

**WJEC (Wales) Biology A-level**  
**Topic 4.2: Sexual Reproduction**  
**in Plants**  
**Questions by Topic - Mark**  
**Scheme**

1.

Question		Marking details	Marks Available	
1	(a)	(i) P – stigma, Q – ovary (wall) BOTH for 1 mark	1	
		(ii) Nectar;	1	
		(iii) attracts {insects / named insects};	1	
	(b)	I <u>{Pollen / it}</u> deposited on insect;	1	
		II <u>{Pollen / it}</u> transferred to stigma;	1	
	(c)	(i) Anther and stigma touch same part of bee;	1	
		(ii) Anthers and stigma mature at different times / protandry;	1	
	(d)	(i) Anther;	1	
		(ii) Meiosis; correct spelling	1	
		(iii) 10-----5-----5;	1	
		(iv) I fertilisation / it is the gamete / formation of the endosperm; II controls the growth of the pollen tube (through the style); Accept produce enzymes (to digest the style) NOT contain / hold enzymes (to digest the style)	2	
	<b>Question 1 Total</b>			<b>[12]</b>

2.

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
2	<p>Indicative content</p> <p><b>Conditions required for germination</b></p> <ul style="list-style-type: none"> <li>Water + oxygen + suitable temperature</li> </ul> <p><i>Water</i></p> <ul style="list-style-type: none"> <li>Cotyledons swell/ testa softens</li> <li>Transport – dissolve substances/fluid medium for enzymes</li> </ul> <p><i>Oxygen</i></p> <ul style="list-style-type: none"> <li>(Aerobic) respiration –</li> <li>energy/ATP for metabolism</li> </ul> <p><i>Suitable temperature</i></p> <ul style="list-style-type: none"> <li>Speeds up rate of diffusion</li> <li>Increases enzyme activity</li> </ul> <p><b>Germination of Peanut</b></p> <ul style="list-style-type: none"> <li>Non endospermic/endosperm absorbed(into cotyledons)/no endosperm</li> <li>Amylase digest starch in cotyledons to maltose</li> <li>{Proteins/fats} broken down into {amino acids/fatty acids and glycerol}</li> <li>Move to {plumule/radicle/meristem/sink} (Can apply to peanut or barley)</li> <li>For {mitosis/growth/cell division} (Can apply to peanut or barley)</li> </ul> <p><b>Germination of barley</b></p> <ul style="list-style-type: none"> <li>Endospermic/endosperm present</li> <li>Starch/ proteins/fats in endosperm</li> <li>Embryo produces {gibberellic acid/gibberellin}</li> <li>Gibberellic Acid {moves into/stimulates} aleurone layer</li> <li>Gibberellic Acid causes enzymes to break down protein into amino acids</li> <li>Amino acids used to synthesise enzymes such as amylase</li> <li>Amylase breaks down starch in the endosperm into maltose</li> </ul>	3	6		9		

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
	<p><b>7-9 marks</b></p> <p>Indicative content All three parts covered in details <i>The candidate constructs an articulate, integrated account, correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses scientific conventions and vocabulary appropriately and accurately.</i></p> <p><b>4-6 marks</b></p> <p>Indicative content Two parts covered in detail <i>The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate usually uses scientific conventions and vocabulary appropriately and accurately.</i></p> <p><b>1-3 marks</b></p> <p>Indicative content Only one part of the question is addressed. <i>The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate has limited use of scientific conventions and vocabulary.</i></p> <p><b>0 marks</b></p> <p><i>The candidate does not make any attempt or give a relevant answer worthy of credit.</i></p>						
	<b>Question 2 total</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>

3.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)	P – anther , Q - stigma	1			1		
		(ii)	30/10 (1 mark) = 3 (2 marks)		2		2	2	2
		(iii)	Any two for 1 mark from, large anthers/ anthers outside flower/ feathery stigmas/ stigmas outside flower/ absence of petals/ not coloured/green colour Accept reverse argument for insect pollinated	1			1		
	(b)	(i)	Fruit retains ovary wall/ovary wall and testa are fused (1) seed would only have a testa (1)		2		2		
		(ii)	One (nucleus) fuses with the {ovum/egg/female gamete} and the other fuses with (two) polar nuclei (1) The first forms the zygote and the second forms the endosperm nucleus (1)	2			2		
			<b>Question 3 total</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>8</b>	<b>2</b>	<b>2</b>

4. (a)	Large petals, small insignificant petals/no petals; Brightly coloured, dull/brown/green; (not: not coloured) Scented, not scented; Nectar, no nectar; Small amount of pollen, large amount of pollen; Pollen sticky/sculpted, pollen smooth/not sticky/air sacs; Pollen large/heavy, pollen small/light; Anthers/stigma outside flower, enclosed within petals; (Large) feathery stigmas, small/round stigmas; Any 4. One comparison from each pair matched boxes.	4
(b)	lack of/less genetic variation/inbreeding/increased risk of genetic faults/ ref. homozygous recessive. (not: no variation)	1
(c)	pollen tube delivers male gametes to egg/ovule/do not need motile (gametes)/ no water needed/pollen grains transferred by wind or insects;	1
	stops risk of dehydration of gametes;	1
	Tough exine/outer wall;	1
(d)	<i>Fruit from fertilised ovary</i> ; (not: ref. ovary wall/pericarp)	1
	<i>Embryo plant from zygote</i> ; (not: fertilized egg cell)	1
	<i>Testa from integuments</i> ;	1
	<i>Seed from ovule</i> ; (not: ovum)	1