Q.5. a)

i) Prob. that any station can send a frame in the first slot:

$$P(\text{success}) = P(A \text{ only}) + P(B \text{ only}) + P(C \text{ only})$$

$$= P_A \cdot \bar{P_B} \cdot \bar{P_C} + \bar{P_A} \cdot P_B \cdot \bar{P_C} + \bar{P_A} \cdot \bar{P_B} \cdot P_C$$

$$= (0.2)(0.7)(0.6) + (0.8)(0.3)(0.6) + (0.8)(0.7)(0.4)$$

$$= \underline{0.452}$$

ii) Prob. that A succeeds for the first time is 2nd slot-

$$P_A^{\text{success}} = P_A \cdot \bar{P_B} \cdot \bar{P_C} = (0.2)(0.7)(0.6) = 0.084$$

$$P_A^{\text{fail}} = 1 - 0.084 = 0.916,$$

$$P(A \text{ succeeds in } 2^{nd} \text{ slot for the first time}) = \begin{array}{c} 0.916 \times \\ 0.084 \end{array}$$

$$= \underline{0.076944}$$

iii) Prob. that C succeeds for the first time is 3rd slot

$$P_C^{\text{success}} = P_C \cdot \bar{P_A} \cdot \bar{P_B} = 0.224$$

$$P_C^{\text{fail}} = 1 - 0.224 = 0.776,$$

$$P(C \text{ succeeds in } 3^{rd} \text{ slot for the first time}) =$$

$$(0.776)^2 \cdot (0.224) = \underline{0.134746}$$