

BIOLOGY

9700/52 May/June 2016

Paper 5 Planning, Analysis and Evaluation MARK SCHEME Maximum Mark: 30

Published

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Mark scheme abbreviations:

•	separates marking points
,	Separates marking points

- *I* alternatives answers for the same point
- R reject
- A accept (for answers correctly cued by the question, or extra guidance)
- **AW** alternative wording (where responses vary more than usual)
- **<u>underline</u>** actual word given must be used by candidate (grammatical variants accepted)
- max indicates the maximum number of marks that can be given
- ora or reverse argument
- ecf error carried forward
- I ignore
- **mp** marking point (with relevant number)

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Qu	uestion	Expected answer	Extra guidance	Mark
1	(a)	number of individuals or population of each type of/sort of/species present (in the sample) ;	A count the number in different species A in context of any named organisms	
		total number of individuals/all populations (of all species);		[2]
	(b)	any 8 from: 1 ref. to sampling in both areas/grazed and ungrazed ;	I any ref. to standardising environmental factors. I if listed as the independent I ref. to transects	
		2 any idea of marking out the area to be sampled ;	e.g. tape measures/use string and marker pole/make a grid of plot	
		3 use a method of generating random numbers (to use co- ordinates);	e.g. random number generator/app/select number from a hat I throwing of quadrat must be clear that the quadrat is the counting frame	
		4 use a (frame or point) <u>quadrat</u> (for individual samples) ;	spelling of quadrat must be correct at least once	
		5 place (quadrat AW) at coordinates ;	A descriptions, e.g. frame placed on the ground	
		6 <i>ref. to</i> method of identifying or distinguishing different species/types/sorts of plant ;	e.g. photographs/key/app/expert/nature guide/AW A using letters or numbers for different species	
		7 ref. to counting/recording of: number of individuals or the population of/each type/sort/species present (in quadrat/plot) or	I percentage cover/abundance scale	
		the total number of all the plants present (in quadrat/plot);		
		8 same size quadrat/same quadrat AW;		
		9 same size plot in each area ;		
		10 same number of different quadrats/samples per plot;	e.g. 10 quadrats in each plot	
		11 replicate the procedure with a different plot in a given area;	I repeat 3 times and find a mean A if only replicate with different plots in one area	
		12 sample at different times of year/seasons;	I repeat 3 times and take a mean I sampling on same day/next week	

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Question	Expected answer	Extra guidance	Mark
	 13 safety any 1 from: ref. to injury/getting lost and staying with group; allergy to plants and wearing gloves/protective clothing; allergy to pollen/hay fever and wearing mask or taking medication; ref. to uneven ground/hazardous plants or animals or environment and wearing suitable shoes/protective clothing; 	I low risk A any suitable example – thorny/stinging plants, insect bites/stings, snakes, belligerent grazing animals and a suitable precaution	[max 8]
(c)	<i>independent</i> : grazed and/or ungrazed grassland and <i>dependent</i> : (mean) height (of plant) ;	A type of grass land I extent of grazing	[1]
(d) (i)	mode = 864 and median = 864 ;		[1]
(ii)	S _M grazed = 9.33 ;	max 1 if answers are to 1 dp or 3 dp (9.3/9.329, 5.0/4.965)	
	S_{M} ungrazed = 4.97/4.96 ;		[2]
(iii)	860.1 ; to 879.9 ;	A ecf from $1(d)(ii)$ for correct calculation from incorrect S_M	[2]

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Question	Expected answer	Extra guidance	Mark
(iv)	<i>any 2 from</i> : 95% confident/sure/certain that the mean lies within these limits ;	must be a clear statement	
	shows the reliability of the mean ;	R if <i>ref. to</i> accuracy or results AW	
	the ungrazed mean is more reliable (because it's smaller) ;	ora the grazed is less reliable (because it is bigger)	
	the difference between means is significant because there is no overlap between CI for ungrazed and grazed ;		[max 2]
(e)	any 2 from: sample from a large area ;	I sample size	
	<i>idea that</i> there is a long enough time interval, for marked individuals to mix into the population/between capture and recapture ;	I any specified times need the idea of long enough for dispersal	
	idea that the marking technique must not be toxic AW;		
	<i>idea that</i> the marking technique must not increase/decrease chances of survival ;	e.g. increases or decreases chance of predation A in terms of inhibiting/changing movement or behaviour	
	marking technique must not fall off/be rubbed off/washed off animal ;		
	<i>idea that</i> time is not so long that migration/life cycle changes (of the species) have occurred ;		[max 2]
(f)	ungrazed and because there are more seeds (to eat)/AW;	A ungrazed as there will be larger plants and more places for inverts to hide from predators/protection from predators.	[1]
		Total:	[21]

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Quest	ion	Expected answer	Extra guidance	Mark
2 (a))	 any 3 from: body mass/weight; number of volunteers in each group; age of volunteers; 	I diet/sex/alcohol consumption/medication/drugs/range of number of packets of cigarettes ; A same number in each age group	
		 4 no factor affecting air flow / lung capacity ; 	A asthma, CF, COPD, TB, lung cancer A disease affecting the lungs/breathing A living at altitude A minimum time since last cigarette I passive smoking	
		5 (physical) fitness of volunteers ;		
		6 (type of) cigarette smoked ;	A in terms of nicotine/tar/filter/brand	
		7 PEFR device/apparatus used ;		
		8 PEFR test done when volunteers are sitting down/standing up;	A not after exercise/at rest	
		9 time of day the PEFR test performed ;		
		10 ethnicity/race;		[max 3]

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Question	Expected answer	Extra guidance	Mark
(b)	 any 3 from: support (max 2) conclusion 1 (an increase in the number of packets smoked decreas the PEFR measurement) 1 the mean PFER decreases as the mean number of packets/cigarettes smoked increase ; 	answers must either include both 'means' or link relevant data for any two groups (age or PEFR and number of packets smoked) from Table 2.1 ses I comparisons of age with PEFR	
	 2 compare data from two PEFR and a trend on smoking or compare data from two number of packets smoked and a trend PEFR; 3 high<u>est</u> no. of packets/cigarettes smoked has the low<u>est mean PEFR</u>; 	e.g. (mean) PEFR decreases from 513.43 to 300.00 with increase in packets/cigarettes smoked e.g. (mean) PEFR decreases as the (mean) number	
	<i>conclusion 2 (the number of packets smoked increases with age)</i> 4 as <u>mean</u> age increases the <u>mean</u> number of packets increases	;	
	5 compare data from two age groups and a trend on smoking or compare data from two mean number of packets smoked and a trend on age ;	 must link age values to the amount smoked/number of packets (not just quote from the table) must not use group 1 data here (26.42 and 0) e.g. (mean) number of packets increases from 30.61 to 189.22 with an increase in age e.g. (mean) age increases from 22.82 to 36.22 as the (mean) number of packets smoked increases 	
	6 old <u>est</u> volunteers/group 5 smoked the high <u>est mean</u> number of packets ;	 A the youngest smokers/group 2 smoked the least mean number of packets A the largest mean number of packets was smoked by the oldest people 	

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Question	Expected answer	Extra guidance	Mark
	does not support (max 2)		
	 conclusion 1 (an increase in the number of packets smoked decrease the PEFR measurement) 7 as the number packets increases and the values / range / standard deviation of PEFR of two of the group overlap; 	group 1/non-smokers and group 2 group 1/non-smokers and group 3 group 2 and group 3	
	 conclusion 2 (the number of packets smoked increases with age) values/range/standard deviation of the ages (for each group) overlap or there are no distinct age groups/age groups overlap ; group 2 smoke more packets than group 1 but (mean) age is 	A individuals in groups 1, 2, 3 and 4 all have a similar/same age	
	lower;		[max 3]
(c) (i)	there is no <u>significant</u> relationship/correlation between the decrease the PEFR and the increase in the number of packets of cigarettes smoked or there is no <u>significant</u> decrease in the PEFR as the number of packet smoked increases or the increase in the number of packets smoked does not <u>significantly</u> decrease the PEFR ;	the increase in the number of packets of cigarettes smoked and the decrease in the PEFR	[max 1]
(ii)	any 2 from: number of volunteers small (est.) ; great(est) range in number of packets of cigarettes smoked (151–23 larg(est) standard deviation for number of packets of cigarettes ;	0) ; A has a range of 80 instead of 50	[max 2]
		Total:	[9]