Question Number	Scheme	Marks
6(a)	E($C + C + C$) = 3.6 oe	B1
	Var($C + C + C$) = $0.03^2 + 0.03^2 + 0.03^2$ [= 0.0027]	M1
	P($C + C + C > 3.5$) = P $\left(Z > \left(\pm \frac{3.5 - "3.6"}{\sqrt{"0.0027"}} \right) [= -1.9245...] \right)$	M1
	= 0.9726 (calc 0.97285…) **awrt 0.973**	A1
		(4)
(b)	E($R - R$) = 0	M1
	Var($R - R$) = $0.03^2 + 0.03^2$ [= 0.0018]	M1
	$\mathrm{P}((R-R) > 0.05) = \mathrm{P}\left(Z > \left(\frac{0.05 - "0"}{\sqrt{"0.0018"}} \right) [= 1.1785...] \right)$ [= 0.119 (calc 0.119296…)]	M1
	$2 \times \mathrm{P}((R-R) > 0.05) = 2 \times "0.119"$	M1
	= 0.238 table or 0.23859…calc **awrt 0.238/0.239**	A1cso
		(5)
(c)	$\mu_G = 2.5 + 10 \times 2.3 [= 25.5]$	M1
	$\sigma_G{}^2 = 0.1 + 10 \times 0.03^2 [= 0.109]$	M1
	Let $X = G - 2T$	M1
	$\mu_X = "25.5" - 2 \times 2.5 [= 20.5]$	M1
	$\sigma_X{}^2 = "0.109" + 4 \times 0.1 [= 0.509]$	M1
	$\mathrm{P}(G - 2T < 20) = \mathrm{P}\left(Z < \frac{20 - "20.5"}{\sqrt{"0.509"}} [= -0.7008...] \right)$	M1
	= 0.242 (table) or 0.2417… (calc) **awrt 0.242**	A1
		(7)
	Notes	Total 16
(a)	B1 Correct value for E($C + C + C$) may be seen e.g. $\frac{18}{5}$ or implied by later calculation	
	M1 Correct method to find the variance. Condone 0.03^4 instead of 0.03^2 may be implied by calculation or awrt 0.973	
	M1 Correct standardisation using their mean and sd. Allow $\pm \frac{3.5 - "3.6"}{\sqrt{"0.0027"}}$ may be implied by P($Z >$ awrt -1.92) or P($Z <$ awrt 1.92) or awrt 0.973	
	A1 awrt 0.973 do not isw	
(b)	M1 for 0 may be seen or implied by later calculation	
	M1 correct method to find Var($R - R$) may be implied by 0.0018 or $\frac{9}{5000}$ or a later calculation. Must be a numerical value or expression.	
	M1 Correct standardisation using their mean and Var Allow ±	
	M1 2 × "their 0.119"	
	A1 awrt 0.238	
(c)	M1 Correct method for finding the mean of G may be implied by 25.5 or later work or sight of 20.5 (or may subtract 20 so 0.5)	
	M1 Correct method for finding the var of G may be implied by sight of 0.109 provided this is not to find the variance of $10R - T$. May be implied by 0.509	

	M1 Realising they need to find $\pm\ (G-2T)$. Allow $\pm\ (G-2T-20)$ may be seen as part of a probability expression or implied by their calculation
	M1 Correct method for finding the mean of X which may be from using their mean of G (which must be correct if no method or value is seen) Allow 0.5
	M1 Correct method for finding the var of X which may be from using their variance of G (which must be correct if no method or value is seen) may be implied by $10\times0.03^2+0.5$ or 0.509
	M1 Correct standardisation using their mean and standardisation for $G-2T$ (condone $G-T$) leading to a probability < 0.5 Allow 0 – "0.5" for numerator for correct use of 20 with their "20.5" and their "0.509"
	A1 awrt 0.242 from a correct distribution
	Note candidates who attempt $10R+T<2T+20\Rightarrow10R-T<20$ can score maximum M1M0M0M1M0M1A0 (the first method mark is implied by the fourth method mark)