Question	Scheme	Marks
5(a)	$\alpha+\beta=-\frac{3}{4}$	B1
	$\alpha\beta=\frac{k}{4}$	B1
		(2)
(b)	$\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}=\frac{\alpha^3+\beta^3}{\alpha^2\beta^2}$	B1
	$=\frac{(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)}{(\alpha\beta)^2};=\frac{\left(-\frac{3}{4}\right)^3-3\left(\frac{k}{4}\right)\left(-\frac{3}{4}\right)}{\left(\frac{k}{4}\right)^2}=\ldots$	M1; M1
	$=\frac{36k-27}{4k^2}=\frac{9}{k}-\frac{27}{4k^2}$	A1
		(4)
(c)	Product of roots is $\frac{\alpha\beta}{\alpha^2\beta^2}=\frac{1}{\alpha\beta}=\frac{4}{k}$	B1ft
	Equation is $x^2-\left(\frac{36k-27}{4k^2}\right)x+\frac{4}{k}=0$	M1
	$4k^2x^2-(36k-27)x+16k=0$	A1
		(3)
		(9 marks)

Notes:

(a)

B1: Correct expression for $\alpha+\beta$

B1: Correct expression for $\alpha\beta$

(b)

B1: Combines the fractions correctly.

M1: For a correct identity for the sum of cubes.

M1: Substitutes their values for $\alpha+\beta$ and $\alpha\beta$ into their equation for sum of $\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}$ (not dependent, so there may be a slip in the identity used for $\alpha^3+\beta^3$).

A1: Correct expression in terms of *k* in a simplified form - e.g. either form as shown in scheme.

(c)

B1ft: Correct product of roots in terms of *k*, or follow through $\frac{1}{\text{their }\alpha\beta}$ from part (a).

M1: Applies $x^2 - (\text{their sum of roots})x + \text{their product of roots}\,(=0)$. Allow without the "=0" for this mark.

A1: Correct equation, as shown or an integer multiple thereof. Accept equivalents for the *x* term (e.g. $4k^2x^2 + (27 - 36k)x + 16k = 0$. Must include the "=0".