Question	Part	Sub Part	Marking Guidance	Mark	Comments
8	(a)		Electronegativity increases	1	
			Proton number increases (increase in nuclear charge)	1	
			Same number of electron shells/levels	1	Or same radius or Shielding of outer electrons remains the same
			Attraction of bond pair to nucleus increases	1	Allow 'electrons in bond' instead of 'bond pair'
8	(b)		Big <u>difference</u> in electronegativity leads to ionic bonding, smaller covalent	1	Lose a mark if formula incorrect
			Sodium oxide ionic lattice	1	
			Strong forces of attraction between ions	1	
			P ₄ O ₁₀ covalent molecular	1	Must have covalent and molecular (or molecules)
			Weak (intermolecular) forces between molecules	1	Or weak vdW, or weak dipole-dipole between molecules
			melting point Na ₂ O greater than for P ₄ O ₁₀	1	Or argument relating mpt to strength of forces

8	(c)	Moles NaOH = 0.0212 × 0.5 = 0.0106	1	M1 moles of NaOH correct
		Moles of $H_3PO_4 = 1/3$ moles of NaOH (= 0.00353)	1	M2 is for 1/3
		Moles of P in 25000 I = $0.00353 \times 10^6 = 3.53 \times 10^3$	1	M3 is for factor of 1,000,000
		Moles of $P_4O_{10} = 3.53 \times 10^3/4$	1	M4 is for factor of 1/4 (or 1/2 if P ₂ O ₅)
		Mass of $P_4O_{10} = 3.53 \times 10^3/4 \times 284 = 0.251 \times 10^6 g$ = 251 kg	1	(Or if P_2O_5 3.53 × 10 ³ /2 × 142) M5 is for multiplying moles by M_r with correct units allow conseq on incorrect M4 (allow 250-252)