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CHEMISTRY
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PAPER 1

Thursday 11 November 2010 (afternoon)

1 hour

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The periodic table is provided for reference on page 2 of this examination paper.

The Periodic Table

1	2											3	4	5	6	7	0
1 **H** 1.01				Atomic Number **Element** Atomic Mass													2 **He** 4.00
3 **Li** 6.94	4 **Be** 9.01											5 **B** 10.81	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18
11 **Na** 22.99	12 **Mg** 24.31											13 **Al** 26.98	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.06	17 **Cl** 35.45	18 **Ar** 39.95
19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.90	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.71	29 **Cu** 63.55	30 **Zn** 65.37	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.92	34 **Se** 78.96	35 **Br** 79.90	36 **Kr** 83.80
37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** 98.91	44 **Ru** 101.07	45 **Rh** 102.91	46 **Pd** 106.42	47 **Ag** 107.87	48 **Cd** 112.40	49 **In** 114.82	50 **Sn** 118.69	51 **Sb** 121.75	52 **Te** 127.60	53 **I** 126.90	54 **Xe** 131.30
55 **Cs** 132.91	56 **Ba** 137.34	57 † **La** 138.91	72 **Hf** 178.49	73 **Ta** 180.95	74 **W** 183.85	75 **Re** 186.21	76 **Os** 190.21	77 **Ir** 192.22	78 **Pt** 195.09	79 **Au** 196.97	80 **Hg** 200.59	81 **Tl** 204.37	82 **Pb** 207.19	83 **Bi** 208.98	84 **Po** (210)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** (226)	89 ‡ **Ac** (227)															

†	58 **Ce** 140.12	59 **Pr** 140.91	60 **Nd** 144.24	61 **Pm** 146.92	62 **Sm** 150.35	63 **Eu** 151.96	64 **Gd** 157.25	65 **Tb** 158.92	66 **Dy** 162.50	67 **Ho** 164.93	68 **Er** 167.26	69 **Tm** 168.93	70 **Yb** 173.04	71 **Lu** 174.97
‡	90 **Th** 232.04	91 **Pa** 231.04	92 **U** 238.03	93 **Np** (237)	94 **Pu** (242)	95 **Am** (243)	96 **Cm** (247)	97 **Bk** (247)	98 **Cf** (251)	99 **Es** (254)	100 **Fm** (257)	101 **Md** (258)	102 **No** (259)	103 **Lr** (260)

1. On analysis, a compound with molar mass 60 g mol^{-1} was found to contain 12 g of carbon, 2 g of hydrogen and 16 g of oxygen. What is the molecular formula of the compound?

A. CH_2O

B. CH_4O

C. C_2H_4O

D. $C_2H_4O_2$

2. 300 cm^3 of water is added to a solution of 200 cm^3 of 0.5 mol dm^{-3} sodium chloride. What is the concentration of sodium chloride in the new solution?

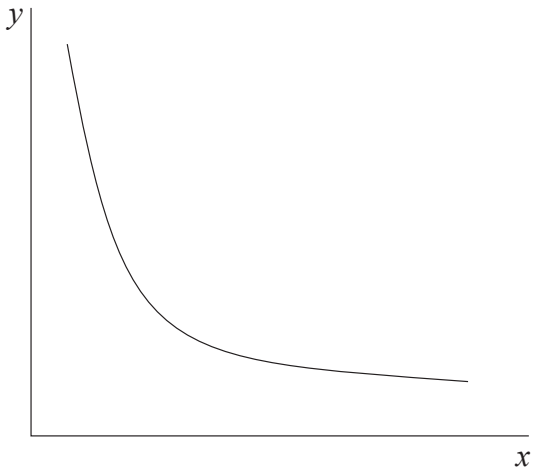
A. 0.05 mol dm^{-3}

B. 0.1 mol dm^{-3}

C. 0.2 mol dm^{-3}

D. 0.3 mol dm^{-3}

3. The graph below represents the relationship between two variables in a fixed amount of gas.



Which variables could be represented by each axis?

	***x*-axis**	***y*-axis**
A.	pressure	temperature
B.	volume	temperature
C.	pressure	volume
D.	temperature	volume

4. Which statement about the species $^{63}Cu^{2+}$ and $^{65}Cu^{+}$ is correct?

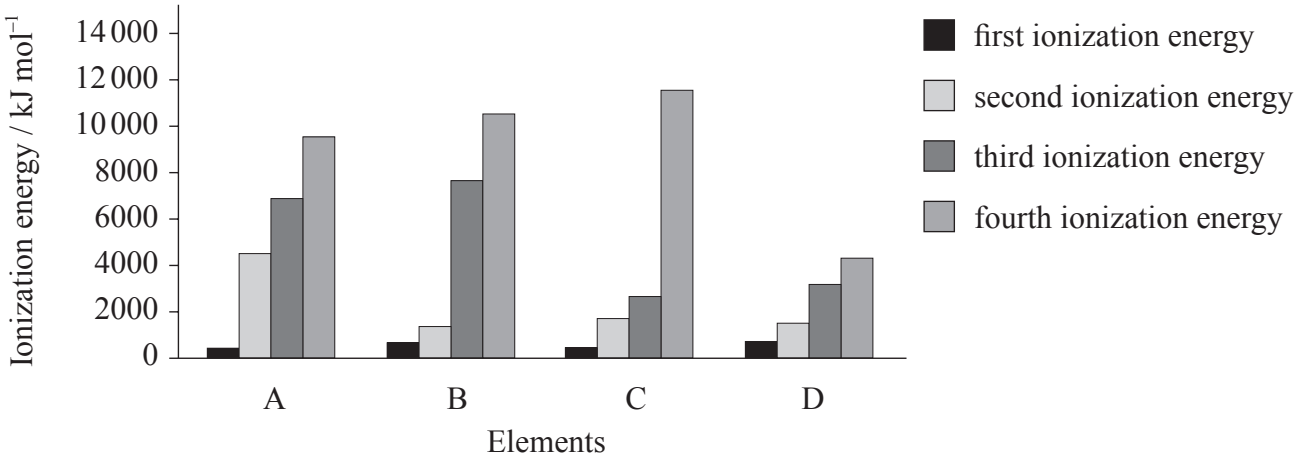
A. Both species have the same number of protons.

B. Both species have the same number of electrons.

C. Both species have the same number of neutrons.

D. Both species have the same electron arrangement.

5. The graph below shows the first four ionization energies of four elements A, B, C and D (the letters are not their chemical symbols). Which element is magnesium?



6. Which statements about the periodic table are correct?

I. The elements Mg, Ca and Sr have similar chemical properties.

II. Elements in the same period have the same number of main energy levels.

III. The oxides of Na, Mg and P are basic.

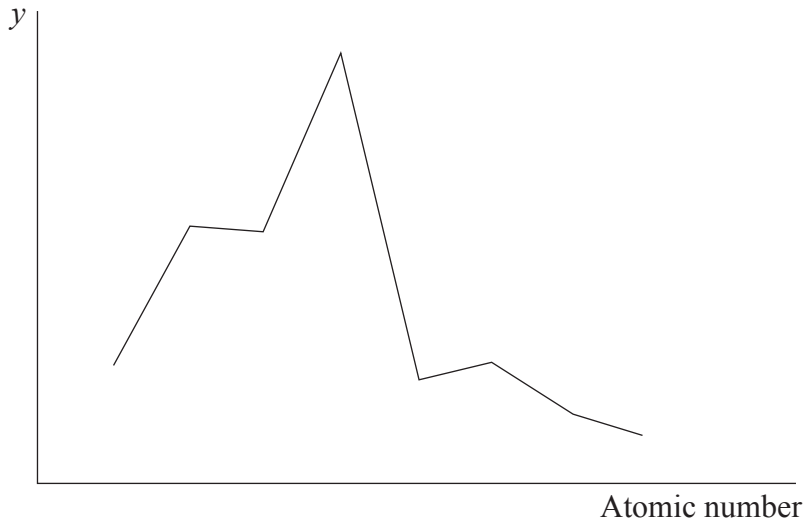
A. I and II only

B. I and III only

C. II and III only

D. I, II and III

7. The *x*-axis of the graph below represents the atomic number of the elements in period 3.



Which variable could represent the *y*-axis?

A. Melting point

B. Electronegativity

C. Ionic radius

D. Atomic radius

8. In which complexes does iron have an oxidation number of +3?

I. $[Fe(H_2O)_6]^{3+}$

II. $[Fe(H_2O)_5(CN)]^{2+}$

III. $[Fe(CN)_6]^{3-}$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III