PHYSICAL SCIENCE   **6888/02**

Paper 2   October/November 2019
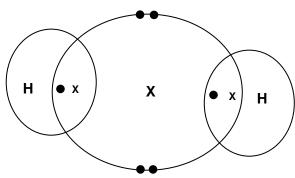
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MARK SCHEME

{6888/02}

MARKS: 80

1 **(a)** **(i)** 0 °C; [1]

        (ii) 100 °C; [1]

    (b) measure the distance between the two fixed points; [1]

        divide distance by 100; [1]

    (c) **(i)** sensitivity of the thermometer increases; [1]

        (ii) divisions will be wider; [1]

2 **(a)** bauxite; [1]

    (b) letter **A** on the anode; [1]

    (c) aluminium more reactive than carbon; [1]

        cannot be displaced by carbon from its compounds; [1]

    (d) low density;

        strength;

        malleable;

        more resistant to corrosion;

        [max 2 marks]

3 **(a)** 3×10^8 m/s OR 3×10^5 km/s; [1]

    (b) conversion to metres; [1]

        c= wavelength X frequency OR 3×10^8 / 200; [1]

        1.5×10^6 Hz; [1]

    (c) X-rays have a much higher frequency than radio waves/X-rays are more
energetic; [1]

        and can cause birth defects/cancers when they penetrate the skin; [1]

4 **(a)** **(i)** oxygen; [1]

        (ii) both have 8 protons; [1]

        X has 8 neutrons, **Z** has 9 neutrons; **A**-different number of neutrons [1]

        (1 mark lost if no evidence of the use of the table)

    (b)

evidence of sharing; [1]

octet; [1]

A- **O** instead of **X**.

(c) Na$_2$X has a higher melting point/H$_2$X has a lower melting point [1]

Na$_2$X has strong forces of attraction/ H$_2$X has weak Van der Waals forces; [1]

(d)

compound	colour	oxidation state
sodium compounds		fixed or specified value of Na;
copper compounds	blue / coloured;	variable/ 1 and 2;

[3]

5 **(a)** **(i)** K.E. = ½ mv^2 OR ½ ×0.02 ×3^2; [1]

0.09 <u>J</u>; [1]

(ii) PE = mgh OR 0.09 = 0.02×10 h; [1]
0.45m; [1]

(iii) no air resistance/no energy is lost; [1]

(b) marble **C** will reach the same height as **B**; [1]
mass has no effect on the acceleration due to gravity; [1]

6 **(a)** copper(II) oxide; [1]

(b) (ionic) precipitation; [1]

(c) water; [1]

(d) acidic oxide; [1]

reacts with water to form an acid; [1]

7 **(a)** 2V; [1]

(b) **(i)** I=V/R OR 2/6; [1]

0.3A; [1]

		(ii)	Q= It OR 0.3 ×10 s;	[1]
			3C;	[1]
		(iii)	$R_{12}=(R_1R_2)/(R_1+R_2)$ OR (2x3)/(2+3);oe	[1]
			1.2Ω;	[1]
		(iv)	1.7 + 0.3 = 2A;	[1]

8 **(a)** (thermal) decomposition; [1]

    (b) **(i)** RFM = 40 + 12+ 16×3; [1]

             = 100; [1]

        (ii) $n= \dfrac{20\,g}{100\,g/mole}$; [1]

             = 0.2 moles $CaCO_3$; [1]

             ratio of moles $CaCO_3$: CaO

                   1 : 1

             moles CaO = 0.2 moles; [1]

        (iii) Ratio of moles $CaCO_3$: CO_2

                   1 : 1

             = 0.2 moles; [1]

        (iv) 0.2 moles $\times$ 24 dm^3/mol; [1]

             4.8 dm^3; [1]

    (c) **(i)** limestone heated with sand and sodium carbonate; [1]

        (ii) calcium oxide reacts with impurities (silicon oxide); [1]

             slag (calcium silicate) formed; [1]

9 **(a)** step-up; [1]

    (b) to reduce energy loss / reduce overheating; [1]

    (c) ac in the primary coil; [1]

         induces changing magnetic field in core; [1]

         induces ac in the secondary coil; [1]

    (d) $V_pI_p= V_sI_s$ OR 21 000 000 = 115 000I_s; [1]

         182.6 A; [1]

10 **(a)** enzymes; Allow named enzyme [1]

    (b) hydrolysis; [1]

(c)

OH-functional group; [1]

correct structure; [1]

(d) bacteria; [1]

oxidise ethanol; [1]

11 **(a)** $^{222}_{87}$; [1]

Fr; [1]

(b) a magnetic field exists around the beta particles; [1]

the magnetic field of the beta particles interacts with the magnetic field of the magnets; [1]

(c) store in sealed lead containers; [1]

(d) 4 half-lives; [1]

1.875 g; [1]