CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

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.

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CAMBRIDGE
International Examinations

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 = <u>fractional</u> 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 **[1]**
= 2 **[1]**

(c) 0.2 OR (b)/10 **[1]**

(d) **(i)** 2 **[1]**

(ii) 12 OR (d) (i)+10 **[1]**

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 +/– ½ 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 **[1]**
= 2 **[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]**

10 (a) (i) iron
speed up the reaction **[2]**

(ii) 400-500ºC
200-300atm **[2]**

(b) crude oil/cracking/natural gas/methane **[1]**

(c) making fertilisers/nitric acid **[1]**

(d) hydroxide ion/OH^- **[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
all excluding voltmeter in series **[1]**
voltmeter in parallel with bulb **[1]**

(b) R = V/I OR 1.5/0.30 **[1]**
= 5 **[1]**
Ω/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]**

14 (a) artery
no valves
thick wall
narrow lumen
convoluted endothelium layer
elastic tissue present
} any 2 **[2]**
accept converse for vein

(b) artery
carries oxygenated blood
carries blood away from heart
Maintain high / fluctuating blood pressure
} any 2 **[2]**
accept converse for vein

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]**

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