ANNEX B

IJC H2 Preliminary Examination (Paper 1)

Qn/No	Topic Set	Answers
1	System of linear equations	\$570
2	Further Curve Sketching	------
3	Small angle approximation, Binomial expansion	$AC \approx 3+\frac{2}{3}\theta^2$, where $a=3$ and $b=\frac{2}{3}$
4	Application of differentiation (Stationary value)	(i) $h=\frac{2}{x^2}$ (iii) 0.89
5	Vectors (scalar and cross-product)	(i) $\lvert\mathbf{b}-\mathbf{a}\rvert=\sqrt{7}\lvert\mathbf{b}\rvert$ (ii) $\sqrt{\frac{3}{7}}\lvert\mathbf{b}\rvert$
6	Application of Integration (Volume of revolution)	(ii) $a=0,\ b=\frac{\pi}{2}$ $\frac{2}{3}\pi$ units^3
7	Application of differentiation (Tangent & Normal), Maclaurin Series	(i) $y=-\frac{1}{2}x+\frac{2}{5}$ (ii) $y=\frac{2}{3}-\frac{3}{2}x+\frac{27}{20}x^2+\ldots$ (iii) $y=\frac{2}{3}-\frac{3}{2}x$
8	Complex numbers	(a) $k=\sqrt{3}\tan\left(-\frac{\pi}{5}\right)$ or $k=\sqrt{3}\tan\left(-\frac{2\pi}{5}\right)$ (b)(ii) $2\sin\theta;\ \theta-\frac{\pi}{2}$
9	Functions	(ii) $\{x\in\mathbb{R}:\ x\geq 0.5,\ x\neq 3\}$ (iii) $\mathrm{gf}(x)=-\frac{1}{x^2-x-6},\ x\leq\frac{1}{2};\ -1$
10	Mathematical Induction, Sequence & Series (M.O.D.)	(ii) $\frac{1}{2}-\frac{N+1}{(N+2)!}$ (iii) $\sum_{n=1}^{\infty}\frac{n^2+n-1}{(n+2)!}\to\frac{1}{2}$ which is a constant, hence it is a convergent series. $S_\infty=\frac{1}{2}$

11	Application of differentiation (Stationary point), Curve Sketching, Application of Integration (Area)	(iii) $\int_{\sqrt{e}-1}^{\sqrt{e}} \frac{\sqrt{1-\left(x-\sqrt{e}\right)^2}}{2e}\,dx - \int_1^{\sqrt{e}} \frac{\ln x}{x^2}\,dx$; 0.0543
12	Complex numbers (including Loci)	(a)(i) $2^{\frac{1}{6}}e^{i\frac{-11\pi}{12}}, 2^{\frac{1}{6}}e^{i\frac{-7\pi}{12}}, 2^{\frac{1}{6}}e^{i\frac{-\pi}{4}}, 2^{\frac{1}{6}}e^{i\frac{\pi}{12}}, 2^{\frac{1}{6}}e^{i\frac{5\pi}{12}}, 2^{\frac{1}{6}}e^{i\frac{3\pi}{4}}$ (a)(iii) 6.735 (b)(ii) Maximum $\lvert w+10\rvert = 26$; Minimum $\lvert w+10\rvert = 12$