Question	Scheme	Marks
6(a)	0.95	B1 (1)
(b)	$X \sim$ B(10, '0.95') $P(X \geq 9) = P(X = 9) + P(X = 10) = 10(0.95)^9(0.05) + 0.95^{10}$ 0.91386... awrt **0.914**	B1 M1 A1 (3)
(c)	Y = Number of bolts that cannot be used $Y \sim$ B(120, 0.05) can be approximated by Po(6) P(more than 117 bolts can be used) = $P(Y \leq 2)$ $P(Y \leq 2) = 0.06196...$ awrt **0.062**	M1A1 dM1 A1 (4) **Total [8]**
	Notes	
(b)	B1 writing or using B(10, '0.95') Allow for a probability of the form ${}^nC_r(0.95)^n(0.05)^{10-n}$ where $1 \leq n \leq 9$ must be seen or a correct answer given M1 for writing or using $P(X = 9) + P(X = 10)$. For using we must see a calculation for each probability using B(10, '0.95') (Condone missing/incorrect ${}^nC_r$), ie allow $(0.95)^9(0.05) + 0.95^{10}$ May be implied by a correct answer. **or** for writing or using $1 - P(X = 0) - P(X = 1) - P(X = 2) - P(X = 3) - P(X = 4) - P(X = 5) - P(X = 6) - P(X = 7) - P(X = 8)$. For writing allow … but need a minimum of 3 terms. For using we must see a calculation for each probability using B(10, '0.95') (Condone missing/incorrect ${}^nC_r$). May be implied by a correct answer. Do **not** allow for **writing** $P(X \geq 9)$ or $P(X > 8)$ or $1 - P(X \leq 8)$ or $1 - P(X < 9)$. A1 awrt 0.914 **NB SC** Using Po(9.5) gets B1M0A0 Alternative B1 writing or using B(10, 0.05) M1 using $P(Y \leq 1)$ [$= P(Y = 1) + P(Y = 0) = 10(0.05)(0.95)^9 + 0.95^{10}$] oe but must use B(10, 0.05) A1 0.9139 from tables **NB** Using Po(0.5) gets B1M0A0	
(c)	1st M1 using a Poisson distribution. 1st A1 Po(6) is written or used. 2nd dM1 dep on first M1 being awarded writing or using $P(Y \leq 2)$ oe eg $P(Y < 3)$ 2nd A1 awrt 0.062 (0.0620 from tables) Do not ISW Note exact binomial gives 0.0575… Note normal approximation gives awrt 0.0713 (calc) or 0.0708 (tables) with cc and awrt 0.0469 (calc) or 0.0465 (tables) without cc	