

**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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- 1 (a) (i) nitrogen / N / (nitrate) ions dissolved in soil water absorbed by roots / root hair cells by diffusion / active transport } any 2  
**explanation is independent** [1]  
[2]
- (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 / consumers eat animals that have eaten plants plants produce oxygen animals need oxygen (oxygen) for respiration } any 3  
[3]
- 2 (a) alkali metals [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  
**it = potassium** [2]
- 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  
**mark the two parts as whole** [2]

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- (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  
**fuels/hydrocarbons alone are insufficient** [1]
- (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  
**allow answer in range 1.60 to 1.62** [2]
- (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**

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- 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  $4 \times 0.13$   
 $= 0.52$  [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  
**minimum of three particles** [1]
- (b) more energy / moving faster  
random / free movement  
**allow converse for solid** [2]
- (c) freezing  
**ignore solidifying**  
evaporation / boiling / vaporisation [2]

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- 12 (a)** distance = speed  $\times$  time **or**  $0.04 \times 1400$   
= 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/ $\text{OH}^-$  [1]
- (ii)** pH 8–10 [1]
- (c)**  $(\text{NH}_4)_2\text{SO}_4$  [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]

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

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

(b) limewater  
 turns milky [2]

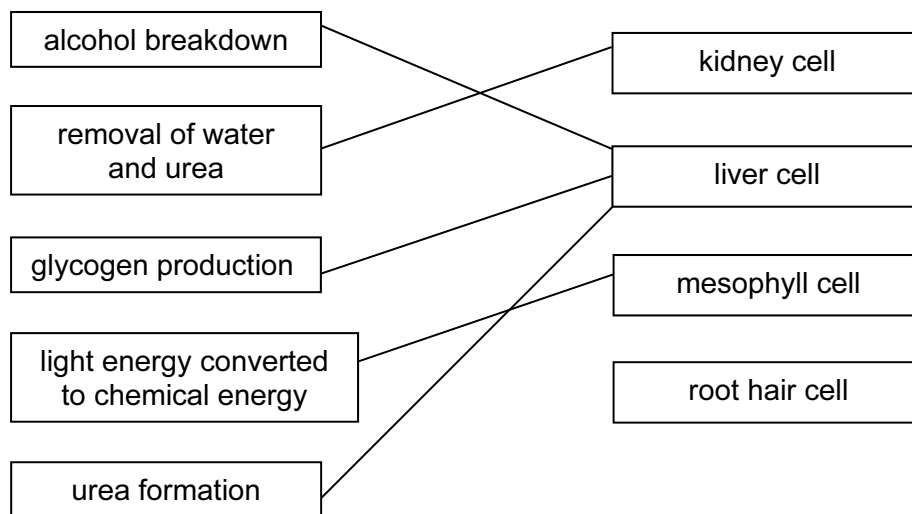
(c) bromine [1]

(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]