Question Number	Scheme	Marks
5(a)(i)	$P(S>640)=P\left(Z>\frac{640-700}{50}\right)$	M1
	awrt **0.885**	A1 (2)
(ii)	$675<S<725$	M1
	$P(675<S<725)=P(S<725)-P(S<675)$ **or** use of symmetry to find correct area	M1
	$P(S<725)=P\left(Z<\frac{725-700}{50}\right)$ or $P(S<675)=P\left(Z<\frac{675-700}{50}\right)$	M1
	$P(-0.5<Z<0.5)=0.6915-(1-0.6915)$ or $1-2\times0.3085$ or $2\times(0.6915-0.5)$	A1
	$=0.383$ awrt **0.383**	A1
		(5)
(b)(i)	$\frac{680-\mu}{\sigma}=1.5$ $\frac{599-\mu}{\sigma}=-0.5244$	M1A1 A1
		(3)
(ii)	$(680-\mu)-(599-\mu)=1.5\sigma-(-0.5244)\sigma$	M1
	$(81=2.0244\sigma)$	
	$\sigma=40.01185$ $\mu=619.98....$ awrt **40** (to 2sf) awrt **620** (to 3sf)	A1A1
		(3)

Question		Scheme	Marks
6.	**(a)**	For sight of $0.6^2\times0.4$ (o.e.)	B1cso (1)
	(b)(i)	$P(X=1)=$ **0.4**	B1
	(ii)	$P(X=4)=1-$"0.4"$-0.24-0.144$ or $0.6^3\times0.4+0.6^4$ or 0.6^3 $=$ **0.216**	M1 A1 (3)
	(c)	$[E(X)=]1\times0.4+2\times0.24+3\times0.144+4\times0.216$, $=2.176$ awrt **2.18**	M1, A1 (2)
	(d)	$[E(X^2)=]1^2\times0.4+2^2\times0.24+3^2\times0.144+4^2\times0.216$ [$=6.112$]	M1
		$\text{Var}(X)=$"6.112"-2.176^2	M1
		$=1.377024$ awrt **1.38**	A1 (3)
	(e)	stop after 1 head so 1 is the max value and can get no heads for 4 tails	B1
		$P(H=0)=$ **0.1296** and $P(H=1)=$ **0.8704**	B1 (2)
	(f)(i)	$[P(\{X=3\}\cap\{H=0\})=]$ $=$ **0**	B1
	(ii)	$[P(\{X=4\}\cap\{H=0\})=]$ $P(H=0)=0.6^4=$ **0.1296** or $\frac{81}{625}$	B1ft (2)
	(g)	$[s]$: 2, 3, 4, 5	B1ft B1
		$[P(S=s)]$: 0.4, 0.24, 0.2736, 0.0864	B1ft B1 (4)
			(17 marks)

Question	Scheme	Marks
5 (a)	$P(X<18)=P\left(Z<\pm\left(\frac{18-15}{2}\right)[=\pm 1.5]\right)$	M1
	$=0.9332$ awrt 0.933	A1
		(2)
(b)	$\frac{x-15}{2}=0.2533$	M1B1
	$x=15.506\ldots$ awrt 15.5	A1
		(3)
(c)	$P(T>\mu-10)=0.975$	M1
	$\frac{(\mu\pm 10)-\mu}{\sigma}=\pm 1.96 \Rightarrow \sigma=\frac{10}{1.96}[=5.10\ldots]$	M1
	$P(T>\mu-5)=P\left(Z>\frac{\mu-5-\mu}{"5.10\ldots"}[=-0.98]\right)[=0.836\ldots]$	M1
	$P(T>\mu-5 \mid T>\mu-10)=\frac{"0.836\ldots"}{"0.975"}$	M1
	$=0.8579\ldots$ awrt 0.858	A1
		(5)
	Notes	**Total 10**

Question Number	Scheme	Marks
2. (a)	B and C	B1
		(1)
(b)	A and C independent gives:	
	$P(C)\times 0.65=0.13$ **or** $0.65\times(r+0.13)=0.13$ **or** $0.65\times(0.48-s)=0.13$	M1
	$P(C)=0.2$ **or** $r+0.13=0.2$ **or** $0.48-s=0.2$	A1
	$r\{=0.2-0.13\}=\underline{\mathbf{0.07}}$ **or** $s\{=0.48-0.2\}=\underline{\mathbf{0.28}}$	A1
	$P(A)+r+s=1$ **or** $0.65+"0.07"+s=1$ **or** $0.65+"0.28"+r=1$	M1
	$s\{=1-0.72=\}\ \underline{\mathbf{0.28}}$ **and** $r\{=1-0.93=\}\ \underline{\mathbf{0.07}}$	A1
		(5)
(c)	$P[(B\cup C)']="0.2"+q$ **or** $0.13+"0.07"+q$	B1ft
	$P(A\cap C')=p+q \quad \{=0.52\}$	B1
	$\{P[(A\cap C')\cap(B\cup C)]=q\Rightarrow\}$ $"(p+q)"\times"(0.2+q)"=q$ **or** $"(p+q)"\times"(0.13+"0.07"+q)"=q$ or $"(p+q)"\times"(1-s-p)"=0.52-p$	M1
	[Using $p+q=0.52$] $0.52\times"(0.2+q)"=q$ or $0.52(0.72-p)=0.52-p$	M1
	$q=\underline{\frac{13}{60}}$	A1
	$p=\underline{\frac{91}{300}}$	A1
		(6)