ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

BIOLOGY 9190/1

PAPER 1 Multiple Choice

NOVEMBER 2007 SESSION 1 hour

Additional materials:
- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)
- ruler

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. 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.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

S/16

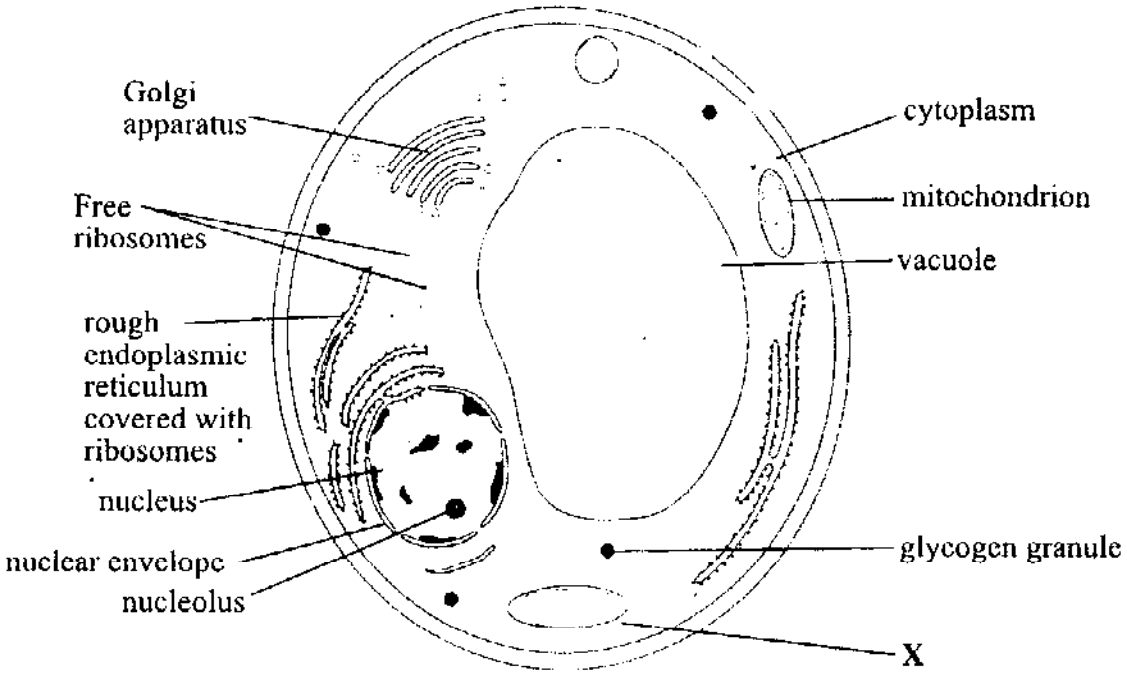
This question paper consists of 17 printed pages and 3 blank page.

[Turn over

1 Which feature is a characteristic of a prokaryotic cell?

	cell size/μm	cell wall	ribosomes
A	0.5 - 10	cellulose	80 s
B	10 – 100	murein	70 s
C	10 – 100	cellulose	80 s
D	0.5 – 10	murein	70 s

2 The diagram shows a yeast cell. The actual size of the mitochondrion marked **X** is 0.8 μm long.



What is the magnification of organelle **X**?

A 0.05
B 20
C 2 000
D 20 000

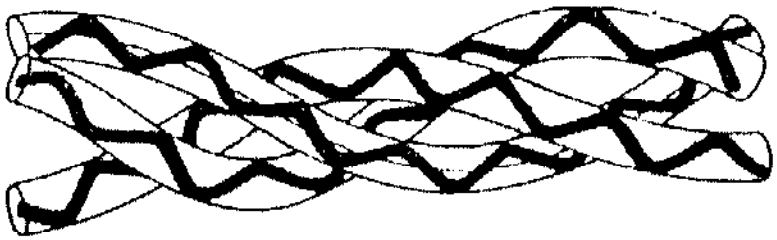
3 In which organelle does synthesis of polypeptide chains occur?

A centrioles
B golgi apparatus
C mitochondria
D lysosomes

4 Which bonds usually remain intact when a protein is denatured?

A disulphide bonds
B hydrogen bonds
C ionic bonds
D peptide bonds

5 The diagram shows a structural protein.



Which bonds hold the three strands together?

A disulphide bridges
B hydrogen bonds
C ionic bonds
D peptide bonds

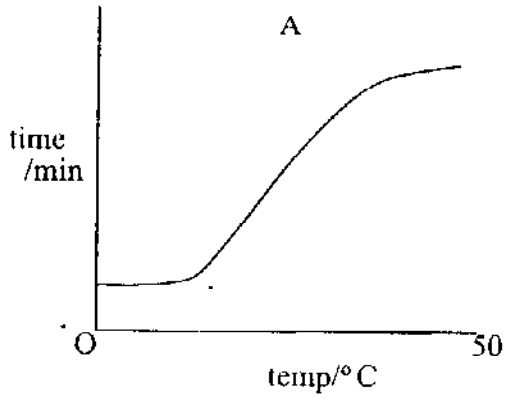
6 In an experimental investigation, a student made the following observations on liquid substance Z.

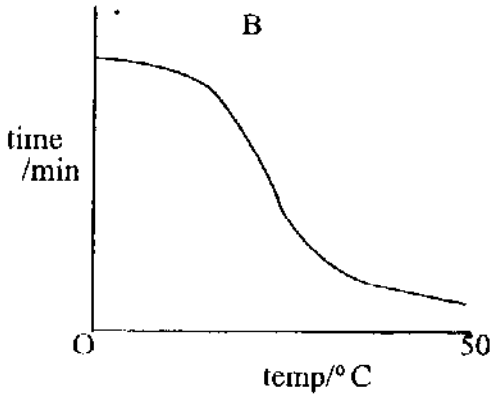
Z + iodine in potassium iodide solution	blue colour
Z + Benedict's solution + heat	blue colour
Z + sodium hydroxide solution + copper sulphate solution	blue colour

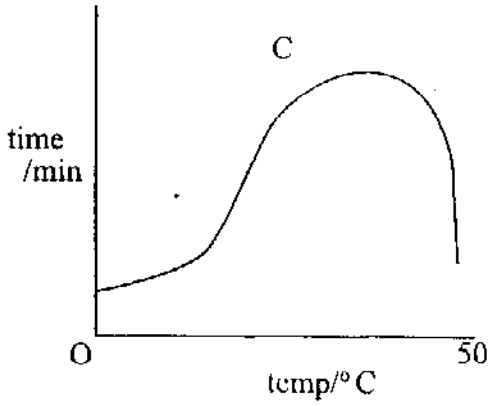
What deduction can be made from the results?

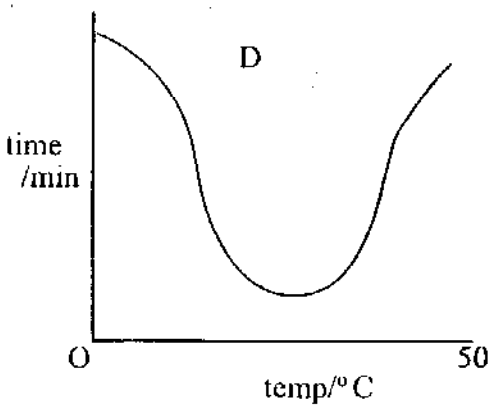
A Z is a polysaccharide.
B Z has no reducing sugar.
C Z has protein and starch.
D Z contains sucrose.

7 In an enzyme controlled reaction the time taken for all substrate molecules to be converted into products at different temperatures was recorded and used to plot a graph. Which graph is correct?





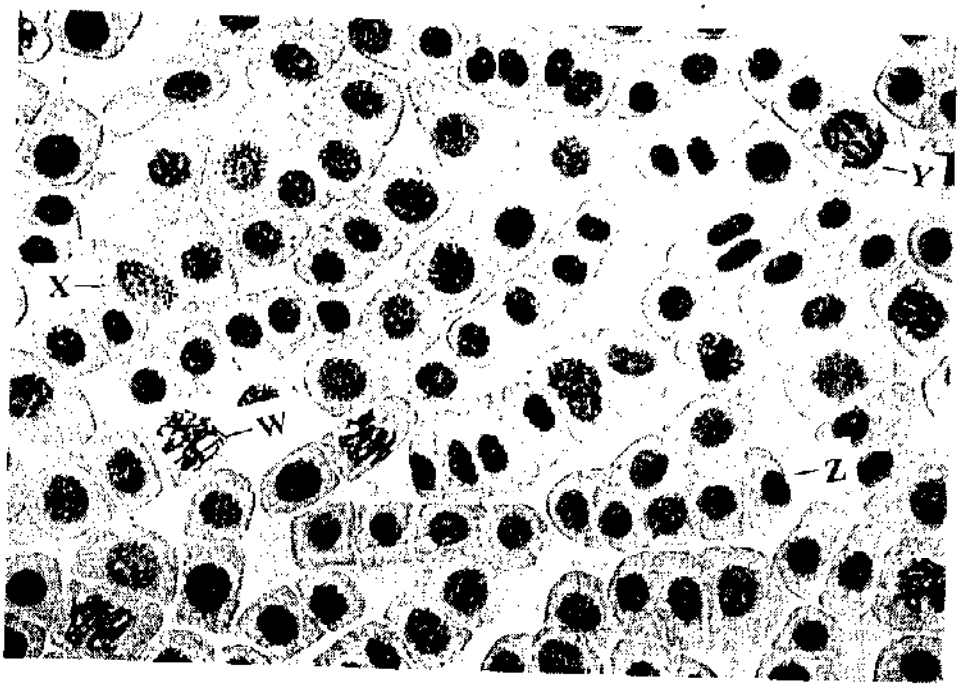




8 Finely divided platinum speeds up the decomposition of hydrogen peroxide but **not** as much as a piece of liver. Which property of enzymes is demonstrated by this statement?

A catalysis of reverse reactions
B large turnover number
C protein nature
D substrate specificity

9 The photomicrograph shows cells in various stages of the mitotic cell cycle.



Which cells are at the stages named below?

	interphase	prophase	metaphase	anaphase
A	X	Z	W	Y
B	Z	X	W	Y
C	Z	X	Y	W
D	X	W	Y	Z

10 Which statement correctly describes the second division of meiosis?

A The separating chromatids are genetically different.
B Chiasmata form between the non-sister chromatids of homologous chromosomes.
C The chromosomes duplicate during interphase.
D The cells are still in the diploid state.

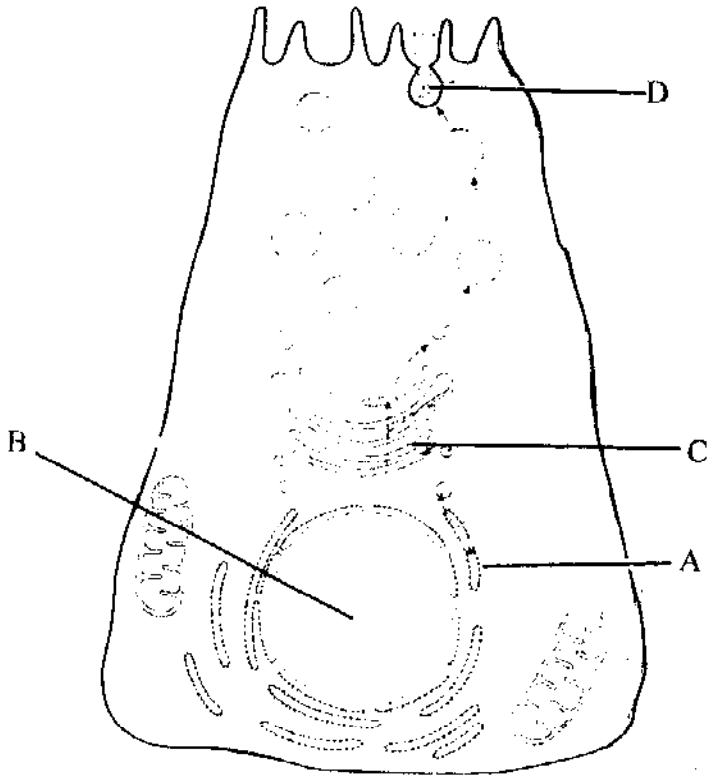
11 The table shows the relative amounts of bases in DNA of various organisms.

Source of DNA	base present / %				Total
	Adenine	Guanine	Thymine	Cytosine	Percentage
Human	30.9	19.9	29.4	19.8	100
Sheep	29.3	21.4	28.3	21.0	100
Hen	28.8	20.5	29.2	21.5	100
Salman	29.3	20.5	29.3	20.9	100
Locust	29.3	20.5	29.3	20.9	100
Wheat	27.3	22.8	27.1	22.8	100
Yeast	31.3	18.7	32.9	17.1	100
E. Coli	24.7	26.0	23.6	25.7	100
X 174 (virus)	24.6	24.1	32.7	18.6	100

What conclusion can be drawn from the table?

A All organisms have the same quantity of genetic material.
B The amount of purine bases are approximately equal to amount of pyrimidine bases in cells.
C DNA contains more adenine and thymine than guanine and cytosine.
D Adenine and guanine are purine bases and thymine and cytosine are pyrimidine bases.

12 Radioactive organic bases are supplied and taken up by pancreatic exocrine cells which secrete pancreatic enzymes. The diagram shows movement of materials within the cell. Where is radioactivity detected in the cell **two** days later?



13 Which biological molecule contains nucleotides?

key; present ✓ absent X

	collagen	**adenosine triphosphate (ATP)**	**transfer RNA**
A	X	✓	✓
B	✓	✓	X
C	X	X	✓
D	✓	✓	✓

14 A man heterozygous for phenylketonuria (PKU) and with blood group AB marries a woman heterozygous for both PKU and blood group A. What fraction of their children is likely to have both PKU and blood group A?

A. $\frac{1}{16}$

B $\frac{1}{8}$

C $\frac{1}{4}$

D $\frac{3}{4}$

15 Which term refers to genes located at the same locus on homologous chromosomes?

A allelic
B codominant
C homogametic
D linked

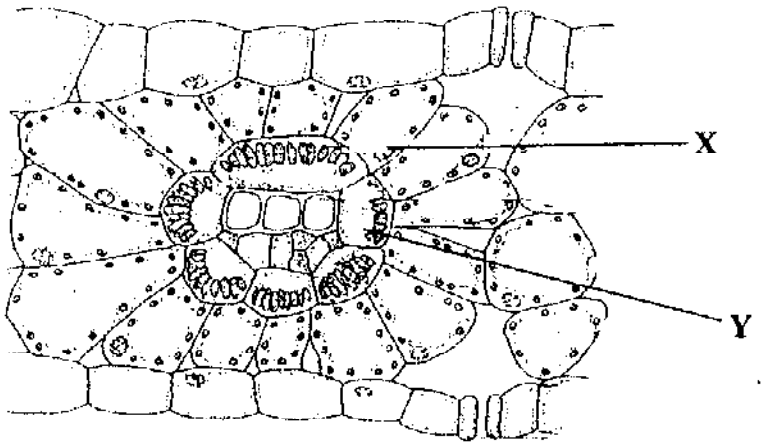
16 The following statements refer to natural selection.

1 It changes a gene pool.
2 It increases rate of mutations.
3 It removes harmful genes.
4 It improves species adaptation.

Which statements are correct?

A 1 2 and 3
B 1 3 and 4
C 2 3 and 4
D 2 1 and 4

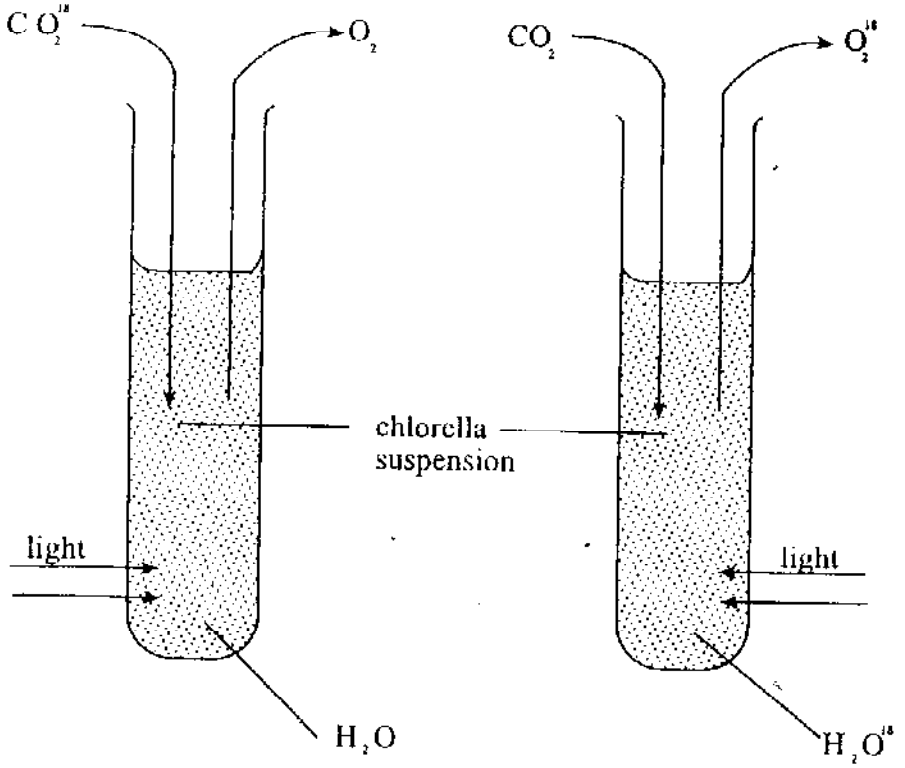
17 The diagram shows the transverse section of a C_4 leaf.



What are the carbon dioxide acceptors in cell **X** and **Y**?

	Cell **X**	Cell **Y**
A	malate	ribulose biphosphate
B	phosphoenol pyruvate	oxaloacetate
C	phosphoenol pyruvate	ribulose biphosphate
D	ribulose biphosphate	phosphonenol pyruvate

18 The diagram below shows illuminated suspensions of chlorella cells (green algae) exposed to either labelled carbon dioxide $\left(CO_2^{18}\right)$ or labelled water $\left(H_2O^{18}\right)$. The oxygen evolved was analysed by the mass spectrometer to determine the O_2^{18} concentration.



What conclusion can be drawn from the results?

A Oxygen evolved in photosynthesis came from carbon dioxide.
B Oxygen evolved in photosynthesis came from water.
C Labelled oxygen from carbon dioxide is more dense than labelled oxygen from water.
D Light energy splits carbon dioxide to release oxygen molecules.

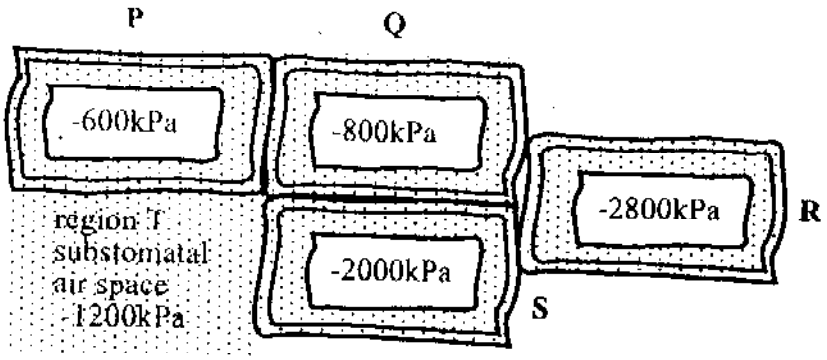
19 Some antibiotics (bacteriostatics) stop the growth and multiplication of bacteria by inhibiting the electron transport chain. What are the effects of the antibiotics on bacterial respiration?

	glycolysis	**Krebs cycle**	**ethanol concentration**
A	decrease	increase	increase
B	increase	increase	decrease
C	decrease	decrease	increase
D	increase	decrease	decrease

20 Which substance acts as the hydrogen acceptor during anaerobic respiration in a fungus cell?

A ethanal
B ethanol
C pyruvate
D nicotinamide adenine dinucleotide (NAD)

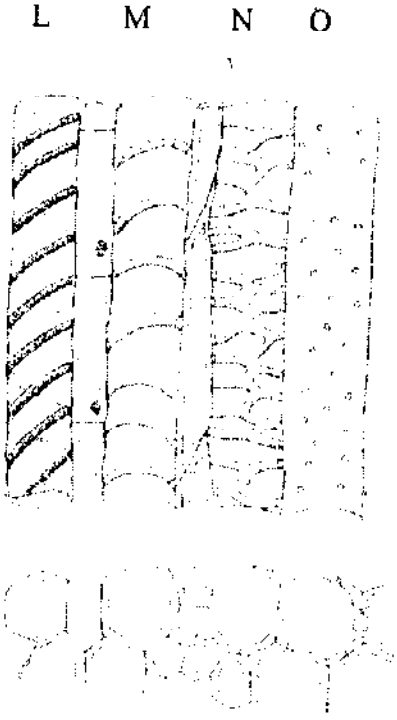
21 The diagram shows cells of different water potential located in the leaf mesophyll layer.



What is the direction of water movement between the cells.

A	R	→	Q	→	P
B	Q	→	S	→	T
C	S	→	T	→	P
D	T	→	S	→	R

22 The diagram shows xylem vessels supported by bands of lignin.



What is the correct pattern of lignin deposition?

	Pattern of deposition			
	spiral	**annual**	**reticulate**	**pitted**
A	L	M	N	O
B	N	O	L	M
C	M	L	N	O
D	L	M	O	N

23 Where is the heart rate controlled?

A atrio-ventricular node
B hypothalamus
C medulla
D sino-atrial node

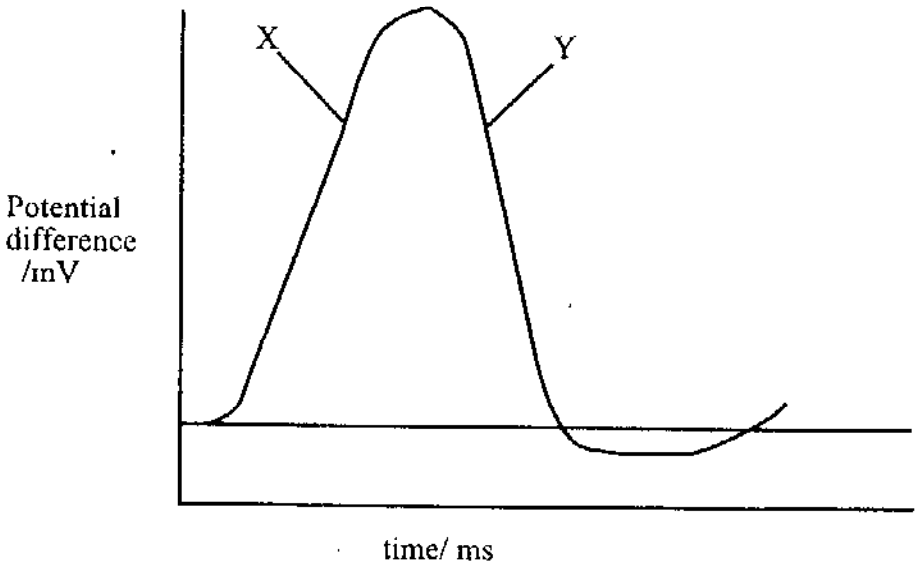
24 The following statements describe effects of exercise on the body.

1 increased blood flow to the tissues
2 stronger heart
3 increased heart rate
4 increased heart muscles
5 increased cardiac output

Which of these are short term effects?

A	1	3	and	5
B	2	3	and	5
C	1	2	and	4
D	2	4	and	5

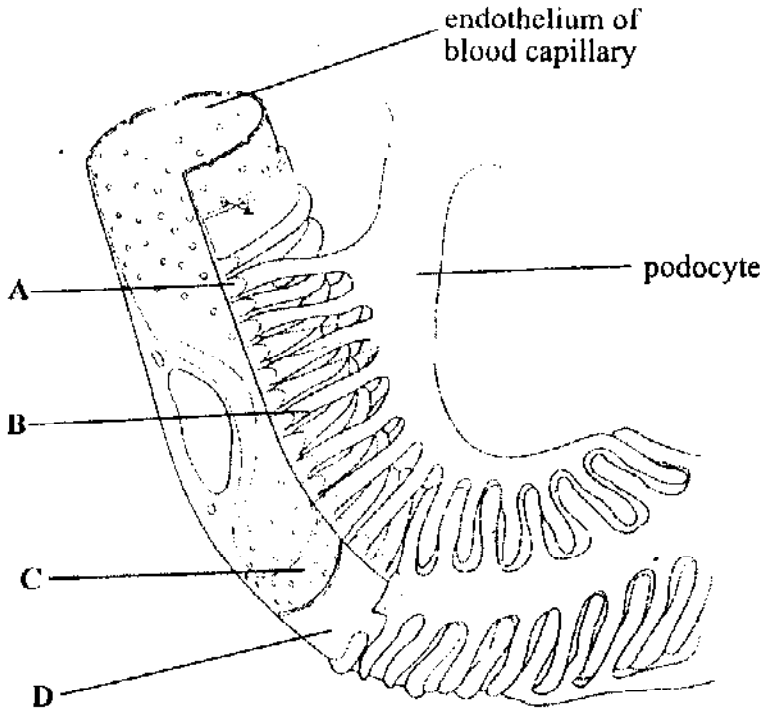
25 The diagram shows an action potential.



Which pair of statements correctly describes events at **X** and at **Y**?

	at **X**	at **Y**
A	potassium ions move out of axon	sodium ions move into the axon
B	potassium ions enter into the axon	sodium ions move out of the axon
C	sodium ions move out of axon	potassium ions enter into the axon
D	sodium ions enter into the axon	potassium ions move out of the axon

26 The diagram shows the relationship between glomerular capillaries and inner wall of the bowman's capsule. Which part carries out ultrafiltration?



27 Which is perfomed by the hepatocyte of an adult human?

A production of red blood cells
B production of plasma proteins
C destroying bacteria in the blood
D production of essential fatty acids

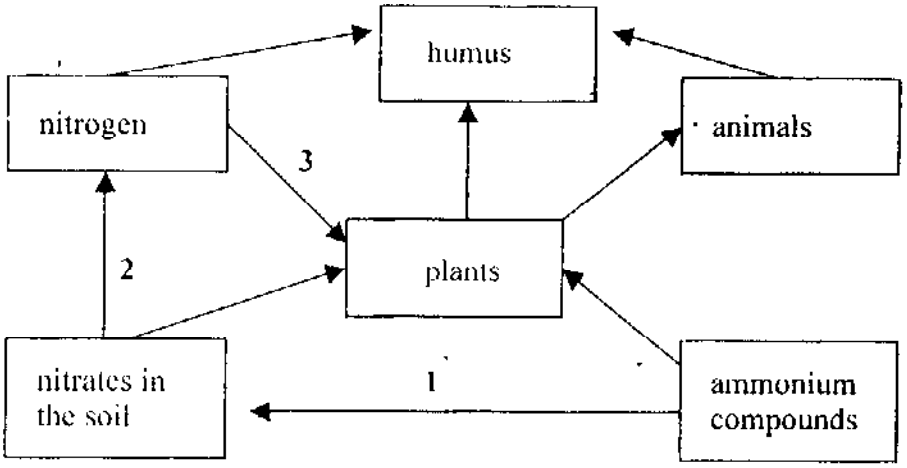
28 Which statement correctly describes the endocrine nature of the pancreas?

A Secretes insulin and glucagons into blood capillaries.
B Secretes amylase and lipase into the pancreatic duct.
C Secretes adrenaline into blood capillaries.
D Secrets hydrogen carbonate ions into the pancreatic duct.

29 Which statement best describes a community?

A The number of plant species that can be sustained by an ecosystem.
B All members of one species in a habitat.
C All plant and animal species in an ecosystem.
D All living and non-living components in an area.

30 The diagram shows a simplified nitrogen cycle.



What are processes 1, 2 and 3 referring to?

	1	2	3
A	nitrification	denitrification	nitrogen fixing
B	nitrogen fixing	nitrification	denitrification
C	denitrification	nitrogen fixation	nitrification
D	nitrification	nitrogen fixation	denitrification

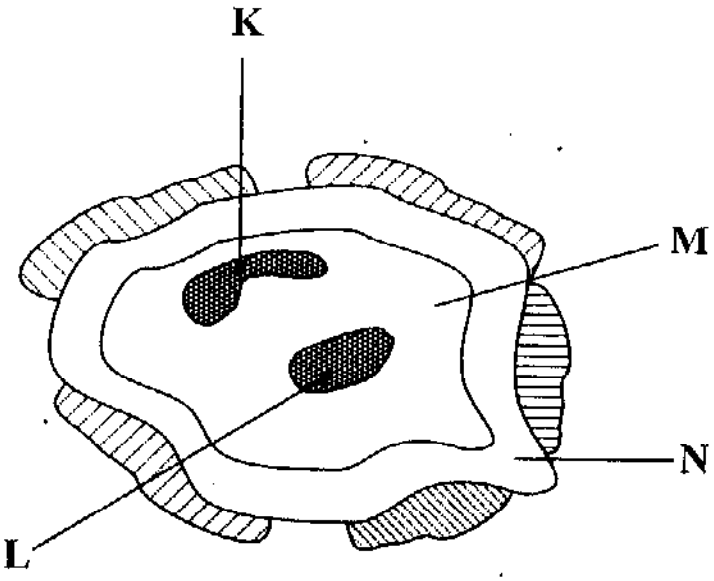
31 What is the major toxic effect of carbon monoxide in the environment?

A acid rain formation
B formation of carboxyhaemoglobin
C cause greenhouse effect
D destroys the ozone layer

32 Hormone replacement therapy (HRT) helps to restore oestrogen in women at menopause to prevent loss of bone mass. Which hormone is activated by presence of oestrogen?

A calcitonin
B leutenising hormone
C parathormone
D progesterone

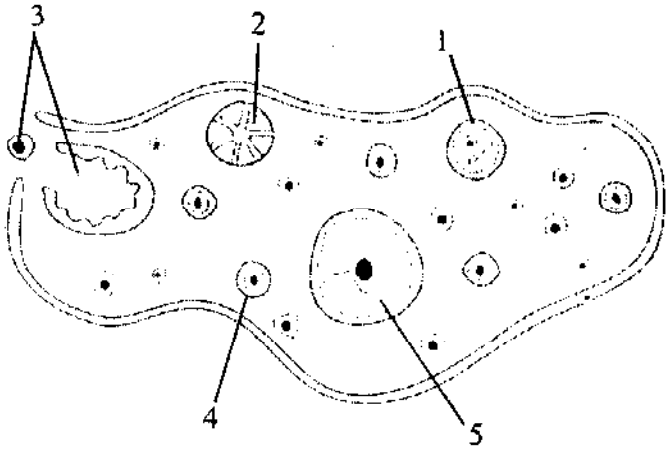
33 The diagram shows the structure of a mature pollen grain.



Which parts are represented by the letters **K**, **L**, **M** and **N**?

	tube nucleus	generative nucleus	intine	cytoplasm
A	L	K	M	N
B	K	L	N	M
C	L	K	N	M
D	K	L	M	N

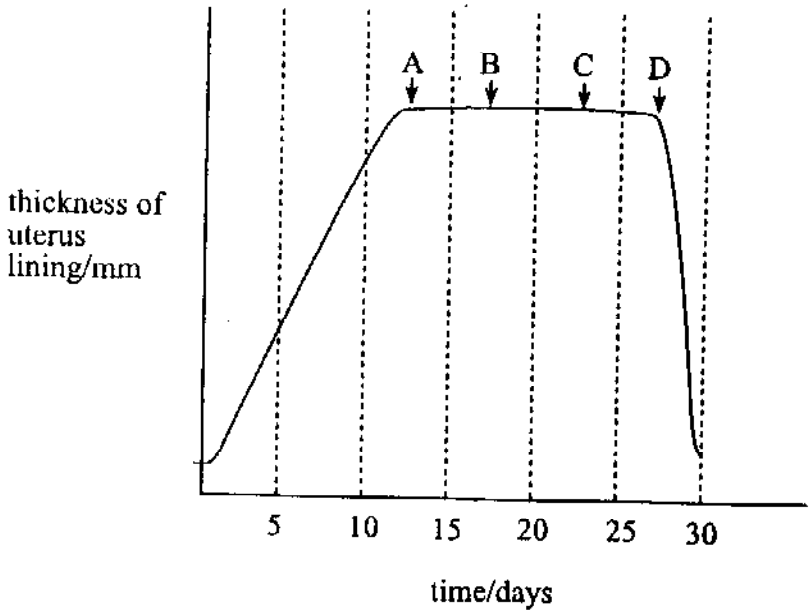
34 The diagram shows the structure of the ovary of a mammal.



What is the correct developmental sequence of structures labelled 1 to 5?

A	2	3	1	4	5
B	2	1	4	3	5
C	1	4	2	5	3
D	4	1	5	3	2

35 The diagram shows changes in the thickness of the uterus lining throughout the menstrual cycle in an adult female. At which point does the corpus luteum begin to break?



36 Which activity of a pregnant mother causes intra-uterine growth retardation (IUGR) of the foetus?

A alcohol intake
B intake of heroin
C practising unprotected sex
D smoking tobacco

37 Which features are found in the alveolar walls?

key; present ✓ absent x

	collagen fibres	**goblet cells**	**ciliated cells**
A	✓	x	x
B	✓	✓	✓
C	x	x	x
D	x	x	✓

38 Which disease causes alveoli to lose their elasticity?

A bronchitis
B lung cancer
C emphysema
D tuberculosis

39 Which group of organisms has the greatest surface area to volume ratio?

A bryophyta
B prokaryotae
C protozoa
D pteridophyta

40 Which taxon contains the least number of organisms?

A class
B family
C order
D phylum