Annex B

SAJC H2 Maths Prelim :

Qn/No	Topic Set	Paper Number	Answers	Marks
1	Binomial Expansion	9740/01	$a = \frac{1}{\sqrt{3}}$, b $= -\frac{1}{\sqrt{3}}$, $c = \frac{5}{6\sqrt{3}}$	4
2	Mathematical Induction	9740/01		6
3	Inequalities + Integration	9740/01	(i) $x < 0$ or x ³ 2 (ii) $a = 4$	6
4	Complex Numbers (Loci)	9740/01	(ii)(a) $3\sqrt{2} \le \lvert z-3-3i \rvert < 6$ (ii)(b) $\frac{3\pi}{4} \le \arg(z-(3+3i)) < \pi$	6
5	Maclaurin's Series	9740/01	(ii) $x - \frac{1}{3}x^3$ (iii) $\frac{16\sqrt{3}}{9}$ (iv) 0	7
6	Tangent and Normal	9740/01	(i) $60x+16y=125a$ (ii) $\left(\frac{25}{16}a, \frac{125}{64}a\right)$ (iii) $\left(\frac{7}{3}a, \left(\frac{7}{3}\right)^{\frac{3}{2}}a\right)$ and $\left(\frac{7}{3}a, -\left(\frac{7}{3}\right)^{\frac{3}{2}}a\right)$	8
7	Functions	9740/01	(i) $\{a \in \square : a > -1\}$ (ii) $[-3, \frac{51}{7})$ (iii) h : $x \mapsto \frac{2e^{2x}-3e^{x}-3}{e^{x}+1}$, $x \in \square, x > 0$	8
8	Maxima-Minima + Rate of Change	9740/01	(a) $A = x\sqrt{a^2-x^2}$ (b) $-\frac{1}{12}$ rad/s	10

9	Vectors (lines)	9740/01	(ii) $\begin{pmatrix}4.5\\1\\0\end{pmatrix}$ (iii) $\begin{pmatrix}0\\-8\\11\end{pmatrix}$ (iv) 14.9; 53.6; Perpendicular/shortest distance from point X to line AB.	11
10	Vectors (planes)	9740/01	(i) $\begin{pmatrix}-1\\-3\\1\end{pmatrix}$; $3\sqrt{5}$ (ii) $1+\sqrt{55}$ (iii) $r\cdot\begin{pmatrix}2\\1\\-2\end{pmatrix}=9$	11
11	Area & Volume	9740/01	(a)(i) 2.76 units^2 (a)(ii) $\pi\left(\frac{1}{2}+4\ln 2\right)$ units^3 (b)(ii) $\tan^{-1}3$	11
12	Integration	9740/01	(a) $\frac{4}{3}(x+1)\sqrt{x+1}-4\sqrt{x+1}+C$ (b) $\ln(\tan^{-1}x)+C$ (c)(i) $-\frac{xe^{\sqrt{1-x^2}}}{\sqrt{1-x^2}}$ (c)(ii) 1	12
	Pure Maths			
1	Summation/Method of Difference	9740/02	(ii) $\frac{1}{2}-\frac{1}{(2n+2)!}$	6
2	AP & GP	9740/02	(ii) 5 (iii)56	7
3	Transformations	9740/02	(b) 1. Translate the graph of $y=\frac{1}{x^2}$ by 2 units in the positive x direction 2. Stretch the resulting graph parallel to the y-axis with a scale factor of -4. 3. Translate the resulting graph by 1 unit in the positive y	6

			direction.	
4	Differential Equations	9740/02	(ii)$k < 0$ A vaccination had been found to eliminate the virus OR The people infected by the virus had passed away	8
5	Complex Numbers	9740/02	(a) k = 2 (b) $z_1 = 2e^{i(-\frac{11\pi}{15})}, z_2 = 2e^{i(-\frac{5\pi}{15})}, z_3 = 2e^{i(\frac{\pi}{15})}$ $, z_4 = 2e^{i(\frac{7\pi}{15})}, z_5 = 2e^{i(\frac{13\pi}{15})}$	13
	Statistics			
6	P & C	9740/02	31	3
7	Sampling	9740/02	(ii) Quota Sampling	6
8	Normal Distribution	9740/02	(i) 275 (ii) 344	5
9	Probability	9740/02	(i) $\frac{14}{55}$ (ii) $\frac{11}{21}$	7
10	Poisson Distribution	9740/02	$\lambda = \frac{1}{2}$; 0.392; 0.714	7
11	Hypothesis Testing	9740/02	(i) p-value $= 0.00882$; reject H_0 (ii) conclusion in (i) does not change (ii) 60	10
12	Linear Regression and Correlation	9740/02	(ii) From the scatter diagram, the regression line of y on x should have negative gradient. Therefore $y = 79 - 2x$ is the correct regression line of y on x. (iii) (35, 18) (iv) -0.933 (v) $a = 1.75' 10^{58}$; $b = -33.6$	10
13	Binomial Distribution	9740/02	(ii) 0.923 (iii) 0.299 (iv) 11 0.00242	12