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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCES P2

COMMON TEST

MARKING GUIDELINE

JUNE 2024

SEE ACADEMY

MARKS: 75

DURATION: 1½ hours

This marking guideline consists of 5 pages.

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QUESTION 1:

1.1	C ✓✓	(2)
1.2	C ✓✓	(2)
1.3	A ✓✓	(2)
1.4	B ✓✓	(2)
1.5	D ✓✓	(2)
		[10]

QUESTION 2

2.1

2.1.1 Oak (chip). ✓
The density of oak is less than the density of water. ✓ (2)

2.1.2 Aluminium. ✓
Aluminium has a lower density than lead. ✓
For a constant mass, the density is inversely proportional to the volume. ✓ (3)

2.2

2.2.1 Pure Substance ✓ (1)

2.2.2 $4Al + 3O_2 \rightarrow 2Al_2O_3$ LHS ✓
RHS ✓
Balancing ✓ (3)

2.3

2.3.1 Physical (change) ✓ (1)

2.3.2 Decomposition ✓
A single reactant is broken down into multiple products. ✓ (2)

2.4 Mass of reactants = 2(14 + 1x3) + 2x1 + 32 +16x4 ✓
= 132 $g.mol^{-1}$
Mass of products = 2(14 + 4x1) + 32 + 16x4✓
= 132 $g.mol^{-1}$
Mass of reactants is equal to the mass of products. Therefore mass is conserved. ✓ (3)

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QUESTION 3

3.1 Melting. ✓ (1)

3.2 Thermometer ✓ (1)

3.3 Crushed ice allows for easier transfer of heat energy from one particle to the next. ✓✓

or

Use crushed ice because it is easier for the thermometer to measure the temperature✓✓ (2)

3.4 The temperature of the substance increases. ✓
The average kinetic energy of the particles increases. ✓
Particles move faster. ✓ (3)

3.5 The water has reached room temperature ✓ and there isn't an external heat source. ✓ (2)

3.6 Liquid. ✓ (1)

[10]

QUESTION 4

4.1

4.1.1 A larger atomic radius results in lower first ionisation energy. ✓ (1)

4.1.2 As you move from left to right across a period the effective nuclear charge increase ✓
The force of attraction between the nucleus and the outer orbital increases. ✓

or

Cl has a smaller atomic radius than Mg✓✓ (2)

4.1.3 Decrease ✓
As you move down the group the atomic radius increases. ✓
The force of attraction between the nucleus and valence electrons decreases. ✓ (3)

4.1.4 The outermost energy level is full in noble gases✓ resulting in a stable electronic configuration ✓

or

Noble gases have the smallest atomic radius✓ for the elements in the same period. ✓ (2)

4.2 The energy released when an electron is attached to an atom or molecule to form a negative ion. ✓✓ (2)

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4.3 Halogen ✓ (1)

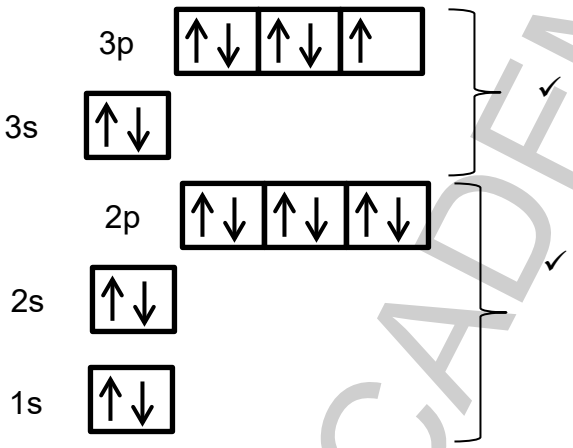
[11]

QUESTION 5

5.1

5.1.1 18 ✓ (1)

5.1.2

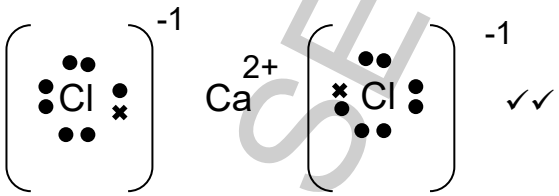


sp-notation: $1s^2 2s^2 2p^6 3s^2 3p^5$ ✓ (3)

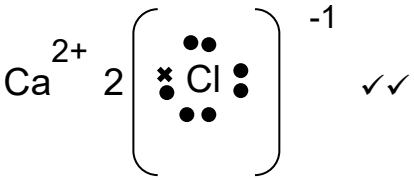
5.1.3 Ionic bonds✓ (1)

5.1.4

OPTION 1



OPTION 2



(2)

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5.2 Let the 2nd isotope be Copper – X

% Copper – X = 100 – 25 ✓ = 75%

✓ ✓ ✓

$$63,5 = 65 \times \frac{25}{100} + X\left(\frac{75}{100}\right)$$

x = 63

number of neutrons = 63 – 29 ✓

= 34 ✓ (6)

5.3

5.3.1 MgO ✓✓ (2)

5.3.2 $(NH_4)_2Cr_2O_7$ ✓✓ (2)

5.4 Copper (II) nitrate ✓✓ **Note:** Copper nitrate ✓ (2)

[19]

QUESTION 6

6.1

6.1.1 $M(CaCO_3) = 40 + 12 + 16 \times 3$ ✓

= 100 g.mol^{-1} ✓ (2)

Positive marking from 6.1.1

6.1.2 $n(CaCO_3) = \frac{m}{M}$ ✓

$n(CaCO_3) = \frac{50}{100}$ ✓

$n(CaCO_3) = 0,5$ mol

$n(CaCO_3) = \frac{N}{N_A}$ ✓

$0,5 = \frac{N}{6,02 \times 10^{23}}$ ✓

N = 3,01 x 10^{23} molecules ✓ (5)

6.2 $n(CO_2) = \frac{V}{V_m}$ ✓

$0,5 = \frac{V}{22,4}$ ✓

V = 11,2 dm^3 ✓ (3)

[10]

TOTAL: 75

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