NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY ADVANCED SUBSIDIARY LEVEL 8223/1

PAPER 1 Multiple Choice 1 hour

Marks 40 **2022**

Additional Materials: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write in soft pencil.
- Make sure that you receive the multiple choice answer sheet.
- There are **forty** questions on this paper. Answer **all** questions with **your examination number on it**.
- For each question, there are four possible answers **A**, **B**, **C** and **D**. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.
- If you want to change an answer, thoroughly erase the one you wish to delete.

Read the instructions on the answer sheet carefully.

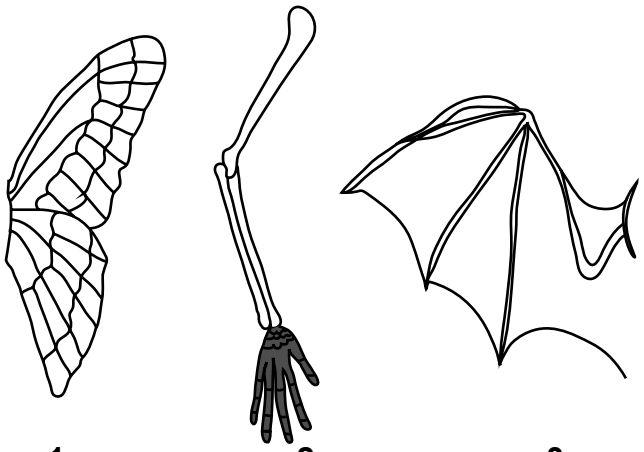
- Each correct answer will score one mark.
- All questions in this paper carry equal marks.
- Any rough working should be done in this booklet.
- You may use a non-programmable calculator.

This document consists of **12** printed pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 The diagram shows structures found in some animals.



1 insect wing **2** human arm **3** bat wing

Which structures are homologous?

A 1 and 2 only

B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

2 The Simpson's index of diversity was calculated for four different areas A - D of a habitat. Which area has the lowest biodiversity?

A 0.01

B 0.18

C 0.20

D 0.80

3 What name is given to the role an organism plays in a community?

A habitat

B ecosystem

C niche

D population

4 What causes bioaccumulation of chemical wastes in living organisms?

A the rate of consumption and excretion of chemicals is the same

B build-up of chemicals in water

C excretion of chemicals is faster than consumption

D intake of chemicals is faster than transformation

5 Which statement describes the role of 'frozen zoos'?

A promoting sustainable utilization of wild species

B storage of cells at very low temperature

C storage of seeds at constant temperature and moisture

D storage of embryos at room temperature

6 An electron microscope has a higher resolution than a light microscope.

What describes resolution in microscopy?

A the ability to distinguish between two objects that are very close together

B the clarity of the image formed by the microscope

C the number of times the image has been magnified by the objective lens

D the power of the microscope to focus on very small objects

7 Which is the correct reason why an eyepiece graticule is calibrated?

A It aids magnification by the objective lens.

B It can be used to make measurements.

C It magnifies the specimen.

D It makes comparisons between specimens.

8 A lysosome measures 0.4 μm in diameter.

What is the diameter in nm?

A 4

B 40

C 400

D 4000

9 Which pair of organelles has a double membrane?

A chloroplasts and mitochondria

B chloroplasts and vacuole

C mitochondria and ribosomes

D nuclei and ribosomes

10 What identifies a cell as a prokaryote?

A The DNA is associated with protein.

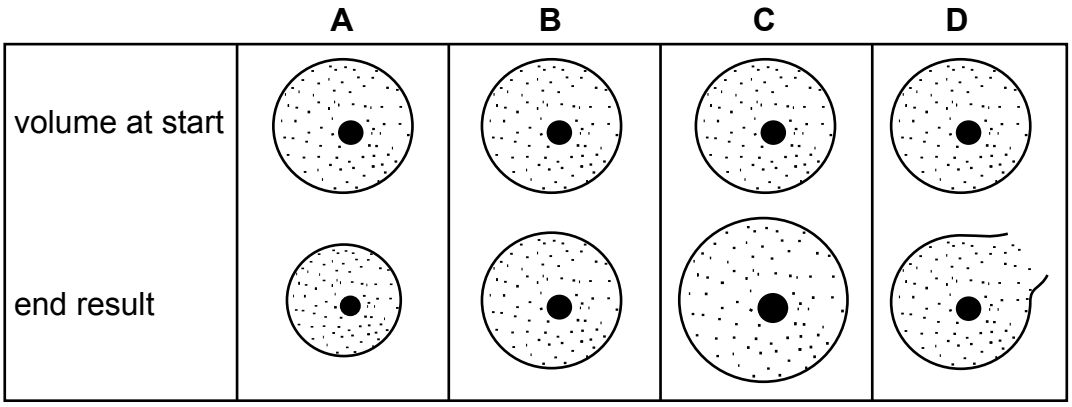
B The DNA is in a circular form.

C The DNA is located in nucleus.

D The DNA is surrounded by a membrane system.

11 Identical animal cells were placed in solutions of different water potentials.
The diagram shows the volume of the cells at the start and the end result.

Which cell was placed in the solution with the lowest (most negative) water potential?



12 When cylinders of potato tissue were immersed in a 0.35 mol dm^{-3} sucrose solution, they showed no change in mass.

What will happen to the cells when cylinders are immersed in a 0.1 mol dm^{-3} sucrose solution?

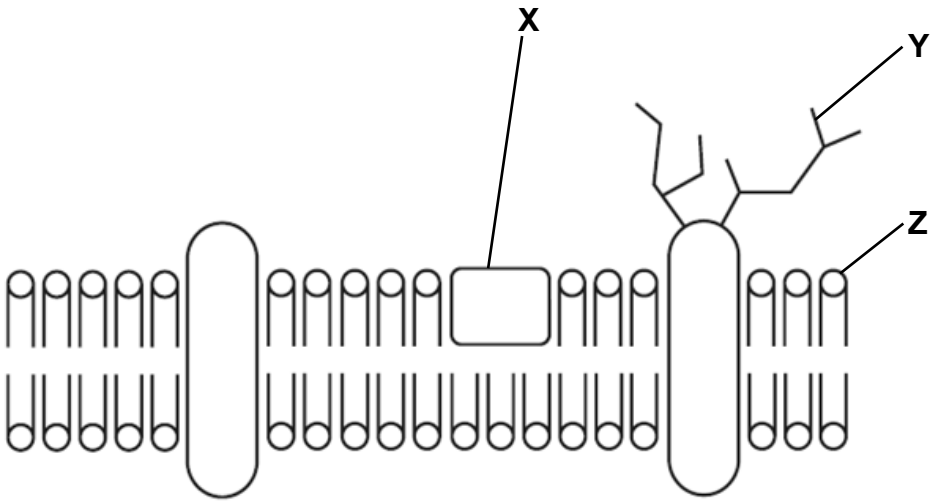
A cells will become plasmolysed

B cells will burst

C water potential of the cells become more negative

D water potential of the cells become less negative

13 The diagram shows the structure of a cell membrane.



Which labels are correct for **X**, **Y** and **Z**?

	X	Y	Z
A	protein	glycoprotein	glycolipid
B	protein	glycoprotein	phospholipid
C	glycoprotein	protein	glycolipid
D	glycoprotein	protein	phospholipid

14 A naturally occurring polysaccharide is a branched chain of α-glucose.

The straight parts of the molecule are linked by α-1, 6 glycosidic bonds with a small number of branches which are linked by α-1, 4 glycosidic bond.

Which polysaccharide has a structure most similar to that described?

A amylopectin

B amylose

C cellulose

D glycogen

15 By which process do large molecules cross the cell surface membrane if they are too large to cross by diffusion?

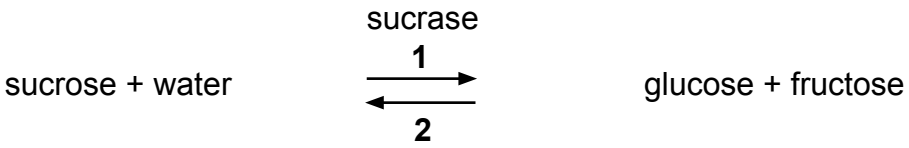
A active transport

B exocytosis

C facilitated diffusion

D osmosis

16 The equation shows a reversible reaction.



In this reaction, on which molecule or molecules do active sites occur and what type of reaction occurs at **1** and **2**?

	active site present on	**reaction at 1**	**reaction at 2**
A	glucose and fructose	hydrolysis	condensation
B	sucrase only	hydrolysis	condensation
C	glucose and fructose	condensation	hydrolysis
C	sucrase only	condensation	hydrolysis

17 How many haem groups are found in one molecule of human haemoglobin?

A 1

B 2

C 3

D 4

18 What happens when a triglyceride molecule forms?

A 3 glycerol molecules and 1 fatty acid molecule combine, absorbing 4 molecules of water

B 3 fatty acid molecules and 1 glycerol molecule combine, releasing 3 molecules of water

C 3 glycerol molecules and 1 fatty acid molecule combine, releasing 4 molecules of water

D 3 fatty acid molecules and 1 glycerol molecule combine, absorbing 3 molecules of water

19 Food tests are carried out on four solutions.

Which solution contains only sucrose and protein?

solution	Benedict's test	acid hydrolysis then Benedict's test	iodine in potassium iodide solution	Biuret test
A	×	✓	×	✓
B	✓	✓	×	✓
C	×	✓	✓	×
D	✓	×	✓	×

Key:

✓ = positive result

× = negative result

20 Which factor could affect the rate of enzyme-catalysed reactions when temperature and pH are at their optimum levels?

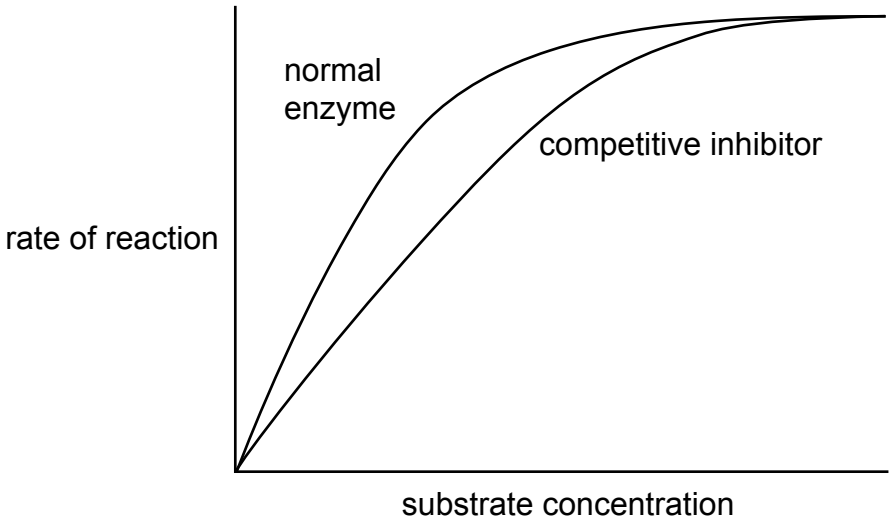
A activation energy

B active site

C average moisture

D enzyme concentration

21 The following graph shows the effect of increasing substrate concentration on an enzyme-catalysed reaction in the presence of a competitive inhibitor.



What happens to the rate of an enzyme-catalysed reaction in the presence of a competitive inhibitor?

A The rate of the reaction decreases.

B The rate of the reaction decreases initially and then recovers.

C The rate of the reaction increases.

D The rate of the reaction is not affected.

22 What is the benefit of measuring the initial rate of an enzyme reaction (V_0) at the beginning of a reaction?

A changes in substrate concentration (S) are negligible, so S can be treated as a constant

B changes in K_m are negligible, so K_m can be treated as a constant

C $V_0 = V_{max}$

D varying substrate concentration (S) has no effect on V_0

23 Some air-borne fungi grows within the xylem vessels of plants.

Which processes will be **directly** affected by these fungi?

A conduction in the apoplast

B development of root pressure

C stomatal movement

D uptake of water by the root hair

24 During transpiration, what is the site for evaporation of water in the leaves?

A air space

B mesophyll cells

C stomata

D walls of xylem vessels

25 Why is the mass flow of sap through sieve tube elements described as an active process?

A Phloem sap is able to flow in sieve tube elements against the pull of gravity.

B Sucrose is loaded into a sieve tube element against a concentration gradient.

C Sucrose passes out of the phloem into regions where cells are dividing.

D Water follows sucrose into a sieve tube element down a water potential gradient.

26 A potometer can be used to measure transpiration rates in a plant.

Why is the plant stem cut under water before attaching to the potometer?

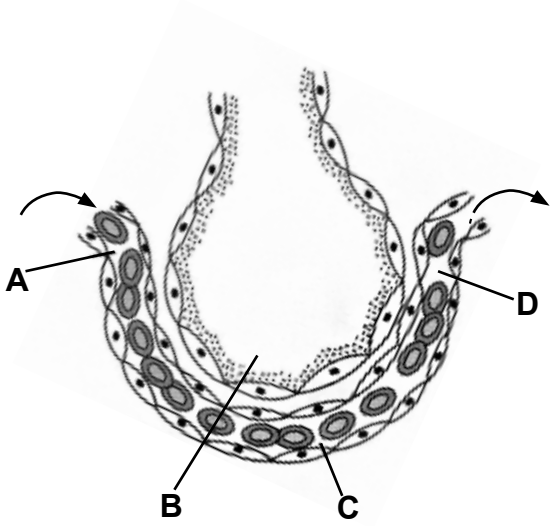
A to maintain the turgidity of the xylem vessels

B to prevent collapse of the xylem vessels

C to stop air entering the xylem vessels

D to stop water loss from the xylem vessels

27 The diagram shows an alveolus and an associated blood capillary. The arrow indicates the direction of blood flow.



Which region has the highest carbon dioxide concentration?

28 What are the effects of carbon monoxide and nicotine on the cardiovascular system?

	carbon monoxide	nicotine
A	combines with haemoglobin	increases blood pressure
B	combines with haemoglobin	reduces heart rate
C	reduces blood pressure	increases heart rate
D	reduces heart rate	combines with haemoglobin

29 What is diastolic blood pressure?

A the maximum blood pressure in the arteries

B the blood pressure in the left ventricle at the end of a contraction

C the maximum blood pressure in the right ventricle

D the blood pressure in the arteries when the heart is resting between beats

30 What is the function of Purkyne tissue in the mammalian heart?

A to conduct a wave of electrical excitation over the atria

B to conduct a wave of electrical excitation over the ventricles

C to reduce the spontaneous contraction of the heart

D to separate oxygenated from deoxygenated blood

31 The antibiotic streptomycin is now proving to be less effective in reducing the incidence of tuberculosis (TB) worldwide.

What is the reason for this observation?

A Antibiotics such as streptomycin are not effective as antiviral drugs.

B Fewer people are living in isolated rural areas and overcrowding occurs in inner cities.

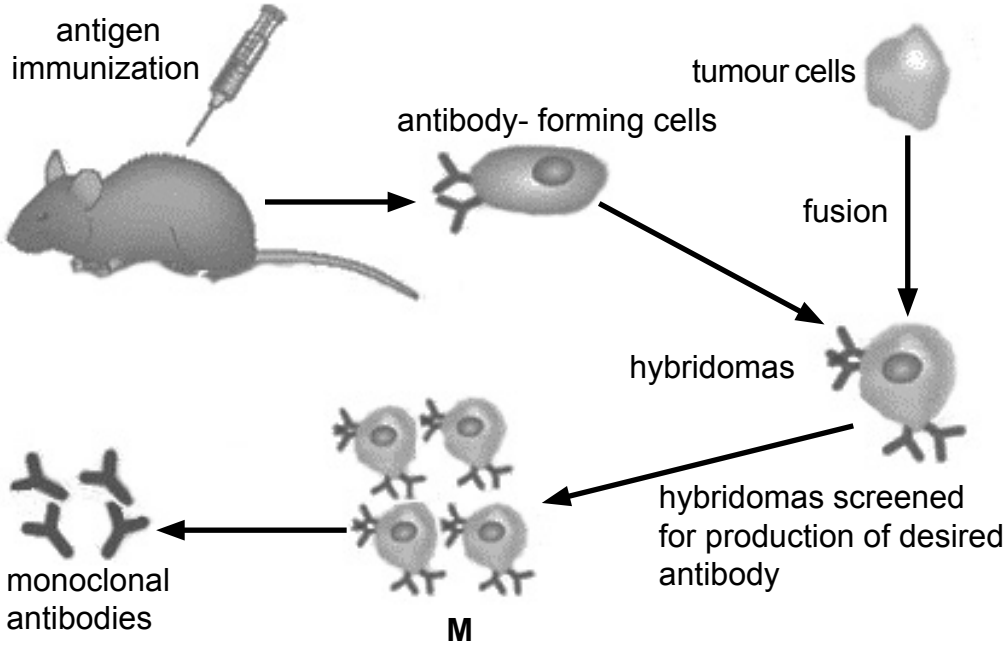
C The incidence of HIV infection is increasing, activating previously inactive mycobacteria.

D There is an increase in the number of people infected with drug resistant strains of TB.

32 What is the causative agent and method of transmission of tuberculosis?

	causative agent	**method of transmission**
A	bacterium	air-borne droplets
B	bacterium	water-borne
C	virus	air-borne droplets
D	virus	water-borne

33 The diagram shows the hybridoma technology for producing monoclonal antibodies.



What happens at **M**?

A clones are screened

B immune cells are isolated

C hybridomas are cloned

D hybridomas are formed

34 Which response is a specific immune response?

A inflammation

B phagocytosis

C production of antibodies

D release of histamine

35 The antibodies to snake poison can be obtained by injecting the toxin into a horse. The horse will produce antibodies which can be extracted from its plasma a few weeks after the toxin was injected. The antibodies are used to treat a person bitten by the same type of snake.

What type of immunity is brought about by this treatment?

A artificial active

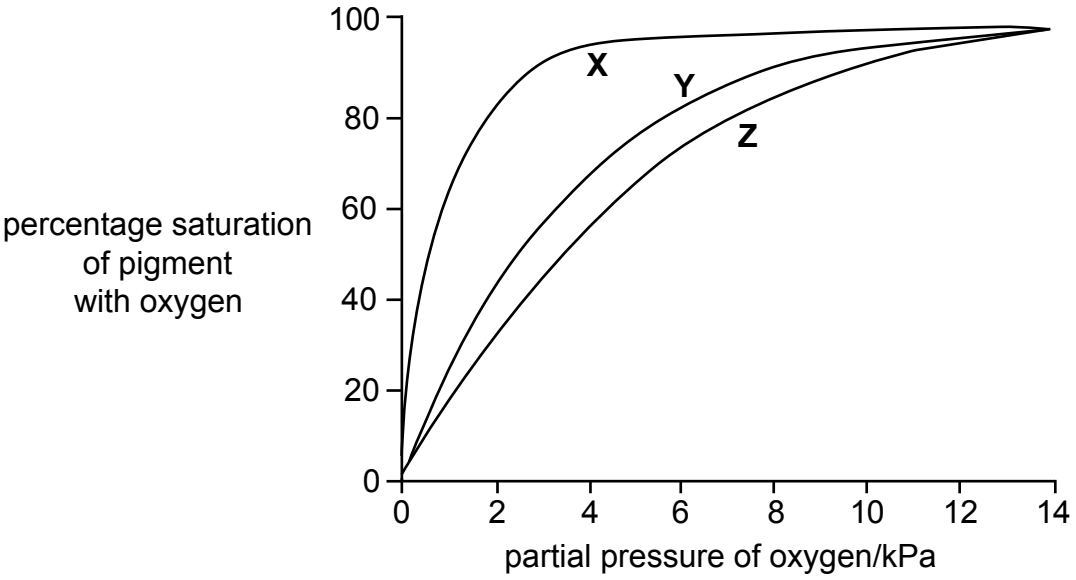
B artificial passive

C natural active

D natural passive

36 The graph shows oxygen dissociation curves for myoglobin, fetal haemoglobin and adult haemoglobin.

Myoglobin, found only in muscles, releases oxygen when partial pressures are very low. Fetal haemoglobin binds slightly more to oxygen than adult haemoglobin.



What are **X**, **Y** and **Z**?

	X	Y	Z
A	adult haemoglobin	fetal haemoglobin	myoglobin
B	myoglobin	fetal haemoglobin	adult haemoglobin
C	fetal haemoglobin	myoglobin	adult haemoglobin
D	myoglobin	adult haemoglobin	fetal haemoglobin

37 Which event occurs during the contraction of the left ventricle?

A The bicuspid valve opens.

B The semilunar valve in the aorta closes.

C The pressure in the right atrium becomes greater than the pressure in the left ventricle.

D The pressure in the left ventricle becomes greater than the pressure in the aorta.

38 Which cell activity must occur before prophase of mitosis can begin?

A breakdown of the nuclear envelope

B increased production of mRNA

C migration of centrioles to opposite poles

D spindle fibres radiate from centrioles

39 What is found in both DNA and mRNA?

A deoxiribose sugar

B double helix

C sugar-phosphate backbone

D thymine base

40 In a DNA sequence for sickle cell anaemia, adenine replaces thymine in a CTT triplet, forming the triplet CAT. During the synthesis of a sickle cell haemoglobin molecule, the amino acid valine is incorporated instead of glutamic acid.

What is the anti-codon in the tRNA molecule carrying this valine?

A CAT

B CAU

C GTA

D GUA