ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

SSC BIOLOGY ADVANCED PAPER

Candidate Name:	
Candidate Number :	
Centre Name :	
Centre Number :	

Paper 1: Biology **(2 hours) For Examination June 2025**

It is necessary to respond on the answer sheets provided alongside this question paper. Additionally, you must have a soft pencil (preferably of type B or HB), a clean eraser and a dark blue or black pen.

INSTRUCTIONS:

- You must write your name, candidate number, center name and center number on the answer sheets in the designated spaces.
- Objective section consists of 25 questions, and it is essential that you attempt all of them.
- Each question has four options labelled A, B, C, and D. Select the option that you think is correct. Mark it on the multiple choice answer sheet using a soft pencil.
- Attempt all the questions from subjective section using a dark blue or black pen.
- It is important to follow the instructions provided on the answer sheets.
- Do not use correction fluid.
- Avoid writing on any bar codes.

INFORMATION:

- This paper has a total of 100 mark

. • In objective section there are 25 questions, each carries one mark. There is no negative marking for incorrect responses.

- In subjective section, 45 marks are for extended theory and 30 marks for practical component. The number of marks assigned for every question or its parts is indicated within brackets [ ]

OBJECTIVE SECTION (MCQ) **(25marks)**

1**.** Which of the following best explains how fertility drugs increase the chances of pregnancy?

A – These drugs prevent the release of eggs from the ovaries.

B – These drugs reduce hormone levels to delay ovulation.

C – These drugs contain hormones that stimulate ovulation.

D **–** These drugs stop the menstrual cycle to allow fertilization.

2. How can a DNA nucleotide be described?

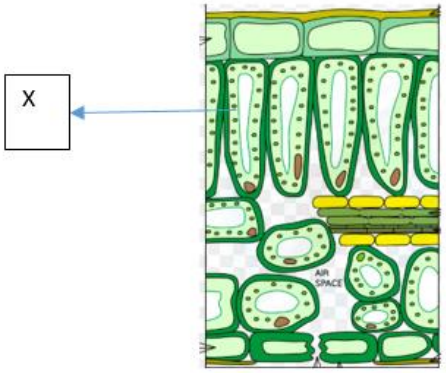
A – Polymer

B – Monomer

C – Double helix

D – Single strand

3. In the **diagram** identify the labelled part X is



A. xylem vessel

B. phloem vessel

C. root hair cell

D. leaf palisade cell

4. What is the approximate percentages of Oxygen and Carbon dioxide are present in expired air?

	Percentage of oxygen	**Percentage of Carbon dioxide**
A.	16	0.03
B.	**16**	**0.04**
C.	21	0.04
D.	21	0.03

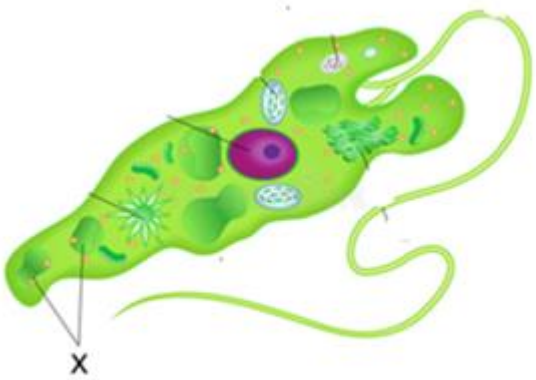
5. Euglena **does** not fit perfectly into either the plant or animal kingdom. Which plant-like characteristic is present in this organism?

A – Presence of nucleus

B – Presence of Ribosomes

C – Presence of Mitochondria

D - Presence of Chloroplast



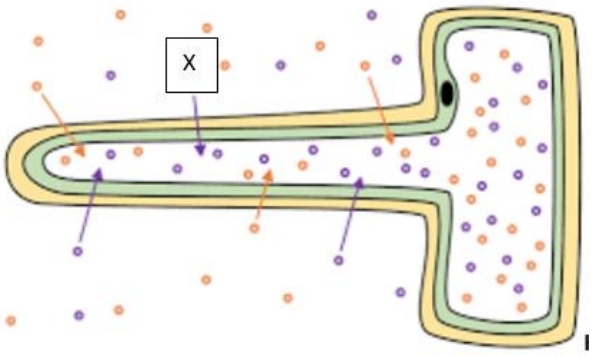
Euglena

6. What is the name of process by which substance X move into the cell as shown in the diagram?

Key:

Blue Salt molecules

Pink water molecules



A: Diffusion

B: Active transport

C: Osmosis

D: Brownian motion

7. A patient is experiencing a vitamin deficiency disease that affects his eyesight. Which type of food would be recommended to help improve his vision?

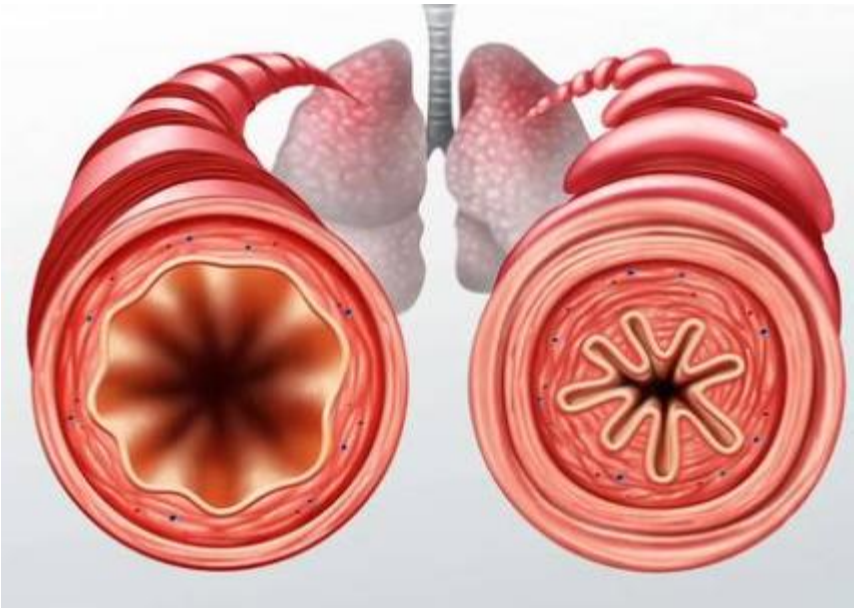
A: Citrus fruits

B: Red meat

C: Carrots

D: milk

8. The diagram of lungs show a disease in a person. A person is suffering in which lung disease?



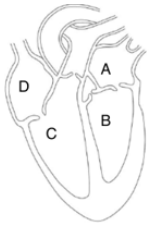
A: Lung cancer

B: Bronchitis

C: Emphysema

D: Coughing

9. A person is admitted in a hospital with irregular heart beat his natural heart rhythm is disturbed it means that heart's natural pacemaker (the **sinoatrial node**) is not working properly. Where a pacemaker most likely to be placed in a human heart in this condition?



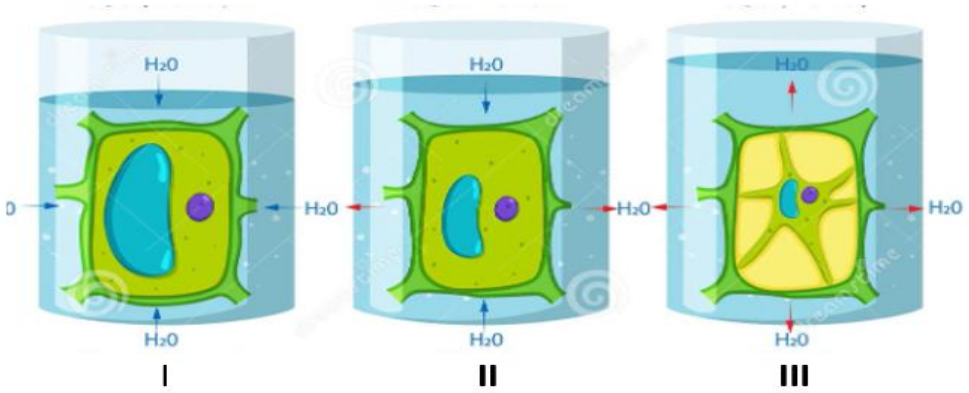
A: left atrium

B: Right atrium

C: left ventricle

D: Right ventricle

10. An experiment is conducted to determine the effect of tonicity of the solutions on plant cells. Image below represents the condition of plant cells 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 solution present in beaker	
	beaker 1	**beaker 2**	**beaker**
A.	hypertonic	hypotonic	isotonic
B.	isotonic	hypotonic	hypertonic
C.	**hypotonic**	**isotonic**	**hypertonic**
D.	isotonic	hypertonic	hypotonic

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

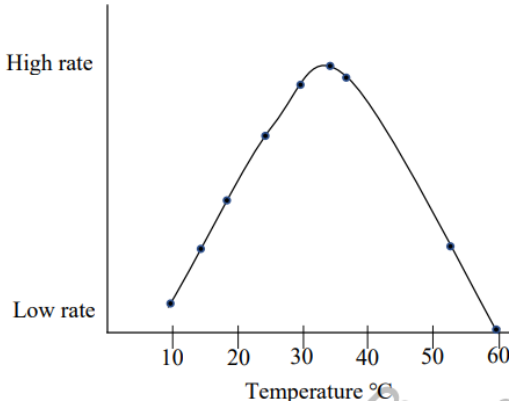
The temperature range at which the substrate molecules will no longer fit into enzyme is

A. 10 – 20 °C.

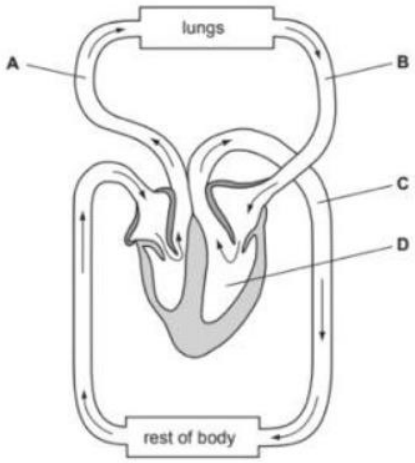
B. 20 – 30 °C.

C. 30 – 40 °C.

D. 50 – 60 °C.



12. Blood vessel B is an important blood vessel that delivers blood from lungs to the heart. Identify blood vessel B.



A: Pulmonary artery

B: Pulmonary Vein

C: Vena cava

D: Aorta

13. A sample of blood was spun using a centrifuge, using your knowledge and identify which component of the blood could not be separated by centrifugation?

A: Red blood cells

B: White blood cells

C: Platelets

D: Plasma

14**.** What is the correct information about the term aseptic technique?

A: A process that involves using microorganisms to make products

B: A process by which an experiment is carried out under controlled conditions

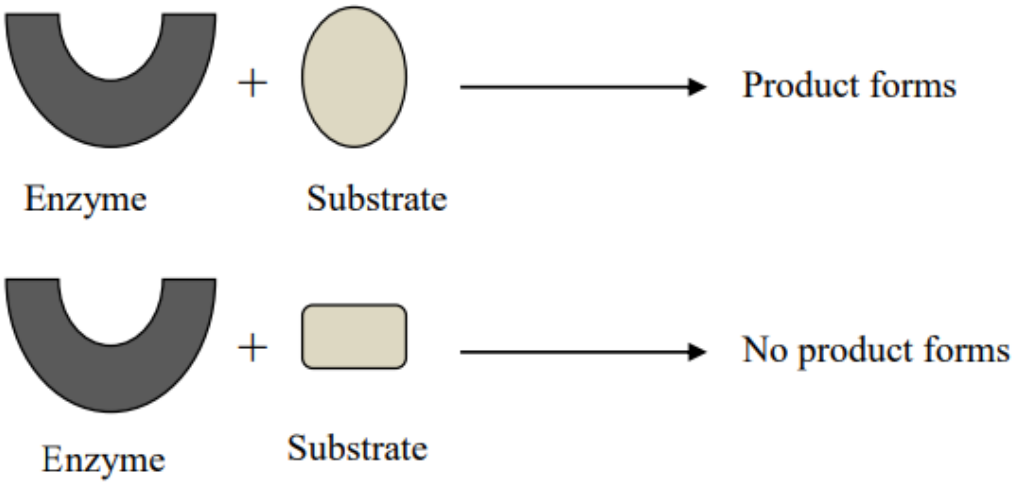
C: A process by which an experiment is carried out to prevent contamination from pathogens

D: A process by which to investigate population growth of a pathogen.

15. Which of the following is the CORRECT difference between respiration and photosynthesis?

	Respiration	Photosynthesis
A.	**A It is a catabolic process**	**It is an anabolic process**
B.	It takes place in animals and plants	It takes place in animals
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.

16. The property of enzymes shown in the given diagram of enzyme-catalyzed reaction is



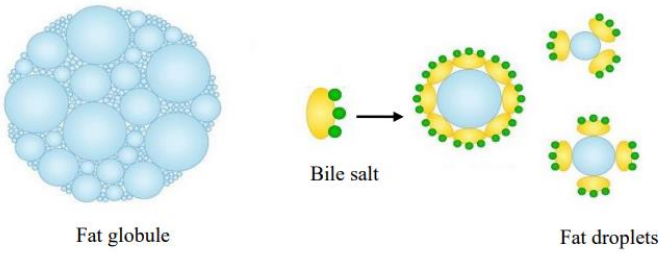
A. sensitivity to changing pH

B. high rate of reaction.

C. requirement of co-factor

D. specificity.

17. 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.

18. Which word would best describe what is being observed in this picture?

A. population

B: Community

C: Natural Selection

D: Ecosystem

19. Below is a food web of a forest habitat:

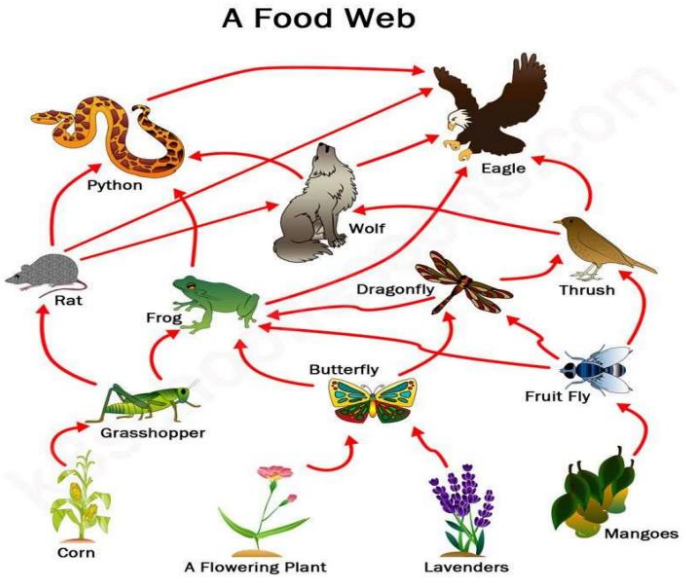
Which of the following correctly describes the trophic level of the frog?

A: Predator

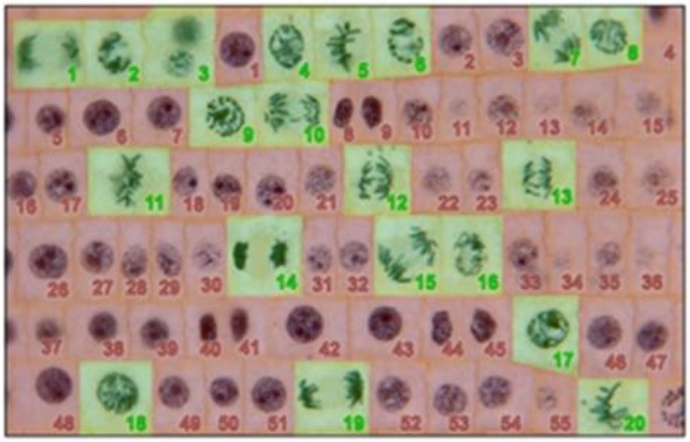
B: Tertiary consumer

C: primary consumer

D: Secondary consumer



20**.** Calculate the mitotic index of the following image? The image shows a total of 75 cells, the cell images highlighted green indicate the number of cells going through mitosis.



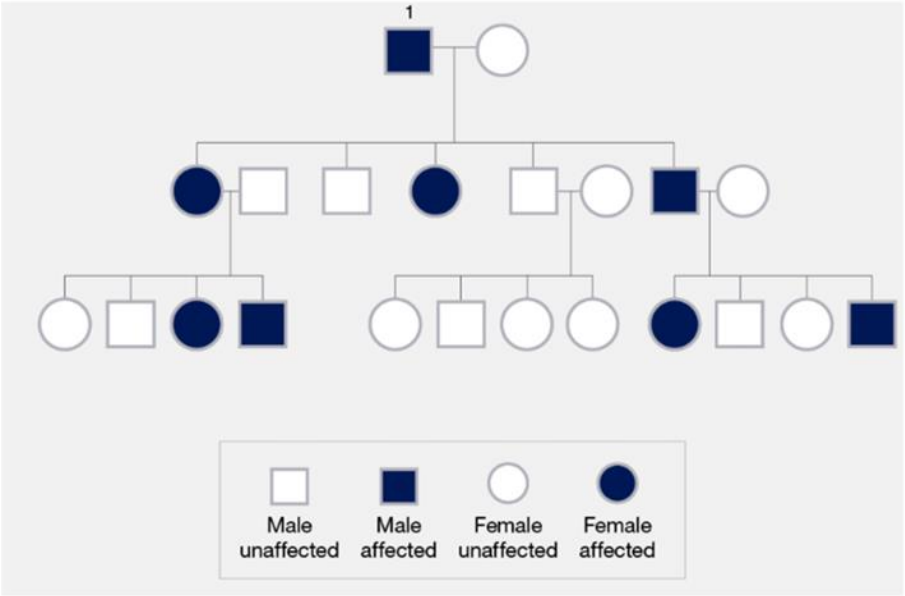
A: 0.36

B: 0.73

C: 0.27

D: 0.20

21. An unknown disease is caused by a dominant allele (H), determine the genotype of individual 1.



A: Hh

B: HH

C: hh

D: HH

22**.** The menstrual cycle plays an important role in the female reproductive cycle, which hormone is responsible for building the uterus lining?

A: thyroxin

B: estrogen

C: glucagon

D: Vasopressin

23. Which option is correct about hormones and their role in the body?

	Hormone	**Gland**	**Function**
A.	**ADHD and vasopressin**	**Pituitary gland**	**It controls other endocrine glands and releases hormones that affect growth, metabolism, and reproduction.**
B.	Melatonin	Thyroid gland	which aids in digestion and oral hygiene
C.	Thyroxin	Pineal gland	Regulate metabolism, heart function, and development.
D.	saliva	Salivary gland	melatonin, a hormone that regulates sleep-wake cycles

24**.** The body plan of an invertebrate animal is shown in the figure. Which group does this organism belongs to?

A. Annelid

B. Crustacean

C. **Platyhelminthes**

D. Nematode

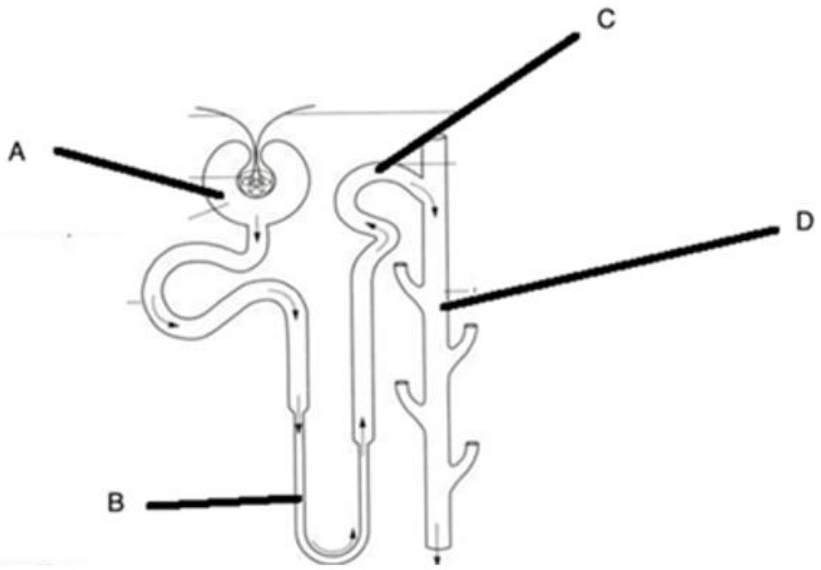
25. Which one best describes the term active immunity?

A. It is gained by receiving antibodies from another organism.
B. It provides short-term protection without memory cell formation.
C. It develops when the body produces its own antibodies after exposure to an antigen.
D. It occurs only through breast milk in newborns

THEORY PAPER: (45marks)

Q1a) Identify the parts A, B, C and D of a diagram.

(2marks)



A._____

B._____

C._____

D._____

b) The nephron's reabsorption and secretion processes are vital for maintaining the body's fluid and electrolyte balance (homeostasis). Explain what are the substances that are secreted and reabsorbed in different parts of a nephron?

(5marks)

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c) What is the function of human skin in the excretion of waste products? (3marks)

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d) How does the skin help to regulate body temperature during cold weather? (3marks)

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e) A DNA sample contains 15% of adenine nitrogenous base. Explain what would be the percentage of cytosine in this DNA sample?

(2marks)

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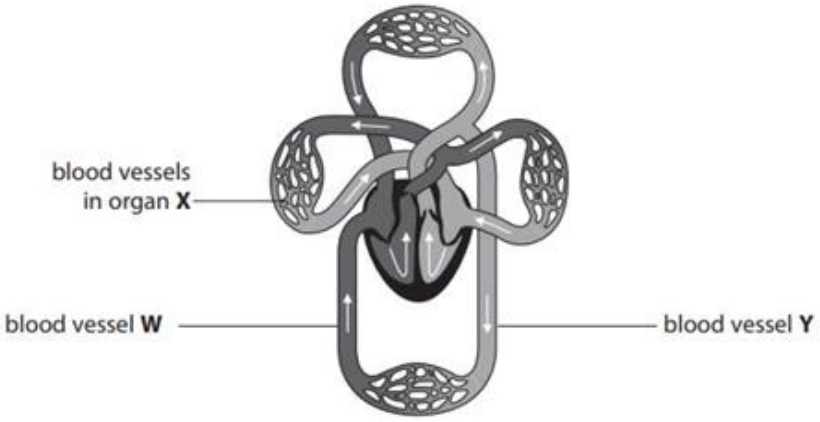
Q2) Look at the diagram and answer the following questions:



a) Name the blood vessel W and the kind of blood present in it? (1mark)

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_____

b) Blood vessel Y contains which kind of blood and what function does it perform? (1mark)

_____
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c) Older men are more likely to suffer with coronary heart disease, a condition that can cause a heart attack followed by death if left untreated. Describe and explain treatments for coronary heart disease.

(5marks)

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Q3) Oxygen makes up about 20–22% of the Earth's atmosphere and is a vital reactant in aerobic respiration, a process that releases energy necessary for the survival of organisms.

a) Write the balanced chemical equation of aerobic respiration? (2marks)

b) Explain the process of inhalation and exhalation in humans. (3marks)

c) Explain how an oxygen debt can occur in the body and how it is repaid? (2marks)

Q4) Pathogens are microorganisms that can cause infectious diseases. Polio virus has been eradicated from modern society due to vaccination. Name a structure found in viruses but not in bacteria?

(1mark)

_____
_____

b) Describe the process of vaccination?

(2marks)

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Q5) Stem cells have a broad range of applications in treating patients with various medical conditions.

1a) Define stem cell and where they found in our body? (2 marks)

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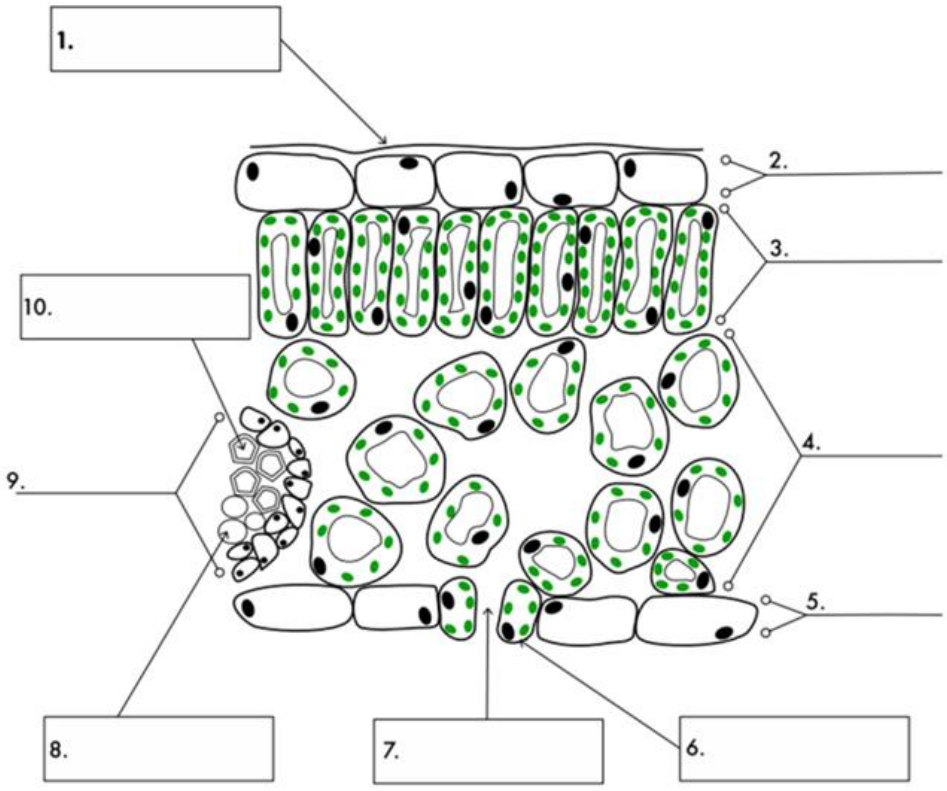
Q6) Label the diagram below and name two substances which are transported by vessel 9?

(3marks)



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a) Describe the process that occurs at 7. (2 marks)

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b) Identify layer 4, and describe how it is adapted to its function? (3 marks)

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d) Sickle cell Anemia is a condition that affects the red blood cells, it is a genetic disorder. How this disease can be treated?

(3marks)

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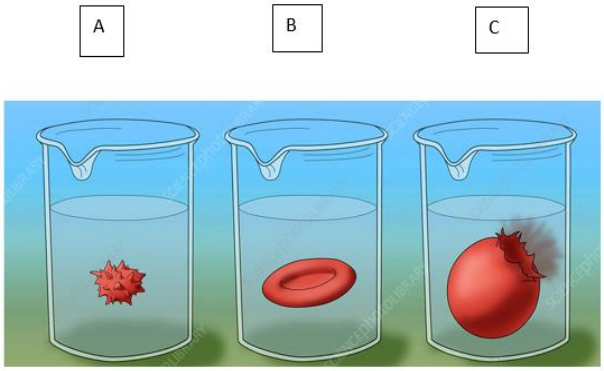
PRACTICAL COMPONENT: **[Total 30 marks]**

Q1) A student wanted to investigate the effect of osmosis on red blood cells, the student placed 3 red blood cells in different solutions A, B and C and observed the results.

a) Identify which one is isotonic ,hypotonic and hypertonic solution? Justify your answer.
(4marks)

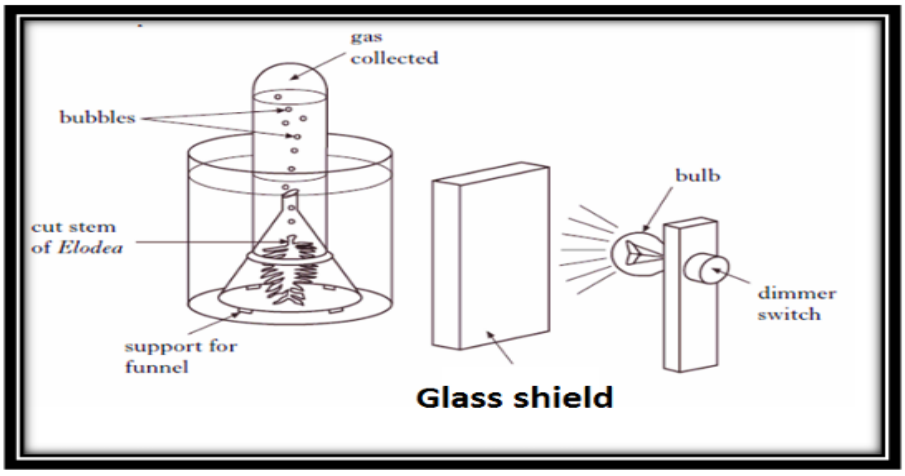


b) Design a suitable investigation for the effect of different concentration of salt solution on potato slice.

(6marks)

c) Why does a red blood cell burst when put into water? (2marks)

Q2) Students conducted an investigation to examine how temperature influences the rate of photosynthesis. They arranged their experimental setup as illustrated below:



a) What is the dependent variable of this investigation? (1mark)

_____
_____

b) Investigate which gas is collected in the test tube and how it can be tested?
(2marks)

_____
_____
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_____

Table 1 below shows the results:

Temperature °C	Rate of photosynthesis/ cm3 per hour			
	Repeat 1	Repeat 2	Repeat 3	Mean
0	2.2 cm3	2.8 cm3	2.5 cm3	2.5 cm3
10	16.5 cm3	17 cm3	16.6 cm3	16.7 cm3
20	25.0 cm3	26.4 cm3	26.3 cm3	25.9 cm3
30	45.2 cm3	43.4 cm3	44.3 cm3	Z

c) Identify the error the students have made in representing their data?
(1mark)

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d) Calculate the value of Z? (2marks)

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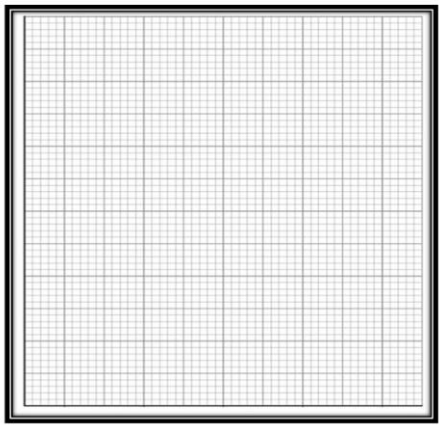
e) Draw a line graph to represent Table 1 (5marks)



f) Interpret the observed results? (3marks)

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g) Explain the results observed at the temperature of 0°C? (2marks)

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h) Suggest a further change that could be done to improve the accuracy of this experiment to identify the optimum temperature for photosynthesis?

(2marks)

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ANSWERING KEY OF MCQs

1.	**C**
2.	**A**
3.	**D**
4.	**B**
5.	**D**
6.	**B**
7.	**C**
8.	**B**
9.	**B**
10.	**C**
11.	**D**
12.	**B**
13.	**D**
14.	**C**
15.	**A**
16.	**D**
17.	**D**
18.	**B**
19.	**D**
20.	**D**
21.	**C**
22.	**B**
23.	**A**
24.	**C**
25.	**C**

Table of specification

	Scheme of Assessment SSC Biology Advanced				
Exam Specification					
		AO1	AO2	AO3	
Topic no.	TOPICS	MCQs (1m)			
1	Foundations of Biology: Cells, Life, and Organization	1			
2	Movement into and out of cells	1		12	
3	Biological Molecules and Nutrition	4	2		
4	Respiratory System and the Effects of Smoking	2	7		
5	Transport in Animals	4	7		
6	Disease, Immunity and Drugs	2	3		
7	Plant Nutrition and Transport	2	10	18	
8	Coordination, Hormonal Control and Excretion	2	13		
9	Cell Division and Reproduction	3			
10	Genetics, Classification, and Evolution	2	3		
11	Ecology and Human Impact on the Environment	2			
12	Biotechnology and Genetic Engineering	-			
		Total:25	Total:45	Total:30	Total:100