

Marking scheme for Core Worksheet – Option D

- 1 a** the range of doses of a drug that gives safe, effective therapy / the range of concentrations of drugs in the blood plasma that gives safe, effective therapy [1]
- b** an unintended, usually undesirable, effect of a drug on the body [1]
- 2 a** $\text{Mg(OH)}_2(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{MgCl}_2(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$ [2]
 $\text{Al(OH)}_3(\text{s}) + 3\text{HCl}(\text{aq}) \rightarrow \text{AlCl}_3(\text{aq}) + 3\text{H}_2\text{O}(\text{l})$ [2]
 $\text{NaHCO}_3(\text{s}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$ [2]
1 mark for each correct antacid formula and 1 mark for each correct equation
- b** number of moles of each antacid in 0.500 g is
- $\text{Mg(OH)}_2: \frac{0.500}{58.33} = 8.57 \times 10^{-3} \text{ mol}$
- $\text{Al(OH)}_3: \frac{0.500}{78.01} = 6.41 \times 10^{-3} \text{ mol}$
- $\text{NaHCO}_3: \frac{0.500}{84.01} = 5.95 \times 10^{-3} \text{ mol}$ [1]
- number of moles of acid neutralised by each antacid:
- $\text{Mg(OH)}_2: 8.57 \times 10^{-3} \times 2 = 1.71 \times 10^{-2} \text{ mol}$
- $\text{Al(OH)}_3: 6.41 \times 10^{-3} \times 3 = 1.92 \times 10^{-2} \text{ mol}$
- $\text{NaHCO}_3: 5.95 \times 10^{-3} \text{ mol}$ [1]
- therefore 500 mg aluminium hydroxide neutralises the most stomach acid [1]
- 3 a** drugs that reduce pain [1]
- b i** B contains an amide group. [1]
- ii** A and C contain a carboxylic acid group. [1]
- iii** A contains an ester group. [1]
- c** prevents the production of prostaglandins [1]
- 4 a** inhibit an enzyme required by bacteria to make a normal cell wall [1]
cell wall weakened and bacterial cell bursts [1]
- b** bacteria have become resistant to penicillin [1]
modifying the side chain produces penicillins that are not affected by the penicillinase enzyme [1]