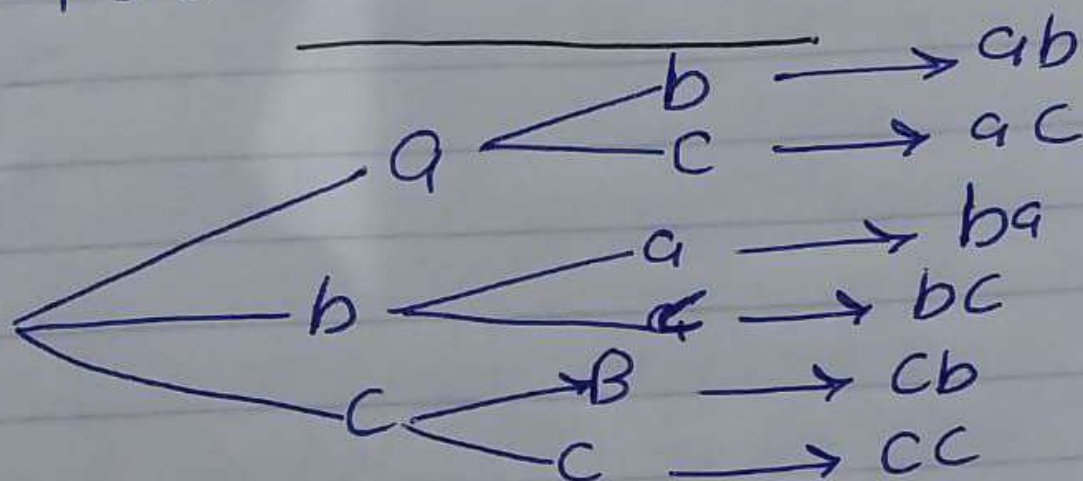


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$$1) 12C_4 \cdot 8C_4 \cdot 4C_4$$

$$445 \cdot 70 \cdot 1 = 34650$$

2)



$$3) i) P(A) = \frac{4C_2}{12C_2} = 0.0409$$

$$P(B) = \frac{8C_2}{12C_2} = 0.4242$$

$$ii) P(\text{at least one defective}) =$$

$$= 1 - P(\text{not defective})$$

$$= 1 - 0.04242 = 0.5758$$

$$P(\text{not defective}) = \frac{8C_2}{12C_2} = 0.4242$$

$$7) \text{ Possible outcomes} = 6^3 = 216$$

$$\frac{5}{36} \times 3 = 0.41\bar{2}$$

$$8) \leq P(X) = K^2 - 8$$

$$K^2 - 8 = 1$$

$$\begin{array}{r} K^2 - 8 \\ K^2 = 9 \\ \hline K = 3 \end{array}$$

$$9) 1 - P(A \cup B) = 1 - 0.8 = 0.2$$

$$4) \text{ (i) } P(\text{none defective}) = \frac{{}^{10}C_3}{{}^{15}C_3} = 0.263$$

$$\text{(ii) } P(\text{one item defective}) =$$

$$\frac{{}^5C_1 \cdot {}^{10}C_2}{{}^{15}C_3} = \frac{200}{455} = 0.4396$$

$$\text{iii} \quad P(\text{at least one defective}) =$$

$$= 1 - P(\text{none defective})$$

$$= 1 - 0.263 = 0.736$$

$$5) \quad P(A) = \text{boys}$$

$$P(B) = \text{girls from Mars} \quad \text{half boys \& half girls from Mars}$$

$$P(A) = \frac{10}{30} = \frac{1}{3}, \quad P(B) = \frac{1}{3}$$

$$P(A \text{ and } B) = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$$

$$P(A \text{ or } B) = \frac{1}{3} + \frac{1}{3} - \frac{1}{6}$$

$$= \frac{2}{3}$$

$$6) P(A) = \frac{3}{8}, P(B) = \frac{1}{2}$$

$$P(A \cap B) = \frac{1}{2}$$

$$\rightarrow P(A^c) = 1 - \frac{3}{8} = \frac{5}{8}$$

$$\rightarrow P(B^c) = 1 - \frac{1}{2} = \frac{1}{2}$$

$$\rightarrow P(A^c \cap B^c) = P(A \cup B)^c = 1 - P(A \cup B)$$

$$= 1 - P(A) + P(B) - P(A \cap B)$$

$$= 1 - \left(\frac{3}{8} + \frac{1}{2} - \frac{1}{2} \right)$$

$$= 1 - \frac{7}{8}$$

$$= \frac{1}{8}$$

$$\rightarrow P(A^c \cup B^c) = P(A \cap B)^c = P(A)^c \cup P(B)^c$$

$$= \frac{5}{8} + \frac{1}{2} - \frac{1}{8} = \frac{11}{8}$$

$$\rightarrow P(A \cap B^c) = P(B^c | A) \cdot P(A)$$

$$= \left(1 - P(B | A) \right) \cdot P(A)$$

$$= \left(1 - \frac{1}{2} \right) \cdot \frac{3}{8}$$

$$= \frac{3}{16}$$