

**GCSE Chemistry A (Gateway Science)**  
**J248/03 C1-C3 and C7 Higher (Higher Tier)**

**Question Set 22**

1

The table shows information about some atoms and ions.

Particle	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons	Electronic structure
A	11	23	11	.....12.....	11	2.8.1
B	9	19	9	10	9	.....2.7.....
C	.....17.....	37	17	.....20.....	17	2.8.7
D	13	27	.....13.....	.....14.....	10	2.8

(a) Complete the missing information in the Table above. [4]

(b) Particle A is a metal atom, particle D is an ion. Explain why. [2]

A - one electron in outer shell or energy level  
 D - has more protons than electrons

(c) Particle C has the electronic structure 2.8.7.

What does this electronic structure tell you about the position of particle C in the Periodic Table?

Explain your answer. Group 7 as 7 electrons in outer shell and period 3 as 3 shells occupied [4]

(d) Complete the table below to give information about protons, neutrons and electrons.

	Charge	Mass in atomic mass units
proton	.....positive.....	1
neutron	.....neutral.....	.....1.....
electron	negative	.....1/1836.....

[2]

(e) Rutherford was a scientist who helped to develop the atomic model.

State how Rutherford's work contributed to the development of the atomic model. [1]

He found that the atom consists mostly of empty space with its mass concentrated in a central positively charged nucleus.

**Total Marks for Question Set 22: 13**

# The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(0)								
1 H hydrogen 1.0	2 He helium 4.0														
3 Li lithium 6.9	4 Be beryllium 9.0														
11 Na sodium 23.0	12 Mg magnesium 24.3														
19 K potassium 39.1	20 Ca calcium 40.1														
37 Rb rubidium 85.5	38 Sr strontium 87.6														
55 Cs caesium 132.9	56 Ba barium 137.3														
87 Fr francium	88 Ra radium														
21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8
39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3
57-71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon
89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium	113 Nh nihonium	114 Fl flerovium	115 Mc moscovium	116 Lv livermorium	117 Ts tennessine	118 Og oganesson

Key  
atomic number  
Symbol  
name  
relative atomic mass

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