Question Number	Scheme	Marks
3(a)	$\frac{1}{6}a(a+1)=0.6$	M1
	$a^2+a-3.6=0$ So $a=\frac{-1\pm\sqrt{1+4\times3.6}}{2}$	M1
	$=1.462\ldots$ awrt 1.46	A1
		(3)
(b)(i)	$[f(x) = \frac{d}{dx}F(x) =]\frac{1}{3}x+\frac{1}{6}$	M1A1
	$[E(X) =]\int_0^2 x\left(\frac{1}{3}x+\frac{1}{6}\right)dx$	M1
	$=\left[\frac{x^3}{9}+\frac{x^2}{12}\right]_0^2$	A1
	$=\frac{11}{9}$ awrt 1.22	A1
(ii)	$[Var(X) =]\int_0^2 x^2\left(\frac{1}{3}x+\frac{1}{6}\right)dx\left[-\left(\frac{11}{9}\right)^2\right]$	M1
	$=\left[\frac{x^4}{12}+\frac{x^3}{18}\right]_0^2-\left("\frac{11}{9}"\right)^2$	A1ft
	$=\frac{23}{81}$ awrt 0.284	A1
		(8)

	Notes	Total 11
(a)	**M1**	putting F(x) = 0.6 or 1 − 0.4
	M1	attempting either completing the square or quadratic formula (one slip allowed) (condone + instead of ±) Must set F(a) = 0.6 or F(a) = 0.4 to score this mark May be implied by awrt 1.46 or awrt -2.46 (if set = 0.4 then may be implied by awrt 1.13 or awrt –2.13)
	A1	awrt 1.46 (must reject other root if stated)
(b)(i)	**M1**	attempting to differentiate $F(x)$ at least one $x^n \to x^{n-1}$ May be seen in part a
	A1	Cao
	M1	attempting $\int_0^2 xf(x)\,dx$ at least one $x^n \to x^{n+1}$ using their f(x) which must be a changed function from $F(x)$. No need for limits
	A1	For $\frac{x^3}{9}+\frac{x^2}{12}$ (may be unsimplified) Ignore limits
	A1	Awrt 1.22
(ii)	**M1**	M1 attempting $\int x^2f(x)\,dx$ at least one $x^n \to x^{n+1}$ using their f(x) which must be a changed function from F(x). Ignore limits.
	A1ft	For $\frac{x^4}{12}+\frac{x^3}{18}-\mu^2$ (may be unsimplified) Ft their E(X). Ignore limits. The subtraction may be seen after the evaluation of E(X^2)
	A1	Awrt 0.284

4. A company claims that 35% of its peas germinate. In order to test this claim Ann decides to plant 15 of these peas and record the number which germinate.

(a) (i) State suitable hypotheses for a two tailed test of this claim.

(ii) Using a 5% level of significance, find an appropriate critical region for this test. The probability in each of the tails should be as close to 2.5% as possible.

(4)

(b) Ann found that 8 of the 15 peas germinated. State whether or not the company's claim is supported. Give a reason for your answer.

(2)

(c) State the actual significance level of this test.

(1)

(Total for Question 4 is 7 marks)