FORM THREE MID TERM TWO 2017 MARKING SCHEME **1.** $R.E = \frac{0.05}{8.2} + \frac{0.05}{6.2} + \frac{0.05}{5.7}$	M1	represent
= 0.02293 P.E = 0.02293 × 100 □	M1 A1	or equivalent CAO
2. JKF[1] or JK[1]F or J[1]KF		
0.8 × 0.7 × 0.4 + 0.8 × 0.3 × 0.6 × 0.2 × 0.7 × 0.6	M1	
0.224 + 0.144 + 0.084	M1 A1	

3. 1 - 13500 = 13,500 × $^{10}/_{100}$ = 1350

13501 - 27000 = 13,500 × $^{15}/_{100}$ = 2025

27001 - 45000 = 18000 × $^{20}/_{100}$ = 3600

45001 - 62400 = 17400 × $^{25}/_{100}$ = 4350

4a. AX x XC =XD x XB
6 x 6.5=5x X
X= 7.8

b) BT2= AT x CT
BT2 = 19.5 x 7
BT = 11.68

B1 □ value to be replaced

11,3
25

1
056

5. $\int^2 = \frac{1}{4\pi^2 LC}$ $L = \frac{1}{4\pi^2 \int^2 C}$	M1 A1 2		
6. $(Log_2x)^2 + Log_28 =$ $Log_2 x\ 4\ (Log_2x^2 + 3 =$ $4Log_2x$ Let Log_2x $= t\ t^2 - 4t +$ $3 = 0$ $(t -1)\ (t -3)$ $= 0\ t = 1$ or 3	 M1 A1 B1 **03**	 quadratic equation Both values	
7.	$4x^2 – 9x – 1 = 0$ $x^2 – {}^{9x}/_4 – ¼ = 0$ $x^2 – {}^{9x}/_4 = ¼$ $x^2 – {}^{9x}/_4 + ({}^{-9}/_8)^2 = ¼ + ({}^{-9}/_8)^2$ $(x – {}^{9x}/_8)^2 = ¼ + {}^{81}/64 = {}^{97}/_{64}$ $x – {}^{9}/_8 = ¼ + {}^{81}/_{64} = {}^{97}/_{64}$ $x - {}^{9}/_8 = \pm\sqrt{{}^{97}/_{64}} = \pm 1.2311$ either $x - {}^{9}/_8 = + 1.2311$ $x = 1.2311 + 1.125 = 2.35611$ or $x - {}^{9}/_8 = -1.2311$ $x = -1.2311 + 1.125 = -0.10611$	 M1 M1 A1	 Completing the squares For both ans Accept 4dp	

8.

$\overrightarrow{OT} = \frac{3}{5}\overrightarrow{OB} + \frac{2}{5}\overrightarrow{OA}$

$= \frac{3}{5}\begin{pmatrix} 7 \\ -5 \\ 0 \end{pmatrix} + \frac{2}{5}\begin{pmatrix} 2 \\ 0 \\ 5 \end{pmatrix}$

$= \begin{pmatrix} 5 \\ -3 \\ 2 \end{pmatrix}$

$|\overrightarrow{OT}| = \sqrt{5^2 + -3^2 + 2^2} = 6.164$ units.

B1

M1A1

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9. $PQ = \begin{pmatrix} 14 & 0 \\ 0 & 14 \end{pmatrix}$

B1 — multiplication

$\begin{pmatrix} 4 & 1 \\ -2 & 3 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 9 \\ -1 \end{pmatrix}$

M1 — Multiplying by the invese

$\frac{1}{14}\begin{pmatrix} 3 & -1 \\ 2 & 4 \end{pmatrix}\begin{pmatrix} 4 & 1 \\ -2 & 3 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{14}\begin{pmatrix} 3 & -1 \\ 2 & 4 \end{pmatrix}\begin{pmatrix} 9 \\ -1 \end{pmatrix}$

$\begin{pmatrix} x \\ y \end{pmatrix} \quad \begin{pmatrix} 2 \\ 2 \end{pmatrix}$

A1

03

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10. a, a + 6d, a + 24d . . . . . a + 6d = a

B1

M1

$a^2 + 12ad + 36d^2 = a^2 + 24ad$

$12ad = 36d^2$

M1

$a = 3d$ . . . . .(i)

$a + 19d = 22$ . . . . . (ii)

$3d + 19d = 22$

$22d = 22$

$d = 1$

$a = 3$

A1

	MARKS	REMARKS
b) $S_{40} = \frac{40}{2}[2a + (n-1)d]$ $= 20[2 \times 3 + 39 \times 1]$ $= 900$	M1 A1	
c) i) $ar^9 = 3(3)^9$ $= 59{,}049$	M1 A1	
ii) $\frac{a(r^n - 1)}{r - 1} = \frac{3(3^{10} - 1)}{3 - 1} =$	M1	
11. a) $V = k + mr^2$ $95 = k + 25m$ $\underline{167 = k + 49m}$ $72 =$ $24m\ m$ $= 3$ $k = 95 - 75 = 20$ $v = 20 + 3(10)^2$ $= 320$ b) i)	M1 A1 B1 B1	✓ formation of simultaneous equations ✓ values of m and k ✓ substitution of r = 10 ✓ volume
KR^2 $P_1 = \frac{}{T}$ $1\times$ $P_2 = \frac{1.2^2}{0.9} = 1.6$ $\%age = \left\| \frac{1.6 - 1}{1} \right\| \times 100$ $= 60\%$	M1 M1 A1 M1 A1	
ii) $12 = \frac{36}{k}$	B1 10	