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CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 series

0653 COMBINED SCIENCE

0653/23 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.

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1 **(a)** A to cell membrane/membrane round vacuole ;
B to nucleus ;
C to cell wall/large vacuole ; [3]

(b) water ;
mineral (salts)/named mineral ; [2]

(c) **(i)** transport ;
of sugars/substances made in the leaves ; [2]

(ii) roots have no sucrose/short of nutrients ;
no source of energy/cannot respire ; [2]

[Total: 9]

2 **(a)** **(i)** argon/Ar ; [1]

(ii) calcium/lithium and oxygen/sulfur/fluorine ;
metal with non-metal ; [2]

(b) **(i)** nucleus ; [1]

(ii) 15 ;
same as number of electrons/3 shells = Period 3, 5 outer electrons means Group 5 so must be phosphorus which has proton number 15 ; [2]

[Total: 6]

3 **(a)** change resistance (of circuit)/change current through resistor ; [1]

(b) X – ammeters need to be in series in a circuit ; [1]

(c) 13.3 ;
ohms ; [2]

[Total: 4]

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4 (a)

nutrient tested for	**reagent**	**result**	**conclusion**
protein	biuret	**purple**	contains protein
starch	iodine (solution)	blue black	**contains starch**
fat	ethanol (and water)	**milky white**	contains fat

one mark for any two correct ; ; ; [3]

(b) for growth
for repair
other use of protein ; ; [max 2]

(c) increases surface area ;
idea of making it easier for enzymes to make contact ; [2]

(d) soil erosion
flooding
increases carbon dioxide in atmosphere
extinction
drought
increase in global warming ; ; [max 2]

[Total: 9]

5 (a) (i) **Q** ;
orange layer is rust ;
formed when iron reacts with (dissolved) air and water ; [3]

(ii) calcium/magnesium/zinc ;
hydrogen ; [2]

(iii) (acid) temperature was lower/metal in **P** was less reactive/metal in **P** had smaller surface area ; [1]

(b) (i) different boiling points ; [1]

(ii) (vehicle) fuel ;
burns easily/releases much energy when burnt ; [2]

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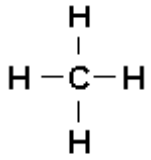
(c) (i)



; [1]

(ii) (methane) + oxygen → carbon dioxide + water ; ; [2]
(LHS and RHS)

[Total: 12]

6 (a) (i)

uses	type of radiation	effects on tissue
screening luggage	X-rays	activates sensitive cells in retina
security marking	microwave	kills cancerous cells
satellite communication	ultra violet	heats water in tissues
seeing	visible light	causes tanning of skin

Each side, 3 correct 2mk, 1 correct 1mk [4]

(b) sine wave ;
amplitude correctly labelled ;
wavelength correctly labelled ; [3]

(c) (i) same horizontal level as nose ;
same distance behind mirror that nose is from mirror ; [2]

(ii) same size as object ;
upright ;
virtual ; [3]

[Total: 12]

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7 **(a)** A trachea ;
B lung ;

(b) **(i)** movement of molecules ;
from region of high concentration to low concentration/down a concentration gradient ; [2]

(ii) plasma ; [1]

(iii) more energy used/more muscle contraction ;
more carbon dioxide produced by cells ;
in respiration/by oxidation of glucose ; [max 2]

(iv) increases/faster ;
greater diffusion gradient (from blood to alveolus) ; [2]

[Total: 9]

8 **(a)** **(i)** gas into limewater ;
goes cloudy ; [2]

(ii) salt ; [1]

(iii) 9 ;
3 ; [2]

(b) **(i)** the higher the pH , the less acidic/the lower the acid concentration ;
lowering acid concentration decreases the rate ; [2]
(accept correct collision theory explanation)

(ii) temperature
surface area of calcium carbonate
degree of agitation of the mixture ; ; [max 2]

[Total: 9]

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9 **(a)** **(i)** 80 m ;

(ii) not moving ; [

(iii) unbalanced because speed is changing ; [1]

(b) geothermal/hydroelectricity/waves/wind/biomass ; [1]

(c) **(i)** kinetic energy ; [1]

(ii) gravitational potential energy ; [1]

(d) density = mass/volume ;
= 45/36 = 1.25 g/cm^3 ; [2]

(e) particles far apart ;
irregular arrangement ; [2]

[Total: 10]