Question 40 (Answer: **D**)

- Let the ^{24}Mg abundance be x%; the other two share $(100 - x)$ equally, so each is $(100 - x)/2$.
- Their average mass is 25.5, so $24x + 25.5(100 - x) = 2430$.
- $-1.5x = -120$, giving $x = 80$%.

Question 40 (Answer: **B**)

- Gallium has 31 protons, so the two isotopes are ^{69}Ga and ^{71}Ga.
- $A_r = (6 \times 69 + 4 \times 71)/10 = 698/10$.
- $= 69.8$.

1(a)(i)	24 protons 28 neutrons 24 electrons
1(a)(ii)	(^{54}Cr has two) more neutrons (than ^{52}Cr)
1(a)(iii)	(relative) abundance (of each isotope)
1(a)(iv)	The fourth isotope has any value of RIM less than 51.996
1(b)(i)	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ (3d^5\ 4s^1)$
1(b)(ii)	6
1(c)(i)	Cr / $Cr_2O_7^{2-}$ **AND** it gains electrons
1(c)(ii)	(+)4
1(c)(iii)	*Due to an issue with question 1(c)(iii), the question has been removed from the question paper.*
1(c)(iv)	**M1** CO_2 has only instantaneous / temporary dipole–induced dipole forces **AND** methanal has permanent dipole–permanent dipole (and id-id) forces **M2** IMF's in methanal are stronger than IMF's in CO_2
1(d)(i)	rate of forward and backward (reaction) are the same / equal **OR** concentrations of reactants and products are constant
1(d)(ii)	closed system
1(d)(iii)	**M1** (mixture becomes more) orange **M2** forward reaction is endothermic **M3** (mixture becomes more) orange **M4** equilibrium moves (forwards/right) to compensate for extra acid / H^+
1(e)	**M1** hydrolysis **M2** $CrF_4 + 2H_2O \rightarrow CrO_2 + 4HF$