Question Number	Scheme	Notes	Marks
5(a)	$r(r+1)(r+5)=r^3+6r^2+5r$	Correct expansion. May be implied	B1
	$\left\{\sum_{r=1}^{n}\left(r^3+6r^2+5r\right)=\sum_{r=1}^{n}r^3+6\sum_{r=1}^{n}r^2+5\sum_{r=1}^{n}r=\right\}\frac{1}{4}n^2(n+1)^2+6\times\frac{1}{6}n(n+1)(2n+1)+\frac{5}{2}n(n+1)$ M1: Having achieved two terms of the correct form from the expansion, replaces at least one of $\sum r^3$, $\sum r^2$ or $\sum r$ correctly A1: Correct expression in any form		M1A1
	$=\frac{1}{4}n(n+1)\left[n(n+1)+4(2n+1)+10\right]\Rightarrow\frac{1}{4}n(n+1)\left(n^2+9n+14\right)$ Obtains $\frac{1}{4}n(n+1)[...]$ where ... is a 3TQ in n May be implied by subsequent correct work. Note they might expand first to get e.g., $\frac{1}{4}n\left(n^3+10n^2+23n+14\right)$ or $\frac{1}{4}\left(n^4+10n^3+23n^2+14n\right)$ or $\frac{1}{4}n^4+\frac{5}{2}n^3+\frac{23}{2}n^2+\frac{7}{2}n$ Allow factor reconstruction after solving. Condone poor algebra but if no 3TQ is seen or the expanded form is wrong and they go straight to an answer it must follow. Expect a full method if e.g., expands or partially expands $\frac{1}{4}n(n+a)(n+b)(n+c)$ and equates coefficients. Requires previous M mark.		**d**M1
	$\frac{1}{4}n(n+1)(n+2)(n+7)$	Correct expression. Not just values. Brackets in any order. Accept $\frac{n}{4}(n+1)(n+2)(n+7)$ or $\frac{n(n+1)(n+2)(n+7)}{4}$	A1
			(5)
(b)	$20\times21\times25+21\times22\times26+...+40\times41\times45$ $=\frac{1}{4}\times40(40+1)(40+2)(40+7)-\frac{1}{4}\times19(19+1)(19+2)(19+7)=...$ or $\frac{1}{4}\times40(41)(42)(47)-\frac{1}{4}\times19(20)(21)(26)=...$ Attempts to find a **value** for $\sum_{r=1}^{40}r(r+1)(r+5)-\sum_{r=1}^{19}r(r+1)(r+5)$ using $f(40)-f(19)$. We will allow one slip only (one of the eight components of the products) provided a full substitution as above is seen. **There must be explicit evidence that they are using their result from part (a)**. So do not accept just 809340 – 51870 = ... but allow e.g., $=\frac{1}{4}\times3237360-\frac{1}{4}\times207480=...$ Their part (a) must be of the correct form. Allow if they are using made up values for a, b and c.		M1
	= 757 470	757 470 only. Allow 7.5747×10^5 Isw if subsequently rounded	A1
			(2)
			Total 7