

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2014 series**

### **0652 PHYSICAL SCIENCE**

**0652/21**

Paper 2 (Core Theory), maximum raw mark 80

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 October/November 2014 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2014	0652	21

- 1 (a) 2.8 (cm) ; [1]
- (b) (i) point correctly marked to  $\leq \frac{1}{2}$  a square (e.c.f.) ; [1]
- (ii) extension is proportional to load ; [1]
- (c) (volume =)  $3 \times 6 \times 2.5 = 45 \text{ cm}^3$  ; [1]
- (i) density = mass/volume / (63 / 45) = 1.4 ;  
g/cm<sup>3</sup> ; [2]
- [Total: 6]**
- 2 (a) aqueous sodium hydroxide / ammonia ;  
with sodium hydroxide: blue precipitate insoluble (in excess) ;  
**OR** with ammonia: blue precipitate dissolving to deep blue solution ; [max 2]
- (b) boil / evaporate ;  
(crystallise and) filter / pour off liquid / wash ;  
dry in oven / dry with filter paper ; [3]
- (c) copper sulfate ; [1]
- [Total: 6]**
- 3 (a) exothermic ; [1]
- (b)  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$  ; [2]  
(1 for formulae, 1 for balancing)
- (c) (i) *bonds broken:*  
H – H ;  
O – O ;  
*bonds made:*  
H – O ; (*allow names*) [3]
- (ii) making bonds gives out more energy than that needed to break bonds ; [1]
- [Total: 7]**

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2014	0652	21

- 4 (a) a mixture of two (or more) metals ; [1]
- (b) metals expand ;  
copper more than invar ; [2]  
*(copper expands faster than invar, 1 mark max)*
- (c) strip bends away from contact ;  
breaking the circuit/ switching off heater ; [2]
- [Total: 5]**
- 5 (a) collection over water or in gas syringe ;  
graduations shown on collection vessel ; [2]  
*(collection by displacement of air – 1 mark only)*
- (b) molar mass of calcium carbonate is 100 ;  
contains 1 atom/ 12 u of carbon (therefore 12%) ; [2]
- [Total: 4]**
- 6 (a) wavelength correctly marked ; [1]
- (b) (i) 3 (or more) wavefronts drawn moving slightly left of top centre of the tank ;  
wavefront direction so angle of incidence = angle of reflection (by eye) ;  
wavelength constant and equal to incident wave train ; [3]
- (ii) reflection ; [1]
- [Total: 5]**
- 7 (a) oxygen used up (by combustion) ;  
forms carbon dioxide which dissolves (in the water) ;  
lower pressure ; [max 2]
- (b) nitrogen ; [1]
- (c) carbon monoxide formed ;  
toxic/ poisonous/ prevents blood carrying oxygen ; [2]
- [Total: 5]**

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2014	0652	21

- 8 (a) fizzes / bubbles formed ;  
floats ;  
'scoots' about surface ; [2]
- (b) potassium / rubidium / caesium / francium ;  
lithium ; [2]
- (c) magnesium / aluminium ;  
silicon / phosphorus / sulfur / chlorine / argon ; [2]
- (d) 2,8 for sodium ;  
2,8,8 for chlorine ;  
sodium and chloride (**NOT** chlorine) ; [3]
- [Total: 9]**

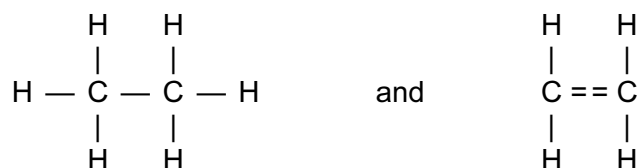
- 9 (a) (i) 1 less bright ;  
2 brighter ;  
3 not lit ;  
4 as bright ; [4]
- (ii) circuit 4 (accept 2) ;  
largest current taken from the cells ; [2]
- (b) (i) ammeter ; [1]
- (ii) correct symbol for ammeter (*if voltmeter is answer in (i) e.c.f. for this mark only*) ;  
circuit copied correctly and meter measuring a current ;  
ammeter correctly placed to measure current through cells ; [3]
- [Total: 10]**

- 10 (a) (i) iron rod is magnetised ; [1]
- (ii) ferromagnetic materials / steel / iron are attracted ;  
non-(ferro)magnetic materials / not all metals magnetic ; [2]
- (b) pins become induced magnets ;  
like poles at the bottom (can be scored from diagram) ;  
like poles repel ; [3]
- [Total: 6]**

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2014	0652	21

11 (a) 6, 6, 6 ;  
6, 6 8 ; [2]

(b) (i)



6 hydrogens in ethane ;  
4 hydrogens in ethane ;  
single bond in ethane and double bond in ethane ; [3]

(ii) bromine / bromine water ;  
no change with ethane ;  
decolourises with ethane ; [3]

(iii) used to make polythene / plastics / named addition polymer / ethanol ; [1]

[Total: 9]

12 (a) deflected by an electric field / attracted / repelled to charged plate ;  
towards the positive plate / away from negative plate ; [2]

(b) electrons ; [1]

[Total: 3]

13 (a) any mention of randomness of decay ; [1]

(b) clear lines within  $\pm 2.5$  minutes of correct answer from the axes showing the  
points chosen ;  
24.5 or 2.5 (min) ; [2]

(c) contains 2 protons ;  
2 neutrons ; [2]  
(allow: helium nucleus /  $\text{He}^{2+}$  for 2 marks OR helium ion / atom 1 mark max)

[Total: 5]