Question	Answer	Marks	Guidance
(a)	$4\cos^4 x+\cos^2 x-3=0 \Rightarrow \left(4\cos^2 x-3\right)\left(\cos^2 x+1\right)=0$	**M1**	Attempt to solve 3 term quartic (or quadratic in another variable).
	$\Rightarrow \left[\cos^2 x=\right]\frac{3}{4}\ \left[\ \cos^2 x=-1\right]$	**A1**	If M0 scored then **SC B1** is available for sight of $\frac{3}{4}$ [and -1].
	$\Rightarrow \cos x=[\pm]\sqrt{\mathit{their}\frac{3}{4}}$ **OE** $\left[=\pm\frac{\sqrt{3}}{2}\right]$	**M1**	Square rooting '*their* $\cos^2 x$'. Allow without ±. May be implied by correct final answer(s). Ignore $\sqrt{-1}$.
	$[x=]\ \frac{\pi}{6},\frac{5\pi}{6},\frac{7\pi}{6},\frac{11\pi}{6}$	**A1** **A1 FT**	Dependent on preceding M1 only. Exact answers needed. A1 for any 2 correct answers A1 A1 for 4 correct answers and no others inside the range $0\leqslant x\leqslant 2\pi$ A0 A1 FT can be awarded for two exact answers that are $2\pi-$'*their* $\frac{\pi}{6}$ and $\frac{5\pi}{6}$' within the range $0\leqslant x\leqslant 2\pi$.
			SC: If all 4 answers given in degrees (30, 150, 210, 330) or non-exact (AWRT 0.524, 2.62, 3.67, 5.76 or 0.167π, 0.833π, 1.17π, 1.83) and no others then **SC B1**.
		5	

Question	Answer	Marks	Guidance
(b)	$\cos^2 x = \dfrac{-1-\sqrt{1+16k}}{8} < 0$ [$\therefore$ no solutions].	B1	State that this root is less than 0, needs to be linked to $\cos^2 x$. Can be achieved by substituting a value for $k \geqslant 0$.
	$[\cos^2 x] = \dfrac{-1 \pm \sqrt{1+16k}}{8}$	*M1	Must use quadratic formula. Allow any value of k **but not** ± 3. Condone + rather than $\pm$.
	Substituting $k = 5$ and obtain 1 from the formula	DM1	Or argue logically if $k > 5 \Rightarrow 1+16k > 81 \Rightarrow > 1$.
	$\cos^2 x = 1$ or $\cos^2 x >$ or $\geqslant 1$	A1	Needs to be linked to $\cos^2 x$.
	Concluding statement having considered both $\pm$ cases. $\therefore$ no solutions	A1	Dependent upon all previous marks having been scored.
	Alternative method for question (b)		
	$\cos^2 x = \dfrac{-1-\sqrt{1+16k}}{8} < 0$ [$\therefore$ no solutions].	B1	State that this root is less than 0, needs to be linked to $\cos^2 x$. Can be achieved by substituting a value for $k \geqslant 0$.
	$[\cos^2 x] = \dfrac{-1 \pm \sqrt{1+16k}}{8}$	*M1	Must use quadratic formula. Allow any value of k **but not** ± 3. Condone + rather than $\pm$.
	$\dfrac{-1+\sqrt{1+16k}}{8} * 1 \Rightarrow -1+\sqrt{1+16k} * 8 \Rightarrow 1+16k * 81$	DM1	$*$ represents any inequality or =.
	$k * 5$	A1	$*$ represents any inequality or =.
	Concluding statement having considered both $\pm$ cases. $\therefore$ no solutions	A1	Dependent upon all previous marks having been scored.
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