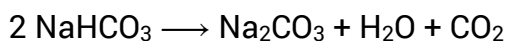


0	1
---	---

A solid called sodium hydrogencarbonate is heated in an oven. It forms carbon dioxide gas as shown by the equation below.



A spoonful of baking soda contains a mass of 22 g of sodium hydrogencarbonate.

0	1	.	1
---	---	---	---

Calculate the mass of carbon dioxide that could be made from 22 g of sodium hydrogencarbonate.

Show clearly how you work out your final answer.

Relative atomic masses: H = 1; C = 12; O = 16; Na = 23

[3 marks]

.....

.....

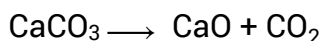
.....

.....

Mass of carbon dioxide = ..... g

0	2
---	---

Limestone ( $\text{CaCO}_3$ ) is a raw material. On strong heating it is converted to calcium oxide which is a very useful substance.



0	2	.	1
---	---	---	---

Calculate the formula mass (Mr) of calcium carbonate.

[2 marks]

.....

Mr of calcium carbonate = .....

0	2	.	2
---	---	---	---

Calculate the mass of calcium carbonate needed to make 30 tonnes of calcium oxide.

[3 marks]

.....

.....

.....

.....

.....

Mass of calcium carbonate needed = ..... tonnes

(Total 8 marks)

**End of Question**  
**See next page for Data Sheet**

1	2	3	4	5	6	7	0
7 <b>Li</b> lithium 3	9 <b>Be</b> beryllium 4	11 <b>Na</b> sodium 11	12 <b>C</b> carbon 6	14 <b>N</b> nitrogen 7	16 <b>O</b> oxygen 8	19 <b>F</b> fluorine 9	20 <b>Ne</b> neon 10
23 <b>Na</b> sodium 11	24 <b>Mg</b> magnesium 12	27 <b>Al</b> aluminium 13	28 <b>Si</b> silicon 14	31 <b>P</b> phosphorous 15	32 <b>S</b> sulfur 16	35.5 <b>Cl</b> chlorine 17	40 <b>Ar</b> argon 18
39 <b>K</b> potassium 19	40 <b>Ca</b> calcium 20	70 <b>Ga</b> gallium 31	73 <b>Ge</b> germanium 32	75 <b>As</b> arsenic 33	79 <b>Se</b> selenium 34	80 <b>Br</b> bromine 35	84 <b>Kr</b> krypton 36
85 <b>Rb</b> rubidium 37	88 <b>Sr</b> strontium 38	115 <b>In</b> indium 49	119 <b>Sn</b> tin 50	122 <b>Sb</b> antimony 51	128 <b>Te</b> tellurium 52	127 <b>I</b> iodine 53	131 <b>Xe</b> xenon 54
133 <b>Cs</b> caesium 55	137 <b>Ba</b> barium 56	204 <b>Tl</b> thallium 81	207 <b>Pb</b> lead 82	209 <b>Bi</b> bismuth 83	[209] <b>Po</b> polonium 84	[210] <b>At</b> astatine 85	[222] <b>Rn</b> radon 86
[223] <b>Fr</b> francium 87	[226] <b>Ra</b> radium 88	201 <b>Hg</b> mercury 80	201 <b>Hg</b> mercury 80	197 <b>Au</b> gold 79	197 <b>Au</b> gold 79	[272] <b>Rg</b> roentgenium 111	
		59 <b>Ni</b> nickel 28	59 <b>Ni</b> nickel 28	59 <b>Co</b> cobalt 27	59 <b>Co</b> cobalt 27	[271] <b>Ds</b> darmstadtium 110	
		56 <b>Fe</b> iron 26	56 <b>Fe</b> iron 26	56 <b>Fe</b> iron 26	56 <b>Fe</b> iron 26	[268] <b>Mt</b> meitnerium 109	
		55 <b>Mn</b> manganese 25	55 <b>Mn</b> manganese 25	55 <b>Mn</b> manganese 25	55 <b>Mn</b> manganese 25	[277] <b>Hs</b> hassium 108	
		52 <b>Cr</b> chromium 24	52 <b>Cr</b> chromium 24	52 <b>Cr</b> chromium 24	52 <b>Cr</b> chromium 24	[264] <b>Bh</b> bohrium 107	
		51 <b>V</b> vanadium 23	51 <b>V</b> vanadium 23	51 <b>V</b> vanadium 23	51 <b>V</b> vanadium 23	[266] <b>Sg</b> seaborgium 106	
		48 <b>Ti</b> titanium 22	48 <b>Ti</b> titanium 22	48 <b>Ti</b> titanium 22	48 <b>Ti</b> titanium 22	[262] <b>Db</b> dubium 105	
		45 <b>Sc</b> scandium 21	45 <b>Sc</b> scandium 21	45 <b>Sc</b> scandium 21	45 <b>Sc</b> scandium 21	[261] <b>Rf</b> rutherfordium 104	
		44 <b>Ti</b> titanium 22	44 <b>Ti</b> titanium 22	44 <b>Ti</b> titanium 22	44 <b>Ti</b> titanium 22	[262] <b>Db</b> dubium 105	
		43 <b>V</b> vanadium 23	43 <b>V</b> vanadium 23	43 <b>V</b> vanadium 23	43 <b>V</b> vanadium 23	[261] <b>Rf</b> rutherfordium 104	
		42 <b>Cr</b> chromium 24	42 <b>Cr</b> chromium 24	42 <b>Cr</b> chromium 24	42 <b>Cr</b> chromium 24	[262] <b>Db</b> dubium 105	
		41 <b>Nb</b> niobium 41	41 <b>Nb</b> niobium 41	41 <b>Nb</b> niobium 41	41 <b>Nb</b> niobium 41	[266] <b>Sg</b> seaborgium 106	
		40 <b>Ca</b> calcium 20	40 <b>Ca</b> calcium 20	40 <b>Ca</b> calcium 20	40 <b>Ca</b> calcium 20	[264] <b>Bh</b> bohrium 107	
		39 <b>K</b> potassium 19	39 <b>K</b> potassium 19	39 <b>K</b> potassium 19	39 <b>K</b> potassium 19	[277] <b>Hs</b> hassium 108	
		38 <b>Sr</b> strontium 38	38 <b>Sr</b> strontium 38	38 <b>Sr</b> strontium 38	38 <b>Sr</b> strontium 38	[268] <b>Mt</b> meitnerium 109	
		37 <b>Rb</b> rubidium 37	37 <b>Rb</b> rubidium 37	37 <b>Rb</b> rubidium 37	37 <b>Rb</b> rubidium 37	[271] <b>Ds</b> darmstadtium 110	
		36 <b>Kr</b> krypton 36	36 <b>Kr</b> krypton 36	36 <b>Kr</b> krypton 36	36 <b>Kr</b> krypton 36	[272] <b>Rg</b> roentgenium 111	
		35 <b>Br</b> bromine 35	35 <b>Br</b> bromine 35	35 <b>Br</b> bromine 35	35 <b>Br</b> bromine 35	[261] <b>Rf</b> rutherfordium 104	
		34 <b>Se</b> selenium 34	34 <b>Se</b> selenium 34	34 <b>Se</b> selenium 34	34 <b>Se</b> selenium 34	[262] <b>Db</b> dubium 105	
		33 <b>As</b> arsenic 33	33 <b>As</b> arsenic 33	33 <b>As</b> arsenic 33	33 <b>As</b> arsenic 33	[266] <b>Sg</b> seaborgium 106	
		32 <b>S</b> sulfur 16	32 <b>S</b> sulfur 16	32 <b>S</b> sulfur 16	32 <b>S</b> sulfur 16	[264] <b>Bh</b> bohrium 107	
		31 <b>P</b> phosphorous 15	31 <b>P</b> phosphorous 15	31 <b>P</b> phosphorous 15	31 <b>P</b> phosphorous 15	[261] <b>Rf</b> rutherfordium 104	
		30 <b>Zn</b> zinc 30	30 <b>Zn</b> zinc 30	30 <b>Zn</b> zinc 30	30 <b>Zn</b> zinc 30	[262] <b>Db</b> dubium 105	
		29 <b>Cu</b> copper 29	29 <b>Cu</b> copper 29	29 <b>Cu</b> copper 29	29 <b>Cu</b> copper 29	[266] <b>Sg</b> seaborgium 106	
		28 <b>Si</b> silicon 14	28 <b>Si</b> silicon 14	28 <b>Si</b> silicon 14	28 <b>Si</b> silicon 14	[261] <b>Rf</b> rutherfordium 104	
		27 <b>Al</b> aluminium 13	27 <b>Al</b> aluminium 13	27 <b>Al</b> aluminium 13	27 <b>Al</b> aluminium 13	[262] <b>Db</b> dubium 105	
		26 <b>Fe</b> iron 26	26 <b>Fe</b> iron 26	26 <b>Fe</b> iron 26	26 <b>Fe</b> iron 26	[264] <b>Bh</b> bohrium 107	
		25 <b>Mn</b> manganese 25	25 <b>Mn</b> manganese 25	25 <b>Mn</b> manganese 25	25 <b>Mn</b> manganese 25	[261] <b>Rf</b> rutherfordium 104	
		24 <b>Mg</b> magnesium 12	24 <b>Mg</b> magnesium 12	24 <b>Mg</b> magnesium 12	24 <b>Mg</b> magnesium 12	[266] <b>Sg</b> seaborgium 106	
		23 <b>Na</b> sodium 11	23 <b>Na</b> sodium 11	23 <b>Na</b> sodium 11	23 <b>Na</b> sodium 11	[262] <b>Db</b> dubium 105	
		22 <b>Ti</b> titanium 22	22 <b>Ti</b> titanium 22	22 <b>Ti</b> titanium 22	22 <b>Ti</b> titanium 22	[261] <b>Rf</b> rutherfordium 104	
		21 <b>Sc</b> scandium 21	21 <b>Sc</b> scandium 21	21 <b>Sc</b> scandium 21	21 <b>Sc</b> scandium 21	[262] <b>Db</b> dubium 105	
		20 <b>Ca</b> calcium 20	20 <b>Ca</b> calcium 20	20 <b>Ca</b> calcium 20	20 <b>Ca</b> calcium 20	[266] <b>Sg</b> seaborgium 106	
		19 <b>K</b> potassium 19	19 <b>K</b> potassium 19	19 <b>K</b> potassium 19	19 <b>K</b> potassium 19	[261] <b>Rf</b> rutherfordium 104	
		18 <b>Ar</b> argon 18	18 <b>Ar</b> argon 18	18 <b>Ar</b> argon 18	18 <b>Ar</b> argon 18	[262] <b>Db</b> dubium 105	
		17 <b>Cl</b> chlorine 17	17 <b>Cl</b> chlorine 17	17 <b>Cl</b> chlorine 17	17 <b>Cl</b> chlorine 17	[264] <b>Bh</b> bohrium 107	
		16 <b>O</b> oxygen 8	16 <b>O</b> oxygen 8	16 <b>O</b> oxygen 8	16 <b>O</b> oxygen 8	[261] <b>Rf</b> rutherfordium 104	
		15 <b>P</b> phosphorous 15	15 <b>P</b> phosphorous 15	15 <b>P</b> phosphorous 15	15 <b>P</b> phosphorous 15	[262] <b>Db</b> dubium 105	
		14 <b>N</b> nitrogen 7	14 <b>N</b> nitrogen 7	14 <b>N</b> nitrogen 7	14 <b>N</b> nitrogen 7	[266] <b>Sg</b> seaborgium 106	
		13 <b>Al</b> aluminium 13	13 <b>Al</b> aluminium 13	13 <b>Al</b> aluminium 13	13 <b>Al</b> aluminium 13	[261] <b>Rf</b> rutherfordium 104	
		12 <b>C</b> carbon 6	12 <b>C</b> carbon 6	12 <b>C</b> carbon 6	12 <b>C</b> carbon 6	[262] <b>Db</b> dubium 105	
		11 <b>B</b> boron 5	11 <b>B</b> boron 5	11 <b>B</b> boron 5	11 <b>B</b> boron 5	[264] <b>Bh</b> bohrium 107	
		10 <b>Ne</b> neon 10	10 <b>Ne</b> neon 10	10 <b>Ne</b> neon 10	10 <b>Ne</b> neon 10	[266] <b>Sg</b> seaborgium 106	
		9 <b>F</b> fluorine 9	9 <b>F</b> fluorine 9	9 <b>F</b> fluorine 9	9 <b>F</b> fluorine 9	[261] <b>Rf</b> rutherfordium 104	
		8 <b>O</b> oxygen 8	8 <b>O</b> oxygen 8	8 <b>O</b> oxygen 8	8 <b>O</b> oxygen 8	[262] <b>Db</b> dubium 105	
		7 <b>N</b> nitrogen 7	7 <b>N</b> nitrogen 7	7 <b>N</b> nitrogen 7	7 <b>N</b> nitrogen 7	[264] <b>Bh</b> bohrium 107	
		6 <b>C</b> carbon 6	6 <b>C</b> carbon 6	6 <b>C</b> carbon 6	6 <b>C</b> carbon 6	[261] <b>Rf</b> rutherfordium 104	
		5 <b>B</b> boron 5	5 <b>B</b> boron 5	5 <b>B</b> boron 5	5 <b>B</b> boron 5	[262] <b>Db</b> dubium 105	
		4 <b>He</b> helium 2	4 <b>He</b> helium 2	4 <b>He</b> helium 2	4 <b>He</b> helium 2	[266] <b>Sg</b> seaborgium 106	

1	<b>H</b>	1
	hydrogen	

KEY			
1	→	relative atomic mass	
<b>H</b>	→	atomic symbol	
hydrogen	→	name	
1	→	atomic number	