edexcel

Mark Scheme (Results)

Summer 2015

Pearson Edexcel International Advanced Level in Biology (WBI01) Paper 01 – Lifestyle, Transport, Genes and Health

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Summer 2015
Publications Code IA040928*

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.

- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.

- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.

- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark
1(a)(i)	B platelets	(1)

Question Number	Answer	Mark
1(a)(ii)	D protein	(1)

Question Number	Answer	Mark
1(a)(iii)	C prothrombin into thrombin	(1)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	1. the clotting time only changes at heparin concentrations above 0.5(au) ; 2. there is a decrease in clotting time up to 2(au) ; 3. there is an increase in clotting time { above 2(au) / from 3 to 4(au) } ; 4. comparisons between initial and final value 156.7 s increase / 6.2 x increase / 520% increase OR between initial and 2 au value 2.8 s decrease / 9.3% decrease ;	1. ACCEPT no change between 0 and 0.5(au) / 0.5 (au) has no effect 2. ACCEPT shortest clotting time is at 2(au)	(3)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	clotting is slower / inhibited / reduced / stopped ;	ACCEPT clotting time is increased / longer	(1)

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	risk of excessive blood loss ;	ACCEPT bleeding in the brain / bleeding to death / internal bleeding / ACCEPT thrombocytopenia	(1)

Question Number	Answer	Additional Guidance	Mark
2(a)	1. reference to consisting of C, H and O / eq ; 2. no glycosidic bonds / one sugar unit ; 3. idea of ratio of C:H:O is 1:2:1 ;	ACCEPT correct general formula $(CH_2O)n$ for both MP1 and MP3 e.g. $C_6H_{12}O_6$ gains both marks 2. ACCEPT monomer / single ring structure / simple sugar IGNORE one sugar / one molecule	(2)

Question Number	Answer	Additional Guidance	Mark
2(b)	1. idea of different position of { H / OH } on carbon 1 ; 2. idea of different position of { H / OH } on carbon 4 ;	ACCEPT C as equivalent to carbon	(2)

Question Number	Answer	Mark
2(c)(i)	B lactose	(1)

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	1. reference to glycosidic bond ; 2. between (C)1 and (C)4 / eq ; 3. by condensation (reaction) ; 4. idea that water is lost ;	ACCEPT suitable annotated diagram for any Mark Points formation of 1, 4 glycosidic bond gains MP1 & MP2	(3)

Question Number	Answer	Additional Guidance	Mark
2(c)(iii)	1. reference to enzymes being { specific } ; 2. due to shape of active site ; 3. only allowing certain substrates to { bind / fit / form a complex / eq } ; 4. glucose molecule and galactose molecule have different shapes ;	1. ACCEPT enzymes have { specific } substrates 3. IGNORE reference to 'lock and key' if unqualified	(3)

Question Number	Answer	Additional Guidance	Mark
2(d)	Any two comparisons between monosaccharide and polysaccharide from the table	ACCEPT use of comparative terms e.g. monosaccharides are sweeter / smaller IGNORE simple / complex	(2)

	Monosaccharide	Polysaccharide	
1.	soluble	insoluble	;
2.	small	large	;
3.	sweet	not sweet	;
4.	no glycosidic bonds	glycosidic bonds are present	;
5.	osmotic effect	no osmotic effect	;
6.	single unit / monomer	many units / more than 2 units / polymer	;
7.	cannot be hydrolysed	can be hydrolysed	;

6. IGNORE sugar / molecule unqualified

Question Number	Answer	Additional Guidance	Mark
3(a)	1. (fibrous proteins) are { long / contain many amino acids } ; 2. amino acid sequence is repetitive / eq ; 3. idea of limited folding ; 4. polypeptides lie parallel to each other ; 5. idea of bonds linking chains together ;	3. ACCEPT { no / limited / eq } tertiary structure IGNORE reference to 3D shape etc. 4. ACCEPT parallel chains 5. ACCEPT cross linked chains ACCEPT any named bond between chains	(3)

Question Number	Answer	Additional Guidance	Mark
3(b)	1. mutation changes the sequence of bases in { DNA / gene } ; 2. this could result in a different amino acid ; 3. resulting in different { bonding / folding } ; 4. changing the { shape / strength / eq } of the protein ;	2. ACCEPT different primary structure 4. ACCEPT references to changing secondary / tertiary structures	(3)

Question Number	Answer	Additional Guidance	Mark
3(c)	1. (blood) pressure in the arteries is high ; 2. artery (walls) contain collagen ; 3. collagen provides strength (to the artery wall) ;	IGNORE references to elasticity ACCEPT converse statements	(3)

Question Number	Answer	Additional Guidance	Mark
3(d)	1. parents each contain one recessive allele ; 2. indication that the gametes could contain either the dominant or the recessive allele ; 3. credit an indication of the possible genotypes from fertilisation e.g. Punnet square ; 4. indication of the genotype that results in EDS ; 5. indication that probability is 0.25 / eq ; [award points from a clear genetic diagram]	NOT simply a reference to parents being heterozygous or carriers	(4)

Question Number	Answer	Additional Guidance	Mark
4(a)	1. (in general) an increase in diastolic blood pressure increases death rate ; 2. at higher systolic pressure the effect of diastolic pressure is { variable / irregular } ; 3. an increase in systolic blood pressure increases death rate ; 4. a high systolic blood pressure has a greater influence on death rate than diastolic blood pressure ; 5. greatest death rate is associated with systolic pressure > 21.2 and diastolic pressure < 9.3 ;	ACCEPT 'risk' in place of death rate ACCEPT converse arguments for MP1, MP3 and MP4 5. ACCEPT greatest death rate is associated with highest systolic and lowest diastolic pressure	(3)

Question Number	Answer	Additional Guidance	Mark
4(b)	1. high blood pressure can cause damage to the endothelial (lining of arteries) ; 2. leads to { inflammatory response / accumulation of white blood cells } ; 3. reference to formation of { plaque / atheroma / atherosclerosis } ; 4. lumen is { restricted / narrowed } ; 5. resulting in cells being deprived of { oxygen / nutrient } ;	2. IGNORE immune response 4. ACCEPT 'blocked' IGNORE artery narrows unqualified 5. ACCEPT reduced blood supply to cells	(3)

Question Number	Answer	Additional Guidance	Mark
4(c)	Any two from: 1. age 2. genetics 3. smoking / tobacco products 4. lack of exercise 5. high { salt / sodium } consumption 6. stress / adrenalin 7. being overweight / obese	 2. ACCEPT race / gender 4. ACCEPT exercising	(2)

Question Number	Answer	Mark
4(d)	B antihypertensive	(1)

Question Number	Answer	Additional Guidance	Mark
5(a)	1. catalase is a catalyst ; 2. reference to { lowering / eq } activation energy ; 3. without being used up in the reaction / eq ; 4. idea that once reaction is complete, the enzyme detaches from products ; 5. and can then bind to another {substrate / hydrogen peroxide} ;	1. IGNORE catalase is an enzyme 3. ALLOW without being changed	(3)

Question Number	Answer	Mark
5(b)(i)	B one	(1)

Question Number	Answer	Additional Guidance	Mark
* 5(b)(ii)	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. compare cooked and uncooked samples of potato / different cooking { methods / times / temperatures } ; 2. controlled source of potato ; 3. { mass / volume / surface area } of potato must be the same ; 4. use same concentration of hydrogen peroxide ; 5. measure volume of oxygen released ; 6. over a time period ; 7. use of water bath to control temperature (of enzymes and substrate) ; 8. idea of { repeats / replicates } to calculate the { mean / average } ; 9. compare volume of oxygen collected in a set time / time to collect set volume of oxygen ;	QWC emphasis on clarity of expression 2. e.g. age / variety / same potato 6. time must refer to time for collecting oxygen ACCEPT reference to collecting or measuring oxygen volume at timed intervals 7. ACCEPT any attempt to control the temperature of the enzyme reaction 8. reference to repeat must be qualified with reference to calculation of mean 9. ACCEPT reference to comparing rate of oxygen production	(6)

Question Number	Answer	Additional Guidance	Mark
6(a)	1. DNA replication produces DNA and transcription produces (m)RNA ; 2. in DNA replication thymine (T) is used but in transcription uracil (U) is used (as complementary base to adenine (A)) 3. DNA has deoxyribose and (m)RNA has ribose ; 4. DNA is double stranded and (m)RNA is single stranded ; 5. DNA is helical and (m)RNA is straight / eq ;	comparisons are required for each marking point 2. ACCEPT new DNA strand will be T C G C G A A C G and RNA will be U C G C G A A C G	(3)

Question Number	Answer	Additional Guidance	Mark
*6(b)	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. idea that a mRNA copy is made ; 2. sequence of RNA is U C G C G A A C G ; 3. mRNA leaves the nucleus ; 4. idea of association of mRNA with ribosome ; 5. each tRNA attaches to a specific amino acid / eq ; 6. tRNA transfers the amino acid (to the ribosome / mRNA) / eq ; 7. idea of complementary base pairing between tRNA and mRNA ; 8. reference to peptide bonds forming between amino acids ;	QWC emphasis answer must be in a logical sequence 3. IGNORE mRNA enters cytoplasm 7. ACCEPT anticodon codon interaction	(6)

Question Number	Answer	Additional Guidance	Mark
7(a)	1. add up resting heart rate and heart rate after drink ; 2. divide each total by three ; 3. subtract resting heart rate from heart rate after drink ; OR 4. subtract each resting heart rate from heart rate after drink ; 5. add up the differences ; 6. divide by three ; [award mark points from clear calculation]	1. & 2. ALLOW 'calculate the mean for resting and after drinking heart rates' for one mark if MP1 and 2 not awarded 2. & 6. ACCEPT divide by the number of students 5. & 6. ALLOW 'calculate the mean for difference in heart rates' for one mark if MP5 and 6 not awarded ALLOW full marks for correct explanation / calculations if student 2 identified as anomalous and excluded IGNORE additional manipulations e.g. calculating a percentage change	(3)

Question Number	Answer	Additional Guidance	Mark
7(b)	1. use more students ; 2. repeat the investigation on each student ;	IGNORE reference to standard deviation	(2)

Question Number	Answer	Additional Guidance	Mark
7(c)	1. use a { caffeine-free drink / caffeine solution } ; 2. to rule out the effects of other components of the drink ; OR 3. use a placebo / do a blind trial / eq ; 4. to rule out the placebo effect / eq ; OR 5. use drinks with different concentrations of caffeine ; 6. to establish correlation between concentration and heart rate ;	IGNORE unqualified references to controlling other variables or control of variables other than components of the drink	(2)

Question Number	Answer	Mark
8(a)(i)	A large surface area and high concentration gradient	(1)

Question Number	Answer	Mark
8(a)(ii)	B diffusion	(1)

Question Number	Answer	Additional Guidance	Mark
8(b)(i)	1. PFR is greater in men than in women / eq ; 2. PFR is greatest in men at the age of 35-38 and in women at age of 30-32 ; 3. (on average) men have larger lungs than women ; 4. men have more muscular chests (than women) ;	2. ACCEPT peak flow rate in men occurs 5 years after peak flow rate in women	(3)

Question Number	Answer	Additional Guidance	Mark
8(b)(ii)	1. similar shape / shape described ; 2. idea of line being higher (than for women of 175 cm) ;	description including: initial value between 420 – 450 peak value between 470 – 500 end value between 340 – 370 gains both marking points	(2)

Question Number	Answer	Additional Guidance	Mark
8(c)	1. reference to a { defective / mutated / eq } CFTR gene ; 2. idea that the CFTR { channel / protein } cannot function properly ; 3. as a result chloride ions { build up inside the cells / are not exported from the cells / eq } ; 4. { thick / thicker / sticky / eq } mucus ; 5. in the { airways / bronchi / bronchioles / eq } ; 6. this { mucus } reduces flow of air / PFR ;	2. ALLOW does not allow chloride ions to pass through 4. IGNORE more mucus produced / present 5. IGNORE in the lungs / in the alveoli 6. DO NOT ACCEPT reference to reduced gas exchange causing reduced air flow IGNORE reduces ability to breath	(4)

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