CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

5129 COMBINED SCIENCE

5129/22 Paper 2 (Theory), maximum raw mark 100

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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) (i) nitrogen / N / **[1]**

(nitrate) ions dissolved in soil water
absorbed by roots / root hair cells
by diffusion / active transport
} any 2 **[2]**

explanation is independent

(ii) enzyme

accept amylase / correct named plant enzyme / valid protein type **[1]**

(b) (only green) plants carry out photosynthesis
plants produce food / named foods / producers
animals / humans eat plants / comsumers
eat animals that have eaten plants
plants produce oxygen
animals need oxygen
(oxygen) for respiration
} any 3 **[3]**

2 (a) <u>alkali metals</u> **[1]**

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

(ii) blue / purple **[1]**

(c) ignites / burns / purple flame
more vigorous / faster reaction
melts
moves across surface faster
} any 2 **[2]**

it = potassium

3 (a) mass
weight
field **[3]**

(b) density **[1]**

4 (a) make food pieces smaller
increases surface area of the food
mixes food with saliva / salivary amylase
softens food
dilutes food (water in saliva)
makes food easier to swallow)
} any 2 **[2]**

mark the two parts as whole

(b) (i) food particles stuck between teeth
bacteria in mouth act on food
produce acid
which attacks / dissolves enamel / tooth surface
} any 3 **[3]**

(ii) removes food particles / plaque from teeth
accept antiseptic properties of sap from twig (kills bacteria)
less bacterial growth
less acid (in mouth)
less food for bacteria
} any 1 **[2]**

5 (a) (i) 64

(ii) 34 **[2]**

(b) 48
2.4 ecf [(b) / 20] **[2]**

(c) (i) combustion of (sulfur-containing) hydrocarbon fuels / fossil fuels
allow volcanoes / volcanic eruptions **[1]**
fuels / hydrocarbons alone are insufficient

(ii) acid rain
erosion of buildings etc.
destruction of aquatic life / plant life
} any 1 **[2]**

6 (a) (i) sin i / sin r **or** sin 75 / sin 37
= 1.61 **[2]**
allow answer in range 1.60 to 1.62

(ii) increases **[1]**

(b) both rays converge **[1]**
both meet on central line **[1]**

7 (a) sperm duct = B
testis = E
urethra = D **[3]**

(b) (i) deposits semen / sperm in the vagina / near cervix
do not allow urination

(ii) adds (alkaline) liquid to semen / sperm
produces seminal fluid
} any 1 **[2]**
do not allow produces sperm

8 (a) (i) protons and neutrons
electrons (**all three required**) **[1]**

(ii) protons and electrons (**both required**) **[1]**

(iii) electrons protons (**both required**) **[1]**

(iv) electrons lost (**both required**) **[1]**

(b) 99
155 **[2]**

9 (a) completes circuit
correct symbol (tip and tail outside box) **[1]**

(b) (i) V = IR **or** 4 × 0.13
= 0.52 **[2]**

(ii) 0.98 **or** 1.5 – (b)(i) **[1]**

10 (a) (i) loss of water (vapour)
through stomata **[2]**

(b) change
add water (to soil around plant)
put the plant in reduced light / darkness
reduce the temperature
increase humidity
protect plant from draughts
explanation
so that the rate of transpiration is less than or equal to the rate of uptake of water **[2]**

11 (a) particles randomly arranged and not touching **[1]**
minimum of three particles

(b) more energy / moving faster
random / free movement **[2]**
allow converse for solid

(c) freezing
ignore solidifying
evaporation / boiling / vaporisation **[2]**

12 **(a)** distance = speed × time **or** 0.04 × 1400
= 56 **[2]**
depth = 28 (allow ecf) **[1]**

(b) **(i)** no. of complete oscillations / waves per second **[1]**

(ii) wavelength = speed / frequency **or** 1400 / 20 000
= 0.07
m (unit independent) **[3]**

13 oxygen
haemoglobin
antibodies
phagocytosis
blood clotting **[5]**

14 **(a)** 3 bonding pairs with hydrogen
1 lone pair **[2]**

(b) **(i)** hydroxide ion / OH^- **[1]**

(ii) pH 8–10 **[1]**

(c) $(NH_4)_2SO_4$ **[1]**

15 **(a)** length / density
pressure
e.m.f.
colour
resistance
} any 2 **[2]**

(b) size of the bore / the bore / size of bulb **[1]**

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

(ii) conduction **[1]**

(d) better / good absorber of heat / thermal radiation **[1]**

(e) heated air expands
becomes less dense
rises / convection
} any 2 **[2]**

(f) sound has a longer wavelength / lower frequency
sound cannot pass through vacuum
sound is longitudinal
infra-red is electromagnetic
} any 1
allow converse for infra-red **[1]**

16 **(a)** contains carbon to carbon double bond **[1]**

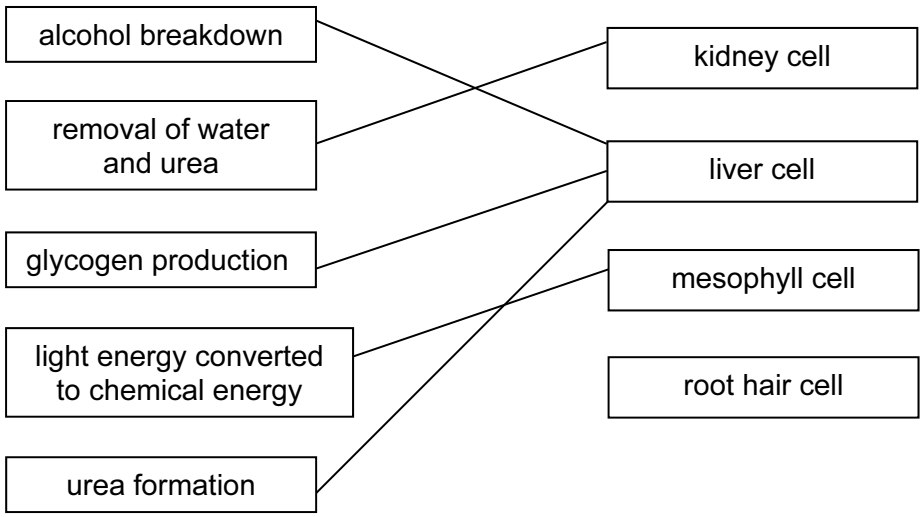
(b) limewater
turns milky **[2]**

(c) bromine **[1]**

(d) many monomers / small molecules
chemically bonded / joined together
to form long chains / large molecule / macromolecule
} any 2 **[2]**

17 4 2
234 90 **[4]**

18



[5]

[Total: 100]