Mark Scheme (Results)

Summer 2017

Pearson Edexcel International Advanced Level
In Biology (WBI03) Paper 01
Practical Biology and Research Skills

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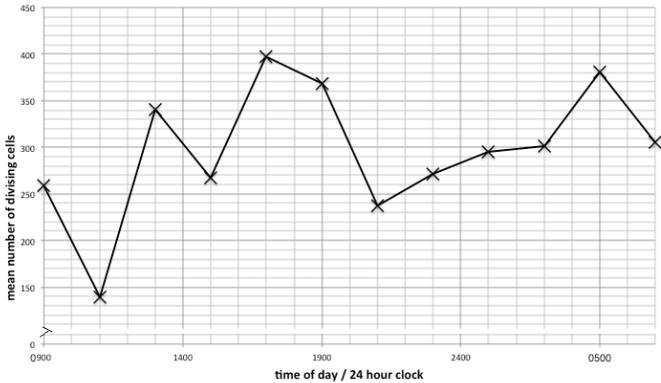
General Marking Guidance

- 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)	orcein / toluidine (blue) / methylene blue / Schiff's / Giemsa / Feulgen / (aceto)carmine ;	**ACCEPT** spelling variants	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	1. temperature ; 2. keep (growing) seeds in incubator / { thermostatically controlled / eq } { water bath / room } / eq ; 3. { variety / type/ age } of seeds; 4. take all from same { parent plant / seed packet / eq } ; 5. pH (of water used to moisten sawdust) ; 6. buffer ; 7. light (intensity) ; 8. same light source / eliminate all light ; 9. (availability of) water ; 10. add same volume to sawdust ; 11. humidity ; 12. air conditioned room / room with humidifier ;	**ACCEPT** air conditioned room **ACCEPT** stated temperature between 0 to 50 ℃ **ACCEPT** reference to position in room in relation to daylight	**(4)**

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	1. (to calculate) { standard deviation / standard error / error bars / range bars } ; 2. idea of measuring the { reliability / variability } of data ; 3. to { identify / exclude / deal with } anomalies ;	**DO NOT ACCEPT** refs to increasing reliability	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(a)(iv)	1. named resource ; 2. description of how used ;	examples, random number tables, dice, coin, blindfold, quadrat, "draw numbers out of a hat" e.g. for quadrat: use (random) co-ordinates, toss coin, roll dice: select/not select for blindfold: pick any 5 number seedlings	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	**A** axes correct orientation and linear scale, (time of day on x axis, number dividing cells on y); **L** axes correctly labelled ; **P** correct plotting ; **S** points joined using ruled straight lines ;	**A:** graph must occupy at least half the grid x – time of day, y- mean number of dividing cells y axis does not have to start at zero but can accept discontinuity between zero and 100 **L:** x-axis, time of day **and** 24-hour clock, y-axis mean number of dividing cells **S** Do not award if extrapolated example 	**(4)**

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. idea that **both** have { maxima / peaks } but at different times of day ;	**1.** This needs to be a clear statement	
	2. **in SET 1** the { maxima / peaks } are at {1300 / 1700 / 1900 / 0500 } ;	**2**. **ACCEPT** any one correctly quoted. **ACCEPT** { 1pm / 5pm / 7pm / 5am }	
	3**. in SET 1** the (peaks / maxima) occur at { 4 / 4 / 6 / 12 } hour intervals ;	**3.ACCEPT** { 4 / 8 / 10 / 20 } hours (after the start of germination) / eq)	
	4. idea that **in SET 2** the (peaks / maxima) also occur at { 4 / 4 / 6 / 12 / same } hour intervals ;	**4.ACCEPT** also { 4 / 8 / 10 / 20 } hours (after the start of germination) / eq) "in both sets the peaks occur at 4 hour intervals" gains mps 3 and 4	**(4)**

Question Number	Answer	Additional Guidance	Mark
1(c)	1. both sets of results show fluctuations / eq ;	**1.** **ACCEPT** idea that neither set shows a constant number of dividing cells **DO NOT ACCEPT** simple idea of show same pattern	
	2. idea that { there are many more peaks of cell division in grass / time between peaks less in grass / division happens more often in grass } ;	**2.** **ACCEPT** converse argument for mps 2 and 3	
	3. (overall) fewer cells dividing in grass ;		**(3)**

Question Number	Answer	Additional Guidance	Mark
2(a)	1. numbness in limbs ; 2. difficulty speaking ; 3. difficulty walking ; 4. tremors ; 5. uncontrollable shouting ; 6. { brain / nerve } damage ; 7. paralysis ; 8. coma ; 9. death ; 10. stated negative effects on the newborn ;		**(3)**

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	1. correct linear scale chosen for y axis ;	e.g. 0, 100, 200 or 0, 200, 400	
	2. y axis correctly labelled with units ;	e.g. Mean { mercury / Hg} excretion (of the 9 children) / { µg per g urine / µg g^{-1} urine }	
	3. bars correctly added for 54 days (102) and 261 days (27) ;		
	4. line drawn at 50 µg g^{-1} urine, line labelled including "WHO limit" ;		**(4)**

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	title must mention mercury { in urine / excreted } and { chelating agent / treatment / therapy } ;	**e.g.** change in mercury in urine following treatment	**(1)**

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	page ;		**(1)**

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	1.all 6 elements present ;	1. **ACCEPT** in any order author, date, article title, journal title, volume and part number	
	2. no extras ;		
	3.order correct ;	3. **ACCEPT** with a minimum of four elements in correct sequence	
	4.authors names properly abbreviated (surname followed by initial) ;	**4. ACCEPT** Joel, F or Jacqueline, M as correct e.g. Forman, J and Moline, J (2000). A Cluster of Pediatric Metallic Mercury Exposure Cases Treated with DMSA Environmental Health Perspectives 108, (6). Forman J et al, 2000 A Cluster of Pediatric Metallic Mercury Exposure Cases Treated with DMSA Environmental Health Perspectives 108 6 Ignore minor spelling errors of names	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(d)	1. a burning sensation in the vein at the site of delivery ; 2. fever ; 3. headache ; 4. nausea ; 5. vomiting ; 6. convulsions ; 7. hypotension ; 8. cardiac arrhythmias ; 9. kidney failure ; 10. mineral deficiency ; 11. brain damage ; 12. learning ability affected ;	Any four correct gains 2 marks Any two or three correct gains 1 mark	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(e)	1. patient being treated could have { brain damage / effect on learning ability / kidney failure } ; 2. this could { affect family / friends / employers / health service } ;	 2. Must refer to effect on **other** people's lives	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(f)	1. surgery / nerve grafts ; 2. surgery treats nerve damage, chelation therapy prevents nerve damage ; **surgery / nerve grafts** 3. may be less effective ; 4. more costly ; 5. has longer recovery time ; 6. has fewer side effects / named example of chelation therapy side effect ;	ACCEPT converse for 3, 4 , 5 and 6 Mps 3, 4, 5 and 6 must be comparative	**(3)**