11.)

Let M1: output is from machine 1 ; M2: Output is from machine 2
M3: output is from machine 3.
$P(M1) = 0.10$
$P(M2) = 0.35$
$P(M3) = 0.55$

Let D: output is defective. Then: $P(D|M_1) = 0.05$,

$P(D|M_2) = 0.03$, $P(D|M_3) = 0.01$

E: randomly selected widget is defective.
$P(E) = P((D \cap M_1) \cup (D \cap M_2) \cup (D \cap M_3)) = P(D \cap M_1) + P(D \cap M_2) + P(D \cap M_3)$
$$- P(D \cap M_1 \cap M_2 \cap M_3)$$

since $D \cap M_1 \cap M_2 \cap M_3 = \phi$ $\Rightarrow$ $P(D \cap M_1 \cap M_2 \cap M_3) = 0$

$\Rightarrow P(E) = P(D \cap M_1) + P(D \cap M_2) + P(D \cap M_3) = \sum_{i=1}^{3} P(D|M_i) \cdot P(M_i)$

$\Rightarrow P(E) = (0.05)(0.10) + (0.03)(0.35) + (0.01)(0.55) = 0.021$

$\therefore$ 2.1 % is the probability that a randomly selected
widget is defective.