| Question | Answer | Mark | Comments |
|---|---|---|---|
| 1(a) | 0.1 on Fail<br>for First check | B1 | oe fraction, decimal or percentage |
| | 0.01 on Fail<br>and<br>0.99 on Pass<br>for Second check | B1 | oe fraction, decimal or percentage |
| | **Additional Guidance** | | |
| | Ignore any extra branches drawn | | |

| Question | Answer | Mark | Comments |
|---|---|---|---|
| 1(b) | **Alternative method 1** | | |
| | 0.9 × their 0.01 or 0.009 | M1 | oe eg $\frac{9}{10} \times \frac{1}{100} = \frac{9}{1000}$ |
| | their 0.009 + their 0.1 | M1dep | oe<br>their 0.1 must be > 0 and < 1 |
| | 0.109 | A1ft | oe fraction, decimal or percentage<br>ft their tree diagram if all probabilities are > 0 and < 1 |
| | **Alternative method 2** | | |
| | 0.9 × their 0.99 or 0.891 | M1 | oe eg $\frac{9}{10} \times \frac{99}{100} = \frac{891}{1000}$ |
| | 1 – their 0.891 | M1dep | oe |
| | 0.109 | A1ft | oe fraction, decimal or percentage<br>ft their tree diagram if all probabilities are > 0 and < 1 |
| | **Additional Guidance** | | |
| | Answer 0.109% | | M2A0 |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 2(a) | Yes $\frac{3}{5}$ and No $\frac{2}{5}$ for Bag A | B1 | oe fraction, decimal or percentage |
| | Yes $\frac{1}{10}$ and No $\frac{9}{10}$ for both pairs of branches on Bag B | B1 | oe fraction, decimal or percentage |

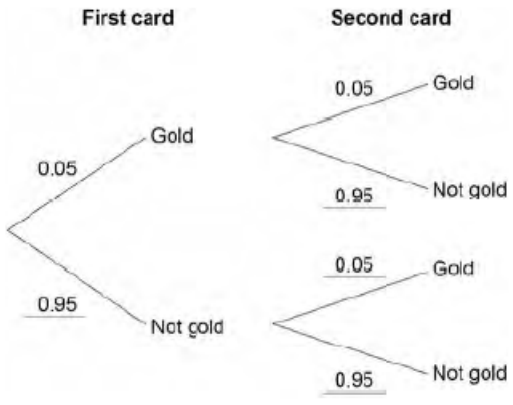
| Q | Answer | Mark | Comment |
|---|---|---|---|
| 2(b) | their $\frac{3}{5}$ × their $\frac{1}{10}$ or $\frac{3}{50}$ | M1 | oe may be on tree diagram<br>ft their tree diagram if their $\frac{3}{5}$ and their $\frac{1}{10}$ are $> 0$ and $< 1$ |
| | their $\frac{3}{5}$ × their $\frac{1}{10}$ × 450<br>or $\frac{3}{50}$ × 450 | M1dep | oe<br>their $\frac{3}{50}$ must be $> 0$ and $< 1$ |
| | 27 | A1ft | ft their tree diagram if their $\frac{3}{5}$ and their $\frac{1}{10}$ are $> 0$ and $< 1$ |

| | Additional Guidance | |
|---|---|---|
| | For the first mark, accept the correct probability shown on the tree diagram and ignore other probabilities | |
| | For the first mark, do not allow $\frac{3}{5} \times \frac{1}{10}$ seen as part of a longer multiplication string of probabilities<br>eg $\frac{3}{5} \times \frac{1}{10} \times \frac{9}{10}$ | M0 |
| | Check tree diagram for working | |
| | $\frac{27}{450}$ implies | M1M1A0 |
| | Students with incorrect probabilities on the tree diagram can score marks for follow through in part (b) or from the correct probabilities recovered<br>eg probabilities of $\frac{3}{4}$ and $\frac{9}{10}$ on the top row of the tree diagram but an answer of 27 in part (b) | B0B0 in (a)<br>M1M1A1 in (b) |
| | Allow follow through from values rather than probabilities on the branches, with denominator 5 for Bag A and 10 for Bag B<br>eg from 2 on Bag A and 9 on Bag B allow $\frac{2}{5} \times \frac{9}{10} \times 450 = 162$ | M1M1A1ft |
| | For A1ft allow a correct decimal answer or the answer truncated or rounded up to the nearest integer<br>eg from $\frac{3}{4}$ and $\frac{1}{10}$ leading to $\frac{3}{40} \times 450$ accept 33 or 33.75 or 34 | M1M1A1ft |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(a) | The probabilities sum to 1 | B1 | oe eg 0.1 + 0.3 + 0.6 = 1 |
| | **Additional Guidance** | | |
| | Ignore comments about the dice, eg 0.5 + 0.5 = 1 | | |
| | Do not accept an incorrect statement alongside a correct one<br>eg they add up to 1 and 0.1 + 0.4 + 0.6 = 1 | B0 | |
| | All probabilities add up to 100% | B1 | |
| | It doesn't include any other colours | B0 | |
| | They add to a whole number | B0 | |
| | The probabilities are not zero | B0 | |
| | The only colours on the tree diagram are red, blue and green | B0 | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(b) | 0.4 | B1 | |

| Q | Answer | Mark | Comment |
|---|---|---|---|
| 3(c) | 0.15 | B1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 4(a) | Fully correct diagram | B2 | oe<br>B1 0.95 seen once in correct position |
| | **Additional Guidance** | | |
| |  | | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 4(b) | $0.05 \times 0.05$ or $0.0025$<br>or<br>$0.05 \times 0.95$ or $0.95 \times 0.05$<br>or $0.0475$<br>or<br>$0.95 \times 0.95$ or $0.9025$ | M1 | oe<br>ft their tree diagram in (a) if all probabilities are between 0 and 1 |
| | $1 - 0.95 \times 0.95$ or $1 - 0.9025$<br>or<br>$0.05 \times 0.05 + 2 \times 0.05 \times 0.95$<br>or<br>$0.0025 + 2 \times 0.0475$<br>or<br>$0.0025 + 0.095$ | M1dep | oe<br>ft their tree diagram in (a) if all probabilities are between 0 and 1 |
| | 0.0975 or 0.098 | A1ft | oe eg $\frac{39}{400}$ or 9.75% |
| | **Additional Guidance** | | |
| | Calculations or probabilities for part (b) may be seen on diagram in part (a) | | |
| | If part (a) is incorrect full marks may be scored in part (b) | | |