CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2014 series

5129 COMBINED SCIENCE

5129/22 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.

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CAMBRIDGE
International Examinations

1 osmosis ;
stomata ;
transpiration ;
wilted ; [4]

2 **(a)** **(i)** 44 ;
40 ; [2]

(ii) 22 ; 40 ; [2]

(b) more reactive (than carbon) ; [1]

(c) reduction ; [1]

3 **(a)** I = V / R **or** 6 / 0 ;
20 ;
Ω (unit independent) ; [3]

(b) **(i)** 0.5 ;

(ii) 0.2 ;

(iii) 0.5 ; [3]

4 **(a)** A = red blood cell
B = white blood cell (accept erythrocyte)
Both correct for 1 mark [1]

(b) platelets (formation of) blood clot ;

red blood cells — prevents loss of blood from wound / oxygen transport } any 2

white blood cells — carry out phagocytosis / produce antibodies / carry out tissue rejection } any 1 [3]

(c) amino acids
glucose / glycerol
lipids or fats / fatty acids)
(named) vitamins
(named) mineral
Hormones
carbon dioxide
urea
proteins
antibodies
} any 3 [3]

5 **(a)** **(i)** 2e on inner shell
8e on second shell ; [1]

(ii) +2 ; [1]

(b) 13 ; [1]

(c) **(i)** 2 ; [1]

(ii) magnesium carbonate
magnesium hydroxide
magnesium oxide } any 2 [2]

6 **(a)** $Fd = F_1d_1$ **or** $F \times 0.3 = 500 \times 1.5$ **or** $500 \times 1.5 / 0.3$;
2500 ; [2]

(b) **(i)** $W = Fs$ **or** 500×1.2 ;
600 ;
J (unit independent) ; [3]

(ii) gravitational / potential / gravitational potential ; [1]

7 **(a)** **(i)** movement of molecules / particles / substances ;
from higher concentration to a region of lower concentration ; [2]
(credit down a concentration gradient)

(ii) oxygen
carbon dioxide
water } any 2 [2]

(b) **(i)** particles in the air / dust / pollen
Inspired particles such as animal hairs
pollutant chemical in inspired air
smoking
chemical in air causing allergic reaction } any 1 [1]

(ii) (rate of) diffusion is reduced ;
distance is greater ; [2]

(iii) less diffusion will occur ;
smaller surface area ; [2]

8 **(a)** **(i)** cracking ; [1]

(ii) C_3H_8 ; [1]

(iii) alkanes ; [1]

(b) octane remains orange / no change ;
ethene decolourised / goes colourless ; [2]

(c) double bond between Cs and single bonds to Hs ; [1]

(d) ethanol ; [1]

9 **(a)** volume / length / density ; [1]

(b) larger increase in length for same increase in temperature ; [1]

(c) **(i)** 100 [1]

(ii) clinical do not measure temperatures this high
boiling point of water too high
stated range of clinical thermometer } any 1 [1]

10 **(a)** positive ; [1]

(b) repels ; [1]

11 **(a)** **(i)** **D** – petal ;
E – anther ;
F – carpel / pistil ; [3]

(ii) Anther — production of pollen grains / production of male gamete ;
Sepal — protects the developing flower parts ; [2]

(b) **(i)** water
oxygen
suitable / correct temperature } any 2 [2]

(ii) seed contains stored starch
amylase converts starch to glucose / sugar
(accept amylase digests starch / produces sugar)
during respiration
(to provide energy) for growth } any 3 [3]

12 **(a)** W ; [1]

(b) **(i)** Z ;

(ii) reacts with water ; [2]

(c) **(i)** X ; [1]

(ii) conducts when molten but not solid
dissolves in water
high melting point } any 2 [2]

13 **(a)** **(i)** ring <u>expands ;</u> [1]

(ii) ring <u>contracts ;</u> [1]

(b) wood is an insulator / poor conductor ; [1]

(c) **(i)** <u>convection ;</u> [1]

(ii) <u>radiation ;</u> [1]

14 **(a)** nitrogen ;
Oxygen ; [2]

(b) 78–80 ; [1]

(c) **(i)** carbon monoxide
sulphur dioxide
oxides of nitrogen } any 1 [1]

(ii) incomplete combustion of hydrocarbons
combustion of sulphur compounds in fossil fuels
nitrogen and oxygen in air combining during combustion } [1]

explanation must match the pollutant

15 **(a)** **A** – microwaves ;
B – X-rays ; [2]

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

(ii) black ; [1]

(c) $\gamma = f\lambda$ **or** $4 \times 10^{14} \times 5 \times 10^{-7}$;
2×10^{8} ; [2]

16 oxygen ;
carbon dioxide ;
food / nutrients / habitat ;
soil ; [4]

17 atomic / proton ;
metallic non-metallic ;
groups ;
periods ; [4]

18 **(a)** F = ma **or** a = F / m **or** 2000 / 800 ;
2.5 ; [2]

(b) positive gradient from origin ;
gradient decreases ; [1]

[Total: 100]