

# **Environmental and Land Based Science**

General Certificate of Secondary Education

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

## **Mark Scheme for January 2011**

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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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1. Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	=	alternative and acceptable answers for the same marking point
<b>(1)</b>	=	separates marking points
<b>A / allow</b>	=	answers that can be accepted
<b>N / not</b>	=	answers which are not worthy of credit
<b>R / reject</b>	=	answers which are not worthy of credit
<b>I / ignore</b>	=	statements which are irrelevant
( )	=	words which are not essential to gain credit
—	=	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument
OWTTE	=	or words to that effect

## MARK SCHEME

Question	Answer	Marks	Guidance
1	C: It grows underground	[1]	
2	B: The phenotypes of the F2 generation are YY:Yy:yy;	[1]	
3	C: Tall, weak stems and decreased yield	[1]	
4	D: P;	[1]	
5	C: Ventilation increases O <sub>2</sub> for photosynthesis;	[1]	
6	Place an S on the style;	[1]	
7	Chicken manure and leaf mould;	[1]	
8	Two of: Improve soil (crumb) structure; add humus; improve water retention; improve retention of minerals; minerals are released slowly; improve aeration of clay soil; increase beneficial fauna;	[2]	A adds nutrients (NPK) A improves drainage
9	5:5:20; high K needed for flowers;	[2]	A needed for flowers without mention of K if the ratio is correct
10	(Sensor) sends data to the computer; If soil is too dry, computer turns sprinklers on/If soil is too wet, computer turns sprinklers off;	[2]	R if no reference to computer/control system R reference to humans
11 a	Seed leaves/Stored food;	[1]	A nutrients instead of food
b	provide food/energy for germination;	[1]	A nutrients instead of food A provides energy (for shoot) to grow/ before leaves grow
12 a	labelling the diagram (capillary matting/reservoir/water);	[1]	
b	matting absorbs water from a reservoir/ Plant gets water from matting OWTTE;	[1]	
c	1 of: does not overwater the plants/plants absorb as much water as they need/saves water/water goes directly to the roots; does not result in leaf scorching; water must be available for mineral absorption;	[1]	A cheap

Question	Answer	Marks	Guidance
13	2 of: pollen produced before/after stigma is receptive; Short stamens and a long style; Inability of pollen to grow on the stigma of the same flower; Separate male and female flowers/ not produce pollen;	[2]	A reference to anther and stigma being separate R anthers hanging outside the plant with no reference to stigma R removing stigma
14	7.5%;	[1]	
15	12	[1]	
16	Suitable activity and risk identified and Suitable control measure mentioned	[2]	1 mark for the risk and the control measure
17	Three of: decrease in % peat use by gardeners/Local Authority; but still same quantity/more peat being used; due to increased gardening activities; increase in quantity used by private sector; use of peat is still greater than the use of the alternatives; use of relevant data from the table	[3]	
18	<b>Climatic:</b> 1 of: cool temperatures to prevent respiration; not freezing /to avoid frost damage; moderate humidity to prevent fungal diseases/stop drying out; <b>Mechanical:</b> 1 of: transport in packing to prevent bruising; handle as little as possible to prevent contamination/bruising; <b>Biological Hazards:</b> 1 of: Spray with pesticides to prevent pests; store in sealed containers to prevent entry; store in low oxygen to prevent pest respiration;	[3]	1 mark if 3 suggestions are made about how the vegetables can be stored without any reasons
19 a	Pollen is transferred from the anther; To the stigma; By wind/insect;	[3]	
b	pollen grain; ovule; ovary;	[3]	
	<b>Total</b>	[36]	

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