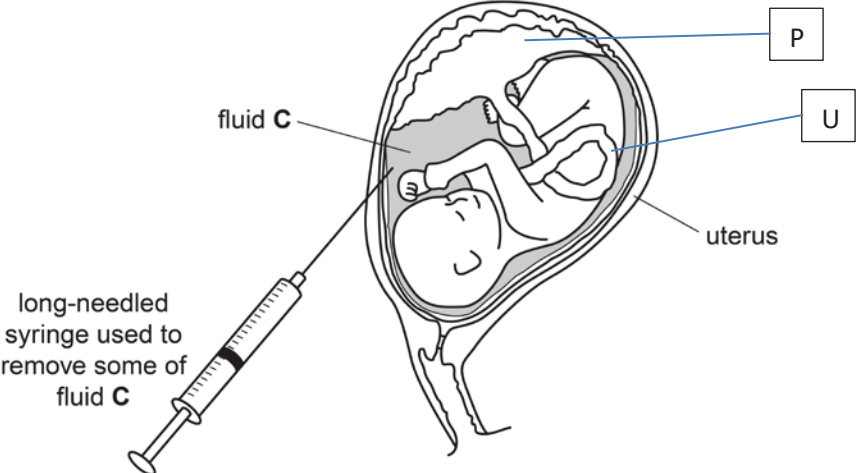


2019 Prelim 4E Biology Paper 1 6093/1

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

Section A: Structured Questions [50m]

1	ai	F ;		
	aii	G ;		
	b	narrowing of the aorta / OWTTE ;		
	c	accept ora where relevant <i>suggest</i> 1 blood flows <u>from</u> aorta <u>to</u> pulmonary artery ; 2 increased volume of / more, blood to lungs ; A blood to lungs at higher pressure 3 oxygenated and deoxygenated mix / oxygenated blood / blood from aorta, to lungs ; <i>explain (why blood flows from aorta to pulmonary artery)</i> 4 left ventricle thicker wall (than right ventricle) ; 5 (so) contraction generates greater force (than right ventricle)/AW ; 6 higher pressure in aorta (than pulmonary artery) ; [3 max] <i>max 2 for omission of suggestion or explanation</i> adapted from: 9700_s10_qp_22		
				[Total: 6]
2	a	i	4;	
		ii	0.5 dm ³ /500 cm ³ ;	
		iii	4 (breaths) x 500 (cm ³) x 4 (quarter minutes); 8000 cm ³ ; R 8 dm ³	
	b	i	single breaths occupy a shorter time; breaths have greater amplitude;	
		ii	more oxygen uptake ; <u>more</u> energy (R produced, made, manufactured, etc.) ; from aerobic respiration ; more muscular contraction;	
				[Total: 10]
3	a	amniotic fluid ; prevents physical harm / damage to fetus ;		
	b	DNA / chromosomes ; from fetal cells / nuclei ; (of fluid C is used for the analysis)		

	c	i, ii	 long-needled syringe used to remove some of fluid C	
	d		umbilical cord carries fetal blood to and from placenta ; <u>which then</u> ; transfers nutrients / oxygen from mother to fetus ; removes CO₂ / waste from fetus to mother ; <i>max 2m if no ref to causal / sequential relation between umbilical cord and placenta</i> <i>penalize once for unclear direction of transfer / transport</i>	
			[Total: 9]	
4	a		less digestion of protein ; protease / pepsin, no / reduced activity ; (stomach) <u>decrease</u> in pH / acidity / less acid ; R change ref. fewer microorganisms / bacteria / pathogens killed ; A work best in acid conditions R drug neutralises the acid adapted from: 5090_s14_ms_21	
	b		(X) gall bladder, stores / releases bile ; R secretes / produces (which) emulsifies fats ; (Y) pancreas, secretes pancreatic juice ; (which contains) lipase ; breaks down fat into fatty acid and glycerol ;	
			[Total: 8]	
5	a		Circle contains one phosphate group, one nitrogenous base, one ribose, all covalently bonded to each other ;	
	b		M = adenine and O = cytosine ;	

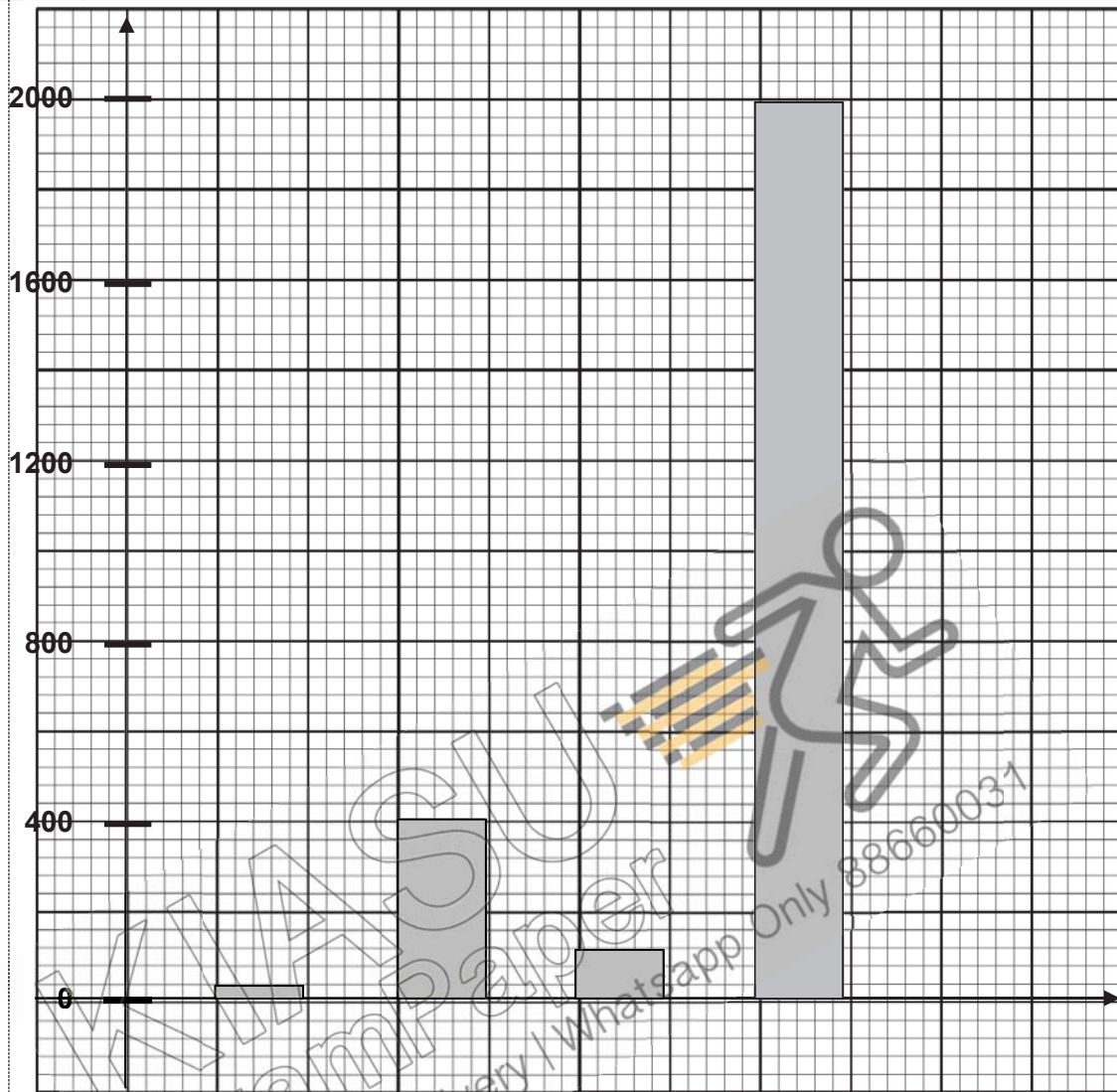
	c	Assume answer is about polypeptide unless indicated otherwise. A comparison is not required. Information given below is for <u>either</u> polypeptide <u>or</u> DNA features. A ideas from either column. Do not penalise if points are not corresponding on one line / sentence. Mark all points on line. Only R if biologically incorrect. <table><tr><td><i>polypeptide</i></td><td><i>DNA</i></td></tr><tr><td>amino acids</td><td>nucleotides ;</td></tr><tr><td>one / single strand / chain</td><td>two / double strand / chains ;</td></tr><tr><td>peptide bonds</td><td>phosphodiester ;</td></tr><tr><td>R between peptides / polypeptides</td><td></td></tr><tr><td>20 types of amino acids</td><td>only 4 types of bases</td></tr><tr><td>A > 4</td><td></td></tr><tr><td>no phosphate / PO₄</td><td>has phosphate / PO₄ ;</td></tr><tr><td>2° / 3° structure</td><td>double helix ; 3 max</td></tr></table> adapted from: 9700_s04_ms	<i>polypeptide</i>	<i>DNA</i>	amino acids	nucleotides ;	one / single strand / chain	two / double strand / chains ;	peptide bonds	phosphodiester ;	R between peptides / polypeptides		20 types of amino acids	only 4 types of bases	A > 4		no phosphate / PO ₄	has phosphate / PO ₄ ;	2° / 3° structure	double helix ; 3 max	
<i>polypeptide</i>	<i>DNA</i>																				
amino acids	nucleotides ;																				
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			[Total: 4]																		
6	a	drink C (increased salt intake led to) decreased water potential in blood plasma ; pituitary gland released more ADH into bloodstream ; cells in walls of collecting ducts more permeable to water / more water reabsorbed from collecting duct into capillaries ; lowest increase in volume of / more water in + urine / produces least / little / less urine ;																			
	b	more protein ; lg ref. to specific foods correct ref. excess amino acids ; broken down in / converted by liver / deamination ; adapted from: 5090_s14_ms_22																			
			[Total: 7]																		
7	a	one per line, mark the first, any 2 from: detection of pressure, temperature, pain, touch;; (A for ONE mark max. a reference to the detection of stimuli)																			
	b	dilation of arterioles; R capillaries more blood, carries heat;																			

		heat lost from + body surface/skin/named heat transfer method; capillaries supply sweat glands; [max 3]	
	c	stores energy; supplies energy/heat; insulates (against heat loss); *ref. low external temperature [max 1] adapted from: N15/1/22	
			[Total: 6]

Section B: Free Response Questions [30m]

8	a	father is XY / contains Y chromosomes ; A marks in Punnett Square mother is XX / does not contain Y chromosomes ; father produces sperm with either X or Y (chromosomes) ; mother produces eggs only with X (chromosomes) ; sex depends on which sperm fertilises the egg ; 1:1 male : female in offspring / AW ;	[6]
	b	<i>explain (why bacteria only grew on jelly without antibiotic)</i> reference to (bacteria) killed in region with antibiotic / ORA ; <i>explain (why some bacteria grew on jelly with antibiotic after some time)</i> gene, mutation ; <u>causes</u> some bacteria to be <u>resistant</u> to antibiotic ; (resistant bacteria) survive, reproduce ; pass on resistance / gene mutation to next generation / offspring ; information from https://news.harvard.edu/gazette/story/2016/09/a-cinematic-approach-to-drug-resistance/	
		[Total: 10]	
9	a	8.8 – 6.9 / 20 ; 0.10 ; % per minute ; R plural	
	b	three more tubes, placed 15 cm, 20 cm, 25 cm away from the lamp ; measure percentage of oxygen in the solutions at 0 , 5, 10, 20 minutes ; calculate mean rate of oxygen production for all tubes for the 20 minutes of the experiment ; plot a graph of mean rate against light intensity / distance from lamp, draw a trend line ; rate will increase with light intensity then level off ; [max 4]	[4]
	c	no, photosynthesis / light dependent reaction ; oxygen used up in respiration ;	[2]
	d	glucose is converted to sucrose ; translocation (of) sucrose ; from the leaf to the seeds ; through phloem ; converted to starch ;	[3]

10 a (OR)



b the position of an organism / feeding level AW;
in a food chain / food web / pyramid of biomass / pyramid of numbers
/ pyramid of energy;

c i $A \rightarrow C \rightarrow B \rightarrow D$

ii small plants/animals absorb/contain pesticide ;
eaten by small fish
(Only mark available if no ref to pesticide in the answer) ;
(pesticide) passes from small fish to large fish ;
each time many organisms eaten/higher organism gets large
dose/intensifies, increases;
is not excreted;
cannot be broken down ;
stored in body AW;
adapted from: 5090_s11_ms_21

End of Paper

