

**MARK SCHEME for the May/June 2013 series**

**5129 COMBINED SCIENCE**

**5129/21**

Paper 2 (Theory), maximum raw mark 100

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Page 2	Mark Scheme	Syllabus	Paper
	GCE O LEVEL – May/June 2013	5129	21

- 1 (a) 2.4 [1]
- (b) 7.26 [1]
- 2 (a) (i) iris = F  
optic nerve = B  
suspensory ligaments = D [3]
- (ii) Lens – (changes shape to) focus image on retina  
Do not accept reflect
- Ciliary muscles –change the shape of the lens
- Retina – convert light to nerve impulse [3]
- (b) (i) the pupil has become wider/bigger/dilated [1]
- (ii) (moved) from bright light into dimmer light  
student has been shocked or frightened  
has taken a drug  
has had eye drops inserted } any 1 [1]
- (iii) contract - radial (iris muscles)  
relax - circular (iris muscles) [2]
- 3 (a) (i) P = fractional distillation  
R = cracking [2]
- (ii) Q = alkane  
S = alkene [2]
- (b)  $x = 5$   
 $y = 12$  [2]
- 4 (a) 0.9 [1]
- (b)  $0.9/0.45$  OR  $(a)/0.45$   
 $= 2$  [1]  
[1]
- (c)  $0.2$  OR  $(b)/10$  [1]
- (d) (i) 2 [1]
- (ii)  $12$  OR  $(d) (i)+10$  [1]

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- 5 (a) (i) 19
- (ii) 9 [2]
- (b) (i) 7/VII
- (ii) -1 [2]
- 6 (a) pipette  
blue/purple  
burette  
green [4]
- (b) The sodium chloride is not contaminated with indicator [1]
- 7 (a) (i) all bars not touching  
bars same width  
3 bars drawn to correct height  $\pm \frac{1}{2}$  square [3]
- (ii) 57.1(%) [1]
- (b) palisade (mesophyll layer)  
contains more chloroplasts/chlorophyll [2]
- (c) nitrogen/nitrate needed to form protein/amino acids  
protein is required for growth [2]
- 8 (a)  $I = P/V$  OR  $13/6.5$   
= 2 [1]  
[1]
- (b) heated water expands/becomes less dense [1]  
rises [1]  
cold water sinks to replace hot water [1]
- (c) conduction [1]
- (d) black is a good emitter (of thermal radiation) [1]
- 9 (a) (i) normal correctly drawn [1]
- (ii) ray from mirror at correct angle [1]
- (b) correct vertical position behind the mirror [1]  
same distance behind mirror as object is in front [1]

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- 10 (a) (i) iron  
speed up the reaction [2]
- (ii) 400-500°C  
200-300atm [2]
- (b) crude oil/cracking/natural gas/methane [1]
- (c) making fertilisers/nitric acid [1]
- (d) hydroxide ion/OH<sup>-</sup> [1]
- 11 testes  
vagina  
egg cell  
zygote [4]
- 12 (a) (i) symbols for ammeter, resistor, lamp and voltmeter all correct [2]  
one symbol incorrect scores 1, two incorrect scores 0 [1]  
all excluding voltmeter in series [1]  
voltmeter in parallel with bulb [1]
- (b)  $R = V/I$  OR 1.5/0.30 [1]  
= 5 [1]  
 $\Omega/\text{ohm}$  [1]
- (c) 0.30 [1]
- 13 (a) 111 44 [2]  
11.1 4.4 (divide by 10) [1]  
2.775 (divide by 4)/2.8 [1]
- (b) limewater  
milky/cloudy/white precipitate [2]

Page 5	Mark Scheme	Syllabus	Paper
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- 14 (a) artery  
no valves  
thick wall  
narrow lumen  
convoluted endothelium layer  
elastic tissue present  
**accept converse for vein** } any 2 [2]
- (b) artery  
carries oxygenated blood  
carries blood away from heart  
Maintain high / fluctuating blood pressure  
**accept converse for vein** } any 2 [2]
- 15 (a) 8
- (b) (i) electron [1]
- (ii) 1 more proton [1]  
1 less neutron [1]  
neutron changes into a proton scores 2
- (c) 5000  
11400 1250 [3]
- 16 (a) U [1]
- (b) T [1]
- (c) R [1]
- (d) Q [1]
- (e) U [1]

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17 (a) insufficient food / lack of food (to feed the population) [1]

(b) drought/lack of water  
 plants cannot grow/are stunted  
 little food produced  
 animals die from dehydration

flooding  
 crop plants killed/animals drown/unequal distribution because  
 of poor transport links

over-population  
 too little food can be grown to feed increasing number of people

unequal distribution of food  
 richer people buy more food than they need – leaving too little  
 food for others/poor transport facilities result in food not being  
 distributed

war/insurgency  
 crops/animals destroyed by bombs/chemicals/supply chains  
 disrupted/too few people to care for crops or animals

pandemic disease  
 people too ill to tend crops/care for animals

plagues (e.g. of locusts)  
 food eaten by other insects/animals

infections in crop plants/animals  
 crops/animals die

[6]

Explanation must match the problem and not simply restating the definition of famine