Pearson

Mark Scheme (Results)

January 2018

Pearson Edexcel International Adavance Level In Biology (WBI03) Paper 01 Practical Biology and Investigative Skills

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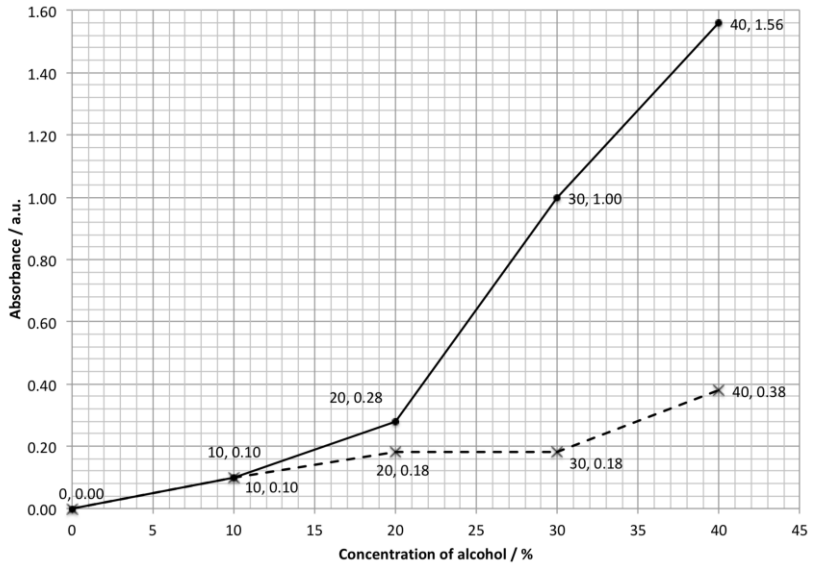
General Marking Guidance

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

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	1. to remove any {betalain / pigment / stain / dye / juice / colour / redness} ; 2. which would affect the results / so the {results / investigation / experiment} are valid / make sure any reading is due to the effect of alcohol / to avoid anomalies ;	Mp2 Ignore references to precision/reliable/accurate etc	(2)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	1. temperature ; 2. use a water bath which is {thermostatically controlled / (set) at {constant / fixed} temperature / (set) at quoted temperature (10-50 C)} / incubator ; 3. volume of the alcohol / volume stated (in the test tube) ; 4. suitable volumetric device used ; 5. any aspect of beetroot sample ; 6. suitable method described ; 7. pH ; 8. by using a buffer ;	Mp2 Ignore any references to room Allow a description of how temperature is controlled Mp4 e.g. measuring {cylinder / beaker} / pipette / burette / volumetric flask Mp5 e.g. diameter / length / size / volume / mass / age / type Mp6 (diameter) cork borer / (length) ruler / (condition/age) same beetroot / (mass) balance ;	(2)

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	1. idea of taking account of a {possible variable / alcohol absorbance} ; 2. to ensure that the absorbance (measured) is due to {betalain / eq} (only) / make results valid / avoid zero error / avoid offset error / for a (valid) comparison ;	Mp1 ignore ref to alcohol being colourless Mp2 Ignore reference to calibration of colorimeter Ignore reference to control Accept as eq. betalain pigment / stain / dye / juice / colour / redness	(2)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	L line graph with points joined with ruled line ; A axes correctly orientated and labelled as x – alcohol conc. and %, y – absorbance and a.u. ; P correct plotting ; S suitable linear scale with figures on the axes with at least one zero at the origin ; K key or lines correctly labelled ;	Note Bar chart will lose mp L and mp P if 0,0 not clear Judge L on plots present (e.g if 0,0 is missing as a plot can still get L for joining the rest) S graph must occupy at least half of the grid sample graph  	(5)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. {both (alcohols) / methanol and ethanol} cause {betalain to leak out / increased permeability} ; Or (increase in) absorbance shows that betalain has leaked out eq ; 2. methanol has more effect / ethanol has less effect (on permeability) ; 3. from 20% methanol shows big increase (in permeability) but ethanol shows little / eq ; Or there is no difference (in permeability) between 0 and 10% / at 10% they have same effect (on permeability) ;	Accept as eq. betalain pigment / stain / dye / juice / colour / redness Mp1, *both increased permeability*, can be awarded if methanol increases more than ethanol is implied Ignore ref to 20-30% flat for ethanol	(3)

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	1. (experiment / investigation) should be repeated ; 2. under same conditions / at each concentration ;		(2)

Question Number	Answer	Additional Guidance	Mark
1(b)(iv)	{calculate / plot / use / check overlap} in {SD / error bars / range bars / standard error} ;		(1)

Question Number	Answer	Additional Guidance	Mark
1(c)	1. idea that data support suggestion ; 2. (both / detergent) cause {pigment leakage / increase in absorbance / decrease in transmission} ; 3. idea that {both / detergent} {damage / cause increase in permeability of} membrane ; 4. idea that detergent bigger / eg effect ;	Mp2 accept positive or negative correlation in correct context	(3)

Question Number	Answer	Additional Guidance	Mark
2(a)	coronary heart disease / atherosclerosis / stroke / CHD / CVD / vascular diseases of the brain / vascular diseases of the kidney / peripheral arterial disease ;	Do not accept answers that include references to aspects of CVD such as cost / treatments/side effects/prevention etc	(1)

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	1. idea of converting numbers to percentages ; 2. correct description of how this is done / correct percentages calculated of those with serious vascular events {10.7 / 10.71 and 13.2 / 13.17} / correct formula shown ;	Mp1 If a percentage is calculated then mp1 is awarded Accept percentage without serious vascular events 89.28 / 89.3 and 86.82 / 86.8 Mp2 If both percentages are calculated correctly then mp1 and 2 are awarded	(2)

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	1. bar chart / table / pie chart ; 2. suitable labelled visual with proportions / manipulated numbers (correct or consistent with bi) ;	If percentages NOT shown in bi but are clearly correct in bii then can be awarded in bi.	(2)

Question Number	Answer	Additional Guidance	Mark
2(c)	1. idea that the incidence of both conditions increases over time ; 2. there is a greater incidence of stroke than of heart attack / eq ; 3. aspirin has {no effect / same effect as placebo} on incidence of heart attack ; 4. aspirin decreases incidence of strokes / eq ; 5. aspirin has no effect on strokes for the first two years / eq ;	Mp1 can be pieced together	(4)

Question Number	Answer	Additional Guidance	Mark
2(d)	1. 32 tablets cost 0.75 USD, so 1 is 0.75÷32 ; 2. 183 tablets cost (ans to mp1) x 183 ; 3. (difference is 228.78 − ans to mp2 =) {224.49 /224.491 / 224.5 / 225} USD ; Or 4. 32 tablets cost 0.75 USD, so 183 cost 183 ÷ 32 ; 5. (ans to mp 4) x 0.75 ; 6. (228.78 − ans to mp 5) = {224.49 /224.491 / 224.5 / 225} USD ;	e.g. allow 1 aspirin costs 0.75 x 183 = 137.25 USD ; difference is 228.78 − 137.25 = 91.53 USD Other answers are possible depending on rounding. All 3 marks can be awarded for the correct answer on the line. 2 marks can be awarded for a correct consequential answer (e.g 91.53)	(3)

Question Number	Answer	Additional Guidance	Mark
2(e)	1. blood in the urine / constipation / dizziness ; 2. muscle pain / muscle damage / muscle inflammation / liver damage / liver inflammation / increased blood sugar/ type 2 diabetes ;		(2)

Question Number	Answer	Additional Guidance	Mark
2(f)	1. use of animals in research because animals cannot give consent / have rights ; 2. animals can feel pain / because of the side effects ; 3. (it may be unethical) to administer drugs to people because of side effects / (it may be ethical) to administer drugs to people because they can give consent ; 4. placing women on a placebo for ten years because they could be receiving treatment ;		(3)

Question Number	Answer	Additional Guidance	Mark
2(g)	1. all 6 elements present with no extras i.e. names, date, article title, journal, volume number and pages do not award if "volume", "pages", "pp" are included ;	Ridker, P.M. et al (2005). A Randomized Trial of Low-Dose Aspirin in the Primary Prevention of Cardiovascular Disease in Women The New England Journal of Medicine. 352, 1293-1304.	
	2. order correct ;	Mp2 there must be a minimum of 4 elements to judge this	
	3. reference has name followed by initial(s) and {et al / (and) others} ;	Mp3 allow Paul, M. R. et al for author	(3)