

2805/03 Environmental Biology

June 2004

Mark Scheme

ADVICE TO EXAMINERS ON THE ANNOTATION OF SCRIPTS

1. Please ensure that you use the **final** version of the Mark Scheme.
You are advised to destroy all draft versions.
2. Please mark all post-standardisation scripts in red ink. A tick (✓) should be used for each answer judged worthy of a mark. Ticks should be placed as close as possible to the point in the answer where the mark has been awarded. The number of ticks should be the same as the number of marks awarded. If two (or more) responses are required for one mark, use only one tick. Half marks ($\frac{1}{2}$) should never be used.
3. The following annotations may be used when marking. No comments should be written on scripts unless they relate directly to the mark scheme. Remember that scripts may be returned to Centres.
 - x = incorrect response (errors may also be underlined)
 - ^ = omission mark
 - bod = benefit of the doubt (where professional judgement has been used)
 - ecf = error carried forward (in consequential marking)
 - con = contradiction (in cases where candidates contradict themselves in the same response)
 - sf = error in the number of significant figures
4. The marks awarded for each part question should be indicated in the margin provided on the right hand side of the page. The mark total for each question should be ringed at the end of the question, on the right hand side. These totals should be added up to give the final total on the front of the paper.
5. In cases where candidates are required to give a specific number of answers, (e.g. 'give three reasons'), mark the first answer(s) given up to the total number required. Strike through the remainder. In specific cases where this rule cannot be applied, the exact procedure to be used is given in the mark scheme.
6. Correct answers to calculations should gain full credit even if no working is shown, unless otherwise indicated in the mark scheme. (An instruction on the paper to 'Show your working' is to help candidates, who may then gain partial credit even if their final answer is not correct.)
7. Strike through all blank spaces and/or pages in order to give a clear indication that the whole of the script has been considered.
8. An element of professional judgement is required in the marking of any written paper, and candidates may not use the exact words that appear in the mark scheme. If the science is correct and answers the question, then the mark(s) should normally be credited. If you are in doubt about the validity of any answer, contact your Team Leader/Principal Examiner for guidance.

Mark Scheme Page 3 of 8	Unit Code 2805/03	Session June	Year 2004	Version Final
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Abbreviations, annotations and conventions used in the Mark Scheme	/ = alternative and acceptable answers for the same marking point ; = separates marking points NOT = answers which are not worthy of credit R = reject A = accept () = words which are not essential to gain credit _____ = (underlining) key words which must be used to gain credit ecf = error carried forward AW = alternative wording ora = or reverse argument
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Question	Expected Answers	Marks
1 (a)	land previously used by humans / fallen into disuse ; example ; needs treatment before, it can be used again / plants can grow on it ; <u>brownfield</u> sites ;	max 2
(b)	lack of top soil ; no organic material ; lack of nutrients ; unstable ; very free draining / no moisture ; acidic / low pH / pH 4 ;	max 3
(c) (i)	establish quickly ; roots help, bind / stabilise, mounds ; provide organic material ; speed up development of soil ;	max 2
(ii)	retain moisture / reduce evaporation ; provide organic material ;	max 1
(iii)	possess root nodules ; with nitrogen-fixing bacteria / <i>Rhizobium</i> ; build up <u>nitrate</u> ions in soil ;	max 2
(iv)	provide habitats / cover for animals ; reduce, wind speed / exposure ; <u>roots</u> reduce soil erosion ; AVP ; e.g. role of leaf litter, interception of rainfall	max 2
(d)	uncolonised area becoming colonised over period of time ; occurs in series of stages / seres ; each stage alters environment ; creates conditions for next stage ; build up of soil ; increase in biodiversity ;	max 3

[Total: 15]

Mark Scheme Page 4 of 8	Unit Code 2805/03	Session June	Year 2004	Version Final
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Question	Expected Answers	Marks
2 (a)	habitat destruction ; plant collecting ; killed directly by, herbicides / pesticides ; pollution ; (competition from) introduced non-native species ; AVP ;	max 3
(b)	on verge of becoming extinct ; reduction in biodiversity ; reduction in gene pool / loss of alleles ; ecological imbalance ; aesthetic reasons ; for future generations ; AVP ; e.g. possible uses	max 4
(c)	1 quotas initially introduced ; 2 then complete ban on international trade ; 3 price of ivory fell / less demand for ivory ; 4 ban on hunting ; 5 co-operation between countries (role of CITES) ; 6 construction of, ditches / fences ; 7 eliminates need for farmers to shoot elephants ; 8 role of ecotourism / income from tourism ; 9 Zimbabwe's CAMPFIRE programme ; 10 saw elephants as valuable resource ; 11 controlled safari hunting ; 12 large amounts paid by tourists to shoot an elephant ; 13 has reduced numbers being killed ; 14 prohibitive fees for shooting reduces demand for safari ; 15 role of National Parks ; 16 ref rangers / wardens ; 17 AVP ; 18 AVP ;	max 7
	QWC – legible text with accurate spelling, punctuation and grammar;	1

[Total: 15]

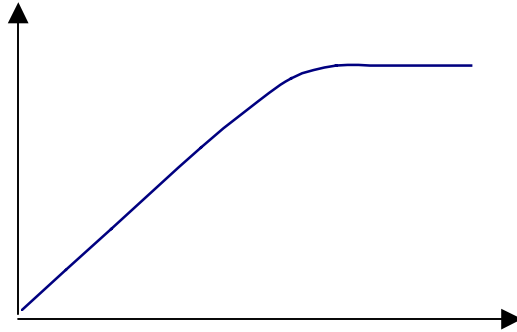
Mark Scheme Page 5 of 8	Unit Code 2805/03	Session June	Year 2004	Version Final
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Question	Expected Answers	Marks
3 (a) (i)	(general) increase in production / increase in use ; in aerosols ; in refrigeration / air conditioning systems ; fire extinguishers / solvents / cleaning agents / fast food packaging ; use of figures / data quote ; AVP ; e.g. ref fuel crisis in 1970s	max 3
(ii)	sharp decrease in production ; R total ban agreement on reduction in CFC use ; targets set ; development of alternatives / named alternatives ; recycling ; more environmentally acceptable disposal of fridges etc ; use of figures / data quote ;	max 3
(b)	ozone layer blocks <u>UV</u> light from the sun ; <u>increased</u> levels of <u>UV</u> light reaching the earth ; problems if these are over inhabited areas ; increased level of, mutation / damage to DNA ; increase in <u>skin</u> cancers ; damage to eyes / cataracts ; damage to (human) immune systems ; reduced crop yields ; AVP ; e.g. detail of mutation	max 5
(c)	not all countries signatories to Montreal Protocol ; some countries cannot afford to develop new technologies ; some CFCs still released ; problems of disposal of fridges etc ; illegal use / trade, of CFCs ; A black market CFCs already released are long-lived / some remain active in damaging ozone for up to 50 - 70 years ; other chemicals deplete ozone layer ; ozone only produced slowly in <u>atmosphere</u> ;	max 4
[Total: 15]		

Mark Scheme Page 6 of 8	Unit Code 2805/03	Session June	Year 2004	Version Final
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Question **Expected Answers** **Marks**

4 (a)



- (i) shape of curve ; 1
(ii) choice of quadrat to include 80 – 100% of species ; 1

(b)

general points
random sampling ;
repetitions ;
calculate mean ;

species frequency
record, presence / absence, of species ;
frequency = % of quadrats in which species is present ;

percentage cover
estimate percentage cover in quadrat ;
example of calculation ;
use of ACFOR / DAFOR scale ;
Braun-Blanquet ;

max 5

(c)

subjective ;
different sized plants difficult to estimate ;
overlapping presents a problem ;
spreading plants tend to be over estimated ;
AVP ;

max 3

(d) (i) *award two marks if correct answer (16.4) is given*

total number of hits = 110 ;
 $18/110 \times 100 = 16.4\%$;

2

(ii)

transect ;
line / tape / string (from sea to woodland) ;
(point) quadrat placed at, regular intervals / selected intervals ;
positioned at right angles to tape ;
repeats at same position ;
AVP ; e.g. record sand / bare ground

max 3

[Total: 15]

Mark Scheme Page 7 of 8	Unit Code 2805/03	Session June	Year 2004	Version Final
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Question	Expected Answers	Marks
5 (a)	<p><i>advantages</i></p> <p>benefits to wildlife / ref to no pesticide use ; less risk of polluting nearby water systems ; improved soil structure ; no chemical residues on food / no airborne chemicals ; crops can be sold at a premium ; GM-free ;</p> <p><i>disadvantages</i></p> <p>lower yields ; more labour intensive ; more disease / presence of pests ; product has shorter shelf life ; products have more blemishes ;</p>	<p>max 3</p> <p>max 3</p>
(b)	<p><i>farm waste</i></p> <p>1 excess fertilisers leached from soil ; 2 lead to eutrophication ; 3 manure / slurry leaks ; 4 lead to pollution of bodies of water ; 5 some effluent may contain, antibiotics / growth hormones / pesticides ; 6 methane ; 7 global warming / greenhouse effect ;</p> <p><i>land</i></p> <p>8 valuable habitats, destroyed / damaged ; 9 e.g. marshes / fens / water meadows / woodlands ; 10 ploughing / fertilising, damages traditional meadows ;</p> <p><i>hedgerow removal</i></p> <p>11 reduces habitats ; 12 loss of biodiversity ; A here or for land usage 13 e.g. base is important habitat for invertebrates / nesting sites ; 14 reduces food sources for wildlife ; 15 reduces wildlife corridors ; 16 loss of windbreak leads to soil erosion ; 17 roots bind soil ; 18 exposes topsoil to erosion by rain ; 19 AVP ;</p>	<p>max 3</p> <p>max 3</p> <p>max 4</p> <p>max 8</p>
	QWC – clear, well organised using specialist terms;	1
		[Total: 15]

Mark Scheme Page 8 of 8	Unit Code 2805/03	Session June	Year 2004	Version Final
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Question	Expected Answers	Marks
6 (a)	industrial insulators ; lubricants / hydraulic fluids ; fire retardants ; plasticisers / paints / inks ; discharged in industrial waste ;	max 2
(b)	taken in by, producers / phytoplankton ; consumers eat large, numbers / biomass, of prey ; consumers take in large amount of, organochlorines / PCBs ; deposited in fatty tissue ; PCBs not, broken down / excreted ;	max 4
(c)	lymphocytes produce antibodies ; in response to, infection / presence of antigens ; infection, causes lymphocyte proliferation / increases rate of mitosis ; proliferation / rate of mitosis, less with higher levels of PCBs ; so weaker <u>immune response</u> ; use of figures ; AVP ; AVP ;	max 4
(d)	attach to cell surface membrane ; interfere with <u>control</u> of, cell cycle / mitosis ; interfere with DNA replication ; inhibit enzymes ; interfere with, spindle / centrioles ; interfere with chromosomes lining up on equator ; AVP ;	max 3
(e)	DDT released from fat stores (as they are broken down) ; DDT reduces rate of mitosis of lymphocytes ; at a time when they are required ; AVP ;	max 2

[Total: 15]