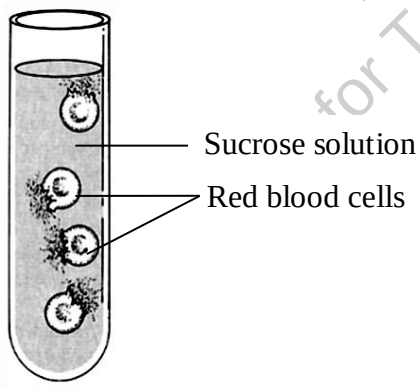


What will happen if the setup is left for three hours?

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.

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

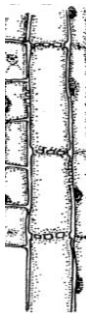
(**Note**: The internal concentration of human red blood cells is 0.9%.)



The concentration of sucrose solution in the given situation would be

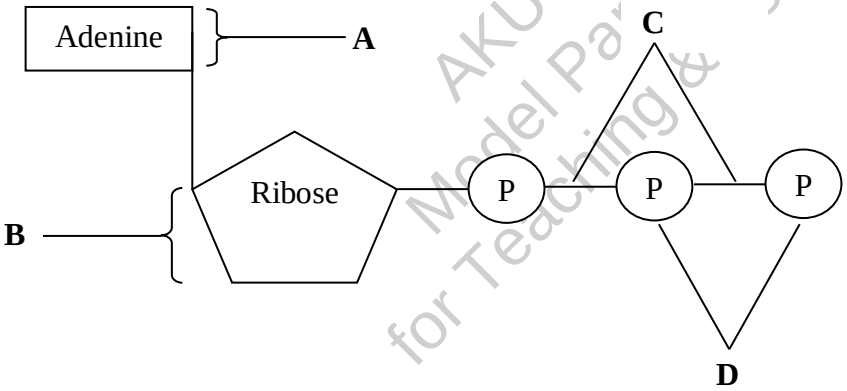
A. 3%.
B. 5%.
C. 0.9%.
D. 0.1%.

14. The diagram that represents phloem vessels in plants is

			
A	B	C	D

15. The given diagram illustrates the chemical structure of adenosine triphosphate (ATP).

Which labelled part of ATP provides energy when broken?



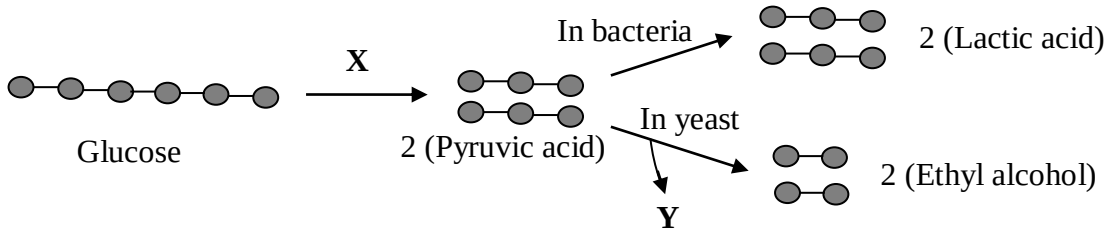
16. The reduction of nicotinamide adenine dinucleotide phosphate ($NADP^+$) takes place during the light reactions of photosynthesis by

A. gaining two electrons and one hydrogen ion.
B. gaining one electron and two hydrogen ions.
C. removing two electrons and one hydrogen ion.
D. removing one electron and two hydrogen ions.

17. How many water molecule are involved in light-dependent reactions to produce TWO molecules of oxygen?

A. 2
B. 3
C. 4
D. 5

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. The similarity between aerobic and anaerobic respiration is that in both the processes,

A. mitochondria plays a vital role.
B. oxidation reduction reactions occur.
C. equal amount of energy is produced.
D. complete oxidation of glucose takes place.

20. The dark reactions of photosynthesis are independent of light. However, if plants are deprived of light, then dark reactions would NOT occur because they need some molecules to proceed with, which form in the presence of light.

These molecules are

A. ADP and NADP.
B. water and oxygen.
C. ATP and NADPH.
D. glucose and oxygen.

21. In 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.

22. Breathlessness is one of the major symptoms of emphysema. Breathlessness occurs because the

A. patient suffers from cough.
B. air spaces of alveoli are enlarged.
C. walls of bronchioles become thin.
D. heart cannot pump enough oxygenated blood.

23. 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.

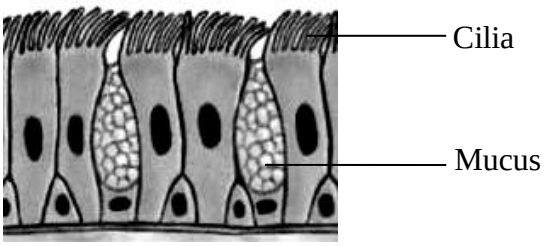
24. The given table shows the percentage of oxygen gas in inspired and expired air.

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.

25. The given type of cells are found in all of the following parts of the respiratory tract EXCEPT



A. trachea.
B. alveolus.
C. bronchus.
D. nasal cavity.

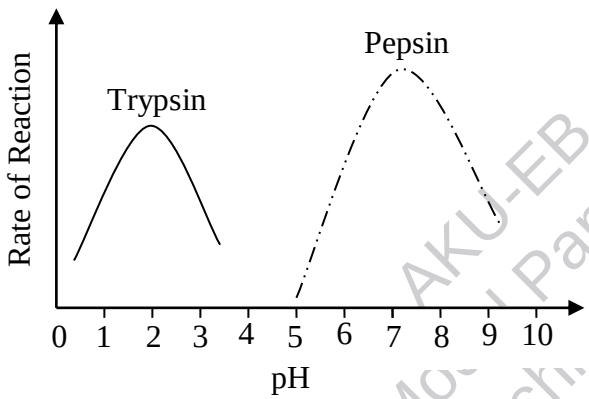
26. Asif goes for a morning walk where the temperature of the surrounding is 13°C.

In this situation, enzymes in Asif's body would work BEST at a body temperature of

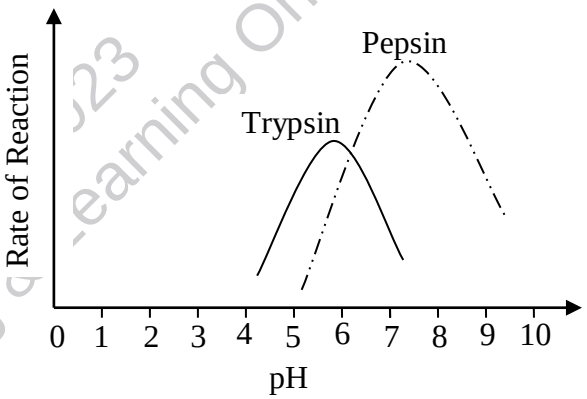
A. 13°C.
B. 23°C.
C. 30°C.
D. 37°C.

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

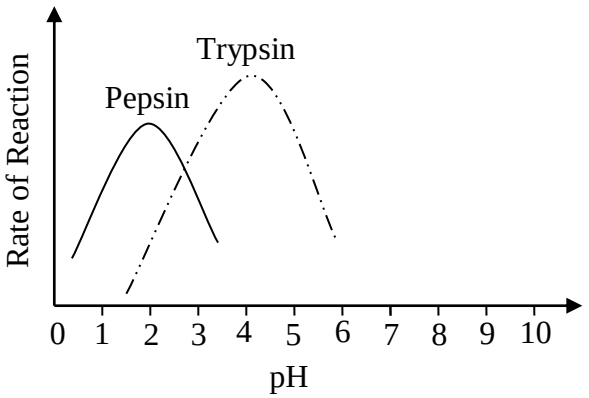
A



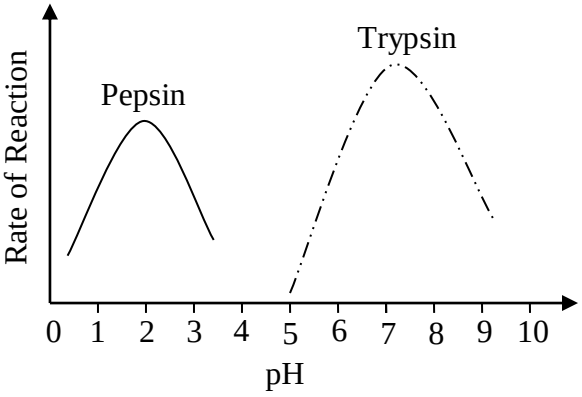
B



C



D



28. 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.

29. The function of vitamin K in human body is

A. clotting of blood.
B. oxidation of glucose.
C. absorption of calcium.
D. synthesis of eye pigments.

30. 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

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.

31. 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.

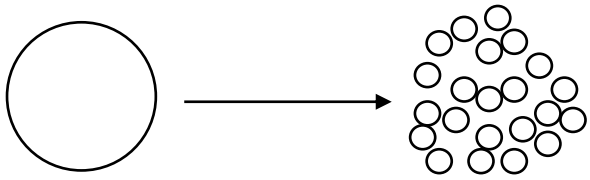
32. A patient has the following symptoms.

- Difficulty in expelling faeces
- Infrequent bowel movements

The patient is MOST likely to be suffering from

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

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



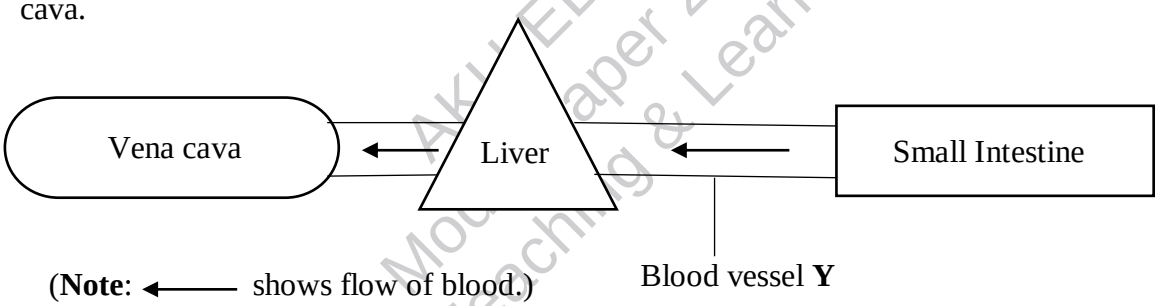
Fat drop

Fat droplets

This process is called

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

34. The given diagram represents the pathway of blood flow from the small intestine to the vena cava.

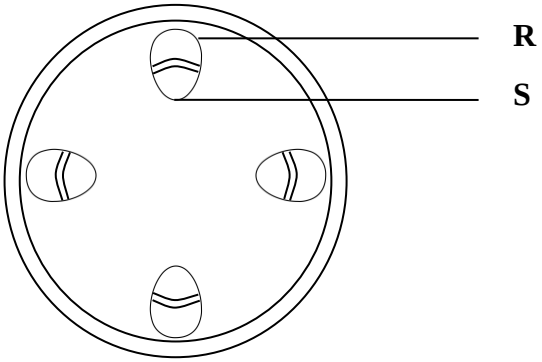


(**Note**: ← shows flow of blood.)

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

35. 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

36. 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	Decreased	Increased
B	Increased	Decreased
C	Decreased	Decreased
D	Increased	Increased

37. Which of the following is CORRECT about thrombocytes?

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

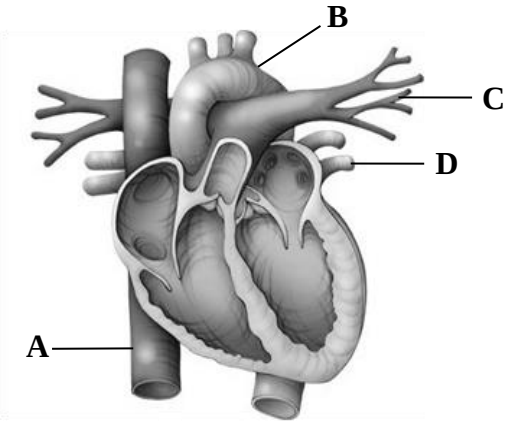
38. Saima has blood group **B**. She needs blood.

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

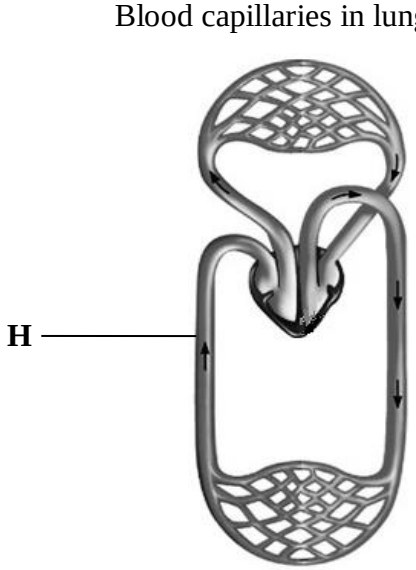
	Blood Group A	Blood Group B	Blood Group AB	Blood Group O
A	Yes	No	Yes	No
B	Yes	No	No	Yes
C	No	Yes	Yes	No
D	No	Yes	No	Yes

39. The given diagram represents the human heart.

The blood vessel that receives the oxygenated blood from lungs is



40. 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.

END OF PAPER

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