

# **Environmental and Land Based Science**

General Certificate of Secondary Education

Unit **B491/02**: Plant Cultivation (Higher Tier)

## **Mark Scheme for June 2011**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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**Annotations**

Used in the detailed Mark Scheme:

<b>Annotation</b>	<b>Meaning</b>
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

## MARK SCHEME: B491/02

Question		CBT Question Numbers	Answer	Mark	Guidance									
1		1	soil moisture probe; phosphate probe; light sensor;	3										
2		2	the anther of one flower to the stigma of another flower of the same species	1										
3		3	<b>P</b> placed on the shoot; <b>R</b> placed on the root	2										
4		4	<b>C</b> – the appearance of an organism	1										
5		5	<b>D</b> – It will have the same characteristics as the parent plant	1										
6		6	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td></td> <td><b>r</b></td> <td><b>r</b></td> </tr> <tr> <td><b>R</b></td> <td>Rr</td> <td>Rr</td> </tr> <tr> <td><b>r</b></td> <td>rr</td> <td>rr</td> </tr> </table>		<b>r</b>	<b>r</b>	<b>R</b>	Rr	Rr	<b>r</b>	rr	rr	1	
	<b>r</b>	<b>r</b>												
<b>R</b>	Rr	Rr												
<b>r</b>	rr	rr												
7	a	7	14	1	<b>accept</b> 14.3									
	b	7	tannins: reduce the ability of the seed/ cells to absorb water/oxygen/ inhibit enzymes necessary for seed germination/ inhibit hormones/ inhibit respiration	1	<b>accept</b> any suitable reason with reference to germination <b>reject</b> any reference to growth <b>reject</b> any reference to nutrients									
8	a	8	<b>A</b> ; No fertiliser was added/ acted as a comparison to make sure effects were due to fertiliser addition	2										
	b	9	adding P and K without N has very little effect/ slight increase of 0.3t/ha; adding P and K with N has the greatest effect/ larger effect than adding N alone/ 4x increase;	2	one mark for two correct statements the second mark for use of data in one of the statements									
	c	10	£270	1										

Question		CBT Question Numbers	Answer	Mark	Guidance
	d	11	£348	1	
9		12	one from: lack of oxygen/ build up of carbon dioxide/ lack of light/ idea of insulates against extreme temperatures.	1	
10		13	the pollen would not be able to land here/ pollen less likely to germinate/ no pollination; egg/ovule will not be fertilised/ no seeds formed/ no fertilisation	2	<b>accept</b> reference to disease if qualified
11		14	one from: stems grow tall and weak and the wheat falls over/ water leaves the roots by reverse osmosis/ burns the roots/ soft growth allowing disease problems	1	
12		15	two from: adds humus to the soil/ improves crumb structure/ slow release/ contains a full range of trace elements/ increases bacterial action/ improves water holding capacity of the soil/ improves aeration/ reduces leaching	2	
13		16	<b>advantage:</b> identical to/ same characteristics as the parent plant; <b>disadvantage:</b> All plants will be susceptible to the same disease/ no new varieties produced/ viral transmission	2	
14		17	adding lime; causes the clay particles to flocculate/ stick together to improve drainage; clear ditches; Installation of field drains/ subsoiling to remove plough pan/ allow faster removal/ drainage of water improves aeration; adding organic matter improves soil structure	3	one mark each for the suggestions. second mark for further information on one of the suggestions. <b>ignore</b> cultivation/ploughing unless qualified

Question		CBT Question Numbers	Answer	Mark	Guidance
15		18	suck sucrose/amino acids/sugar; reducing the amount of energy/raw materials for crop growth; transmission of viruses; distortion of young growth; sooty mould growth reduces photosynthesis/light	2	<b>ignore</b> insect cover the plant
16		19	the pollen nuclei/tube pass down the style; nuclei fuse; fertilisation inside an ovule/egg; produce a seed; seed dries out before release; ovary develops into the fruit	3	<b>reject</b> reference to pollination credit reference to plant embryo developing in the seed
17		20	hydroponics; no soil/roots in a nutrient reservoir; drip irrigation; hosepipe with holes in delivering drips of water and nutrients directly to the roots; boom sprayer ;liquid fertilizer sprayed from the back of a tractor; liquifeeder; fertilizer bottle attached to hosepipe; slurry; using a muck spreader on a tractor; capillary matting with water and fertiliser in the reservoir	3	two marks for two reasonable suggestions. third mark for further details on one of the methods.
			<b>Total</b>	<b>36</b>	

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