

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME
MAXIMUM MARK : 100
SYLLABUS/COMPONENT : 0654/2 CO-ORDINATED SCIENCES (CORE)



- 1(a) the community / **all** the living things ;
+ the habitat / all the non-living things ; 2
- (b)(i) blackjack/cotton plant ► aphid ► ladybird ► pied wagtail ; 1
- (ii) cotton plant/blackjack ; 1
- (c)(i) sunlight ;
photosynthesis/description of photosynthesis ; 2
- (ii) jackal eats rabbit ;
energy is (stored) in food / chemical energy ; 2
- (iii) black shouldered kite ;
energy lost along food chains / kite is at end of food chain; 2
- 2(a) gravity downwards in both;
tension upwards in fig C; 2
- (b) stage B;
greatest velocity so greatest KE; 2
- (c) straight line;
through origin; 2
- 3(a) B;
A;
D; 3
- (b)(i) formed over a very long time scale;
from once living material; 2
- (ii) biogas contains carbon dioxide (as well as methane);
carbon dioxide does not burn / less combustible material
in biogas so less heat evolved / owtte; 2
- (c) reference to (large chain) molecules made of repeating units / monomers;
which soften / melt when heated / can be repeatedly remoulded by heating; 2

- 4(a)(i) radicle ;
cotyledon 2
- (ii) ovule ; 1
- (b)(i) warm temperature needed ;
light not needed ; 2
- (ii) greener/more starch ;
because more chlorophyll/photosynthesis ;

leaning towards light ;
positive phototropism / plant shoots grow towards the light ; MAX2
- 5 (a)(i) 250 MJ; 1
- (ii) lost as (waste) heat/sound etc; 1
- (iii) 100MW; 1
- (b)(i) cleaner/less pollution;
fossil fuels have other uses apart from burning;
fossil fuels are running out/non renewable; MAX 2
- (ii) source;
description; 2
- (c)(i) transformer; 1
- (ii) reduce energy losses; 1
- 6(a)(i) 29;
48;
29;
1; 4

- (b)(i) transition; 1
- (ii) reference to physical differences
e.g. copper has higher fixed points / harder / stronger
reference to chemical properties
copper less reactive / forms coloured compounds / acts as catalyst; MAX 1
- (c)(i) → copper + carbon dioxide / monoxide; 1
- (ii) reference to mass of oxygen lost /copper oxide has the mass of oxygen
in it copper does not / owtte; 1
- 7(a)(i) vibrate more/faster /have more KE;
particles move further apart; 2
- (ii) particles vibrate more at hot end;
KE /energy passed by collision from one particle to the next; 2
- (b) **strong** attractive force between atoms 1
- (c) 400 J/kg/°C;
doesn't depend on mass; 2
- (d) energy supplied used to weaken bonds;
to allow particles to separate; 2
- 8(a) cell membrane ;
controls what goes in and out of the cell ; 2
- (b)(i) line to nucleus ; 1
- (ii) sperm will fuse with/fertilise egg ;
to restore 46 chromosomes ; 2
- (iii) genetic material / genes ;
instructions for making proteins/determine characteristics of cell; 2

- (c)(i) testes ;
- (ii) controls puberty in males/any correct stated secondary sexual characteristic ; 1
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- 9(a) paper;
ceramics;
steel;
glass; 4
- (b)(i) atoms of different elements bonded in compound not in mixture/
elements retain properties in mixture and not in compound/
mixture has variable composition compound has formula/
often easier to separate elements in mixture; 1
- (ii) increase pressure;
reduce temperature; 2
- (iii) components have different boiling points; 1
- (c)(i) speeds up reaction; 1
- (ii) nitrogen molecules very stable / unreactive / held by strong bonds; 1
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- 10(a) 100W; 1
- (b) less resistance(brighter bulb/more current); 1
- (c) electrical;
into heat;
and light; 3
- (d) name ;
use; 2

11(a)(i) iodine (solution);

(ii) starch present inside tubing but not outside ;
starch molecules too big to get through membrane ; 2

(iii) glucose present inside tubing and outside ;
glucose diffuses through membrane ; 2

(b) breaks down/digests starch;
to maltose; 2

12(a)(i) 7; 1

(ii) pH increases;
potassium hydroxide neutralises the acid;
temperature increases;
because the reaction is exothermic / gives out heat (energy); 4

(iii) → potassium chloride; + water; 2

(b) bubbles / effervescence;
reaction produces carbon dioxide; 2