Further Mathematics 9649 ANNEX

Paper 1		
QN	**TOPIC** (***Pls Select***)	**ANSWERS** (***Exclude graphs and text answers***)
1	Complex Numbers	$2.99+0.275i$
2	Conics	
3	Differential Equations	(ii) $y=\left(-\frac{1}{2x}+\frac{1}{4}+Ce^{-\frac{2}{x}}\right)^{-\frac{1}{2}}$
4	Apps of Integration (incl. polar)	(i) $\frac{3}{4}$ (iii) $\frac{3}{128}\sqrt{3}-\frac{5\pi}{96}+\frac{1}{6}$
5	Numerical Methods	0.7709, 0.7853
6	Recurrence Relations	(a) $(1+b-d)u_n-c$ (b) $p^{n-1}u_1+\frac{q(1-p^{n-1})}{1-p}$ (c) 2000
7	Apps of Integration (incl. polar)	(b) $0<t<\frac{3}{2}$
8	Differential Equations	(ii) $T\cos\theta-mg=m\left[L\sin\theta\frac{\mathrm{d}^2\theta}{\mathrm{d}t^2}+L\cos\theta\left(\frac{\mathrm{d}\theta}{\mathrm{d}t}\right)^2\right]$ (iii) $\theta=\frac{\pi}{12}\left(\sin\sqrt{\frac{g}{L}}t+\cos\sqrt{\frac{g}{L}}t\right)$, Maximum $\theta=\frac{\sqrt{2}\pi}{12}$ (iv) $\theta_0-\frac{g}{L}\sin\theta_0$
9	Linear Algebra	(i) Basis for $K_1=\left\{\begin{pmatrix}2\\1\\1\\0\end{pmatrix},\begin{pmatrix}3\\-2\\0\\1\end{pmatrix}\right\}$, Basis for $K_2=\left\{\begin{pmatrix}2\alpha-9\\2-\alpha\\-1\\1\end{pmatrix}\right\}$, Rank of A = 3 (ii) $S=\left\{\lambda\begin{pmatrix}1\\1\\1\\0\end{pmatrix}+\mu\begin{pmatrix}2\\1\\1\\0\end{pmatrix}+\tau\begin{pmatrix}3\\-2\\0\\1\end{pmatrix},\lambda,\mu,\tau\in\mathbb{R}\right\}$ (iii) $\left\{\theta\begin{pmatrix}1\\2\\-1\end{pmatrix}+\phi\begin{pmatrix}2\\3\\-3\end{pmatrix},\theta,\phi\in\mathbb{R}\right\}$

10	Conics	(iv) $E \approx 0.8491$, $\theta = 1.06\,\text{rad}$
11	FM P1 Q11 Topic	
12	FM P1 Q12 Topic	
13	FM P1 Q13 Topic	
14	FM P1 Q14 Topic	

Paper 2

QN	TOPIC (*Pls Select*)	ANSWERS (*Exclude graphs and text answers*)
1	Complex Numbers	$\pm 2\sqrt{3}$
2	Mathematical Induction	(a) $F_1 = 1, F_2 = 1, F_3 = 2, F_4 = 3, F_5 = 5, F_6 = 8$
3	Complex Numbers	(b) $S = (-4)^n \sin n\theta \sin^{2n} \frac{1}{2}\theta$ (c) $0, 1, -27, 64$
4	Linear Algebra	$\mathbf{M} = \begin{pmatrix} 4 & -1 & -6 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$, $u_r = 4(-1)^r - 3.2^r + 3^r$ for $r \geq 1$.
5	Numerical Methods	(ii) 0.601 (v) 0.58
6	Continuous RV	(i) $\mathrm{F}(x) = \begin{cases} 0, & x < 0 \\ \frac{1}{2}[1 - \cos(\pi x)], & 0 \leq x \leq 1 \\ 1, & x > 1 \end{cases}$
7	Hypo Testing & Confidence Intervals	
8	Non-parametric Tests	
9	Hypo Testing & Confidence Intervals	(i) 0.1386, $m = 100$ (ii) 60
10	Chi-square Tests	$6 \leq m \leq 10$
11	Continuous RV	(ii) $m = \lambda, \lambda - 1$ (iii) $\lambda \leq 3$, where $\lambda \in \mathbb{Z}^+$ (iv) e^{-9} or 1.23×10^{-4}
12	FM P2 Q12 Topic	
13	FM P2 Q13 Topic	
14	FM P2 Q14 Topic	