

## Solutions

### Q1

$$(a)(i) \left(\frac{6}{6}\right)\left(\frac{1}{6}\right) = \frac{1}{6} \quad (ii) 1 - \left(\frac{1}{6}\right) = \frac{5}{6}$$

$$(b)(i) \left(\frac{6}{6}\right)\left(\frac{5}{6}\right)\left(\frac{4}{6}\right) = \frac{5}{9} \quad (ii) 1 - \left(\frac{5}{9}\right) = \frac{4}{9}$$

### Q2 $P(\text{oversleep \& cycle to school})$

+  $P(\text{does not oversleep \& cycle to school})$

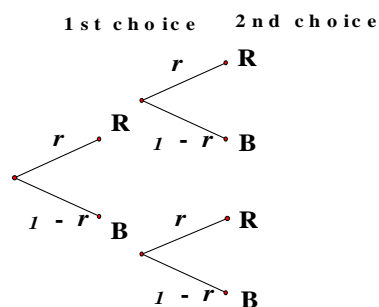
$$= (0.4)(0.7) + (0.6)(0.1) = 0.34$$

### Q3

$$(i) 0.1 \quad (ii) (0.10)(0.2) = 0.02$$

$$(iii) (a) (0.9)^3 = 0.729 \quad (b) 1 - 0.729 = 0.271$$

### Q4



$$(a) 1-r \quad (b) r^2 \quad (c)(i) r^9 \quad (ii) 1-r^9$$

### Q5 Construct a possibility diagram.

+	1	2	2	3
1	2	3	3	4
2	3	4	4	5
5	6	7	7	8
6	7	8	8	9

$$(a)(ii) \frac{3}{16}$$

To get total score of all three dice between 30 to 35, total score for red and blue dice must be either, 2, 3 or 4 (probability is 7 out of 16)

while score on the green die must be 30 (probability is 1 out of 4)

$$\left(\frac{7}{16}\right)\left(\frac{1}{4}\right) = \frac{7}{64}$$

### Q6 This can happen only if all the 3 balls transferred are Of the same colour.

$$P(\text{all 3 balls transferred are red}) = \left(\frac{2}{11}\right)\left(\frac{3}{12}\right)\left(\frac{3}{12}\right) = \frac{18}{1584}$$

$$P(\text{all 3 balls transferred are white}) = \left(\frac{9}{11}\right)\left(\frac{10}{12}\right)\left(\frac{10}{12}\right) = \frac{900}{1584}$$

$P(\text{each box will contain 2 red balls \& 9 white balls again})$

$$= \frac{18}{1584} + \frac{900}{1584} = \frac{51}{88}$$

### Q7

$P(1 \text{ faulty bulb in the 3 bulbs selected})$

$$= \left(\frac{3}{10}\right)\left(\frac{7}{9}\right)\left(\frac{6}{8}\right) + \left(\frac{7}{10}\right)\left(\frac{3}{9}\right)\left(\frac{6}{8}\right) + \left(\frac{7}{10}\right)\left(\frac{6}{9}\right)\left(\frac{3}{8}\right)$$

$$= 3 \times \left(\frac{3}{10}\right)\left(\frac{7}{9}\right)\left(\frac{6}{8}\right) = \frac{21}{40}$$

$P(0 \text{ faulty bulb in the 3 bulbs selected})$

$$= \left(\frac{7}{10}\right)\left(\frac{6}{9}\right)\left(\frac{5}{8}\right) = \frac{7}{24}$$

$P(\text{a pack of 10 with 3 faulty bulbs is accepted})$

=  $P(1 \text{ or } 0 \text{ faulty bulb in the 3 bulb selected})$

$$= \frac{21}{40} + \frac{7}{24} = \frac{49}{60}$$

### Q8

(a) The sum of all probability is 1.

$$P(\text{red}) = 1 - P(\text{white}) - P(\text{yellow}) = 1 - \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$$

$$(b) P(\text{not yellow}) = 1 - \frac{1}{3} = \frac{2}{3}$$

$$(c)(i) P(\text{both yellow}) = \left(\frac{1}{3}\right)\left(\frac{1}{3}\right) = \frac{1}{9}$$

$$(c)(ii) P(\text{blue flower}) = 0$$

$$(c)(iii) P(\text{one yellow, one white})$$

$$= P(\text{1st yellow, 2nd white}) + P(\text{1st white, 2nd yellow})$$

$$= \left(\frac{1}{3}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{3}\right) = \frac{1}{3}$$

$$(d) P(\text{neither red}) = \left(\frac{5}{6}\right)\left(\frac{5}{6}\right) = \frac{25}{36}$$

**Q9**

(a)(i)0.09 (ii)0.99 (iii)0.001 (iv)0.9999

(b)(i) $(0.1)^n$  (ii) $1 - (0.1)^n$ **Q10**(i) $\frac{1}{3}$ (ii) $P(\text{finishes at } P \text{ or } Q \text{ or } Y)$  $= P(\text{finishes at } P) + P(\text{finishes at } Q) + P(\text{finishes at } Y)$ 

$$= \frac{1}{9} + 0 + \frac{4}{9} = \frac{5}{9}$$

**Q11**

$$= \left( \frac{B}{B+W} \right) \left( \frac{B+N}{B+W+N} \right) + \left( \frac{W}{B+W} \right) \left( \frac{B}{B+W+N} \right)$$

$$= \frac{B}{B+W}$$

**Q12** $P(\text{all 6 faces not painted})$  $+ P(\text{one face painted and lands on ground})$ 

$$= \frac{8}{64} + \frac{24}{64} \times \frac{1}{6} = \frac{3}{16}$$

**Q13(i)**  $P(B > C) = P(B \text{ draws } 2, C \text{ draws } 1) + P(B \text{ draws } 5, C \text{ draws } 1 \text{ or } 4)$ 

$$= \left( \frac{4}{6} \right) \left( \frac{3}{6} \right) + \left( \frac{2}{6} \right) \left( \frac{5}{6} \right) = \frac{11}{18}$$

**Q13(ii)**  $P(A > \text{both } B \text{ and } C)$  $= P(A \text{ draws } 3, B \text{ draws } 2, C \text{ draws } 1) + P(A \text{ draws } 6, B \text{ draws any number}, C \text{ draws } 1 \text{ or } 4)$ 

$$= \left( \frac{4}{6} \right) \left( \frac{4}{6} \right) \left( \frac{3}{6} \right) + \left( \frac{1}{6} \right) \left( \frac{6}{6} \right) \left( \frac{5}{6} \right) = \frac{13}{36}$$