

Qu 4	Scheme	Marks	AO
(a)	$0.08 + 0.09 + 0.36 = \underline{0.53}$	B1 (1)	1.1b
(b)(i)	$[P(G \cap E \cap S) = 0 \Rightarrow] \underline{p = 0}$	B1	1.1b
(ii)	$[P(G) = 0.25 \Rightarrow] 0.08 + 0.05 + q + "p" = 0.25$ $\underline{q = 0.12}$	M1 A1 (3)	1.1b 1.1b
(c)(i)	$[P(S E) = \frac{5}{12} \Rightarrow] \frac{r + "p"}{r + "p" + 0.09 + 0.05} = \frac{5}{12}$ $[12r = 5r + 5 \times 0.14 \Rightarrow] \underline{r = 0.10}$	M1 A1ft A1	3.1a 1.1b 1.1b
(ii)	$[0.08 + 0.05 + "0.12" + "0" + 0.09 + "0.10" + 0.36 + t = 1 \Rightarrow] \underline{t = 0.20}$	B1ft (4)	1.1b
(d)	$P(S \cap E') = 0.36 + "q" [= 0.48]$ $P([(S \cap E') \cap G]) = "q" [= 0.12] \text{ and } P(G) = 0.25 \text{ and}$ $P(S \cap E') \times P(G) = "0.48" \times \frac{1}{4} \underline{\text{or}} 0.12$ $P(S \cap E') \times P(G) = 0.12 = P([(S \cap E') \cap G]) \text{ so are independent}$	B1ft M1 A1 (3)	1.1b 2.1 2.2a
(11 marks)			

Notes	
(a)	B1 for 0.53 (or exact equivalent) [Allow 53%]
(b)(i)	B1 for $p = 0$ (may be placed in Venn diagram)
(ii)	M1 for a linear equation for q (ft letter “ p ” or their value if $0, p, 0.12 \Rightarrow$ by $p + q = 0.12$
	A1 for $q = 0.12$ (may be placed in Venn diagram)
(c)(i)	M1 for a ratio of probabilities (r on num and den) (on LHS) with num < den and num <u>or</u> den correct ft. Allow ft of letter “ p ” <u>or</u> their p where $0, p < 0.86$ but “+ 0” is not required.
	1 st A1ft for a correct ratio of probabilities (on LHS) allowing ft of their p where $0, p < 0.86$
	2 nd A1 for $r = 0.1(0)$ or exact equivalent (may be in Venn diagram) Ans only 3/3
(ii)	B1ft for $t = 0.2(0)$ (o.e.) <u>or</u> correct ft i.e. $0.42 - (p + q + r)$ where p, q, r and t are all probs
(d)	B1ft for $P(S \cap E') = 0.48$ (with label) (ft letter “ q ” or their value if $0, q, 0.12$)
	M1 for attempting all required probs (labelled) <u>and</u> using them in a correct test (allow ft of q)
	A1 for all probs correct and a correct deduction (no ft deduction here)
SC	No “P” If correct argument seen apart from P for probability for all 3 marks, award (B0M1A1) If unsure about an attempt using conditional probabilities, please send to review.

