Question Number	Scheme	Marks
1(a)	$\frac{200-\mu}{\sqrt{0.04}} = -1.6449$	M1 A1
	$\mu = 200.3$	A1
		(3)
(b)	$X \sim B(8, 0.05)$	B1
	$P(X \geq 3) = 1 - P(X \leq 2) = 1 - 0.9942$	M1
	$= 0.0058$ awrt 0.0058	A1
		(3)
(c)	$Y \sim Po(3)$	B1
	$P(Y > 5) = 1 - P(Y \leq 5) = 1 - 0.9161$	M1
	$= 0.0839$ awrt 0.0839	A1
		(3)

	Notes		Total 9
1(a)	**M1**	$\pm\frac{200-\mu}{\sqrt{0.04}} = \pm z$ value, where $\lvert z \rvert > 1$	
	A1	For a correct equation with compatible z value and $z = 1.6449$ or better	
	A1	200.3 Condone awrt 200.3 **NB** M1A0A1 is possible	
(b)	**B1**	Writing or using B(8, 0.05) May be implied by e.g. 0.9428 or 0.9996 or 0.0571 or 0.0004 or awrt 0.0058	
	M1	Writing or using $1 - P(X \leq 2)$	
	A1	Awrt 0.0058	
(c)	**B1**	Writing or using Po(3) May be implied by e.g. 0.8153 or 0.9665 or 0.1847 or 0.0335 or awrt 0.0839	
	M1	Writing or using $1 - P(Y \leq 5)$	
	A1	Awrt 0.0839	

2. The random variable $X \sim \mathrm{B}(10, p)$

(a) (i) Write down an expression for $\mathrm{P}(X = 3)$ in terms of p

(ii) Find the value of p such that $\mathrm{P}(X = 3)$ is 16 times the value of $\mathrm{P}(X = 7)$

(4)

The random variable $Y \sim \mathrm{Po}(\lambda)$

(b) Find the value of λ such that $\mathrm{P}(Y = 3)$ is 5 times the value of $\mathrm{P}(Y = 5)$

(3)

The random variable $W \sim \mathrm{B}(n, 0.4)$

(c) Find the value of n and the value of α such that W can be approximated by the normal distribution, $\mathrm{N}(32, \alpha)$

(3)

(Total for Question 2 is 10 marks)