

Qu 5	Scheme	Marks	AO									
(a)	$[2q = 0.3] \left[q = \frac{1 - (0.5 + 0.2)}{2} \right] [q =]$ 0.15	B1 (1)	1.1b									
(b)	Realising require sequence: $\bar{7}, \bar{7}, 7$ may see $0.8 \times 0.8 \times 0.2$ o.e. = 0.128 *	M1 A1* (2)	3.4 1.1b									
(c)	Possible values for S are: 1, 2, 3 or 4 only [$P(S = 1)$] = 0.2 <u>and</u> [$P(S = 2) = 0.8 \times 0.2 =$] 0.16 $P(S = 4) = 0.8^3 \times 0.2 + 0.8^4$ [= 0.512] <u>or</u> $1 - [P(S = 1) + P(S = 2) + 0.128]$	B1 M1	3.3 3.4									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>s</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>$P(S = s)$</td> <td>0.2 $= \frac{1}{5}$</td> <td>0.16 $= \frac{4}{25}$</td> <td>0.128 $= \frac{16}{125}$</td> <td>0.512 $= \frac{64}{125}$</td> </tr> </tbody> </table>	s	1	2	3	4	$P(S = s)$	0.2 $= \frac{1}{5}$	0.16 $= \frac{4}{25}$	0.128 $= \frac{16}{125}$	0.512 $= \frac{64}{125}$	M1 A1 (4)
s	1	2	3	4								
$P(S = s)$	0.2 $= \frac{1}{5}$	0.16 $= \frac{4}{25}$	0.128 $= \frac{16}{125}$	0.512 $= \frac{64}{125}$								
(d)	[$= 1 - P(S = 1 = N) = 1 - 0.2$] = 0.8	B1 (1)	1.1b									
(8 marks)												

Notes

(a)	B1 for $q = 0.15$ o.e.
(b)	M1 for evidence that a correct sequence has been applied allow a clear list of all 9 possibilities e.g. (6,6,7), (6,8,7), (6,10,7), (8,6,7), (8,8,7), (8,10,7), (10,6,7), (10,8,7), (10,10,7) or e.g. $0.5 \times 0.5 \times 0.2 [= 0.05] + 4(0.5 \times 0.15 \times 0.2 [= 0.015]) + 4(0.15 \times 0.15 \times 0.2 [= 0.0045])$ A1* for 0.128 from a correct expression with no incorrect working seen
(c)	B1 for a correct sample space for S (e.g. first row of table) condone any letter for B1 if any other values for S are stated they must be attached to a probability of 0 1 st M1 for using the given model to find both values of $P(S = 1)$ <u>and</u> $P(S = 2)$ 2 nd M1 for a correct method to find $P(S = 4)$ <u>or</u> use of $P(S = 4) = 1 - (P(S = 1) + P(S = 2) + 0.128)$ i.e. their $P(S = 1) + P(S = 2) + P(S = 4) = 0.872$ A1 for a fully correct probability distribution, in table or listed separately <u>must be in terms of S</u> for this mark to be scored
(d)	B1 for 0.8