H2 Mathematics 9758 ANNEX

Paper 1		
QN	**TOPIC** (***Please Select***)	**ANSWERS** (***Exclude graphs and text answers***)
1	Equations & Inequalities	159.17
2	Graphs & Transformations	(ii) $-0.5 < k \le -0.470$ or $-0.0503 \le k \le 0$
3	Differentiation & Applications	(i) $x^2 = y^2 - 4a$. (ii) k=4
4	Integration & Applications	(a) $-\frac{\sin^2 x \cos^4 x}{4} - \frac{\cos^6 x}{12} + \mathrm{C}$ (b) $= 2\sqrt{5-3x^2+2x} + \sqrt{3}\sin^{-1}\frac{1}{4}(3x-1) + C$
5	Equations & Inequalities	$\therefore x < \frac{1-\sqrt{1+8a^2}}{2a}$ or $0 < x < \frac{1}{a}$ or $\frac{1}{a} < x < \frac{1+\sqrt{1+8a^2}}{2a}$
6	Differential Equations	(i) $(a-x)\frac{\mathrm{d}y}{\mathrm{d}x} = x - y$ (ii) $y = a + (a-x)\left[\ln(a-x) + C\right]$
7	Sigma Notation & MOD	(i) $u_n = 3An^2 - An - B$ (iii) $n^3 - 2n^2$
8	Integration & Applications	$S = \frac{1}{5}\left(1+\mathrm{e}^{-2\pi}\right)$ and $C = \frac{2}{5}\left(1+\mathrm{e}^{-2\pi}\right)$; $\frac{\pi}{20}\left(9-\mathrm{e}^{-2\pi}\right)$
9	Maclaurin & Binomial Series	(i) $\ln(k+2x)^n = n\left[\ln k + \frac{2x}{k} - \frac{2x^2}{k^2} + \frac{8x^3}{3k^3} - \ldots\right]$ (ii) $-\frac{k}{2} < x \le \frac{k}{2}$ (iii) $2 - 3\ln 3$ (iv) -2 (v) 54.3%
10	Vectors	(i) $\begin{pmatrix}7\\7\\0\end{pmatrix}$ (ii) $x + y - z = 14$ (iii) $\theta = 54.7^\circ$ or 0.955 (v) $4\sqrt{3}$
11	Differentiation & Applications	(ii) $K \approx 0.318$ (iii) 0.395
12	APGP	(ii) 2 weeks (iii) $u_n = 2^{n+1} - 1 + \frac{n}{2}(n-1)$ (iv) 22 weeks

Paper 2		
QN	**TOPIC** (***Please Select***)	**ANSWERS** (***Exclude graphs and text answers***)
1	Integration & Applications	$a^2\left(\frac{\pi}{3}-\frac{9\sqrt{3}}{32}\right)$
2	Functions	(i) $\mathrm{f}^{-1}(x)=-k+\sqrt{x+k^2}$; $D_{\mathrm{f}^{-1}}=[-k^2,\infty)$ (ii) $x=-1\pm\frac{8}{7}\sqrt{10}$
3	Differentiation & Applications	(i) $\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{1}{2\theta}$; $(0,\pi)$ (ii) $\theta=-0.235$
4	Vectors	(i) $\overrightarrow{OZ}=2(3\mathbf{b}-\mathbf{a})$; $\overrightarrow{OX}=2\mathbf{b}$; $\overrightarrow{OY}=\frac{1}{2}(3\mathbf{b}-\mathbf{a})$ (ii) $\theta=60^{\circ}$ or $\frac{\pi}{3}$
5	Complex Numbers	(a) 5 + i and –2; $p=-8$; $q=52$ (b)(i) $2\sqrt{3}\mathrm{e}^{\mathrm{i}\left(\frac{-2\pi}{3}\right)}$ (ii) 2, 5, 8
6	PnC & Probability	(a) 768 (b)(i) 8610 (ii) 40320 (iii) 4320
7	DRV	(ii) $\mathrm{P}(S=1.5)=\frac{20n}{(n+5)(n+4)(n+3)}$ $\mathrm{P}(S=2)=\frac{60}{(n+5)(n+4)(n+3)}$
8	Binomial Distribution	(ii)0.982 (iii) 25 (iv) 0.840
9	PnC & Probability	(ii)0.5 (iii)0.25 (iv) 0.6 (v) $\frac{11}{60}$
10	Normal Distribution	(i)0.0259 (ii)0.00360 (iv) 204 minutes (v)0.0117
11	Hypothesis Testing	(ii) $\bar{x}=99.1$; $s^2\approx10.9$ (iv) $\mathrm{H}_0:\mu=100$ $\mathrm{H}_1:\mu<100$ (iv) $m=99$