CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 series

5090 BIOLOGY

5090/62 Paper 6 (Alternative to Practical), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Mark schemes will use these abbreviations:

- **;** separates marking points
- **/** alternatives
- **()** contents of brackets are not required but should be implied
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- **Ig** ignore (for incorrect but irrelevant responses)
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point (where a greater than sual variety of responses is expected)
- **ORA** or reverse argument
- **underline** actual word underlined must be used by candidate (grammatical variants excepted)
- **max** indicates the maximum number of marks that can be given
- **+** statements on both sides of the + are needed for that mark

Qu	Answer	Mark	Notes
1 (a)	A 2 4; B 2 5; –ve signs for both A values ;	[3]	**R** the word decrease
(b)	1. reference to movement of water; 2. out of tissue in A + into tissue in B; 3. turgor lost in A + increased in B; 4. osmosis; 5. Solution A is more concentrated solution / lower water potential / hypertonic / lower concentration of water (than tissue) or converse for solution B is less concentrated solution / higher water potential / hypotonic / higher concentration of water (than tissue) ; 6. partially permeable membrane;	max [5]	3. **A** flaccid/plasmolysed for A **A** decrease + increase in size of cell vacuole **A** B is more turgid than A 4. **A** within ex- or endosmosis **Ig** direct comparison of concentrations of solutions A and B 6. **A** semi permeable

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(c)	1. outer layer / skin could not absorb / lose water / impermeable / waterproof / AW; 2. stayed the same (length / size); 3. water lost and/or gained by tissue causes curvature / bending /AW; osmosis if not in already credited (b) ;	max [3]	**Ig** dead 3. **A** cells / strip 3. **R** if implies strip is one cell 3. **A** skin comparatively longer/shorter than other tissue causes curvature
		[Total: 11]	

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2 (a)

structural feature	bean seedling	pea seedling
radicle	longer thinner more curved /curly grown more	shorter thicker /wider less curved/ straighter grown less
plumule	smaller shorter 2 leaves 'stalk' not visible inside cotyledons	larger longer 1 leaf 'stalk' visible 'outside' cotyledons
cotyledon	smaller 'vertical' above ground / soil not covered by testa	larger 'horizontal' below ground /soil covered by testa
testa	separate/ removed/ absent (from seedling)	attached / present

[4]

1 mark per structural feature for 2 correct comparative points

A long/short etc.
R e.g. long v small, as not comparative
R large/small

R leaves / no leaves

A epigeal (bean) hypogeal (pea)
R refs to texture

Ig above ground/ below ground
Ig refs to texture, splitting or tearing

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(b) (i)	pea 63–73 mm; bean 80–90 mm;	[2]	max 1 for 2 correct measurements with no / incorrect units
(ii)	1. only the pea seedling drawn; 2. ×2 length of specimen; 3. clear, clean, continuous lines + no shading ; 4. radicle clearly longer than plumule; 5. good shape of testa-covered cotyledons; 6. Labels: radicle + plumule + testa;	[6]	1. **R** if bean drawn or both pea and bean drawn 2. 120 – 150 mm (130–160 if bean drawn) 5. broad attachment, longer horizontally than vertically, tapering from right to left 6. all 3 correct **Ig** other labels e.g cotyledon **A** seed coat
(c) (i)	seed ground / cut up /crushed ; add biuret / sodium or potassium hydroxide + copper sulphate; blue changes to purple/lilac/mauve/violet;	[3]	**A** cut in half **R** if heated **Ig** adding water **A** e.g blue buiret
(ii)	same mass/volume of each tissue tested ; same volume/concentration of reagent added ; left for same length of time; deeper/ darker colour = more protein ORA;	max [3]	**R** amount/quantity **A** if volume given in **2(c)(i)** and 'use same method as in **2(c)(i)**' is stated. **Ig** same temperature **A** purple as darker, violet/lilac as lighter **A** faster colour change = more

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(d) (i)	1. axes fully labelled + linear scale for mass; 2. correct 'plots'; 3. sides of bars ruled + of equal width;	[3]	one axis to be labelled with 'type of food' as well as with food names the other with 'mass of protein in g/100g' 0.5 mm tolerance bars may be vertical or horizontal bars may be arranged in increasing / decreasing order of length or as given in the table
(ii)	pea + (soya) bean + lentil;	[1]	all three required. **R** if other foods included
		[Total: 22]	

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3		carbon dioxide test either hydrogen carbonate <u>indicator</u>; red to yellow; or limewater; cloudy / milky /chalky ; oxygen test glowing splint; rekindles / burns more brightly ; water vapour exhaled air saturated / 100% / more than inhaled air; test either cobalt chloride (paper) ; blue to pink; or anhydrous copper sulphate ; white to blue	[7]	**A** splinter **R** burning / lighted splint **R** rekindles if also ‘pops’ **R** variable
			[Total: 7]	
			[40]	

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