Mark Scheme (Results)

October 2018

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

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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.
- Crosse
- d out work should be marked UNLESS the candidate has replaced it with and alternative response.

Using the Mark Scheme

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge. Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

The mark scheme gives examiners:
- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

/ means that the responses are alternatives and either answer should receive full credit.
( ) means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
ecf/TE/cq (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Quality of Written Communication
Questions which involve the writing of continuous prose will expect candidates to:
- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.
Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

Question Number	Answer	Mark
1(a)(i)	**The only correct answer is A – a glycosidic bond** **B** *is not correct because they do not form hydrogen bonds* **C** *is not correct because fats form ester bonds* **D** *is not correct because they do not contain ionic bonds*	**(1)**

Question Number	Answer	Mark
1(a)(ii)	**The only correct answer is C - hydrolysis** **A** *is not correct because this occurs when glycogen is formed* **B** *is not correct because this occurs when fats are formed* **D** *is not correct because this refers to DNA*	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	1. correctly formed peptide bond ;	MP1 I-CONH/CO-NH/COHN I-orientation	
	2. rest of dipeptide drawn correctly ;	MP2 A-COOH/NH2	
	3. molecule of water shown ;	MP3 A-chemical or structural formula	**(3)**

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	polypeptide / protein ;	ACCEPT dipeptide/peptide DNA-peptide bond	**(1)**

Question Number	**Answer**	**Additional guidance**	**Mark**
1(c)	1. water is a **solvent** ;	"water is a polar solvent"=mp1/2	
	2. water is {slightly charged / dipole / polar / eq} ;	2. A- **correct** reference to hydrogen bonds A-ref to H slightly +ve and O slightly -ve I-amphoteric / charged / ion	
	3. idea that {polar molecules / charged molecules / ions} dissolve/eq in water ;	3. A-ref to being soluble A-substances as eq A-ionic compounds	
	4. correctly **named** example of a solute transported ;	4. Eg O2/CO2/glucose/amino acids/sodium ion/proteins	**(3)**

Question Number	Answer	Additional guidance	Mark
2(a)	1. it affects the blood vessels **and** the heart / eq ; 2. correct description of an effect/named effect ;	1. A-named / type of vessel I-CV/circulatory system 2. A-narrowed or blocked blood vessel / atherosclerosis / plaques / atheroma / reduced blood or O2 supply "A blockage of the coronary artery"=mp1 & 2 I-named CVDs / CHDs(these are consequences not effects)	**(2)**

Question Number	Answer	Mark
2(b)	**The only correct answer is B - antihypertensives** **A** *is not correct because anticoagulants prevent blood clotting* **B** *is not correct because platelet inhibitors act on platelets* **D** *is not correct because statins reduce cholesterol levels*	**(1)**

Question Number	Answer	Additional guidance	Mark
2(c)	**Any two from:** genetics / diet* / age / gender / smoking / exercise / alcohol / stress /obesity/inactivity/high cholesterol/eq ;	I-lifestyle only I-high blood pressure *A-eg high fat / salt /sugar intake A-high BMI/overweight	**(2)**

Question Number	Answer	Additional guidance	Mark
2(d)(i)	1. idea that the populations of the countries are different ; OR 2. idea that it allows for standardisation or comparison ;	I-ref to sample size/reliability/accuracy	(1)

Question Number	Answer	Additional guidance	Mark
2(d)(ii)	1. 141 – 115 = 26 ; 2. 18.44 (%) ;	Correct answer no working gains 2 marks No ecf A-18/18.4/18.439 DNA-18.43	(2)

Question Number	Answer	Additional guidance	Mark
2(d)(iii)	1. idea of improvements in education (health related); 2. idea of improvements in healthcare; 3. idea of improvements in lifestyle;	1. A- increased public awareness/knowledge/literacy 2. A-preventative measures e.g. screening, diagnosis, medication, treatment/named treatment eg statins 3. A- examples of lifestyle changes eg more exercise/improved diet/stop smoking All 3 mps should imply an improvement eg ref to more/better/eq I-ref to changes only	**(3)**

Question Number	Answer	Additional guidance	Mark
3(a)(i)	1. {alteration / change / eq} in DNA ; 2. a change in {base / codon / nucleotide} sequence / a named type of mutation ;	MP1 and 2 ACCEPT "a change in the base sequence of DNA" for 2 marks 2. A- (base) substitution, insertion, deletion	**(2)**

Question Number	Answer	Additional guidance	Mark
3(a)(ii)	1. it is always expressed / always shown in the phenotype ; 2. an allele is {form / version / alternative / variant} of a gene ;	1. A- only one dominant allele is needed I-present only Mp2 DNA-a type of gene	**(2)**

Question Number	Answer	Additional guidance	Mark
3(b)(i)	1. genotypes of parents shown correctly ; 2. correct gametes shown ; 3. all four correct genotypes for all offspring ; 4. phenotypes correctly matched to genotypes of offspring ;	ecf from mp1 A-any letter/penalize use of 2 diff letters once MP2 and 3 ACCEPT in Punnett square 4.A- normal / healthy / sufferer / affected/eq If pedigree diagram drawn-0 marks unless genotypes stated then mp1, 3 and 4	**(4)**

Question Number	Answer	Mark
3(b)(ii)	0.5 / 50% / ½ / 1 in 2 / 2 in 4 / 1:1;	ecf from 3bi mp4 DNA-2:4 **(1)**

Question Number	Answer	Mark
4(a)	**The only correct answer is C - contain phosphate groups** **A** *is not correct because only RNA is single stranded* **B** *is not correct because only DNA contains deoxyribose* **D** *is not correct because only RNA contains uracil*	**(1)**

Question Number	Answer	Additional guidance	Mark
4(b)(i)	Sequence: A C T T C G C C G A 1. both adenines correct; 2. rest of sequence correct;		**(2)**

Question Number	Answer	Mark
4(b)(ii)	**The only correct answer is B - 300** **A** *is not correct because it is a triplet code so 100 is too few* **C** *is not correct because it is a triplet code so 600 is too many* **D** *is not correct because it is a triplet code so 900 is too many*	**(1)**

Question Number	Answer	Additional guidance	Mark
*4(c)	1. transcription named as stage ; 2. DNA {separates / unwinds / unzips / uncoils/ eq} ; 3. by breaking hydrogen bonds ; 4. (mono) nucleotides line up with complementary bases / complementary base pairing occurs ; 5. phosphodiester bonds form (between mononucleotides) ; 6. ref to any correctly named enzyme ; 7. messenger RNA / mRNA {detaches / leaves the nucleus / enters cytoplasm} ;	**QWC-emphasis is on logical sequence.** 1. A-DNA is transcribed 4. A-RNA nucleotides not-DNA nucleotides A-named bases / letters e.g. A-U / T-A / G-C 6. A-(RNA) polymerase / helicase not-DNA polymerase **If candidate talks about transcription AND translation then max marks available(read whole response) If they incorrectly name the stage as translation but then describe transcription they lose mp1 only	**(5)**

Question Number	Answer	Additional guidance	Mark
5(a)	1. x=30 x { 3.8025 / 3.8/ 1.95^2 }; 2. 114.075 / 114 / 114.1 / 114.08 (kg) ;	Correct answer without working gains 2 marks No ecf	**(2)**

Question Number	Answer	Additional guidance	Mark
5(b)(i)	1. idea that as BMI increases % diabetes increases (overall); 2. a decrease between 20-24 ; 3. credit correct manipulation of figures linked to mp1 / 2 ;	1.A-positive correlation I-ref to womens data 3. eg.58% less in 35-39 cf 40+/2% less n 20-24 cf less than 20/overall increase of 94%	**(2)**

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	1. incidence higher in men (in all categories) ; 2. ≥40 there is the greatest difference / 20-24 has the smallest difference ; 3. credit correct manipulation of data linked ;	1. A- converse 2. A-67% greatest / 3% smallest	**(3)**

Question Number	Answer	Additional guidance	Mark
5(c)	1. take exercise ; 2. reduce {energy intake / calorie or kJ intake / eq} ;	1. A- named exercise/sport 2. A-correct ref to energy budgets eg energy output exceeding energy input I-ref to diet / dietary components/named foods only eg a low fat / sugar diet 3.	**(2)**

Question Number	Answer	Additional guidance	Mark
5(d)	1. idea of {under / overestimation/ eq} of food intake ; 2. idea of lack of education about {nutrition / diet / eq} ; 3. idea that they may be {untruthful / forgetful / eq } ;	1.A-portions incorrectly weighed/calculated 2. A-lack of awareness/knowledge 3 A-lie/biased I-ref to other variables not being controlled	**(2)**

Question Number	Answer	Mark
6(a)(i)	**The only correct answer is B** - **catalyse the conversion of fibrinogen to fibrin** **A** *is not correct because its only role is to convert fibrinogen to fibrin* **C** *is not correct because its only role is to convert fibrinogen to fibrin* **D** *is not correct because its only role is to convert fibrinogen to fibrin*	**(1)**

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	1. the {coronary artery/eq} becomes {blocked/narrowed/eq}; 2. blood flow to the heart is reduced/eq ; 3.(this) prevents {oxygen/glucose} from reaching the heart {cells / muscle / tissue}; 4. (cardiac) muscle is {unable to contract / respire /eq} ;	1. **ACCEPT**-artery carrying blood to the heart "oxygenated blood cannot reach heart cells"=mp2/3 4. **ACCEPT** no or less ATP made/heart cells die I-refs to anaerobic respiration/lactic acid I-heart fatigues/stops working	**(3)**

Question Number	Answer	Additional guidance	Mark
6(b)	1. 8.0mm ; 2. 0.67 ;	1. measurement within range of 7.0mm to 9.0mm ; A correct answer in cm; 2. answer within range of 0.58 to 0.75 ;	**(2)**

Question Number	Answer	Additional guidance	Mark
*6(c)	1. artery walls {are thick / contain collagen } ; 2. to withstand high pressure / eq ; 3. arteries contain elastic fibres ; 4. help to maintain pressure / allow stretch and recoil ; 5. arteries have smooth muscle ; 6. changes the diameter of the artery / allow contraction and relaxation ; 7. arteries have a smooth endothelium / eq ; 8. to reduce { friction / resistance / eq } ; 9. arteries have a folded endothelium /eq ; 10. to allow expansion ;	**QWC emphasis on clarity of expression** Paired responses-1/3/5/7/9 are independent structure marks and 2/4/6/8/10 are associated function marks. Mp6 A-constriction and dilation Mp7 and 9 A-inner lining	**(5)**

Question Number	Answer	Additional guidance	Mark
(7)(a)	1. idea that the mutation changes the {primary structure / sequence of amino acids} in the (CFTR) protein ; 2. idea that this leads to a {non-functional / faulty / absent / eq} (CFTR) protein/ (chloride) channel ; 3. chloride ions {do not move out of / move into} the cell ; 4. water {does not move out of / moves into} the cell ;	Mp3 I-ref to sodium ions A-chlorine ion DNA-chlorine only Mp3 & 4 A-stay in the cell	**(3)**

Question Number	Answer	Additional guidance	Mark
7(b)(i)	1. amniocentesis ; 2. amniotic fluid collected ; 3. between 14 and 20 weeks of pregnancy ; 4. {DNA/genes} analysed / cells cultured ; **Or** 5. chorionic villus sampling / CVS ; 6. sample taken from placenta ; 7. between 8 and 12 weeks of pregnancy ; {DNA/genes/alleles} analysed / cells cultured ;	If method does not match description do not award first mark. Mp3 & 7-accept any figure within the given range Mp4 & 8-accept DNA is tested Mp5 accept testing	**(3)**

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	1. idea that the condition is rare / no family history / eq ; OR 2. idea that the test is {expensive / unavailable / eq } ;	Mp1 A-parents not carriers I-refs to risks/ethics or religion	**(1)**

Question Number	Answer	Additional guidance	Mark
7(b)(iii)	1. idea that it may result in a miscarriage / spontaneous abortion ; 2. idea of risk of false {positive / negative} / inaccurate result ; 3. comment on consequence e.g. healthy fetus may be aborted ; 4. {killing / eq} is {wrong / unethical / eq} ; 5. who has right to decide if tests should be performed / eq ;	Mp1 A-harms/damages fetus/embryo I-ref baby Mp4 A-fetus has a right to life/eq	(3)

Question Number	Answer	Additional guidance	Mark
8(a)	1. activity increases up to {40 °C / optimum temperature} **and** decreases above {40 °C / optimum temperature} ;	Mp1 & 2 A-peak Mp1 I-refs to rate of decrease in mass	**(3)**
	2. the increase is non-linear / exponential / eq ;	Mp2 A-increases at an increasing rate	
	3. credit correct manipulation of data linked to mp1 or 2 ;	Mp3-eg from 10-40/up to 40 there is a 312.5% or 25mg/min increase Mp3-eg above 40/from 40-50 there is a 69.7/70% or 23mg/min decrease	

Question Number	Answer	Additional guidance	Mark
8(b)	1. ref to the enzyme is { denatured / denaturing } ; 2. because {R-groups are vibrating / bonds are breaking / eq} ; 3. therefore { no starch / less starch } binds to the active site / { no / fewer } ESCs formed ; 4. therefore the { glycosidic bond / starch} is not { hydrolysed / broken down } ;	2.DNA-peptide bond 2.A-other named bonds 3.A-substrate as eq to starch and fits into as eq to binds 4. A less broken down if in context with mp3	**(3)**

Question Number	Answer	Additional guidance	Mark
8(c)	1. idea of determining the mass of {starch / peas / seeds } at start and end ; 2. allow {peas / seeds} to { germinate / grow / eq } ; 3. controlled variable in { peas /seeds } ; 4. description of how rate is calculated ; 5. temperature controlled in a water bath / eq ; 6. repeat and calculate of a mean / average ;	Mp1 I-amount of peas Mp3 A-eg age/species/type I-size/volume/mass Mp4 A-correct equation/calculation Mp5 A-incubator/temp controlled room If wrong experiment described 2 marks max-mp 5/6	**(4)**

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