Question Number	Scheme	Marks
2(i)(a)	μ is not (a statistic) as it is an **unknown** (parameter)	B1
(b)	$\bar{x}$ is (a statistic) as it is **based on (known) observations**.	B1
		(2)
(ii)	Outcomes $Y_1 = 2$, $Y_2 = 5$ or $Y_1 = 2$, $Y_2 = 6$ or $Y_1 = 5$, $Y_2 = 6$ oe only	M1
	$\mathrm{P}(Y_1 < Y_2) = \frac{1}{3}\times\frac{1}{4}+\frac{1}{3}\times\frac{5}{12}+\frac{1}{4}\times\frac{5}{12}\ \left(=\frac{1}{3}\times\frac{2}{3}+\frac{1}{4}\times\frac{5}{12}\right)$	M1
	$=\frac{47}{144}=0.32638\cdots$ awrt 0.326	A1
		(3)
(iii)(a)	Possible ordered outputs (3, 4), (3, 5), (4, 3), (4, 5), (5, 3), (5, 4)	B1
		(1)
(b)	{10, 11, 13, 14}	M1, A1
		(2)
(c)	Probability of any one outcome $=\frac{1}{6}$ oe	B1

t	10	11	13	14
$\mathrm{P}(T=t)$	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{6}$

M1A1

(3)

	Notes	Total 11
		Mark (i)(a) and (i)(b) together
(i)(a)	**B1**	correct answer and valid reason that μ is either (usually) unknown or a population parameter oe
(i)(b)	**B1**	correct answer and valid reason suggests one of the following that $\bar{x}$ is • based (solely) on observations/calculations/values/information/data/a function oe • contains no unknown population parameters • calculated/measured • numerical property of a sample/derived from a sample Do not allow "it is a statistic because it is known"
		SC B1B0 for μ is not a statistic and $\bar{x}$ is a statistic stated or with insufficient/incorrect reasoning
(ii)	**M1**	correct outcomes stated or implied and no extras. Accept $(2,5)$ $(2,6)$ $(5,6)$ or e.g. $2<5,\ 2<6,\ 5<6$ May consider all outcomes but indicate the rows which are required. Condone the order the other way round for the pairs i.e. $(5,2)$ $(6,2)$ $(6,5)$
	M1	at least two correct products. If $\frac{1}{3}\times\frac{2}{3}$ oe is seen then this is sufficient for M1
	A1	awrt 0.326 Correct answer 3/3
		Mark (iii)(a), (iii)(b) and (iii)(c) together
(iii)(a)	**B1**	Ordered outputs stated or may be seen e.g. in a list/table but not within calculations and no extras. Cannot be implied by their final table in (c). Check by the question for their combinations. Isw if the 6 combinations are stated but they subsequently write 7, 8 and 9 (the sums of the combinations). Do not accept (3, 4) ×2 (3, 5) ×2, (5, 4) ×2

<table>
<tr><td rowspan="2">(iii)(b)</td><td>M1</td><td>at least 2 correct values from 10, 11, 13 and 14 (accept any list form or within a table as part of their calculations). Condone repeats/extras
Condone with replacement at least 2 correct values from 9, 10, 11, 12, 13, 14 and 15</td></tr>
<tr><td>A1</td><td>all correct and no extras/repeats removed. May be implied by final table in (c)</td></tr>
<tr><td>(iii)(c)</td><td>B1</td><td>probability of $\frac{1}{6}$ or equivalent calculation eg $\frac{1}{3}\times\frac{1}{2}$. May be implied by a correct probability for one of the values in the table.</td></tr>
<tr><td rowspan="2"></td><td>M1</td><td>at least 2 correct probabilities or calculations correctly paired with the correct values of t
Condone with replacement at least 2 from:
<table>
<tr><td>t</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr>
<tr><td>P($T = t$)</td><td>$\frac{1}{9}$</td><td>$\frac{1}{9}$</td><td>$\frac{2}{9}$</td><td>$\frac{1}{9}$</td><td>$\frac{2}{9}$</td><td>$\frac{1}{9}$</td><td>$\frac{1}{9}$</td></tr>
</table></td></tr>
<tr><td>A1</td><td>fully correct. Need not be in a table but must have a correct probability associated with correct value. Condone a different variable to T eg X
a correct table with no incorrect working seen implies full marks for (iii)(b) and (iii)(c)</td></tr>
</table>