

(1) [7] Suppose

$$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}, \quad A = \{0, 1, 5, 7\}, \quad B = \{0, 2, 3, 5, 8\}, \quad C = \{5, 6, 8, 9\}$$

(i) Determine $\overline{B \cap A}$

(ii) Determine $(A \cap B) \cup (B \cap C)$

(2) [4] Using the 26 letters of the alphabet, how many different five letter codes are possible if adjacent letters within the codes must be different? (That is, a code can have multiple occurrences of the same letter, as in ababa, but codes having two of the same letter side-by-side are not permitted, as with aabab.)

(3) [4] How many different ways are there of arranging the letters in the word SUNDAY if the arrangements must begin with S and end with Y?