

$$1. (1): S = \{x | x \in [0, 100] \}$$

$$(2): S = \{x | x \in [10, +\infty) \}$$

(3): 设 T 为正品, F 为次品, 用 T, F 组成的序列表示检查结果

$$S = \{FF, TFF, TTFF, FTFF, TTTT, TTTF, TTFT, TFTT, FTTF, FTFT, FTTF, FTFF\}$$

$$(4): S = \{(x, y) | x^2 + y^2 < 1\}$$

$$3. (1): P(A \cup B \cup C) = P(A) + P(B) + P(C) - (P(AB) + P(BC) + P(AC)) + P(ABC)$$

$$\therefore P(ABC) = \frac{1}{64} \therefore P(ABC) \leq P(AB) = \frac{1}{16} \therefore P(ABC) = 0$$

$$\therefore P(A \cup B \cup C) = \frac{1}{8}$$

$$(2): P(A \cup B) = P(A) + P(B) - P(AB) = \frac{11}{15}$$

$$P(\bar{A}\bar{B}) = (1 - P(A))(1 - P(B)) = \frac{1}{3} \therefore P(A \cup B) = 1 - P(\bar{A}\bar{B}) = \frac{2}{3}$$

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(AB) - P(AC) - P(BC) + P(ABC) = \frac{17}{20}$$

$$P(\bar{A}\bar{B}\bar{C}) = (1 - P(A))(1 - P(B))(1 - P(C)) = \frac{1}{15} \therefore P(A \cup B \cup C) = 1 - P(\bar{A}\bar{B}\bar{C}) = \frac{14}{15}$$

$$P(\bar{A}\bar{B}C) = (1 - P(A))(1 - P(B))P(C) = \frac{1}{15} \therefore P(\bar{A}\bar{B}C) = \frac{1}{15}$$

$$P(\bar{A}B\bar{C}) = (1 - P(A))P(B)(1 - P(C)) = \frac{1}{15} \therefore P(\bar{A}B\bar{C}) = \frac{1}{15}$$

$$P(\bar{A}B\bar{C}) = P(\bar{A}B) + P(C) - P(\bar{A}BC) = \frac{1}{15} \therefore P(\bar{A}B\bar{C}) = \frac{1}{15}$$

$$(3): (i): \therefore A, B \text{ 不相容 } \therefore A \cap B = \emptyset$$

$$\therefore P(AB) = P(A) = \frac{1}{2}$$

$$(ii): \therefore P(AB) = P(A) \cdot P(B) = \frac{1}{8}$$

$$\therefore P(B) = \frac{1}{4}$$

$$\therefore P(\bar{A}B) = P(A)(1 - P(B)) = \frac{3}{8}$$

$$P(\bar{A}B) = P(A \cap \bar{B}) = P(A - AB) = \frac{1}{2} - \frac{1}{8} = \frac{3}{8}$$

$$A(S-B) = B(S-A)$$

$$4(1): \because AB = AB \rightarrow AS = BS$$

$$\therefore P(AB) = P(AB)$$

$$\therefore P(A) \cdot (1 - P(B)) = P(B) \cdot (1 - P(A))$$

$$\therefore P(A) = P(B)$$

$$(2): \because A \cup B = A \cup (B - AB)$$

$$A(B - AB) = \emptyset, A \cap B = AB$$

$$\therefore P(A \cup (B - AB)) = P(A) + P(B - AB) = P(A) + P(B) - P(AB)$$

$$\therefore P(A \cup B) = P(A) + P(B) - P(AB)$$

$$\therefore \text{恰有一个发生, 即二者不能同时发生, 事件表示为 } A \cup B - AB$$

$$\therefore P(A \cup B - AB) = P(A \cup B) - P(AB) = P(A) + P(B) - 2P(AB)$$

5. (1): 设只有一片的概率事件为 A, 没有一片也没有的事件为 B
 至少有 2 片的概率事件为 C

$$\text{则 } P(C) = 1 - P(A) - P(B)$$

$$= \frac{C_0^5 - C_1^5 - C_2^5}{C_0^5} = 1 - \frac{C_1^5 + C_2^5}{C_0^5} = 1 - \frac{5 + 10}{126} = \frac{111}{126}$$

(2): 设前 3 次都取到的事件为 A

$$\text{则 } P(A) = \frac{1}{2} \times \frac{4}{7} \times \frac{3}{8} = \frac{1}{12}$$

7. 设能如数得到订货的事件为 A

$$\text{则 } P(A) = \frac{C_0^4 \cdot C_4^3 \cdot C_3^2}{C_{17}^9} = \frac{C_0^4 \cdot C_4^3 \cdot C_3^2}{C_{17}^9}$$

8. (1): 设恰有 90 件次品的事件为 A

$$P(A) = \frac{C_{400}^1 \cdot C_{1100}^{110}}{C_{1500}^{200}}$$

(2): 设只有一件次品的事件为 B, 没有次品事件为 C
至少有 2 件次品事件为 D

$$P(D) = 1 - P(B) - P(C)$$

$$= 1 - \frac{C_{400}^1 \cdot C_{1100}^{199}}{C_{1500}^{200}} - \frac{C_{1100}^{200}}{C_{1500}^{200}}$$

9. 设一双都没有配成的事件为 A

$$P(A) = 1 - P(\bar{A})$$

$$= 1 - \frac{C_1^1 \cdot C_2^1 \cdot C_3^1 \cdot C_4^1 \cdot C_5^1 \cdot C_6^1 \cdot C_7^1 \cdot C_8^1 \cdot C_9^1 \cdot C_{10}^1}{C_{10}^1}$$

$$= 1 - \frac{8}{21}$$

$$= \frac{13}{21}$$

10. 设排列结果为 abiliy 的事件为 A

$$P(A) = \frac{1}{C_{11}^1} \cdot \frac{2}{C_{10}^1} \cdot \frac{2}{C_9^1} \cdot \frac{1 \times 2 \times 2}{A_{11}^7} = \frac{4}{A_{11}^7}$$

H. 设最大个数为 1 的事件为 A, 为 2 的事件为 B, 为 3 的事件 C

$$\therefore P(A) = \frac{4 \times 3 \times 2}{4^3} = \frac{3}{8}$$

$$P(B) = \frac{C_3^2 \cdot C_4^1 \times 3}{4^3} = \frac{9}{16}$$

$$P(C) = \frac{C_4^1}{4^3} = \frac{1}{16}$$

12. 设一个部件强度太弱的事件为A

$$P(A) = \frac{C_{10}^1 \cdot C_{47}^{27} \cdot C_{27}^3 \cdot C_{24}^3 \cdot C_{21}^3 \cdot C_{18}^3 \cdot C_{15}^3 \cdot C_{12}^3 \cdot C_9^2 \cdot C_6^3}{C_{50}^{30} \cdot C_{30}^3 \cdot C_{27}^3 \cdot C_{24}^3 \cdot C_{21}^3 \cdot C_{18}^3 \cdot C_{15}^3 \cdot C_{12}^3 \cdot C_9^3 \cdot C_6^3}$$

$$= \frac{C_{10}^1 \cdot C_{47}^{27}}{C_{50}^{30} \cdot C_{30}^3}$$

$$= \frac{1}{1960}$$