

**MARK SCHEME for the May/June 2011 question paper  
for the guidance of teachers**

**0654 CO-ORDINATED SCIENCES**

**0654/62**

Paper 6 (Alternative to Practical), maximum raw mark 60

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 must be read in conjunction with the question papers and the report on the examination.

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- 1 (a) (i) 21 °C ; 65 °C ; (no tolerance)
- (ii) 44 °C ; (ecf)
- (iii)  $(20 \times 44 \times 4.2) / (12.6 \times 1000)$  ; 0.29 ; (ecf) [2]
- (b) (i) energy / heat lost to environment ;  
to air ;  
heating up needle ;  
test-tube ;  
clamp / stand / boss ;  
too slow to put bread under tube ;  
not all bread burned ; [max 2]
- (ii) insulation / (bomb) calorimeter / move bread closer to tube ; [1]
- (c) (higher)  
has more (energy) ;  
**either mention of fat or carbohydrate ;**  
(allow increase mass to burn = 1 mark) [2]

[Total: 10]

- 2 (a) (i) 59.2 ; (no tolerance) [1]
- (ii) 59.8 ; (no tolerance) (allow ecf all through) [1]
- (iii) 1.3, 1.6 (both) ; [1]
- (iv) 50.4 ; (no tolerance)  
62.3 ; (no tolerance) [2]
- (v) 34.9, 46.8 (both) ; [1]
- (b) shielding insulation / burner closer to beaker ; [1]
- (c) 26.8 ; 29.25 ; [2]
- (d) too expensive / too smoky ;  
too difficult to light / store / transport ;  
carcinogenic / gives off toxic fumes ; [max 1]

[Total: 10]

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- 3 (a) (i)** 2.8 ( $\pm 0.1$ ) ; 4.1 ( $\pm 0.1$ ) ;
- (ii)** sensible scales and labels ;  
correct points ; ;  
line drawn to intersect y-axis ; [4]
- (iii)** from graph, (0.7) ; [1]
- (b)** 70 (ecf) ; [1]  
140 (ecf) ; [1]
- (c)** use of spirit level / measure same height at each end / use a protractor to measure right angle between stand and rule ; [1]

**[Total: 10]**

- 4 (a)** sizes as in column 3 (distance) of table below ; ; (allow 1 mm tolerance) [2]

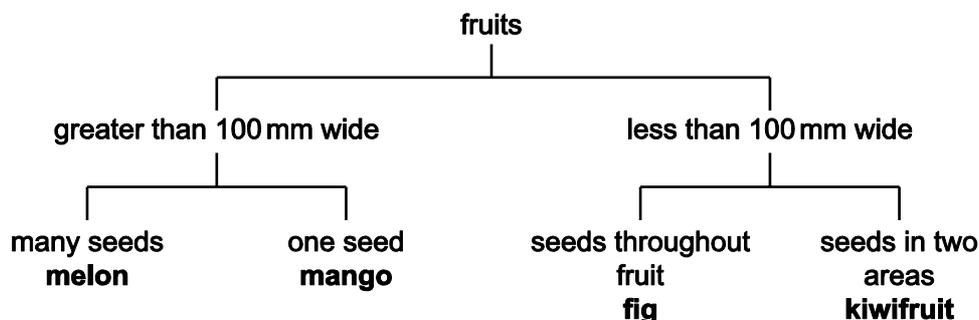
<i>fruit</i>	<i>actual</i>	<i>distance</i>	<i>fraction</i>
melon	120	<b>55</b>	<b>0.46</b>
fig	58	<b>55</b>	<b>0.95</b>
kiwifruit	77	<b>53</b>	<b>0.69</b>
mango	125	<b>53</b>	<b>0.42</b>

- (b)** correct calculation entered correctly in column 4 (fraction) for all four fruits as shown in table ; ; ; [4]  
(note: if candidate has given fractions e.g. 55/120 (=11/24) award the mark(s))

- (c) correct statement for division of fruits into two groups ;  
 a second correct statement to divide two fruits ;  
 a third correct statement to divide two fruits ;  
 key laid out correctly and works (i.e. four fruits identified) ;

[4]

an example of a correct answer could be as follows:–



(other characteristics – could be cracked or smooth skin / presence or absence of a central core / shape – round or oval)

[Total: 10]

- 5 (a) (i) 78 ; 91 ; 128 ;

[3]

- (ii) 23, 36, 73 (all three) ;

[1]

- (b) (i) points ;  
 straight line joining the first 7 points (ignore line for last plot) ;

[2]

- (ii) (yes)  
 straight line ;  
 between 0 and 9 N / at first;  
 (then) not followed / elastic limit reached / owtte ;  
 (award 1 mark if note the jump between 9 N and 10 N, but do not score any points above)

[3]

- (iii) permanent deformation / exceed elastic limit / spring broken / misshaped / stretched too far ;

[1]

[Total: 10]

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- 6 (a) (i) limewater ;  
cloudy / milky / white ppt. ;
- (ii) carbonate ;
- (iii) zinc (allow aluminium) ; [1]
- (b) (NaOH) blue ppt. ;  
remains / does not dissolve in excess ;  
(NH<sub>3</sub>) blue ppt. ;  
dissolves / (dark) blue solution in excess ; [4]
- (c) (i) sulfate ; [1]
- (ii) remove / dissolve any carbonate (ions) ; [1]

[Total: 10]