NAME:		( )	CLASS:	

YISHUN TOWN SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2020

SEC 4 EXPRESS

BIOLOGY

(6093/1)

DATE : 1 Sep 2020 **DAY : Tuesday**

DURATION : 1 hr **MARKS : 40 marks**

ADDITIONAL MATERIALS

Multiple Choice Answer Sheet (OMS)

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number in the spaces provided at the top of this page and on the OMS.

There are **forty** questions. 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 OMS answer sheet.

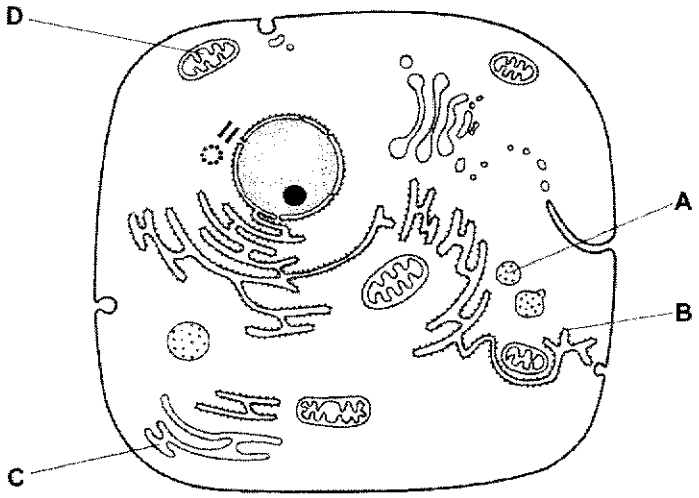
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

You may use an approved calculator.

This question paper consists of **16** printed pages

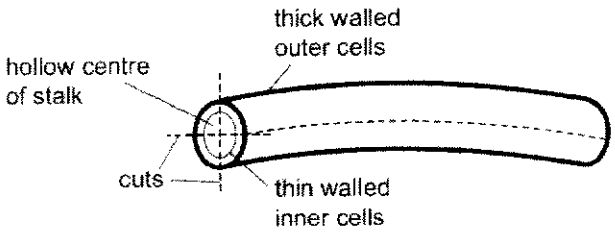
1 The diagram shows the ultrastructure of a typical animal cell. Which structure synthesises and transports lipids?



2 What is the correct order in which organelles function to make and secrete an enzyme?

A Golgi body → lysosome → ribosome → nucleus
B nucleus → ribosome → Golgi body → vesicle
C ribosome → nucleus → lysosome → Golgi body
D vesicle → Golgi body → nucleus → ribosome

3 The stalk of a dandelion flower is a hollow tube. Pieces of the stalk are cut as shown and placed in sucrose solutions of different water potentials.



Which diagram shows the piece that is placed in the sucrose solution with the highest water potential?

A

B

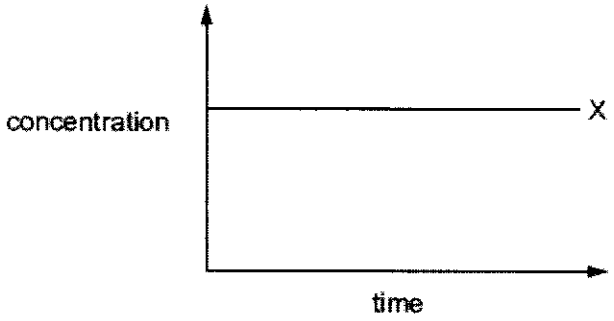
C

D

4 Which feature of transport in xylem depends on the use of energy?

A aerobic respiration in the leaves
B osmosis of water into xylem
C uptake of ions into the root
D transpiration of water from the leaves

5 The graph shows the concentration of one of the substances which is involved in an enzyme-catalysed reaction.

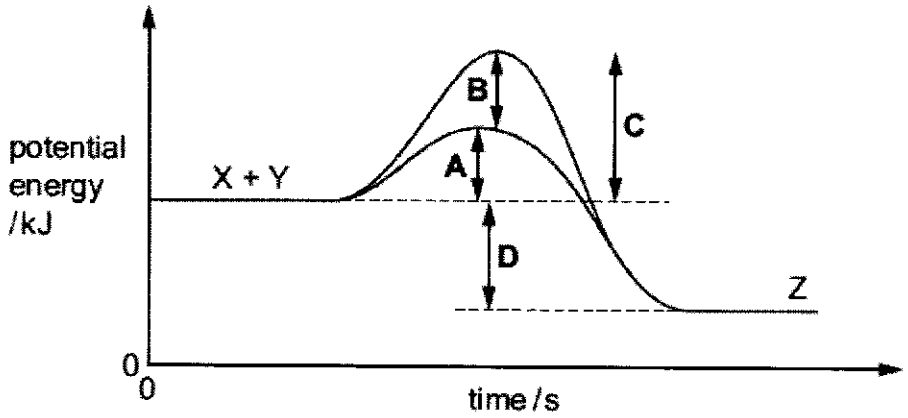


Which substance is shown by line **X**?

A enzyme
B enzyme-product complex
C enzyme-substrate complex
D substrate

6 The graph shows the energy levels involved in an enzyme-catalysed reaction. Substrate molecules **X** and **Y** combine to give product **Z**.

Which arrow shows the reduction in activation energy due to the enzyme?



7 A food gives the following results on testing:

1 a blue colour in the Biuret test
2 a green colour when heated with Benedict's solution
3 a yellow colour with iodine solution
4 a white emulsion with ethanol

Which nutrients does the food contain?

A fat and reducing sugar
B protein and reducing sugar
C reducing sugar and starch
D starch and fat

8 The following statements describe the characteristics of water.

1 water cools a surface from which it evaporates
2 water is used as a solvent for many chemicals
3 water is involved in many metabolic reactions

Which statement(s) make water suitable to use in a blood transport system?

A **1** and **2**
B **1** and **3**
C **2** only
D **3** only

9 A student investigates the effect of different colours of light on the rate of photosynthesis.

In three separate experiments, he shines red, blue, or green light onto an aquatic plant. The number of oxygen bubbles produced by the plant is counted.

Each experiment is carried out three times and the average number of bubbles calculated.

colour of light	**average number of bubbles produced / minute**
red	48
blue	37
green	12

What explains the results?

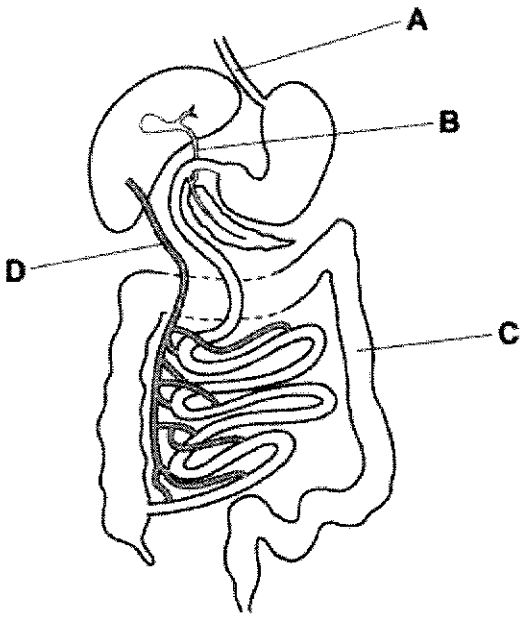
A Chlorophyll absorbs red and blue light more than green light.
B Green light is absorbed by the water.
C Most of the green light is absorbed by the chlorophyll.
D Red light is used least in photosynthesis.

10 Which row shows substances mainly absorbed into capillaries and substances mainly absorbed into lacteals, in the villi of the small intestine?

	mainly absorbed into capillaries	**mainly absorbed into lacteals**
A	amino acids	lipids
B	emulsified fats	glucose
C	glucose	amino acids
D	lipids	emulsified fats

11 The diagram shows part of the alimentary canal and associated organs.

Which part would contain high concentrations of glucose and amino acids, four hours after eating a meal?

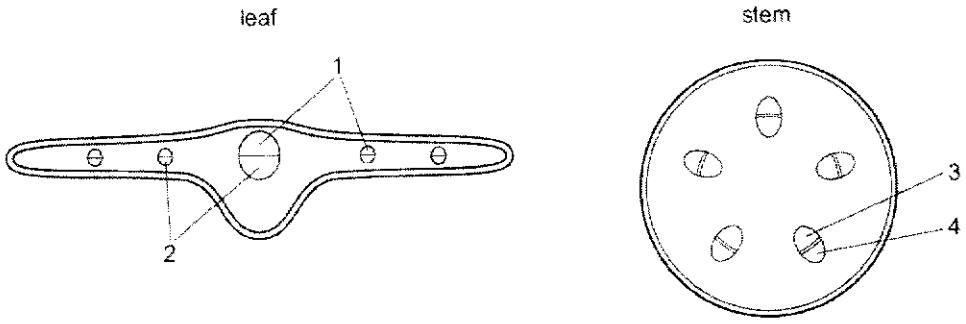


12 Which factors contribute to the increase in transpiration rate when the temperature rises?

1 concentration of water molecules increases in air spaces due to evaporation
2 increased rate of diffusion as water molecules have more kinetic energy
3 steeper concentration gradient between water molecules in air spaces and the air surrounding the leaves

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

13 The diagrams show transverse sections of parts of a plant.

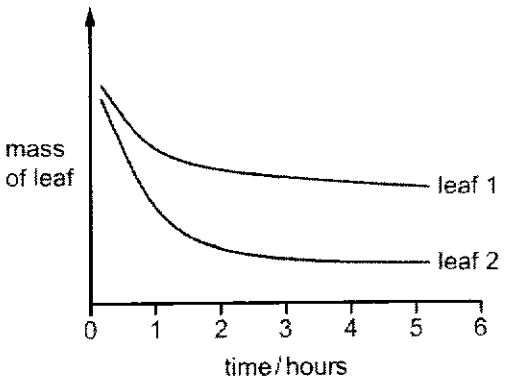


Which labelled structures transport the nitrates used to make amino acids?

	1	2	3	4
A	✓	✗	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

key
✓ = yes
✗ = no

14 The diagram shows the results of an experiment using leaves with the same surface area from two different species of plant. Each leaf was left on a balance in daylight in a closed room and its mass recorded at 1 hour intervals.



Which features of leaf **2** could explain these results?

1 more stomata per unit area of leaf
2 fewer trichomes (hairs) on the leaf
3 sunken stomata
4 thinner cuticle

A **1**, **2** and **3**
B **1**, **2** and **4**
C **1** and **4** only
D **2** and **3** only

15 A person's blood group is determined by antigens present on the red blood cells. The table shows the antigens and antibodies in the blood of people with different blood groups.

blood group	antigens on red blood cells	antibodies in plasma
A	A	b
B	B	a
AB	A and B	neither
O	neither	a and b

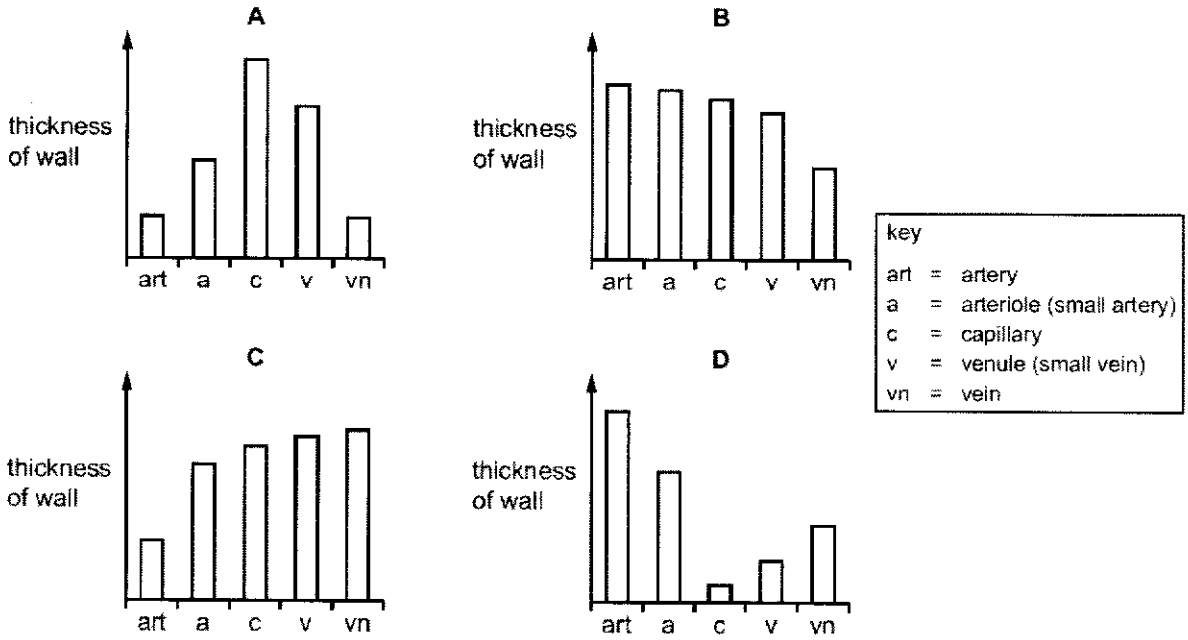
During a blood transfusion, it is essential that the recipient's blood does not contain antibodies to the donor's blood.

Which blood groups can be given to a person with blood group **B**?

A **A** and **B**
B **AB** and **B**
C **AB** and **O**
D **B** and **O**

16 As blood flows from an artery to a vein, the thickness of the walls of the vessels changes.

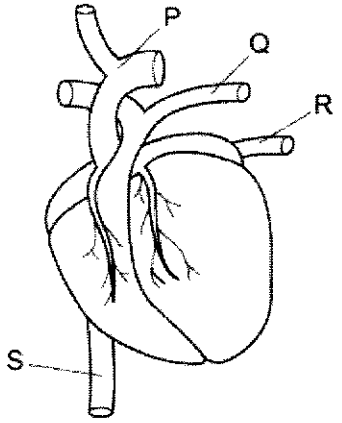
Which bar chart shows these changes correctly?



17 Which blood vessels carry blood into the atria of the heart?

A coronary artery and pulmonary artery
B pulmonary artery and vena cava
C pulmonary vein and vena cava
D vena cava and coronary artery

18 The diagram is an external view of the mammalian heart and the associated blood vessels.



Which statement about the blood vessels associated with a normal, healthy heart is correct?

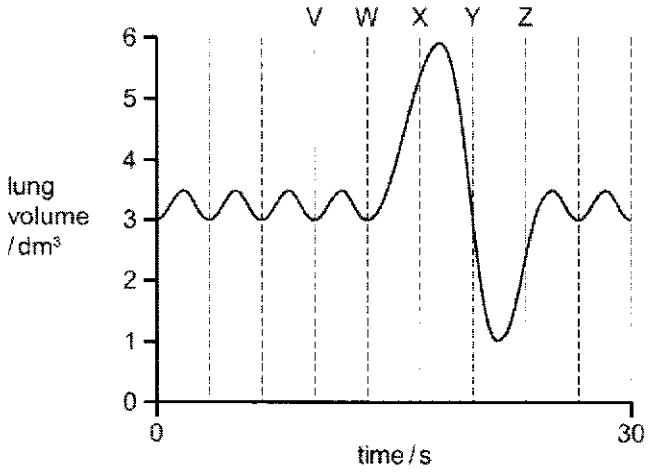
A **P** and **Q** carry blood with more oxyhaemoglobin than haemoglobin.
B **P** and **R** carry blood that is saturated with oxygen.
C **S** and **P** carry blood with a low oxygen concentration.
D **S** and **R** carry blood with more haemoglobin than oxyhaemoglobin.

19 Which reactions take place at a higher rate in a capillary in an alveolus than in a capillary in active muscle?

1 carbon dioxide + water → carbonic acid
2 carbon monoxide + haemoglobin → carboxyhaemoglobin
3 hydrogencarbonate ions + hydrogen ions → carbon dioxide + water
4 oxyhaemoglobin → haemoglobin + oxygen

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

20 The graph shows changes in the amount of air in a person's lungs over a period of 30 seconds.



In which time period is the rate of breathing fastest?

A **V** to **W**
B **W** to **X**
C **X** to **Y**
D **Y** to **Z**

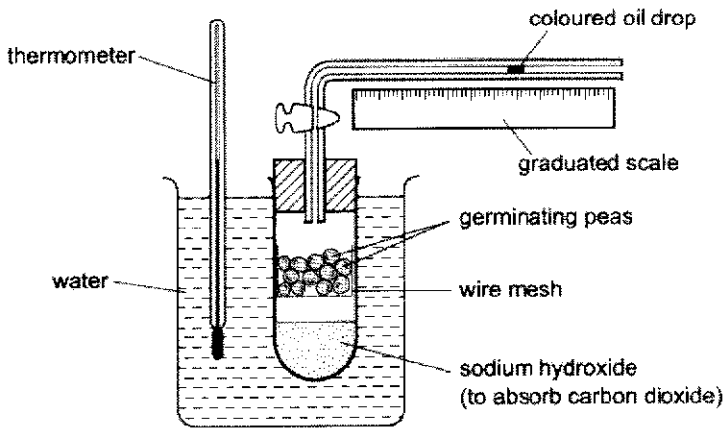
21 Which substance is insufficient when anaerobic respiration is taking place?

A carbon dioxide
B glucose
C lactic acid
D oxygen

22 Which row shows the state of the muscles when breathing out as deeply as possible?

	diaphragm muscles	**external intercostal muscles**	**internal intercostal muscles**
A	contracted	contracted	relaxed
B	contracted	relaxed	contracted
C	relaxed	contracted	relaxed
D	relaxed	relaxed	contracted

23 The diagram shows apparatus used to investigate respiration.



Which change will be seen and what is the explanation?

	change	explanation
A	oil drop moves left	oxygen is used up by the peas
B	oil drop does not move	oxygen is used up as fast as carbon dioxide is released
C	oil drop does not move	carbon dioxide is absorbed
D	oil drop moves right	peas release carbon dioxide

24 Some symptoms of chronic obstructive pulmonary disease (COPD) are listed.

1 breakdown of alveoli
2 increase in secretion of mucus
3 loss of elastic fibres
4 narrowing of airways
5 reduction in surface area for gaseous exchange

Which of these are also the symptoms of emphysema?

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

25 Which of these statements could describe the effect of carbon monoxide in cigarette smoke?

1 It binds irreversibly to haemoglobin.
2 It causes mucus to accumulate in the bronchioles.
3 It results in more carbon dioxide being transported in the blood.
4 It temporarily increases the heart rate.

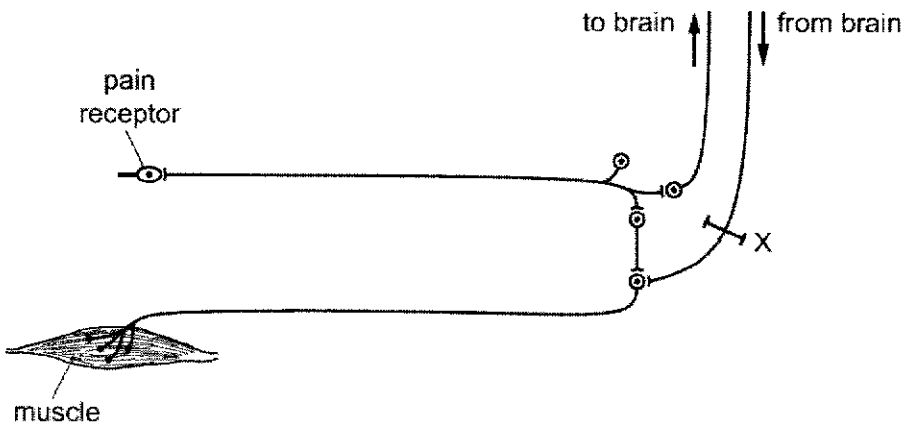
A **1** and **2**
B **1** only
C **2** and **3**
D **3** and **4**

26 Which parts of the skin are involved in the control of body temperature?

	sweat glands	temperature receptors	blood vessels
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

27 The diagram shows some of the nerve pathways associated with a reflex action.



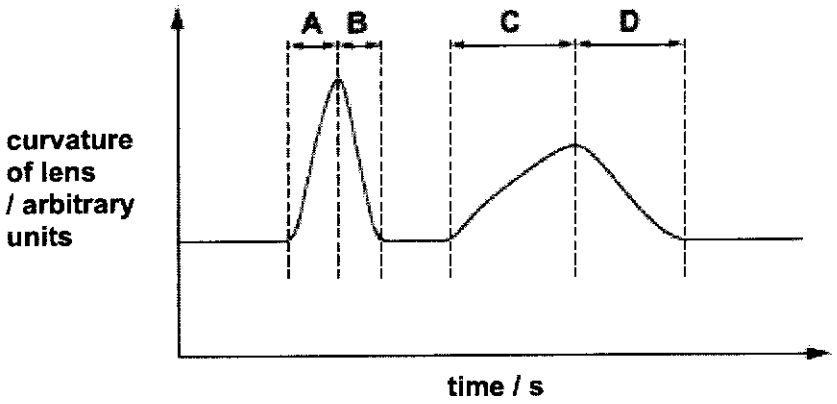
If the pathway at **X** is damaged, how does this affect the reflex?

A the person will not be aware that the reflex is occurring.
B the reflex cannot be controlled consciously.
C the response will occur without any stimulus.
D there is no response to the stimulus.

28 The diagram shows the curvature of the lens in a person's eye.

The shape of the lens changes as the person watches two motorbikes go past at different speeds.

Which period shows a motorbike moving towards the person at the higher speed?



29 What are characteristics of hormones?

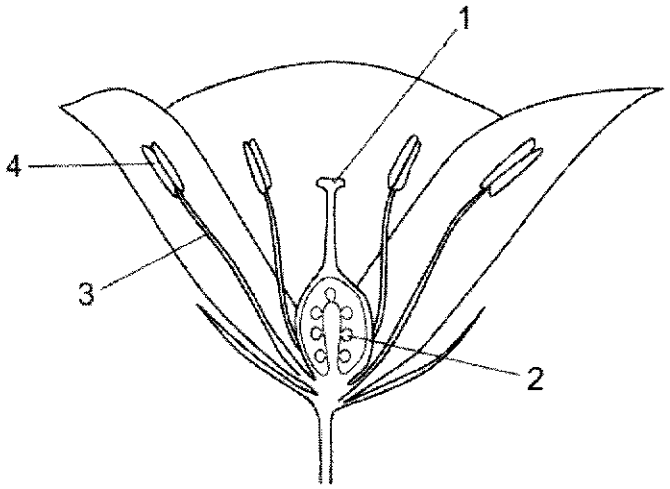
	affect target organs	carried by the blood	produced by glands
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

30 Which plants are most likely to adapt successfully to a climate change in their environment?

A plants that are cross-pollinated
B plants that do not rely on wind-pollination
C plants that grow rapidly
D plants that reproduce asexually

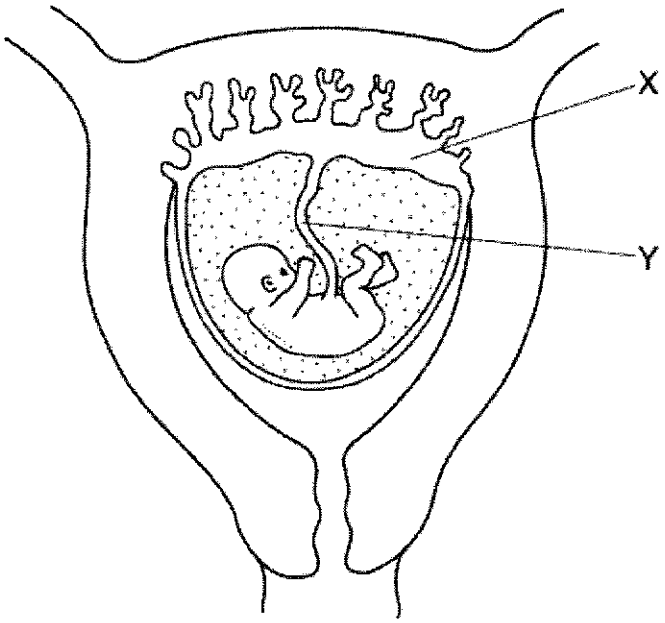
31 The diagram shows a flower cut in half.



Which two parts

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

32 The diagram shows a foetus in the uterus.



Where is the concentration of oxygen highest?

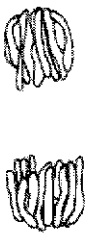
A an artery at **X**
B an artery at **Y**
C a vein at **X**
D a vein at **Y**

33 Which process occurs during prophase of the mitotic cell cycle in an animal cell?

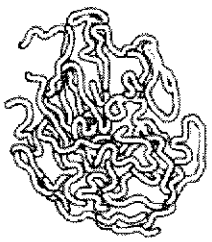
A division of centromeres
B formation of chromosomes
C replication of DNA
D separation of centrioles

34 The diagrams show chromosomes at different stages of mitosis.

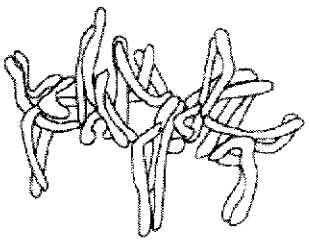
W



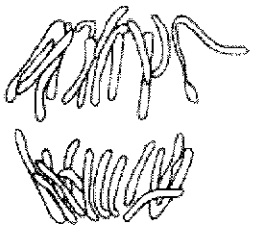
X



Y



Z



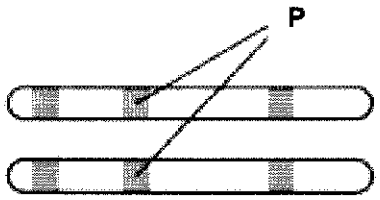
Which shows the correct order of the cell cycle?

A W → X → Y → Z
B X → Y → Z → W
C Y → Z → W → X
D Z → W → X → Y

35 Which row shows the products of mitosis, meiosis and fertilisation?

	products of mitosis	products of meiosis	product of fertilisation
A	four diploid cells	two diploid cells	diploid cell
B	four haploid cells	four diploid cells	haploid cell
C	two diploid cells	four haploid cells	diploid cell
D	two diploid cells	two haploid cells	haploid cell

36 The diagram shows a pair of chromosomes from the same cell.



What do the lines labelled **P** point to?

A the site of alleles made up of two or more genes which are always the same
B the site of alleles made up of two or more genes which might be different
C the site of genes made up of two or more alleles which are always the same
D the site of genes made up of two or more alleles which might be different

37 A short piece of DNA 18 base pairs long was analysed to find the number of nucleotide bases in each of the polynucleotide strands. Some of the results are shown below.

	number of nucleotide bases			
	adenine	cytosine	guanine	thymine
strand 1		4		7
strand 2		5		

How many nucleotides containing thymine were present in strand 2?

A 2
B 4
C 5
D 7

38 Two heterozygous individuals are crossed. Some of the offspring show the recessive characteristic.

What is the probability that one of these offspring that shows the recessive characteristic is homozygous?

A 0.00
B 0.25
C 0.50
D 1.00

39 The table shows the genotypes and phenotypes for hair colour for the members of a family, but **one** phenotype is shown incorrectly.

	genotype		phenotype
family member	allele 1	allele 2	hair colour
mother	a	A	brown
father	A	A	brown
son 1	a	A	blonde
daughter 1	a	a	blonde
son 2	A	A	brown
daughter 2	A	a	brown

Which family member has the **incorrect** phenotype?

A daughter 1
B daughter 2
C son 1
D son 2

40 Over several hundred years, the milk production of a particular type of farm animal has steadily increased.

How has this been achieved?

A artificial selection
B continuous variation
C genetic engineering
D natural selection

NAME:		( )	CLASS:	

YISHUN TOWN SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2020

SEC 4 EXPRESS

BIOLOGY

(6093/2)

DATE : 31 Aug 2020 **DAY : Monday**

DURATION: 1 hr 45 min **MARKS: 80 marks**

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number in the spaces provided at the top of this page.

Section A
Answer **all** the questions. Write your answers in the spaces provided.

Section B
Answer all **three** questions. Write your answers in the spaces provided.

Questions set on the Common Last Topic of the syllabus do not form part of the assessment. They will not be marked by the Examiners.

The last question, Question 10, is in Either/Or form. You must answer Question 10 **Either**, but you do not need to answer Question 10 **Or**. There is no choice of question in this Section.

Turn to this question on page 15 and cross it out by drawing a line through this question.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

You may use an approved calculator.

Section A	
Section B	
TOTAL	

This question paper consists of **15** printed pages

SECTION A (50 MARKS)

Answer **all** questions in this section.
Write your answers in the spaces provided.

1 **(a)** The mammalian kidney is an organ involved in excretion. Explain what is meant by the term *excretion.* [1]

.....

.....

(b) **Fig. 1.1** shows a section through a kidney.

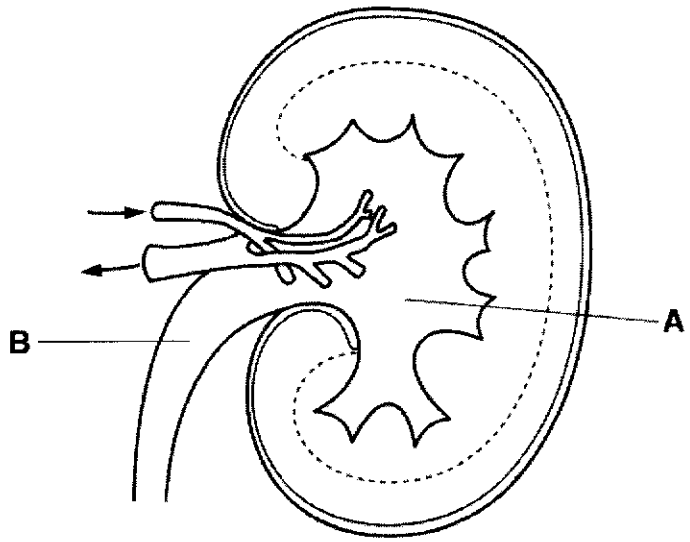


Fig. 1.1

(i) With reference to **Fig. 1.1**, name structures **A** and **B**. [1]

A .....

B .....

(ii) On **Fig. 1.1**, use label lines and letters to label where: [2]

U – ultrafiltration occurs

L – the loop of Henle is found

C – blood urea concentration is low.

2 **Fig. 2.1** is an electron micrograph of a part of an animal cell.

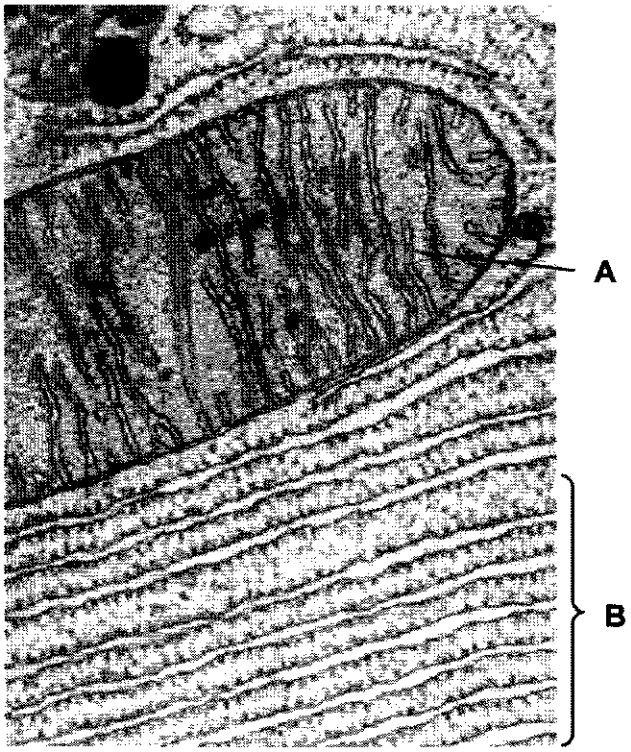


Fig. 2.1

(a)(i) Name organelle **A** and state its role in cells. [2]

.....

.....

.....

(ii) Organelle **A** can also be found in plants. Name one cell in plants which contains numerous amounts of organelle **A**. Explain your answer. [2]

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.....

(b) Name the cell structure labelled **B**. Explain your answer. [2]

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.....

3 **Fig. 3.1** is a photomicrograph of plant cells showing stages in cell division.

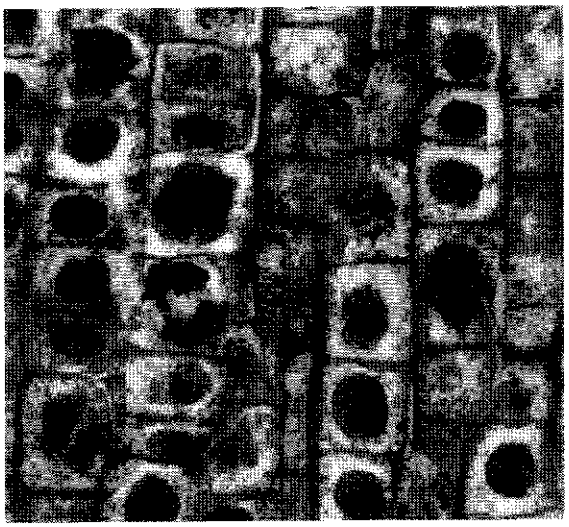

Fig. 3.1

(a) On **Fig. 3.1**, draw a circle around a cell in anaphase. [1]

(b) Describe **three** ways in which mitosis is important in plants. [3]

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(c) Describe the behaviour of the nuclear envelope during mitosis. [2]

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4 **Fig. 4.1** is a graph showing how the blood pressure in the pulmonary artery and in the right ventricle changes during one cardiac cycle.

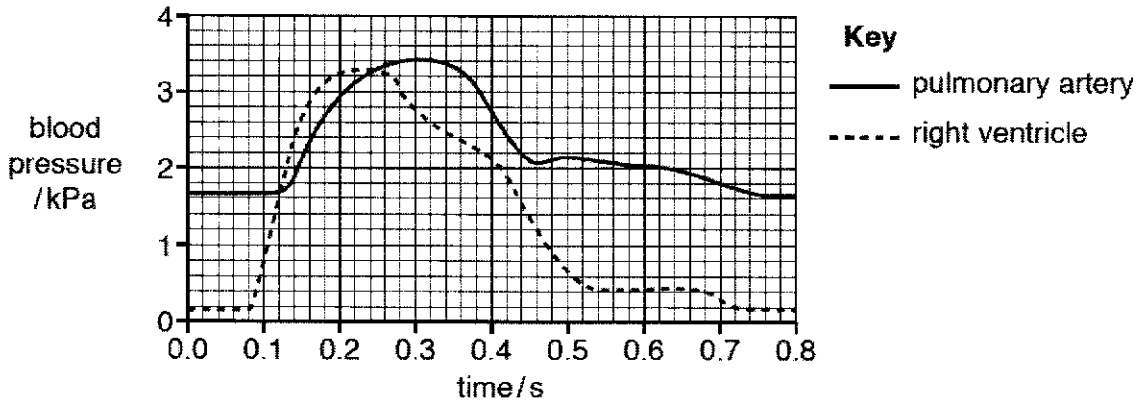

Fig. 4.1

(a) Use **Fig. 4.1** to state the time at which:

(i) the valve between the right ventricle and the pulmonary artery closes. [1]

.....

(ii) the ventricle begins to contract. [1]

.....

(b) State **and** explain one similarity and one difference between **Fig.4.1** and a graph showing how the blood pressure for the **left** ventricle changes during the same cardiac cycle. [4]

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5 (a) Galactosaemia is a rare genetic disease in which the build-up of the monosaccharide, galactose, can result in an enlarged liver, kidney failure and brain damage.

Galactose is produced in the body from the digestion of the sugar lactose, found in milk.

Galactosaemia is caused by a mutation of the gene which codes for an enzyme which converts galactose to glucose.

(i) Suggest how a person with galactosaemia can minimise damage to the liver, kidney and brain. [1]

.....

.....

(ii) Suggest how the build-up of galactose in the liver could lead to the liver becoming enlarged. [2]

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(iii) Explain how a mutation in the gene could result in a change in the enzyme responsible for the metabolism of galactose. [4]

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(b) If the phenotypes of parents are known, the probabilities of having a child with galactosaemia, an unaffected child (healthy, not a carrier) or a child who is a carrier can be calculated.

The dominant allele codes for an enzyme which converts galactose to glucose.

(i) **Describe** the genotypes of the three phenotypes mentioned above. [2]

.....

.....

.....

.....

(ii) Complete **Table 5.1** to show the results of these calculations. [2]

parent 1	parent 2	percentage probability of having a child with galactosaemia	percentage probability of having an unaffected child	percentage probability of having a child who is a carrier
unaffected	carrier	0	50	50
carrier	carrier	.....	.....	.....
unaffected	has galactosaemia	.....	.....	.....
carrier	has galactosaemia	50	0	50

Table 5.1

6 (a) An investigation was carried out to measure the rate of photosynthesis at different concentrations of carbon dioxide. Two different plants, barley and sugar cane, were tested at two different temperatures, 10 °C and 25 °C.

The results are shown in **Fig. 6.1**.

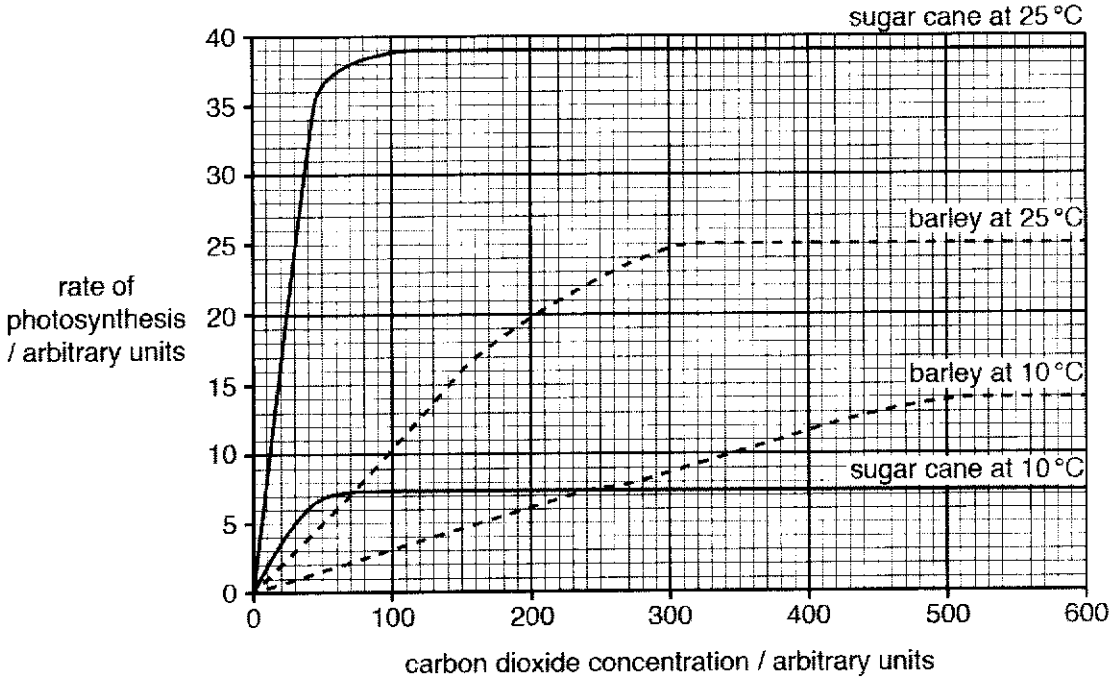

Fig. 6.1

(i) Suggest why, in all four experiments, the rate of photosynthesis became constant as the carbon dioxide concentration increased. [2]

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(ii) With reference to **Fig. 6.1**, describe the difference in the rate of photosynthesis, **at 10 °C**, between barley and sugar cane. [3]

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(iii) Suggest and explain why, **at 25 °C**, sugar cane has a higher rate of photosynthesis than barley. [2]

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(b) Carbon dioxide for photosynthesis enters the leaves through opened stomata. Stomata do not stay open all the time. Changes in environmental conditions can cause stomata to close.

Describe these conditions and explain how stomatal closure benefits the plant. [4]

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7 The pH of the blood of an athlete decreases during a race and returns to its normal level after the race.

The decrease in the pH of the blood is caused by the presence of waste products that have been excreted by cells during respiration.

(a) Name a waste product that is excreted and the cell that excreted it. [2]

waste product : .....

cell : .....

(b) Write the word equation for the reaction to produce the waste product in **(a)**. [1]

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(c) Describe what occurs to the waste product named in **(a)** to help return the pH of the blood back to a normal level. [3]

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SECTION B (30 MARKS)

Answer three questions.
Question **10** is in the form of Either/Or question.
Only one part should be answered.

8 **(a)** **Table 8.1** gives information about the composition of some foods.

food	fat / g per 100 g	energy / kJ per 100 g	protein / g per 100 g
potato chips	11.0	1050	4.0
steamed chicken	5.0	630	25.0
boiled sweet potato	0.6	360	1.0
boiled peas	0.4	210	5.0

Table 8.1

(i) Using the information in **Table 8.1**, state the relationship between the fat content and the energy content of these foods. [1]

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(ii) Calculate the protein content of 250 g of steamed chicken. Show your working. [2]

(iii) Describe an experiment to show the presence of proteins in potato chips. [2]

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(b) A student carried out an investigation into the relationship between the concentration of sucrose solution and the number of sweet potato cells which were plasmolysed.

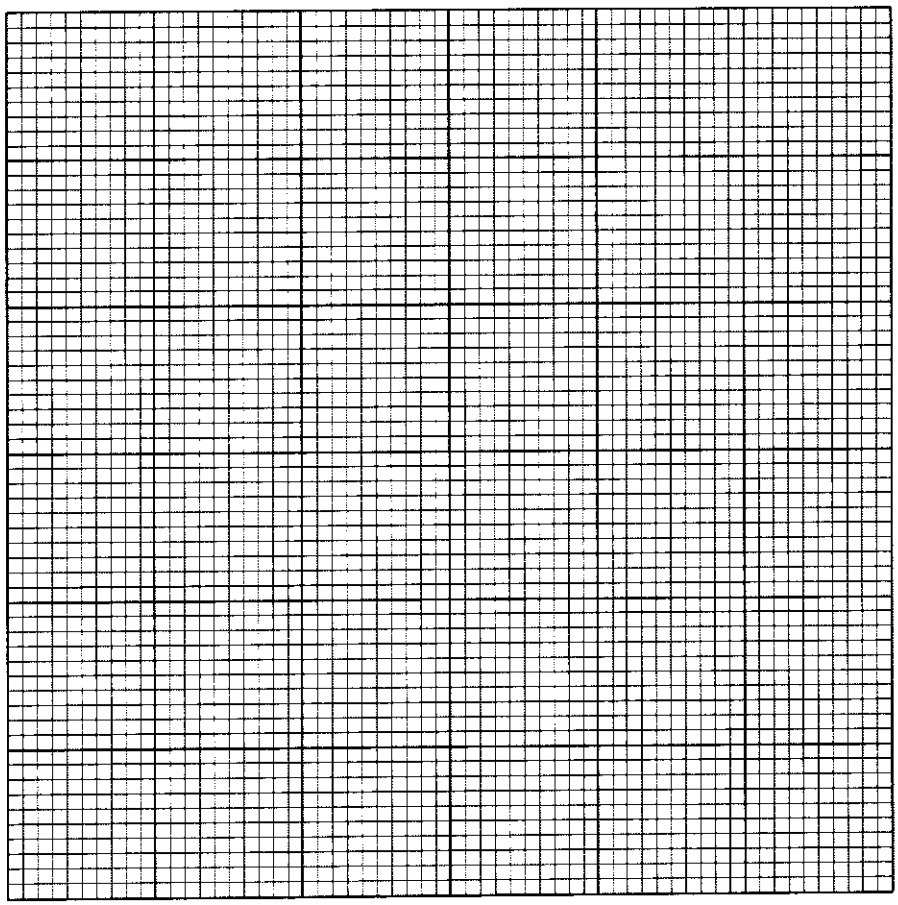
She placed small pieces of sweet potato tissue in sucrose solutions and counted the number of cells that were plasmolysed using a microscope. She then calculated the percentage of cells that were plasmolysed in each solution.

Her results are shown in **Table 8.2**.

concentration of sucrose solution / mol per dm^3	**percentage of sweet potato cells that were plasmolysed**
0.0	0
0.2	5
0.4	18
0.6	75
0.8	100

Table 8.2

Plot a graph of the results in **Table 8.2**. Use your graph to find the concentration of sucrose solution in which 50% of the cells would be plasmolysed. On your graph, show how you obtained this value. [5]



9 In a healthy human body, regulation of glucose is an important process.

(a) Define the term 'glucose regulation' with reference to the human body. [2]

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(b) One of the ways the human body regulates glucose is through the production of insulin. Describe the effects of insulin on muscle cells. [3]

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(c) During periods of stress, the hormone adrenaline is released by the body. Describe how adrenaline from the adrenal gland can reach the liver and its effects on glucose in the body. [5]

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10 Either

(a) Describe the similarities and differences between a voluntary action and a reflex action. [4]

(b) Describe the pathway of nerve impulses in a **named** reflex action. [6]

10 Or

(a) Describe how the carbon in a glucose molecule in the body of an animal is cycled in an ecosystem. [5]

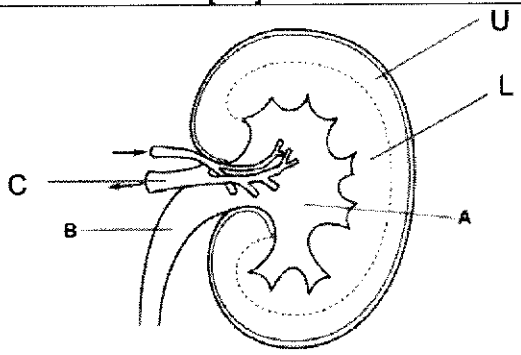
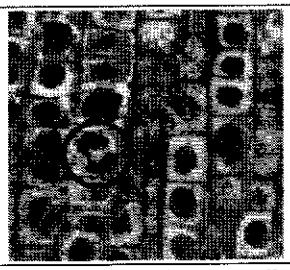
(b) Explain how energy losses occur along food chains. [5]

End of Paper

YTSS 2020 Biology Prelim Paper 1 Answers

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

YTSS 2020 Biology Prelim Paper 2 Answers

Qn	Answer Key		Remarks
	Section A		
1(a)	Excretion is the removal of metabolic waste products from the body	1	
(b)(i)	A – renal pelvis [1/2] B – ureter [1/2]	1	
(ii)	 U – label line at the cortex L – label line at the medulla C – label line at the renal vein (max 2 marks, minus 1 mark for each error)	2	
2(a)(i)	A – mitochondrion (Reject: mitochondria) To release energy / perform aerobic respiration	1 1	
(ii)	Root hair cell [1] → active transport for absorption of dissolved mineral salts [1] OR Companion cell [1] → to provide energy for translocation / movement of food substances in sieve tube cells [1]	2	
(b)	Rough endoplasmic reticulum [1] It has ribosomes attached to the surface [1]	2	
3(a)		1	
(b)	For growth of new cells [1] production of genetically identical cells [1] for asexual reproduction [1] repair of damaged tissue (**A** replace damaged cells, **R** repair damaged cells) [1] replace, dead / worn out / old / non-functioning, cells [1] (any 3, max 3 marks)	3	
(c)	In prophase, nuclear envelope disintegrates/break down [1] In telophase, nuclear envelope forms back/reforms [1]	2	
4(a)(i)	0.24 or 0.25 s	1	
(ii)	0.08 s	1	

Qn	Answer Key		Remarks
(b)	***Similarity*** • STATE: increases and decreases in pressure [1/2] at same time [1/2] **(A** description for part of the graph e.g. starts to rise at same point as RV, returns to minimum at same point as RV) [1] • EXPLAIN: muscles in ventricles both contract (and relax) at same time [1] ***Difference*** • STATE: reaches higher, blood pressure / peak, than RV [1] • EXPLAIN: walls of left ventricle, thicker / more muscular [1] • EXPLAIN: more force exerted by LV / generates a higher pressure [1] • EXPLAIN: left ventricle pumps blood to (whole) body / RV only to lungs) [1] (need to have 1 similarity + 1 difference, to score max 4 marks)	4	
5(a)(i)	Consume/eat less milk/dairy products	1	
(ii)	Lowers water potential in the liver cells, [1/2] Higher water potential in the blood plasma, [1/2] Water molecules enter by osmosis, [1/2] Increasing the size of liver [1/2]	2	
(iii)	• changes / different, base / nucleotide (sequence), in, DNA / gene [1] • changes / different, mRNA, codon / triplet [1] • changes / different, structure of polypeptide [1] • changes / different, protein / enzyme [1] • changes / different, active site [1] • enzyme, non-functional / does not convert galactose to glucose [1] (any 4 points, in the order, max 4 marks)	4	
(b)(i)	Child with galactosaemia – homozygous recessive Unaffected child – homozygous dominant Child who is a carrier – heterozygous (max 2 marks, minus 1 marks for each error)	2	Question asking for describe, not state!
(ii)	25, 25, 50 [1] 0, 0, 100 [1]	2	
6(a)(i)	• limiting factor is no longer carbon dioxide (concentration) [1] • other factors, such as light intensity / temperature is limiting the rate of photosynthesis [1]	2	Many students did not relate to the idea of limiting factor
(ii)	• (rate of photosynthesis) higher rate, at lower concentrations of CO_2 / initially, for sugar cane as compared to barley • levels off / becomes constant, at lower rate of photosynthesis, for sugar cane as compared to barley • levels off / becomes constant, at a lower carbon dioxide concentration, for sugar cane as compared to barley • data quote to support 2nd point or 3rd point e.g. 2nd point – sugar cane at 7–7.5 au **and** barley at 14 au OR 3rd point – sugar cane at 60–70 au **and** barley at 500 au (any 3 points, max 3 marks)	3	Many students did not separate the comparison.

Qn	Answer Key		Remarks
(iii)	SUGGEST: enzymes in sugar cane have higher optimum temperature [1] EXPLAIN: enzymes, are more active / works better / works at faster rate, to increase rate of photosynthesis [1]	2	
(b)	*conditions (max two):* • low light intensity (**A** at night / in the dark) [1] • dry conditions [1] • high temperatures [1] • high light intensity [1] • high wind speed [1] *benefits (max two):* • to reduce transpiration rate [1] • so that the plant can conserve water / prevent excessive loss of water [1] • retains turgidity of cells [1] • (physical) support of plant / prevents wilting [1] • trap oxygen for respiration (at night)	4	
7(a)	Lactic acid Liver OR Carbon dioxide Lungs	1 1 1 1	
(b)	Glucose → lactic acid + small amounts of energy OR Glucose + oxygen → carbon dioxide + water + large amounts of energy	1	
(c)	• lactic acid in the blood plasma • transported to the liver • breakdown into, glucose / carbohydrate OR detoxification • removal of acid (in blood plasma) returns pH back to norm OR • carbon dioxide in blood plasma • transported to lungs • removed in expired air • removal of carbon dioxide (in blood plasma) returns pH back to norm (any 3 points, max 3 marks)	3	
	Section B		
8(a)(i)	as fat (content) increases energy increases	1	
(ii)	62.5 g [1] Working [1]	2	
(iii)	• crush some potato chips with water • decant 2 cm^3 of liquid into a test tube • add 2 cm^3 of sodium hydroxide solution and a few drops of copper (II) sulfate solution OR add 2 cm^3 of Biuret reagent • a positive test is when violet colouration is shown	½ ½ ½ ½	
(b)	Axes [1] Scale [1] Points [1]	5	

Qn	Answer Key		Remarks
	Line [1] Indicate the concentration at 50 % plasmolysed cells [1]		
9(a)	Maintaining/regulating a constant glucose concentration [1] in blood (plasma) [1]	2	
(b)	causes glucose uptake / increases permeability to glucose [1] more glucose respired / increase in respiration rate [1] excess glucose converted to glycogen [1] to be stored in the muscle cells [1] (any 3 points, max 3 marks)	4	
(c)	travel in bloodstream [1] blood vessels involved (3 or more parts mentioned, such as renal vein, vena cava, right side of heart, pulmonary artery and vein, left side of heart, aorta, to the hepatic artery) [1] stimulate liver cells [1] to convert glycogen into glucose [1] thus increasing glucose levels/concentrations (in the blood) [1]	5	
10(a) Either	Similarities: • Both action leads to a response [1] • Both action requires nerve impulses to be transmitted [1] • Both action requires a motor neurone [1] Differences: • Voluntary action requires conscious control while reflex action does not require conscious control [1] • Voluntary action does not need a stimulus while reflex action requires a stimulus [1] • In a voluntary action, the impulse must pass through the relay neurone in the brain while in a reflex action, the impulse may or may not pass through the relay neurone in the brain [1] (any 4 points, max 4 marks)	4	
(b)	Knee jerk reflex • Stimulus received by stretch receptor in the knee • Receptor will generate an impulse • Impulse is transmitted along the sensory neurone • To the relay neurone in the spinal cord • Impulse then transmitted along the motor neurone • To the effector which is the leg muscles OR Pupil reflex • Stimulus received by photoreceptor / (receptors in) retina • Receptor will generate an impulse • Impulse is transmitted along the sensory neurone • To the relay neurone in the brain • Impulse then transmitted along the motor neurone • To the effector which is the circular muscles and radial muscles in the iris	6	