Q1.

2	$\left(2x - \dfrac{3}{x}\right)^5$		
	(i) $32x^5 - 240x^3 + 720x$	$3 \times$ B1 [3]	co. SC B2 for other 3 terms (i.e. ascending)
	(ii) $\left(1 + \dfrac{2}{x^2}\right)(32x^5 - 240x^3 + 720x)$		
	Coeff of x $(1 \times 720) + (2 \times -240)$ $\rightarrow 240$	M1 A1√ [2]	Looks at exactly 2 terms. co from his answer to (i).

Q2.

2	(i) $\left(x - \dfrac{2}{x}\right)^6 = x^6 - 12x^4 + 60x^2$	B1 ×3 [3]	co
	(ii) $\times (1 + x^2) \rightarrow 60 - 12 = 48$	M1 A1√ [2]	Must be exactly 2 terms. √ from his (i).

Q3.

1	$^7C_2\, x^5 \left(\dfrac{2}{x^2}\right)^2$ SOI and leading to final answer	B2	B1 for 2/3 parts correct leading to ans.
	84 or $84x$ as final answer	B1 [3]	If no answer; $84x$ seen scores B2, else $^7C_2\, x^5 \left(\dfrac{2}{x^2}\right)^2$ scores SCB1 only

Q4.

1	$(a + x)^5 + (1 - 2x)^6$		
	Coeff of x^3 in $1^{st} = 10 \times a^2$	B1	co
	Coeff of x^3 in $2^{nd} = 20 \times (-2)^3$	B1 + B1	co
	$\rightarrow 10a^2 - 160 = 90$	M1	Forming an equation for a + solution
	$\rightarrow a = 5$	A1 [5]	co (condone $\pm$)

Q5.

2	$[7C3] \times [(2x^3)^4] \times [(-1/x^2)^3]$ **seen** soi	B1B1	2 elements correct, 3rd element correct
	$35 \times 2^4 \times (-1)^3$ leading to their answer soi	B1	2 elements correct. Identifying reqd term
	$-560(x^6)$ as answer	B1 [4]	SC B3 for $[560(x)^6]$ as answer

Q6.

3	$(1-2x)^2(1+ax)^6$		
	Coeff of x in $(1+ax)^6 = 6ax$	B1	6C1 needs removing (here or later)
	Coeff of x^2 in $(1+ax)^6 = 15a^2x^2$	B1	6C2 needs removing (here or later)
	Multiplies by $(1-4x+4x^2)$	M1	Needs to consider 2 terms in equation
	2 terms in x $6a-4=-1$	A1	Co
	$\rightarrow a = \frac{1}{2}$		
	3 terms in x^2 $15a^2-24a+4=b$	M1	Needs to consider 3 terms in equation
	$\rightarrow b = -4\frac{1}{4}$	A1	
		[6]	

Q7.

2	(i)	$1-6px$ $+15p^2x^2$	B1B1	Simplif¢n of nCr can be scored in (ii)
			[2]	
	(ii)	$15p^2 \times 1 - 6p \times -1$	M1	
		$3p(5p+2)=0$	DM1	Obtain & attempt to solve quadratic
		$p--\dfrac{2}{5}$ oe	A1	Allow $p=0$ in addition
			[3]	

Q8.

4	(i)	$(2+ax)^5 = 32 + 80ax + 80a^2x^2$	$3 \times$ B1	[3]	B1 for each term.
	(ii)	$\times (1+2x)$	M1		Realises need to consider 2 terms.
		$240 = 80a^2 + 160a$	DM1A1		
		$\rightarrow a=1$ or $a=-3$.		[3]	Solution of 3-term quadratic.

Q9.

3	(i)	$(2-x)^6$		
		$64 - 192x + 240x^2$	$3 \times$ B1	co Allow 2^6.
			[3]	
	(ii)	$(1+2x+ax^2)(2-x)^6$		
		Coeff of $x^2 = 240 - 384 + 64a$	M1	Considers at least 2 terms in x^2.
		Equates to 48	M1	Considers exactly 3 terms + solution
		$\rightarrow a = 3$	A1	co
			[3]	

Q10.

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2	$(1 + ax)^6$ Term in $x = 6ax$ Equate with $-30 \rightarrow a = -5$ Term in $x^3 = \dfrac{6.5.4}{3!}a^3$ $\rightarrow$ coefficient of -2500	B1 B1√ B1 B1√ [4]	co √ from his answer for $6ax$ co For $20 \times a^3$

Q11.

1	$^9C_6$ or $^9C_3$ used $\left(\dfrac{1}{x^2}\right)^3$ seen -84	M1 B1 A1 [3]	 Correct answer only $\Rightarrow$ 3marks

Q12.

1	$6C4 \times \left[2(x)\right]^4 \times \left[\dfrac{1}{(x^2)}\right]^2$ 240	B2 B1	B1 for 2/3 terms correct Identified as answer. Allow $240x^0$
			[3]

Q13.

1	$k^2 \times \left(\dfrac{1}{3(x)}\right)^2 \times 10$ (or correct factorials) $10 \times k^2 \times \dfrac{1}{9} - 30 \Rightarrow k - 3$	B2 B1 [3]	B1 for 2/3 terms correct cao

Q14.

4	(i) $(2x - x^2)^6 = 64x^6 - 192x^7 + 240x^8$ (ii) $\times (2 + x)$ coeff of $x^8 = 2 \times 240 - 192$ 288	B1B1B1 [3] M1 A1√ [2]	cao Looks at exactly 2 terms

Q15.

1	powers 4 and 3 35 seen or implied -70	M1 B1 A1 [3]	

Q16.

1	(i)	$64 + 576x + 2160x^2$	**B1B1B1** [3]	Can score in (ii)
	(ii)	$576a(x^2) + 2160(x^2) = 0$	**M1**	
		$a = -\dfrac{2160}{576}$ oe (eg $-\dfrac{15}{4}$) or -3.75	**A1** [2]	

Q17.

8	(i)	$81\,(x^8)$	B1 [1]	
	(ii)	$10 \times 3^3\,(x^8)$ soi leading to their answer	B1B1	B1 for 10, 5C2 or 5C3. B1 for 3^3. But must be multiplied.
		$270\,(x^8)$	B1 [3]	
	(iii)	k × (i)	M1	$k \neq 1, 0$
		405 soi	A1	
		+ (ii)	DM1	
		$675\,(x^8)$	A1 [4]	

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