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Mark Scheme (Results)

GCE

A PEARSON COMPANY

Question Number	Answer	Mark
1(a)	D ;	(1)

Question Number	Answer	Mark
1(b)	A ;	(1)

Question Number	Answer	Mark
1(c)	B ;	(1)

Question Number	Answer	Mark
1 (d)	B ;	(1)

Question Number	Answer	Mark
1(e)	C ;	(1)

Question Number	Answer	Mark
1 (f)	C ;	(1)

Question Number	Answer	Mark
2	1. transcription ; 2. mRNA / eq ; 3. translation ; 4. ribosomes / rough endoplasmic reticulum / RER ; 5. tRNA / eq ; 6. peptide / covalent ;	(6)

Question Number	Answer	Mark
3 (a)	1. rate is same for up to 30 minutes / eq ; 2. faster (uptake) for A than B / eq ; 3. (uptake of) A is linear throughout whereas (uptake of) B is not / eq ; 4. uptake of substance B levels off at {2 to 2.2} hours whereas uptake of A does not / eq ; 5. credit correct manipulation of comparative figures ;	**maximum (3)**

Question Number	Answer	Mark
3* (b) QWC	(QWC – Spelling of technical terms *(shown in italics)* must be correct and the answer must be organised in a logical sequence) 1. correct ref to diffusion (of substance B) occurring due to concentration difference / eq ; 2. idea of rate of uptake decreases ; 3. as the concentration gradient decreases / eq ; 4. (net) uptake stops / eq ; 5. when concentration inside cell equals that outside the cell / eq ;	**maximum (4)**

Question Number	Answer	Mark
3 (c)	1. active transport is {against /eq} concentration gradient /eq ; 2. active transport requires ATP /eq ; 3. ref to involvement of (membrane) proteins in active transport ;	**maximum (2)**

Question Number	Answer	Mark
4 (a)		

Name of blood vessel	Carries blood away from the heart	Carries oxygenated blood
Aorta	✓	✓
Vena cava	✗	✗
Pulmonary artery	✓	✗
Pulmonary vein	✗	✓

[Any 2 correct answers for 1 mark];;;; **(4)**

Question Number	Answer	Mark
4 (b)(i)	1. (blood flows) from heart to gills ; 2. (blood flows) from gills to (rest of) body / eq ; 3. (blood flows) from body back to heart ; 4. ref to single circulation ;	**maximum (3)**

Question Number	Answer	Mark
4 (b)(ii)	1. blood flows {faster /at higher pressure / eq} (to the body) ; 2. blood flows {slower /at lower pressure / eq} to the lung ; 3. idea that this reduces risk of damage to lungs ; 4. correct ref to more efficient {exchange / transport} of gases / eq ;	**maximum (2)**

Question Number	Answer	Mark
4 (c)	1. correct ref to large surface area to volume ratios ; 2. idea that (all) {cells / eq} are very close to the {blood / heart} ; 3. idea that diffusion is fast enough for exchange of {nutrients / gases / waste} ; 4. idea of low metabolism ; 5. idea that movement of blood back into the heart is fast enough (to return blood back into the heart) ;	**maximum (2)**

Question Number	Answer	Mark
5* (a) QWC	(QWC – Spelling of technical terms *(shown in italics)* must be correct and the answer must be organised in a logical sequence) 1. idea that there is a cascade of events (leading to blood clotting) ; 2. ref to *thromboplastin* (starting the cascade) ; 3. ref to conversion of *prothrombin* into *thrombin* ; 4. idea that {*thromboplastin / thrombin*} is {an enzyme / a catalyst} ; 5. ref to conversion of *fibrinogen* into *fibrin* ; 6. ref to formation of mesh of {fibres / *fibrin*} ; 7. ref to requirement of {calcium ions/ Ca^{2+} / vitamin K} ; 8. ref to {*platelets* / blood cells} getting trapped (in the mesh) ;	**maximum (4)**

Question Number	Answer	Mark
5(b)(i)	1. snake venom decreases the clotting time /eq ; 2. (overall) as mass of snake venom increases the clotting time decreases /eq ; 3. idea that only a very small increase (0.004) in mass causes very sharp drop in clotting time ; 4. concentrations above {0.004 /0.02} cause little change in clotting time / eq ; 5. credit correct use of manipulated figures ;	**maximum (3)**

Question Number	Answer	Mark
5(b) (ii)	idea of one of the following: if the snake venom has similar effects as a known clotting factor an idea of its mode of action can be worked out / how deadly the snake is / compare to normal (clotting) process / possible use as medication / for research into antidotes / eq ;	(1)

Question Number	Answer	Mark
5(c) (i)	1. ref to an enzyme as a protein ; 2. ref to {3D / tertiary / globular} structure ; 3. ref. to named bonds (holding structure in place) ; 4. between the R groups ; 5. ref to active site ; 6. idea of specificity of active site ;	maximum (3)

Question Number	Answer	Mark
5(c)(ii)	1. it is one of the enzymes /similar to one of the enzymes, in the clotting process / eq ; 2. idea that has active site complementary to one of the substrates ; 3. ref to it activating other enzymes ; 4. ref to effect on platelets ; 5. idea that it triggers the clotting process ;	maximum (2)

Question Number	Answer	Mark
6(a)	1. each {drink /tea} has different caffeine contents / eq ; 2. coffee has the highest and white tea has the lowest caffeine / eq ; 3. idea that coffee has far more caffeine than the others ; 4. cocoa has a similar caffeine content to Oolong tea / eq ; 5. credit manipulated figures to quantify any of the statements ;	**maximum (3)**

Question Number	Answer	Mark
6(b)(i)	1. idea of heart rate determined before treatment ; 2. idea that daphnia need to be put into tea and allowed to acclimatise ; 3. practical detail e.g. use of microscope ; 4. details of determining heart rate described /eq ; 5. ref to named controlled variable ; 6. ref to {repeats /replicates} ; 7. idea that heart rate of daphnia determined in {white tea (only) / known caffeine concentration} ;	**maximum (4)**

Question Number	Answer	Mark
6(b)(ii)	**For**: 1. *Daphnia* are very simple organisms / *Daphnia* have basic nervous system / eq ; **Against**: 1. use of (any) animal is wrong / how can we be sure what the *Daphnia* can feel / ref. to possibility that the *Daphnia* could die / eq ;	(2)

Question Number	Answer	Mark
7(a)	1. idea that these cells are {easy / painless} to collect ; 2. idea that a relatively {large amount of DNA / large number of cells} can be collected ; 3. they {contain diploid cells / have (23) pairs of chromosomes} ; 4. cells {are genetically identical / have same DNA / have same alleles} ; 5. any {recessive allele / mutated (CF) gene} will be present in them / eq ; 6. idea that if the gametes were tested they may not contain the {recessive allele / mutated (CF) gene}(as they are haploid) ;	**maximum (2)**

Question Number	Answer	Mark
7(b)	1. cystic fibrosis results from one of a number of possible mutations (of this gene) /eq ; 2. idea that testing for only one will miss other recessive alleles ;	(2)

Question Number	Answer	Mark
7(c)	1. ref to false negatives / eq ; 2. idea that the screening programme does not test for all the possible mutations that can cause cystic fibrosis ; 3. idea that a mutation may occur in the formation of the gametes ; 4. idea of mutation in both gametes ; 5. idea that a mutation may occur after fertilisation ;	**maximum (2)**

Question Number	Answer	Mark
7(d)	1. idea that any other family member could be a carrier ;	
	2. idea that informed choices can be made about having children (if they know that they are carriers) ;	(2)

Question Number	Answer	Mark
7(e)	1. heterozygous genotype of both parents shown or stated ;	
	2. possible alleles carried in the gametes shown (can be shown in a Punnet square) ;	
	3. possible genotypes of offspring clearly shown (can be shown in a Punnet square) ;	
	4. corresponding phenotypes given ;	
	5. (probability of having child with cystic fibrosis is) 25% / 1 in 4 / ¼ / 0.25 / ;	maximum (5)

Question Number	Answer	Mark
8(a)(i)	correct substitution (e.g. 83 / 1.8 x 1.8) ; answer = 25.6 ; correct answer = 2 marks	(2)

Question Number	Answer	Mark
8(a)(ii)	1. calculated value is 25.6 which is {greater than 25.0 / in range 25.0 to 29.9} ; 2. (therefore) man is overweight ; 3. but only just (overweight) ;	maximum (2)

Question Number	Answer	Mark
8(b)	1. relative mortality decreases as BMI increases from 19 to {20 to 23} in (both men and women) / eq ; 2. little change in relative mortality within the range {20 / 21 to 24 / 25} / eq ; 3. as BMI increases from above {22 to 25} risk increases (in both men and women) / eq ; 4. idea that from above {20 to 25} the risk for men is greater than that for women / risk the same between 19 and {20 to 25} ;	maximum (3)

Question Number	Answer	Mark
8(c)(i)	1. (relative mortality is) {1.24 to 1.26} ; 2. idea that risk is low / no need to be concerned ; 3. ref to need to {reduce / be concerned} about {BMI / weight / obesity} ;	**maximum (2)**

Question Number	Answer	Mark
8* (c)(ii) QWC	(QWC – Spelling of technical terms *(shown in italics)* must be correct and the answer must be organised in a logical sequence) 1. idea that the woman could reduce her {energy / eq} intake ; 2. {weight/ BMI} decreases if her energy expenditure greater than intake / eq ; 3. diet should have reduced cholesterol levels / eq ; 4. cholesterol has been associated with {high blood pressure / atherosclerosis / eq} ; 5. diet should have reduced saturated fat / eq ; 6. reduces blood {cholesterol /LDL} / eq ; 7. idea that the woman could increase the amount of exercise she took ; 8. weight decreases if energy expenditure is greater than her intake / exercise helps maintain a healthy heart /reduces blood pressure / eq ; 9. idea that if the woman smoked she should reduce it ; 10. smoking {reduces oxygen uptake / increases stickiness of platelets / increases blood pressure / increases risk of atheroma / eq} ; 11. idea that diet should have reduced salt ; 12. high salt associated with high blood pressure ; 13. idea of moderate alcohol intake ; 14. high alcohol associated with high blood pressure ;	**maximum (4)**