习题 3 (1). (2). (3). 4 (2)

3. (1) 解：设 "D" 为 "A, B, C 至少有一个发生"

则：$P(D) = P(A \cup B \cup C) = P_A + P_B + P_C - P(AB) - P(BC) - P(AC) + P(ABC)$

$= \frac{5}{8} + P(ABC)$

$\because P(AB) = P(BC) = 0$. 故 $P(ABC) \geq 0$

则 $P(D) = \frac{5}{8}$

(2) 解：① $P(A \cup B) = P(A) + P(B) - P(AB) = \frac{1}{2} + \frac{1}{3} - \frac{1}{10} = \frac{11}{15}$

② $P(\bar{A}\bar{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B) = \frac{4}{15}$

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

$= \frac{1}{2} + \frac{1}{3} + \frac{1}{5} - \frac{1}{10} - \frac{1}{15} - \frac{1}{20} + \frac{1}{30}$

$= \frac{17}{20}$

(3) 由 ④ $P(\bar{A}\bar{B}\bar{C}) = 1 - P(A \cup B \cup C) = 1 - \frac{17}{20} = \frac{3}{20}$

⑤ $P(\bar{A}\bar{B}C) = P(\bar{A}\bar{B} - C) = P(\bar{A}\bar{B}) - P(\bar{A}\bar{B}\bar{C}) = \frac{4}{15} - \frac{3}{20}$

$= \frac{7}{60}$

⑥ $P(\bar{A}\bar{B} \cup C) = P(\bar{A}\bar{B}) + P(C) - P(\bar{A}\bar{B}\bar{C})$

$= \frac{4}{15} + \frac{1}{5} - \frac{7}{60}$

$= \frac{7}{20}$

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3) (i). 解: A, B 互不相容

则 $A \cap B = \phi$

$A \cap (S - \bar{B}) = \phi$

即 $A \cap S - A \cap \bar{B} = \phi$

故 $A \cap \bar{B} = A \cap S = A$

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

(ii) 解: $P(\bar{A}B) = \frac{1}{8}$

$A\bar{B} = A - B$

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

4. (2) 解:

$P(A\bar{B} \cup \bar{A}B) = P(A\bar{B}) + P(\bar{A}B) - P(A\bar{B}\,\bar{A}B)$

$= P(A\bar{B}) + P(\bar{A}B)$

$= P(A - B) + P(B - A)$

$= P(A) - P(AB) + P(B) - P(AB)$

$= P(A) + P(B) - 2P(AB)$

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