

## **NOVEMBER 2002**

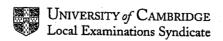
## **INTERNATIONAL GCSE**

## MARK SCHEME

**MAXIMUM MARK: 80** 

SYLLABUS/COMPONENT: 0652/3

PHYSICAL SCIENCE (EXTENDED)



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1	(a)	5,8-9.7	1	
		metallic	1	
		acid	1	
	(b)	idea that mp depends on structure and idea that there are different structures	(1)	
		gases (simple) molecular and metal giant (accept metallic)	(1)	max two marks here
		gases weakly bound and metals strongly bound or gases weak force and metals strong forces	(1)	пеге
·		idea of strength of metallic bond decreasing as the size of the ion increases => weaker electrostatic attraction	(1+1)	5
2	(a)	moment = force x (perpendicular) distance (accept F x d but <b>not</b> F x a)	1	
		80 x 30 or 80 x 0.3	1	
		2400 Ncm or 24 Nm (not N/cm etc. unit penalty)	1	
in the second se	(b) (i)	rate of doing work / rate of transfer of energy / work over time or equivalent (not symbols unless defined)	1	
	(ii)	moment changes	1	
		distance changes	1	max 2
		forces changes	1	6

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		(ii)	line of negative slope (curved or straight)	1	
			passing through (0,(b)(i) value) and (1.5 s, 0)	1	
		(iii)	gravitational potential energy → heat (ignore mention of k.e.)	1	
			of air or fruit or explanation that k.e. not gained because constant speed	1	12
			*one unit penalty only for all the parts in this question		12
5	(a)		to remove excess oxide or MgO not "to remove solid or residue"	1	
	(b)	(i)	calcium sulphate is insoluble / not possible to separate (from oxide) by filtering	1	
		(ii)	add calcium nitrate (solution) to sulphuric acid	1	
			filter	1	
		*	dry residue by warming	1	
	(c)	(i)	40 (ignore unit)	1	
11	- 2	(ii)	0.2 (ignore unit)	1	
		(iii)	0.2 mol H <sub>2</sub> SO <sub>4</sub> needed / ratio 1:1	1	
			2 mol in 1000 cm <sup>3</sup> / vol = no of moles/concentration	1	
			100 cm <sup>3</sup> or 0.1 dm <sup>3</sup> (unit penalty)	1.	

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6	(a)		mention of light	1	
			wave behaves as lenses /refraction of light rays etc	1	
	(b)		use set up shown / project light on to screen		
			measure distance between 2 light or dark bands		
		ī	use of ruler / mention of middle or edges of bands		
			improved by using several bands	4	
			idea of need to work out scaling	max	
			freezing using strobe		
	(c)		$v = f\lambda$	1	
			0.60 (or 0.5952) or 2.5/4.2	1	
			multiplication by 60	1	
			36 (35.7) no unit penalty	1	40
					10
	( - <b>)</b>	(1)	CIT OIL	4	
	(a)	(i)	CH <sub>3</sub> OH	1	mandatory
St.		(ii)	any shared pairs seen	1	
			all shells filled (each $H-2$ , $C$ and $O-8$ )	1	
·		(iii)	same functional group (OH) / same general formula (C <sub>n</sub> H <sub>2n+2</sub> O) / undergo similar reactions/ all alcohols/ similar chemical properties	1	

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(b) (i) 
$$C_2H_4 + H_2O \Rightarrow C_2H_5OH$$
 formulae correct 1 correctly balanced 1

(ii) high temperature not "heat"

catalyst

high pressure not "pressure"

(c) (catalytic) cracking of alkanes 1

" **9** 

6

8 
$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} \text{ or } R_p = \frac{R_1 R_2}{R_1 + R_2}$$

$$R_p = 4 \Omega$$

$$R_t = 12 \Omega \text{ (or } 8 \Omega + R_p \text{ value) ecf wrong } R_p$$

$$V = IR$$
 (or arrangement)

$$I = 0.5 (A) ecf$$
 1

$$V = 2 (V) ecf$$

or any equivalent method with including 2 marks for relevant equations - answers alone gain two marks

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9	(a)		oxide forms layer which bonds to aluminium (or layer is tough and impermeable)	1	
			rust (iron oxide) flakes of leaving another exposed surface/ rust traps water and $air(O_2)$ in contact with iron	1	
	(b)		amphoteric oxides dissolve in alkalis	1	
			NaOH removes(dissolves) oxide (layer) / Al reacts with NaOH	1	
	(c)	(i)	bauxite	1	
		(ii)	Al too (allow "very") reactive / bond with oxide too strong / too much energy is needed / carbon is not reactive enough to reduce aluminium oxide not "it is more reactive"	1	6
10	(a)		induction	1	
			changing	1	·
			primary	1	
			voltage	1	
til ser ≥	(b)		$N_s/N_p = V_s/V_p$ or equivalent	1	
		;	25 (ignore any unit)	1	
					6
	·				Total 80