



PASIR RIS CREST SECONDARY SCHOOL
Preliminary Examination
Secondary Four Express

CANDIDATE
NAME

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CLASS

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INDEX
NUMBER

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Biology

6093/01

Paper 1

14 September 2018

1 hour

Additional Materials: Optical Test Answer Sheet (OTAS)

READ THESE INSTRUCTIONS FIRST

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

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, class and register number on the answer sheet in the spaces provided.

There are **forty** questions on 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 the instruction on the Answer Sheet very carefully.

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

Any rough working should be done in this booklet.

The use of an approved scientific calculator is expected, where appropriate.

For Examiner's Use
40
Parent's Signature

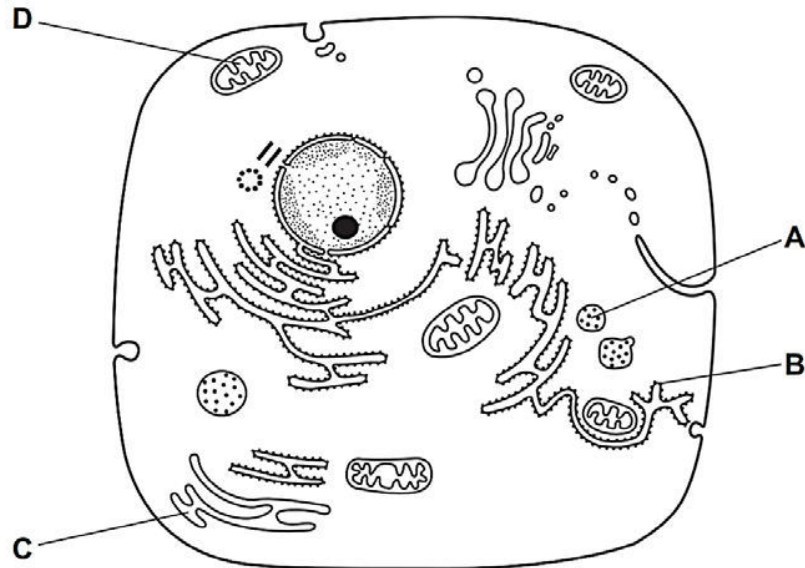
This document consists of 17 printed pages.

[Turn over

Answer **ALL** questions. Shade your answers in the OTAS provided.

- 1 The diagram shows a typical animal cell.

Which structure synthesises and transports lipids?



- 2 A student cuts out four cylinders of potato from the same potato. Each cylinder is 30 mm long. The cylinders are all of the same diameter.

The potato cylinders are placed in sugar solutions of different concentrations. After one hour, the lengths of the cylinders are measured again. The results are shown in the table.

Which potato cylinder has been placed in a solution with a water potential closest to that of the potato cells?

	starting length/ mm	length after one hour/ mm
A	30	33
B	30	31
C	30	27
D	30	26

3 Which row defines active transport?

	cell membrane needed	movement of ions	energy needed
A	no	down a concentration gradient	yes
B	no	up a concentration gradient	no
C	yes	down a concentration gradient	no
D	yes	up a concentration gradient	yes

4 Which chemical elements are present in **both** fats and proteins?

- A** carbon, hydrogen and nitrogen only
- B** carbon, hydrogen and oxygen only
- C** carbon, oxygen and nitrogen only
- D** carbon, oxygen, hydrogen and nitrogen

5 A sample of milk is tested with Benedict's solution. After boiling, a yellow precipitate is observed.

Which conclusion is correct?

- A** A high concentration of glucose is present.
- B** A low concentration of sucrose is present.
- C** No reducing sugars are present.
- D** Reducing sugars are present.

6 Which of the following tests shows the presence of an enzyme in a biological washing powder?

- A** Benedict's test
- B** biuret test
- C** ethanol emulsion test
- D** iodine test

7 Which of the following blood vessels transports blood with the highest glucose concentration?

- A** aorta
- B** hepatic artery
- C** hepatic portal vein
- D** vena cava

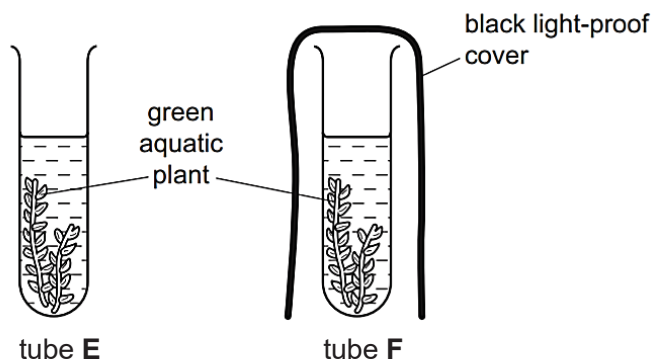
[Turn over

8 What describes the upper cuticle of a leaf?

- A a permeable layer allowing water to enter the leaf
- B a single layer of cells containing many chloroplasts
- C a single layer of transparent cells allowing light to enter the leaf
- D a thin non-cellular layer preventing water loss from the leaf

9 Two test-tubes, **E** and **F**, were set up, each containing a solution of red hydrogencarbonate indicator. Hydrogencarbonate indicator remains red when the carbon dioxide concentration remains unchanged. It turns yellow when the carbon dioxide concentration increases and turns purple when the carbon dioxide concentration decreases.

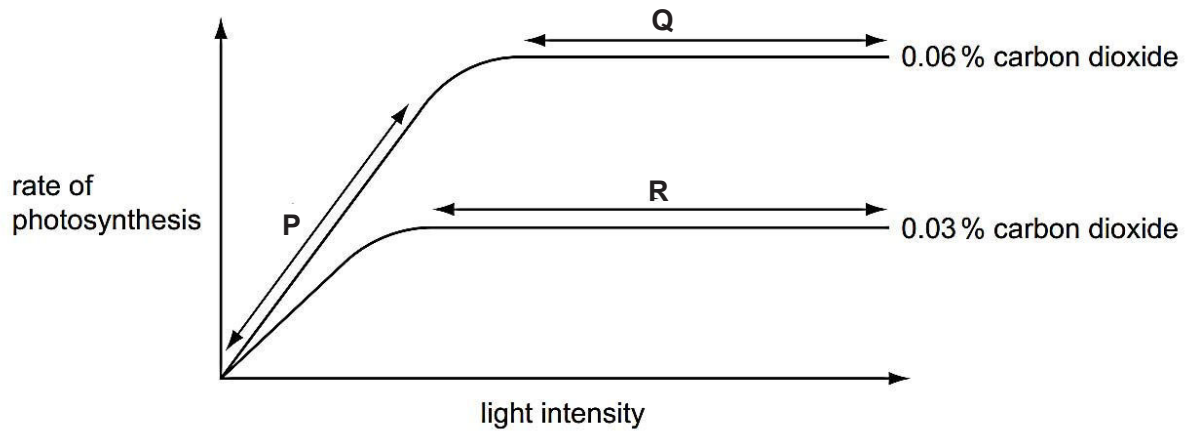
Similar pieces of the same aquatic plant were placed into tubes **E** and **F**. Tube **E** was uncovered while tube **F** had a black light-proof cover. The tubes were left in a warm room in sunlight for four hours.



What would be the colour of the hydrogencarbonate indicator in the two tubes after four hours?

	tube E	tube F
A	purple	red
B	purple	yellow
C	red	yellow
D	yellow	red

- 10 The graph shows the rate of photosynthesis of a plant at increasing light intensities at two different carbon dioxide concentrations. The temperature is kept constant.

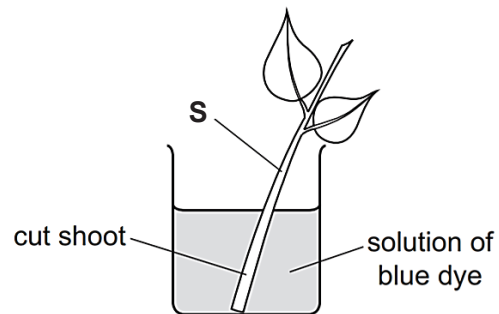


What may be limiting the rate of photosynthesis at **P**, **Q** and **R**?

	P	Q	R
A	carbon dioxide	light intensity	carbon dioxide
B	carbon dioxide	light intensity	light intensity
C	light intensity	carbon dioxide	carbon dioxide
D	light intensity	carbon dioxide	light intensity

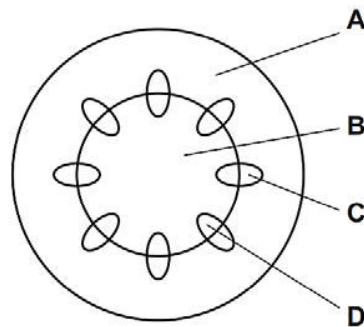
[Turn over

- 11 The cut shoot of a plant is placed in a beaker containing a solution of blue dye for one hour, as shown.



The stem of the shoot is then cut through at **S**, and examined under a microscope.

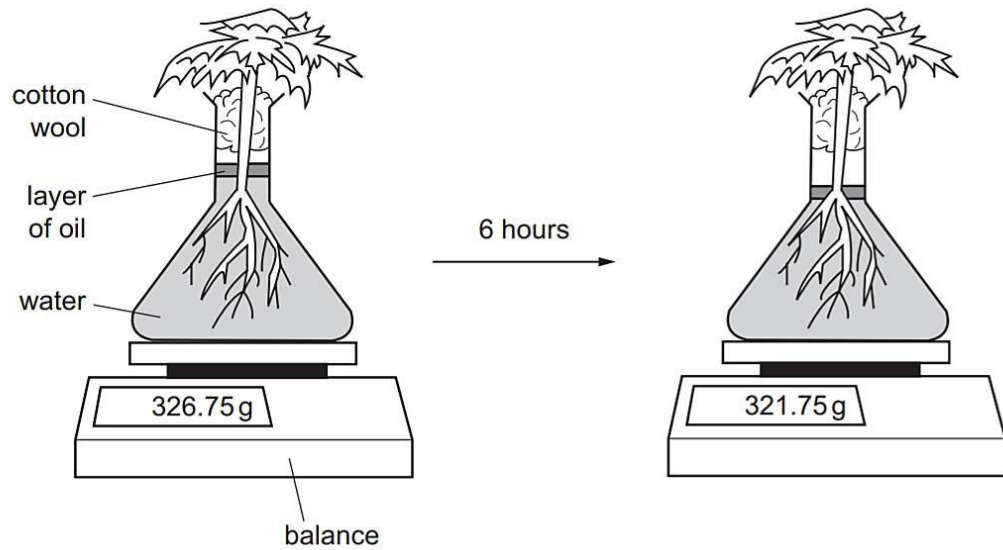
In which region of the stem is the blue dye most concentrated?



- 12 During translocation in plants, which substance is moved and in which direction?

	substance	from	to
A	sucrose	anthers	stigmas
B	sucrose	leaves	roots
C	water	roots	leaves
D	water	soil	root hairs

- 13 The diagrams show a plant in a flask of water. It is left in the light at 16 °C for six hours.



What explains the change in mass after six hours?

- A** absorption of water into the root hairs
B evaporation of water from the flask
C photosynthesis in the leaves of the plant
D transpiration from the leaves of the plant
- 14 An oxygen molecule diffuses directly from the air in an alveolus to haemoglobin in a red blood cell. What is the minimum number of cell surface membranes through which this molecule must pass?
- A** 2
B 3
C 4
D 5
- 15 Which set of values best represents the blood pressures in an artery, a network of capillaries and a vein?

	pressure/ kPA		
	artery	capillary network	vein
A	0.6	4.0	13.0
B	4.0	0.6	13.0
C	13.0	0.6	4.0
D	13.0	4.0	0.6

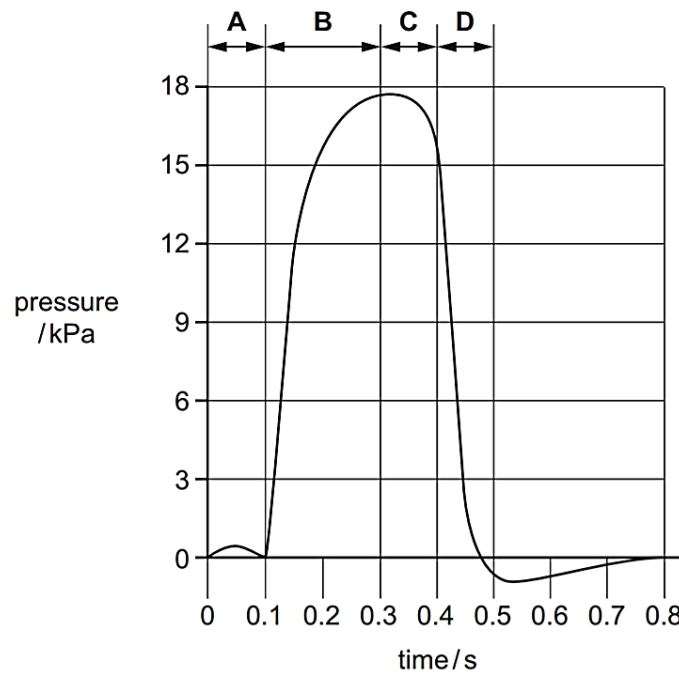
[Turn over

16 How does tissue fluid differ from blood plasma?

- A Tissue fluid contains lesser proteins.
- B Tissue fluid contains more dissolved food.
- C Tissue fluid does not contain dissolved oxygen.
- D Tissue fluid does not contain white blood cells.

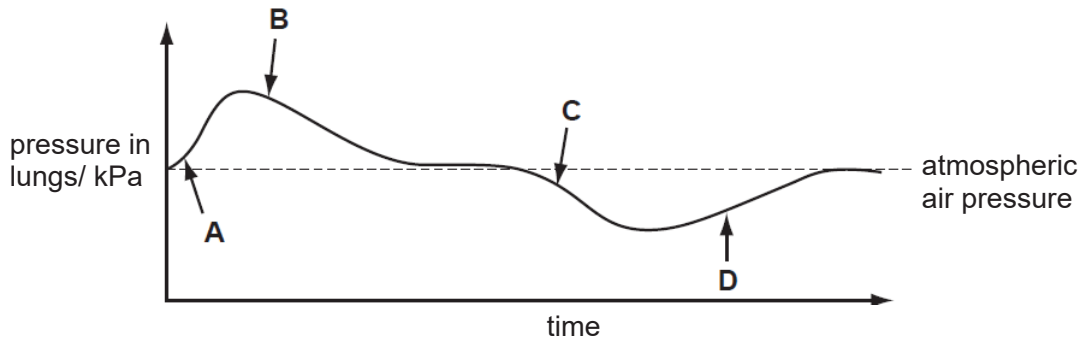
17 The graph shows changes in the blood pressure in the left ventricle of the heart.

During which period is the left **atrium** contracting?

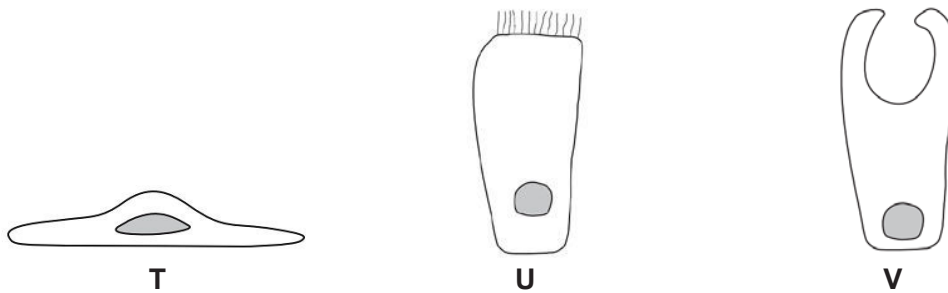


- 18 The diagram illustrates changes in air pressure taking place inside the lungs during a complete cycle of breathing.

Which position on the graph corresponds to the point at which the ribs are beginning to be raised?



- 19 The diagram shows three types of cells.



Which cells are found in alveoli and in bronchi?

	alveoli	bronchi
A	T	U and V
B	T and U	V
C	U and V	T
D	V	T and U

[Turn over

20 What are the effects of the following activities on pulse rate when compared to resting pulse rate?

	slow walking	fast running
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

21 A person drinks a large amount of water.

How does this affect the water potentials of the liquids in the renal arteries, the renal veins and the ureters?

	water potential in renal arteries	water potential in renal veins	water potential in ureters
A	higher	higher	higher
B	higher	little change	higher
C	lower	lower	little change
D	lower	lower	lower

22 The diagram shows a person sweating in hot weather.



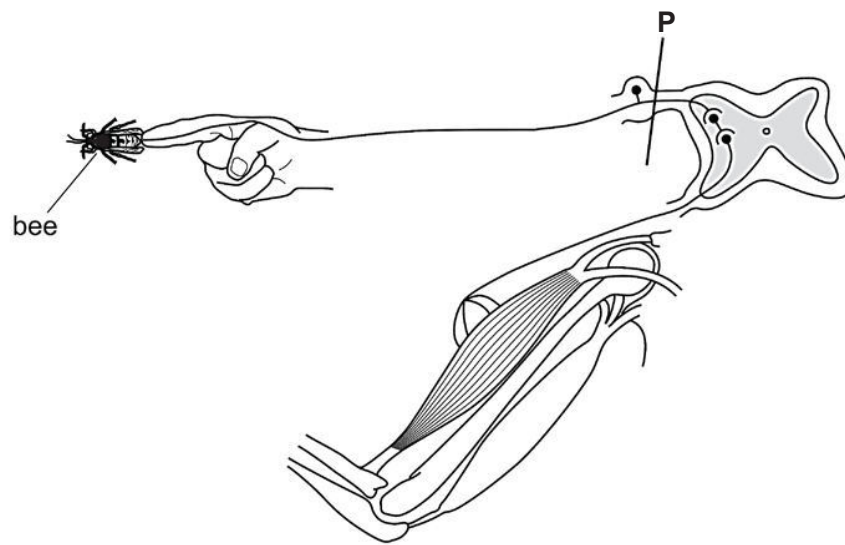
Which part is played by sweat glands during the process of sweating?

- A** effector
- B** receptor
- C** sense organ
- D** stimulus

23 Which process occurs in a kidney dialysis machine?

- A Large protein molecules are removed from the blood plasma.
- B Materials pass out of the blood down a concentration gradient.
- C Oxygen is used up in removing materials from the blood.
- D Pressure forces dialysis fluid into the blood.

24 The diagram shows part of the nervous system, including a reflex arc. It has been cut at **P**.



A bee stings a finger, as shown.

What are the effects of this sting?

	pain felt	arm moved
A	no	no
B	no	yes
C	yes	no
D	yes	yes

[Turn over

- 25 Which changes take place in the eye when a person looks up from reading a book to view a distant object?

	ciliary muscle	lens
A	contracts	becomes thicker
B	contracts	becomes thinner
C	relaxes	becomes thicker
D	relaxes	becomes thinner

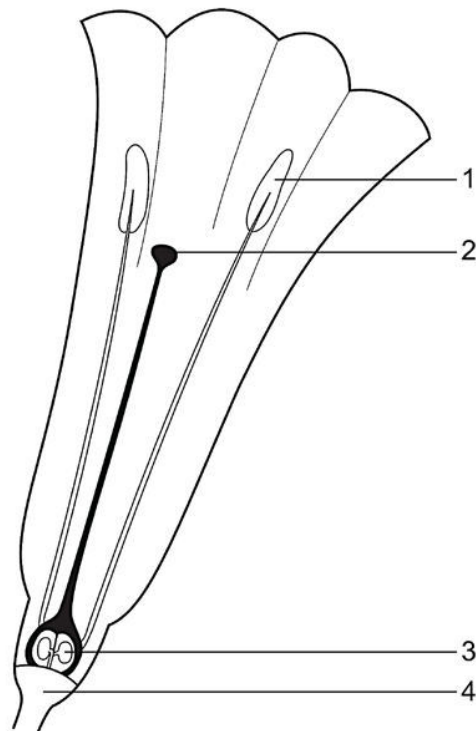
- 26 What is meant by negative feedback?

- A** A change away from a set point causes a change back towards the set point.
- B** A change away from a set point causes further change away from the set point.
- C** A change towards a set point causes a change away from a set point.
- D** Changes away from a set point were provided.

- 27 Which changes occur in the body when a person is shocked?

	increases in	decreases in
A	diameter of pupils in the eye	speed of peristalsis
B	rate of conversion of glycogen to glucose	diameter of pupils in the eye
C	rate of urine production	rate of conversion of glycogen to glucose
D	speed of peristalsis	rate of urine production

28 The diagram shows a section through a flower.



Which labelled structures contain cells which are haploid?

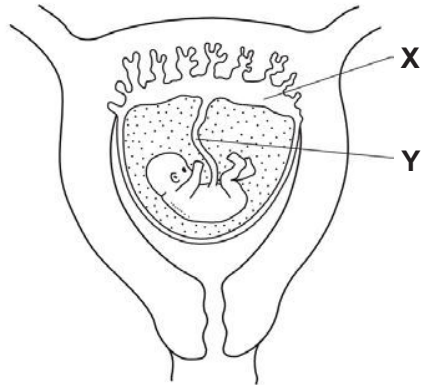
- A 1 and 3
 - B 1 and 4
 - C 2 and 3
 - D 2 and 4
- 29 Male and female sea urchins release their sperms and eggs into the water where fertilisation takes place.

How can their reproduction be described?

- A asexual reproduction which results in genetically dissimilar offspring
- B asexual reproduction which results in genetically identical offspring
- C sexual reproduction which results in genetically dissimilar offspring
- D sexual reproduction which results in genetically identical offspring

[Turn over

30 The diagram shows a foetus in the uterus.



Where is the concentration of oxygen highest?

- A an artery at X
- B an artery at Y
- C a vein at X
- D a vein at Y

31 The statements describe events during the mitotic cell cycle.

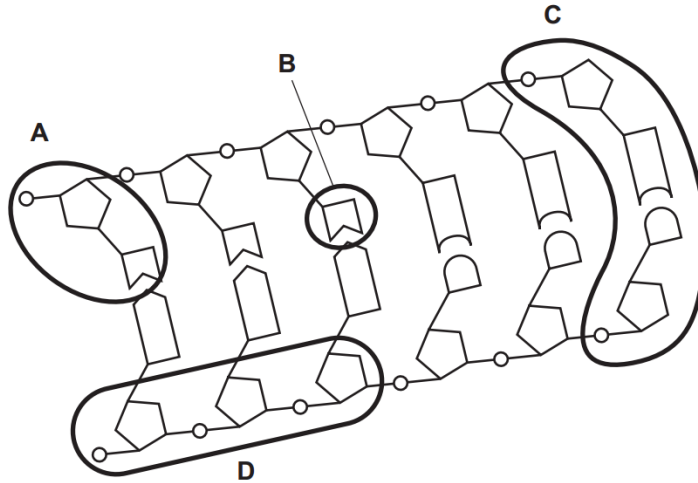
1. Chromosomes migrate to opposite poles of the spindle.
2. Chromosomes arrange themselves at the equator of the spindle.
3. Chromosomes condense and the nuclear membrane disappears.
4. Centromeres divide.

What is the correct order of three of these events in the mitotic cell cycle?

- A 2 → 3 → 4
- B 3 → 2 → 4
- C 3 → 4 → 2
- D 4 → 2 → 1

- 32 The diagram shows part of a DNA molecule.

Which part is a nucleotide?



- 33 DNA from a chromosome is analysed and 20% of its bases are found to be cytosine.

What is the percentage of adenine found in the same DNA molecule?

- A** 20 **B** 30 **C** 40 **D** 60
- 34 The gene for insulin production can be removed from human pancreatic cells and added to the genetic material of a harmless bacterium.

What would be the next stage in using this process to treat diabetes?

- A** Add the transgenic bacterium to human food.
B Inject the transgenic bacterium into the blood of a person with diabetes.
C Put the transgenic bacterium into a fermenter to multiply rapidly.
D Use the transgenic bacterium in a nasal spray.

[Turn over

- 35 Over several hundred years, the milk production of a particular type of mammal in the wild has steadily increased.

How has this been achieved?

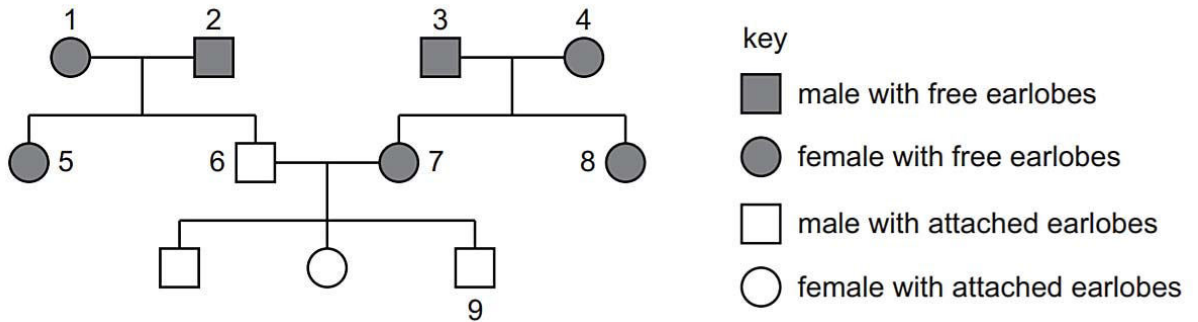
- A artificial selection
 - B continuous variation
 - C genetic engineering
 - D natural selection
- 36 Which statement is **always** true of dominant allele?
- A They cannot undergo mutation.
 - B They give a greater chance of survival than recessive alleles.
 - C They give the same phenotype in heterozygotes and homozygotes.
 - D They occur more frequently in the population than recessive alleles.
- 37 In fruit flies, the allele for a black coloured body is recessive to the allele for a grey coloured body. In an investigation, a black-bodied fly is crossed with a grey-bodied fly.

What will be the body colour of the offspring if the grey-bodied fly is heterozygous?

- A all black
- B all grey
- C 50% black and 50% grey
- D 75% grey and 25% black

- 38 Earlobes can either be attached to the cheek or 'free' (unattached). This characteristic is controlled by a single gene. The allele for attached earlobes is recessive.

The diagram shows the inheritance of earlobe attachment in one family.



Which two individuals must be heterozygous for earlobe attachment?

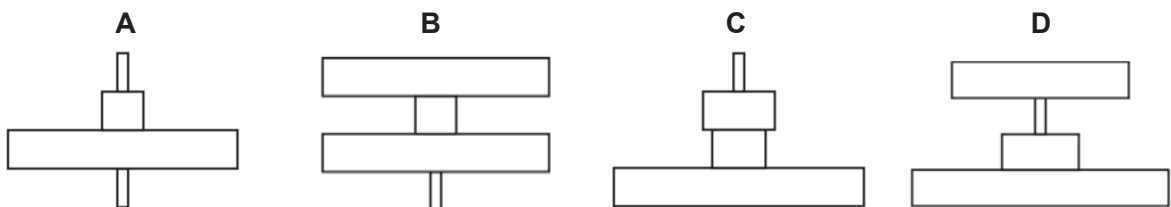
- A 1 and 7 B 3 and 4 C 5 and 8 D 6 and 9
- 39 Within an ecosystem, the top consumers in most food chains are few in numbers.

Which statement explains this?

- A Energy losses occur at each trophic level.
 B Energy losses occur within the consumers' digestive systems.
 C Top consumers are large in size.
 D Top consumers have a low reproductive rate.
- 40 The diagram shows a food chain.

grass → rabbit → fox → flea

Which pyramid of numbers matches this food chain?



End of Paper 1

[Turn over



PASIR RIS CREST SECONDARY SCHOOL
Preliminary Examination
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CANDIDATE
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Biology

Paper 2

6093/02

12 September 2018

1 hour 45 minutes

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your candidate name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use a 2B pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Section A (50 marks)

Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Section B (30 marks)

Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Electronic calculators may be used.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.
The number of marks is given in brackets [] at the end of each question or part question

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 80
Parent's Signature

This document consists of **16** printed pages.

[Turn over

Section A (50 marks)

Answer **all** questions in the spaces provided.

1 Fig. 1.1 shows parts of the alimentary canal that lie in the upper part of the human body.

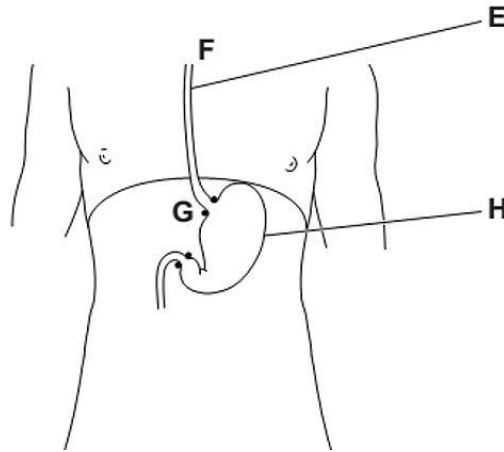


Fig. 1.1

(a) (i) Name the part labelled **E**. [1]

(ii) Name and describe the process that moves food from **F** to **G**.

name of process

description of process

.....

..... [3]

(b) A sore can develop on the wall of organ **H** in Fig. 1.1. This sore is called an ulcer, which can cause a person pain. The pain may be relieved by taking a drug that stops the release of acid produced by the cells in the wall of organ **H**.

Suggest and explain how the processes taking place in organ **H** may be affected in a person taking this drug.

.....

.....

..... [2]

[Total: 6]

2 (a) Define the term *hormone*.

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.....
.....
..... [3]

(b) (i) State the name of the hormone that is involved in the control of the water potential of the blood.

..... [1]

(ii) Describe and explain how reduced secretion of the hormone named in (b)(i) would affect the composition of urine.

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..... [3]

[Turn over

- (c) Table 2.1 shows the concentration of some compounds in the fluids of a glomerulus, a renal capsule and a collecting duct of the kidney.

Table 2.1

compound	concentration/ g per 100 cm ³		
	blood plasma entering glomerulus	filtrate in renal capsule	urine in collecting duct
water	90	90	96
proteins	8.0	0.0	0.0
glucose	0.1	0.1	0.0
urea	0.03	0.03	2.0

With reference to Table 2.1,

- (i) explain why proteins occur in the blood entering the glomerulus but not in the filtrate in the renal capsule,

.....

 [2]

- (ii) explain why there is glucose present in the filtrate but not in the urine, and

.....

 [2]

- (iii) explain the difference in the concentration of urea between the filtrate and urine.

.....

 [2]

[Total: 13]

3 (a) Name the organ that breaks down alcohol in the human body.

..... [1]

(b) Fig. 3.1 shows a computer model of the enzyme alcohol dehydrogenase, which is the enzyme responsible for breaking down alcohol.



Fig. 3.1

Enzymes have a specific three dimensional shape.
Explain why the shape of an enzyme is important.

.....
.....
.....
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..... [3]

[Turn over

- (c) Table 3.1 shows the enzyme activity of alcohol dehydrogenase at different temperatures.

Table 3.1

temperature/ °C	enzyme activity/ arbitrary units
30	115
42	175

- (i) The information in Table 3.1 shows that an increase in temperature increases the activity of alcohol dehydrogenase.

Explain why an increase in temperature causes an increase in enzyme activity.

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..... [3]

- (ii) State **one** factor, **other than** temperature, that affects enzyme activity.

..... [1]

[Total: 8]

4 Blood clots can form if the lining of an artery becomes damaged.

One cause of heart attack is a blood clot in a coronary artery that supplies the muscle of the heart with blood.

(a) Explain how a blood clot is formed.

.....
.....
.....
.....

[3]

(b) Explain how a blood clot can cause a heart attack.

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.....
.....

[3]

[Turn over

(c) One risk factor for cardiovascular disease (CVD) is a high concentration of blood cholesterol.

(i) Table 4.1 shows the death rate due to CVD and the ratio of fatty acids in the diet for four countries.

Table 4.1

country	death rate from CVD/ deaths per 100 000	ratio of unsaturated to saturated fatty acids in diet
Finland	503	0.175
USA	408	0.275
Italy	235	0.350
Japan	115	1.000

Using the information in Table 4.1, describe the relationship between the ratio of fatty acids in the diet and the death rate from CVD.

.....

[1]

5 Read the following passage.

Catfish are a commercially important species of freshwater fish used as a human food source. In the wild, catfish are found in all types of large freshwater habitats, such as rivers, lakes and reservoirs. In North America, they are often maintained in catfish ponds, which are artificially constructed habitats. Each pond functions as a self-sustaining ecosystem with its own community of organisms. Catfish feed on living and dead fish, amphibians, insects and even dead mammals found on the bottom of the pond. Different species of phytoplankton are always present in these ponds. They are small organisms found suspended in the water and they are essential for the growth of all other pond organisms.

(a) With reference to the passage, explain what is meant by

(i) *consumers*, and

.....
.....
..... [2]

(ii) *producers*.

.....
.....
..... [3]

(b) Studies on the energy efficiency of raising catfish in ponds show that only 15 – 20% of the energy taken in by the catfish population in their food is used to increase their total biomass.

(i) Explain why only some of the energy taken in by the catfish is used to increase biomass.

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[3]

(ii) In the wild, only about 10% of the energy taken in by the catfish in their food is used to increase biomass.

Suggest why this percentage is lower in the wild than in the pond.

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[1]

(c) Explain the effects of excess dead fish and faeces egested from the catfish on the environment.

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[3]

[Total: 12]

[Turn over

Section B (30 marks)

Answer **three** questions.

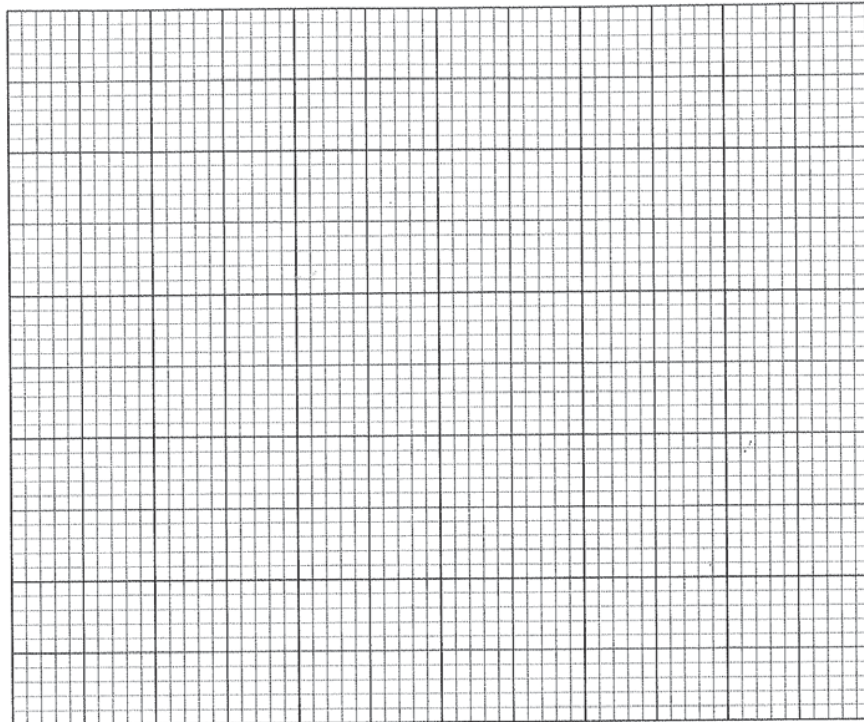
Question **8** is in the form of an **Either/ Or** question. Only one part should be answered.

- 6** Table 6.1 shows the percentage of smokers in a particular country and the number of deaths from lung cancer in that country during the years 1920 to 2010.

Table 6.1

year	percentage of population that were smokers	deaths from lung cancer per 100 000 people
1920	30	100
1930	35	150
1940	45	200
1950	60	250
1960	40	550
1970	30	700
1980	25	800
1990	20	700
2000	20	525
2010	18	500

- (a)** Draw a bar chart of the data for the number of deaths from lung cancer on the grid.



[4]

(b) Describe and explain the relationship between the number of smokers and the number of deaths from lung cancer shown in Table 6.1.

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..... [3]

(c) Explain why a pregnant woman is advised not to smoke.

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..... [3]

[Total: 10]

[Turn over

7 (a) Describe the part played by an ovule in the reproduction of a plant.

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[4]

(b) State the products of an ovary in a woman and describe the roles of each of these products.

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[6]

[Total: 10]

8 Or

(a) Describe the two forms of variation found within a natural population.

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[5]

(b) Explain how variation is important for the long-term survival of the species.

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[5]

[Total: 10]

End of Paper 2

Pasir Ris Crest Secondary School
Secondary Four Express Pure Biology Preliminary Exam 2018
Mark Scheme

Paper 1

1	2	3	4	5	6	7	8	9	10
C	B	D	B	D	B	C	D	B	C
11	12	13	14	15	16	17	18	19	20
D	B	D	D	D	A	A	C	A	D
21	22	23	24	25	26	27	28	29	30
B	A	B	A	D	A	A	A	C	A
31	32	33	34	35	36	37	38	39	40
B	A	B	C	D	C	C	A	A	D

Paper 2 Section A

No.	Answers	Marks
1	(a) (i) oesophagus (1)	1
	(ii) peristalsis (1) + the continuous, coordinated, alternate muscular contraction and relaxation (1) of the <u>walls</u> of the alimentary canal (1) to push food forward OR circular muscles contract + longitudinal muscles relax so lumen narrows to push food forward (1) circular muscles relax while longitudinal muscles contract so lumen widens for food to enter (1)	3
	(b) less bacteria killed (1) less proteins digested (1) <u>pH of stomach higher than optimum</u> (1) protease/pepsin cannot function at maximum rate/ AW (1)	max 2
		[Total: 6]
2	(a) chemical substance produced by endocrine gland + in small amounts (1) transported to target organs by blood + alters activity of target organs (1) destroyed in the liver when not needed (1)	3
	(b) (i) Antidiuretic hormone/ADH	1
	(ii) urine becomes more diluted (1) walls of collecting duct and distal convoluted tubule are less permeable to water (1) lesser water reabsorbed into blood (from glomerular filtrate by osmosis) (1)	3

	<p>(c) (i) proteins are too large/AW (1) cannot pass through partially permeable capillaries wall/ not filtered in glomerulus (1)</p> <p>(ii) small molecule + can be filtered from blood into Bowman's capsule (so present in filtrate) (1) all glucose <u>reabsorbed</u> into blood at proximal convoluted tubule (by diffusion and active transport) (1)</p> <p>(iii) higher urea concentration in urine than filtrate (1) water content decreases as water molecules are <u>reabsorbed</u> into blood (1)</p>	<p>2</p> <p>2</p> <p>2</p>
		[Total: 13]
3	<p>(a) liver (1)</p> <p>(b) enzyme's active site (1) must have complementary shape to substrate (1) to make enzyme-substrate complex/ allow substrate to bind to enzyme/ so that substrates can be converted to products (faster) (1)</p> <p>(c) (i) at higher temperature, enzyme and substrate have higher kinetic energy (1) frequency of effective collision between enzymes and substrate increases (1) rate of enzyme-substrate complex formation increases (1)</p> <p>(ii) pH</p>	<p>1</p> <p>3</p> <p>3</p> <p>1</p>
		[Total: 8]
4	<p>(a) (platelets release) thrombokinase converts prothrombin to thrombin (in the presence of Ca^{2+} ions) (1) thrombin converts soluble fibrinogen to insoluble fibrin (1) fibrin entangles red blood cells to form a clot (1)</p> <p>(b) reduced oxygen supply to cardiac muscles (1) cardiac muscles cannot respire and release energy (1) cardiac muscles die + part of the heart muscle stops contracting (1)</p> <p>(c) (i) as ratio of unsaturated to saturated fatty acids in diet increases from 0.175 to 1.000, death rate from CVD decreases from 503 to 115 (1)</p>	<p>3</p> <p>3</p> <p>1</p>

	<p>(ii) 1. increase ratio of unsaturated fats to saturated fats in their diet/ eat more unsaturated and less saturated fat (1)</p> <p>2. because countries with low ratio of unsaturated to saturated fatty acids have high death rates due to CVD (1)</p> <p>3. reduce animal fats/ increase plant oils (1)</p> <p>4. because animal fats/beef/butter have high percentage of saturated fatty/palmitic/stearic acids (1)</p> <p>OR</p> <p>plant oils/olive and corn oil have a higher percentage of unsaturated fatty/linoleic/ oleic acids (1)</p> <p>OR</p> <p>saturated fatty/palmitic/stearic acids raise blood cholesterol (1)</p> <p>OR</p> <p>unsaturated fatty acids reduce/ do not raise blood cholesterol (1)</p>	4
		[Total: 11]
5	<p>(a) (i) organisms that obtain energy by feeding on other organisms (1)</p> <p>catfish are consumers which obtain energy by feeding on living and dead fish (accept other named examples from passage) (1)</p> <p>(ii) absorbs and converts light energy into chemical energy in food (1)</p> <p>provides food for other organisms in the community/ occupies first trophic level in food chain/web/AW (1)</p> <p>phytoplankton is the producer (1)</p> <p>(b) (i) energy is used by catfish for movement/ muscle contraction/ active transport/transmission of nerve impulses/protein synthesis/ AW (1)</p> <p>most energy is lost as heat during respiration (1)</p> <p>some energy is trapped in faeces and excretory waste (1)</p> <p>(ii) wild catfish needs to use more energy to swim and hunt for food (1)</p> <p>(c) any three points:</p> <ul style="list-style-type: none"> - waste contains toxins (1) - bodies of dead fish and faeces contain nutrients/ nitrates and phosphates (1) - causes eutrophication/ enrich water body with nitrates and phosphates so algae absorb nitrates from water and grow profusely (1) - overcrowding of algae reduces sunlight reaching submerged plants (1) - water plants cannot photosynthesize and die (1) - bacteria decompose dead plants, grow and reproduce quickly (1) - bacteria respire aerobically and reduce amount of dissolved oxygen (1) - aquatic organisms lack oxygen for aerobic respiration and die (1) 	<p>2</p> <p>3</p> <p>3</p> <p>1</p> <p>max 3</p>
		[Total: 12]

Paper 2 Section B

No.	Answers	Marks
6	<p>(a) suitable scale (1) labelled axes with units (1) accurate plots (1) consistent widths of bars (1) *deduct 1 mark if there are no gaps between bars for bar chart</p> <p>(b) general increase in number of deaths from lung cancer as number of smokers increase (1) cigarette contains tar which is carcinogenic/ causes uncontrolled cell division (1) *award 1 mark for citing data to support relationship</p> <p>(c) cigarette contains nicotine (1) nicotine constricts blood vessels + reduce blood/nutrient/oxygen supply to foetus (1) babies born smaller and lighter (1) *accept alternative answers that describe how other chemicals in tobacco smoke cause negative effects to the foetus</p>	<p>4</p> <p>3</p> <p>3</p>
[Total: 10]		
7	<p>(a) contains female gamete/ female nucleus/ egg cell (1) in ovary (1) fertilized by male gamete/ male nucleus (1) to form zygote/ embryo (1)</p> <p>(b) produces haploid ovum/ egg (1) fertilized by sperm to form zygote (1) ovary produces oestrogen and progesterone (1) oestrogen thickens uterine lining (1) oestrogen causes development of sex organs/ secondary sexual characteristics (named) (1) progesterone maintains thickness of uterine lining for implantation (1)</p>	<p>4</p> <p>6</p>
[Total: 10]		
8	<p>Either</p> <p>(a) photoreceptors detect the decrease in light intensity (1) and produce nerve impulses (1) nerve impulses are sent along optic (sensory) nerve to the brain (1) brain returns nerve impulses along motor nerve to radial <u>iris</u> muscles (1) radial <u>iris</u> muscles contract + circular <u>iris</u> muscles relax (1) pupil dilate/ AW (1)</p>	<p>6</p>

	<p>(b) nervous response is faster than hormonal response (1) fast transmission of nerve impulses allows brain to interpret impulse and coordinate response quickly (1) nervous response is short-lived while hormonal response may be long-lived (1) pupil reflex must be short-lived so that changes can occur to components of eye quickly to view objects at changing light intensities (1)</p>	4
		[Total: 10]
8.	<p>Or</p> <p>(a) continuous variation + discontinuous variation (1) continuous variation shows gradual change/ range between extremes (1) traits affected by genes and environment (1) discontinuous variation shows few and distinct differences (1) traits controlled by genes alone (1) accept any correct example linked to form of variation (1)</p> <p>(b) some variations are advantageous/beneficial (1) competition in organisms' habitat/ environment (1) organisms survive breeds/reproduce (1) and pass advantage/ beneficial gene/ allele over many generations (1) continuous adaptation to the changing environment lead to evolution/ natural selection (1) give rise to new species (1)</p>	<p>max 5</p> <p>max 5</p>
		[Total: 10]

