

Paper 1 – MCQ

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

Paper 2 – Section A (50 marks)

	Answer	Marks	Marker's Report
1a	A - digestion B - absorption C - deamination D - excretion Any 2 correct for 1 mark	2	
1b	Trypsin Peptidase	1 1	R: pepsin (Qn states small intestine)
1c	- Amino acids are absorbed from the lumen of the small intestine into the <u>blood capillaries of the villi</u> - Through <u>diffusion and/or active transport</u> depending on difference in concentration gradient between small intestine and blood capillaries	1 1	Some did not specify villi / missed out on active transport.
1di	carbohydrate  aerobic respiration carbon dioxide and water	1	R: respiration (too vague)
1dii	glucose + oxygen → carbon dioxide + water + energy	1	R: carbohydrate Some left out energy.

1e	- <u>water potential</u> of blood plasma <u>increases</u> / water potential of blood plasma is <u>higher</u> than blood cells - causing <u>water molecules to move</u> from blood plasma <u>into</u> blood <u>cells</u> - by <u>osmosis</u> - blood cells will <u>swell</u> / <u>burst</u> Any 2 for 1 mark	2	R: water Some left out name of process.
2a	$5000 - 1500 = 3500 \text{ cm}^3$	1	R: no units
2b	- diaphragm <u>relaxes</u> and <u>arches upwards</u> - external intercostal muscles <u>relax</u>, - internal intercostal muscles <u>contract</u> - ribs move <u>downwards</u> and <u>inwards</u> - thoracic volume <u>decreases</u> - atmospheric pressure now <u>lower</u> than pressure in lungs - air is forced <u>out of lungs</u> Any 2 for 1 mark	3	R: pressure decreases (must show comparison)
2c	Both increase in frequency + increase in volume must be observed	1	Drawings between V and W would not be marked. Poorly done. Most students indicated an increase in volume but not frequency.
2d	Spirogram of person suffering from chronic bronchitis would indicate a <u>increase in speed</u> / <u>decrease in volume</u> of air inspired and expired by the lungs.	1	A: smaller wavelength / amplitude
3a	- Down's syndrome - It is a disease caused by an <u>extra copy of chromosome 21</u> present.	1 1	Accept any other valid ans
3bi	From <u>prophase I</u> to <u>anaphase I</u>	1	R: prophase to anaphase
3bii	- During prophase I, the newly replicated <u>chromatin threads condense to form chromosomes</u> - During anaphase I, <u>homologous chromosomes are separated</u> to opposite poles of the cell	1 1	Some simply repeated information in the question

			text rather than substantiating with the processes that specifically happens in those stages.																								
4ai	- Suggest: Increase in adrenaline - Explain: Stimulate conversion of glycogen to glucose OR - Suggest: After a <u>meal</u> high in <u>sugar / starch / carbohydrates / glucose</u> - Explain: Glucose is <u>absorbed / diffused into the bloodstream</u> by the small intestine	2	Some students showed no / weak understanding of the concept of homeostasis.																								
4aii	- Suggest: blood glucose concentration falls <u>below norm</u> - Explain: Islet of Langerhans secrete glucagon / hormone Q into the bloodstream to <u>convert glycogen back to glucose</u>	1 1	Many left out "before norm"																								
4bii	P – adrenaline Q – glucagon	1 1	Poorly done. P is not insulin, increase in P occurred before increase in blood glucose level.																								
4bii i	- (Adrenal) gland stop producing the hormone - Hormone broken down by liver	1 1	ECF if P was wrongly identified as another hormone. 1m - feedback sent to receptor / islet of Langerhans stop producing hormone 1m- hormone broken down by liver																								
5a	- Gene/ genetic mutation	1	Well done																								
5b	- Discontinuous variation - <u>Phenotypes are clear-cut/distinct/no intermediate</u> between resistance or susceptibility to warfarin	1 1	A: controlled by 1 gene Some students are not clear on the difference between continuous and discontinuous variation.																								
5c	<table border="0"> <tr> <td></td><td>Parent 1</td><td>Parent 2</td><td></td></tr> <tr> <td>phenotype of parents</td><td>Resistant</td><td>Susceptible</td><td></td></tr> <tr> <td>genotype of parents</td><td>Rr</td><td>rr</td><td></td></tr> <tr> <td>gametes</td><td>R r</td><td>r r</td><td></td></tr> <tr> <td>genotype of offspring</td><td>Rr rr</td><td>Rr rr</td><td></td></tr> <tr> <td>phenotype of offspring</td><td>Resistant Susceptible</td><td>Resistant Susceptible</td><td></td></tr> </table>		Parent 1	Parent 2		phenotype of parents	Resistant	Susceptible		genotype of parents	Rr	rr		gametes	R r	r r		genotype of offspring	Rr rr	Rr rr		phenotype of offspring	Resistant Susceptible	Resistant Susceptible		1 1 1 1	Well done.
	Parent 1	Parent 2																									
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5d	- mutation in VKORC1 gene has resulted in some rats becoming resistant to warfarin, while some remain susceptible / <u>variations</u> in population - during incidents of rat extermination, <u>competition</u> between the variants occur - rats that are <u>resistant</u> to warfarin <u>survive, reproduce and pass on favourable genes</u> to their offspring - rats that are <u>susceptible</u> to warfarin <u>die off over time</u> and decrease in numbers in the population - rats that are resistant to warfarin become the <u>predominant species</u> in the environment - rats are said to have <u>evolved</u> Any 2 for 1 mark	3	Many students only got partial credits by mentioning mark points 3 and 4. Some used extremities like “<u>all</u> rats susceptible will die off”. Some fail to associate the question to natural selection and evolution.
6a	- circled a single nucleotide - labelled sugar/deoxyribose, nitrogenous base and phosphate group accurately (3 correct labels for 2m, 2 correct labels for 1m)	1 2	Generally well done, a few mixed up phosphate and sugar.
6b	- hydrogen bonds - formed between bases according to rules of <u>complementary base pairing</u> - holding the two polynucleotide strands together / forms a double helix	1 1 1	Many fail to establish that the bonds hold the 2 polynucleotide strands together.
6c	$(100\% - 38\% - 38\%) / 2 = 12\%$ 1m for correct working, 1m for correct ans with units	2	Well done.
6di	- UUA GAU AGU AGU CGU AAG	1	Well done.
6dii	- Order of bases in a DNA determines the <u>order of bases in the mRNA</u> formed during <u>transcription</u> - Order of bases in the mRNA then determines the <u>order of amino acids on the polypeptide</u> formed during <u>translation</u>	1 1	Poorly done. Most simply stated that order of bases affected polypeptide sequence.

Paper 2 – Section B (30 marks)

7ai	Blood pressure/mmHg arteries arterioles capillaries veins Types of blood vessels	1– Scale 1– line 1– Axis 1– Plot points	Scale – graph has to fill at least ½ of the grid provided line – both curve and line accepted Axis – appropriate labels with units for blood pressure indicated Plot points – accurate to data provided Generally okay, however some students went to find average blood pressure despite question clearly asking for range.
7aii	- Blood pressure is <u>highest</u> in the <u>arteries, 115-120mmHg</u> and lowest in the <u>veins, 10-15mmHg</u> - Blood pressure decreases from 120 to 10 mmHg as blood moves from arteries to arterioles to capillaries and finally to veins / away from the heart - Blood pressure <u>differs</u> in each type of blood vessels - <u>Greatest fall</u> in blood pressure occurs in the arterioles <u>from 115 to 40 mmHg</u> - <u>Greatest range</u> of blood pressure occurs in the arterioles <u>from 40 to 115mmHg</u> Any 2	2	Many did not quote values. If 2 points were given but no data quoted at all, max 1m. If 1 point given without data, 0m.
7aii i	- Blood pressure in the <u>arteries</u> is <u>higher</u> than the blood pressure in the <u>veins</u> - Hence arteries require thicker walls than veins to <u>withstand the higher blood pressure / to prevent rupture of vessel</u>	1 1	R: thickness of wall is dependent on blood pressure in vessel (must specify which has the thicker wall and higher pressure)
7bi	Prevents the <u>mixing of deoxygenated blood</u> in the right side <u>with the oxygenated blood</u> in the left side of the heart	1	R: mixing of blood in the left and right side of the heart (vague)
7bii	Pulmonary artery	1	R: pulmonary arch
7bii i	- Blood is being pumped through the lungs at a higher pressure and as such is <u>flowing quicker through the lungs</u> - <u>Insufficient time</u> for blood to be well oxygenated	1 1	A: blood flows from LV to RV, less oxygenated blood flows to all parts of body R: blood absorb oxygen
8a	- Placenta / embryonic villi	1	Many students only cited diffusion of nutrients from mother's blood into

	- <u>nutrients and oxygen</u> may not reach foetus efficiently - <u>waste materials</u> may also not be removed efficiently - foetus may not receive the protective <u>antibodies</u> from the mother and may be susceptible to diseases - <u>progesterone</u> may not be produced and thus <u>uterine lining</u> may not be properly maintained Any 3	3	fetal blood, leaving out oxygen and antibodies.
8b	- structure <u>B</u> is the <u>amniotic fluid</u> - it <u>supports and cushions</u> the fetus / <u>cannot be compressed</u> / acts as a <u>shock absorber</u>	1 1	
8c	- <u>blood pressure</u> of the mother would <u>kill the foetus</u> as it is much higher than that of the foetus - <u>blood group</u> of foetus may be <u>different</u> from mothers, mixing of the blood would result in <u>agglutination</u>	1 1	Many students mixed up coagulation (blood clot formation) and agglutination (clumping of RBC).
E 9a	- Pain <u>receptors</u> in the finger are <u>stimulated</u> as shown in step 1 - Nerve impulses travels along the sensory neurone to the spinal cord as shown in step 2 - in the grey matter/spinal cord, impulses are transmitted across a synapse to the <u>relay neurone</u> and <u>across another synapse</u> to the motor neurone as shown in step 3 - nerve impulses leave along the <u>motor neurone to the effector</u> as shown in step 4 - the <u>muscles</u> of the finger <u>contract</u> and <u>finger</u> is <u>withdrawn</u> as shown in step 5	1 1 1 1 1 1 - steps	Reference must be made to the steps shown in the figure, if no reference is made, max 5 marks. Many missed out on the receptor being stimulated and the transmission across synapse
E 9b	- similarity: both consists of <u>cell body/nucleus, axon and dendron</u> - difference 1: sensory neurone conducts impulses <u>from the receptors to the CNS</u> while motor neurone conducts impulses <u>from the CNS to the effectors</u> - difference 2: sensory neurone has a <u>long dendron / short axon</u> while motor neurone have <u>short dendron/long axon</u> - difference 3: <u>cell body is circular</u> in sensory neurone, but <u>irregularly shaped</u> in motor neurone	1 1 1 1	Some students stated more than 3 differences but no similarities. Max of 3 marks given in this case. A: both are part of the peripheral nervous system / both contains myelin sheath which allows impulses to be transmitted rapidly
Or 9a	- Petiole holds leaf in position for maximum light absorption - Broad lamina provides a large surface area for maximum light absorption - Waxy cuticle on upper and lower epidermis reduces water loss through evaporation from leaf	6	Some students only mentioned about external structures of the leaf and not the internal structures.

	- Cuticle is transparent for light to enter the leaf - Stomata open in presence of light to allow diffusion of carbon dioxide and oxygen - Chloroplasts contain chlorophyll to absorb light energy for photosynthesis; - More chloroplasts in palisade mesophyll tissue as more light can be absorbed at the upper leaf surface; - Intercellular air space allows rapid diffusion of carbon dioxide and oxygen into and out of mesophyll cells; - Veins contain xylem and phloem to transport water and mineral salts and sugars around the plant; Any 6 answers, max 6 marks		
Or 9b	Temperature - The <u>higher</u> the temperature, the <u>higher</u> the rate of transpiration. - due to <u>greater the rate of evaporation</u> from the cell surface Humidity - The <u>less humid</u> the air, the <u>higher</u> the rate of transpiration - as less water vapour accumulates outside the stomata and thus <u>greater concentration gradient</u> between the leaf and the atmosphere	1 1 1 1	Vice versa explanation accepted as well. Generally well done.