Problem 1 (10 pt)
$$P(acapted) = \frac{96}{100} \times \frac{95}{99} \times \frac{94}{78} \times \frac{93}{47} \times \frac{92}{96} = 0.8119$$

$$P(c,^{c}) = P(c_{2}^{c}) = p$$

 $P(c,) = P(c_{3}) = 1$

$$(C,^{c}) = \overline{P}$$

$$C(c) = \tilde{f}(c)$$

$$C(^{\circ}) = P(^{\circ})$$

$$P(C_1) = P(C_2) = \mathbf{1} - P$$

$$P(C|C, \cap C_2) = 1$$

 $P(C|C, \cap C_2) = \frac{1}{2}$

$$P(\text{defective}) = P(\text{defective}|A)^{\dagger}P(A) + P(\text{defective}|B)^{*}P(B) + P(\text{defective}|C)^{*}P(C)$$

$$= 0.001 \times \frac{1}{3} + 0.004 \times \frac{1}{3} + 0.01 \times \frac{1}{3}$$

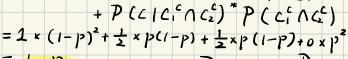
$$= 0.001 \times \frac{1}{3} + 0.004 \times \frac{1}{3} + 0.01 \times \frac{1}{3}$$

$$= 0.005 \qquad (4pt)$$

(b)
$$P(A| \text{ defective}) = \frac{P(\text{defective}|A) * P(A)}{P(B| \text{ defective})} = \frac{P(\text{defective}|A) * P(A)}{P(B| \text{ defective})} = \frac{P(\text{defective}|B) * P(B)}{P(\text{defective})} = \frac{P(\text{defective}|C) * P(C)}{P(\text{defective})} = \frac{0.005}{0.005} = 0.6667 \text{ (2pt)}$$

$$P(C| \text{defective}) = \frac{P(\text{defective}|C) * P(C)}{P(\text{defective})} = \frac{0.01 \times \frac{1}{3}}{0.005} = 0.6667 \text{ (2pt)}$$

(c)
$$P(A) = 0.5 P(B) = 0.4 P(C) = 0.1$$



$$= 1 - 1^{2}$$
 same as $P(C_{1})$ or $P(C_{2})$

$$P(A) = P(B) = P(c) = \frac{1}{3}$$

$$P(\text{defective}) = P(\text{defective}|A)^{\dagger}P(A) + P(\text{defective}|B)^{\dagger}P(B) + P(\text{defective}|C)^{\dagger}P(C)$$

$$= 0.001 \times 0.5 + 0.004 \times 0.4 + 0.01 \times 0.1$$

$$= 0.0031 (4pt)$$

$$P(A| defective) = \frac{P(defective|A)^* P(A)}{P(defective|A)^* P(B)} = \frac{0.001 \times 0.5}{0.0031} = 0.1613 (2pt)$$

$$P(B| defective) = \frac{P(defective|B)^* P(B)}{P(defective)} = \frac{0.004 \times 0.4}{0.0031} = 0.5161 (2pt)$$

$$P(C| defective) = \frac{P(defective|C)^* P(C)}{P(defective)} = \frac{0.01 \times 0.1}{0.0031} = 0.3226 (2pt)$$

$$P(C| defective) = \frac{13}{52} = \frac{1}{4} = 0.25 (5pt)$$

$$(b) P(S_1) = \frac{13}{52} = \frac{1}{4} = 0.25 (5pt)$$

$$= \frac{12}{51} \times \frac{1}{4} + \frac{13}{51} \times \frac{3}{4}$$

$$= \frac{1}{4} = 0.25 (5pt)$$