Question	Scheme	Marks	AOs
1(a)	$\text{f}(x)=\text{e}^{2x}\cos x \Rightarrow \text{f}'(x)=2\text{e}^{2x}\cos x-\text{e}^{2x}\sin x$	M1	1.1a
	$\text{f}''(x)=4\text{e}^{2x}\cos x-2\text{e}^{2x}\sin x-\left(2\text{e}^{2x}\sin x+\text{e}^{2x}\cos x\right)$	M1 A1	1.1b 1.1b
	$\text{f}''(x)=3\text{e}^{2x}\cos x-4\text{e}^{2x}\sin x=p\text{e}^{2x}\cos x+q\left(2\text{e}^{2x}\cos x-\text{e}^{2x}\sin x\right)$ $\Rightarrow p=...,q=...$	M1	3.1a
	$\text{f}''(x)=-5\text{f}(x)+4\text{f}'(x)$	A1	2.1
		(5)	
(b)	$\text{f}(0)=1,\text{f}'(0)=2,\text{f}''(0)=3,\text{f}'''(0)=2,\text{f}''''(0)=-7,\text{f}^{v}(0)=-38$	M1	1.1b
	$\text{f}(x)=\text{f}(0)+x\text{f}'(0)+\frac{x^2}{2!}\text{f}''(0)+...$	M1	1.1b
	$\text{f}(x)\approx 1+2x+\frac{3x^2}{2}+\frac{x^3}{3}-\frac{7x^4}{24}-\frac{19x^5}{60}$	A1	2.2a
		(3)	
			(8 marks)

Notes

(a)
M1: Realises the need to use the product rule and attempts the first derivative
M1: Applies the product rule again to find the second derivative
A1: Correct second derivative simplified or un-simplified
M1: Uses their derivatives in order to obtain values for p and q
A1: Completes the proof and obtains the correct values of p and q
(b)
M1: Attempts all 5 derivatives at $x = 0$ using the result from part (a)
M1: Uses the correct Maclaurin series including the factorials
A1: Correct expression