Question Number	Scheme	Marks
3. (a)	0.02 and $0.98-p$ correctly placed [no mixing of % and probability] 0.96 and 0.05 plus $1-q$, 0.04, 0.95 correctly placed	B1 B1 (2)
(b)	$P(T) = pq + 0.02\times0.96 + (0.98-p)\times0.05 = 0.169$ $\{pq - 0.05p = 0.1008\}$ $P(\text{do not have disease} \mid T) = \dfrac{"(0.98-p)"\times0.05}{0.169} = \dfrac{41}{169}$ So $p = \underline{\mathbf{0.16}}$ e.g. $0.16q - 0.16\times0.05 = 0.1008$ $q = \underline{\mathbf{0.68}}$	M1; A1 M1A1ft A1 dM1 A1 (7)
(c)(i)	$P(\text{type } A \mid T \text{ and not type } B) = \dfrac{pq}{pq+(0.98-p)\times0.05} = \dfrac{0.1088}{0.1088+0.041}$ $= 0.7263\ldots$ awrt $\underline{\mathbf{0.726}}$	M1A1ft A1 (3)
(ii)	Should find test useful, doctor knows there is a much greater chance that the person has type A (0.73 compared to 0.16 or 0.163…[from $\frac{0.16}{0.98}$])	B1 (1) **[13]**

	Notes
(a)	1st B1 for remainder of 1st column probabilities (allow use of correct p so 0.82) 2nd B1 for remainder of 2nd column probabilities (allow use of correct q so 0.68 and 0.32)
	In (b) or (c) if p or q are used as ft in M or A marks they must be probabilities
(b)	1st M1 for attempt to form eq'n in p and q using $P(T) = 0.169$ [at least 2 of 3 correct prod's] 1st A1 for a fully correct equation in p and q or possibly just q (using their p see 3rd M1) 2nd M1 for use of a conditional prob (ratio of probabilities with num or den correct, allow ft on num) and $\frac{41}{169}$ to form an equation in p 2nd A1ft for a correct equation using values from their tree diagram 3rd A1 for solving to get $p = 0.16$ (or exact equivalent) 3rd dM1 (dep on 1st M1) for substituting their p into an equation for q (ft their p value) 4th A1 for $q = 0.68$ (or exact equivalent)
(c)(i)	M1 for an attempt at a conditional prob with numerator of their pq (num < denom) 1st A1ft for a correct ratio of probs (ft their values for p or q with at least one correct) 2nd A1 for awrt 0.726 (or exact fraction $\frac{544}{749}$)
(ii)	B1 If (c)(i) < 0.7 then B0 for suggesting test should be useful (accept "yes") plus statement: about increased prob or "more likely to have type A than no disease" or "prob of A is high"

