



SEC11013: DISCRETE STRUCTURE
SEM 1 2023/2024

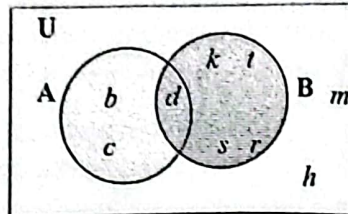
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Date : 1/11/2023

Marks
14
15

Question 1

[6 Marks]

Given the Venn Diagram, answer the following questions:



a. List the elements of set A, B.

$$A = \{b, c, d\}$$

$$B = \{d, k, r, s, t\}$$

b. Find $|U|$

$$|U| = 9$$

c. List ALL the subsets of A.

$$A = \{\emptyset, \{b\}, \{c\}, \{d\}, \{b, c\}, \{b, d\}, \{c, d\}, \{b, c, d\}\}$$

Question 2 $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ $A' = \{2, 4, 6, 8, 10\}$ $B' = \{1, 3, 5, 7, 9, 10\}$ $C' = \{1, 2, 4, 5, 7, 8, 10\}$ [6 Marks]

Given $U = \{x \in \mathbb{Z}, 0 < x \leq 10\}$, $A = \{1, 3, 5, 7, 9\}$, $B = \{2, 4, 6, 8\}$, $C = \{3, 6, 9\}$. Find:

a. $(A \cup B) \cap C$

$$(A \cup B) \cap C = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \cap \{3, 6, 9\} = \{3, 6, 9\}$$

b. $A' - B$

$$A' - B = \{10\}$$

c. $B' \cap (U \cap C')$

$$B' \cap (U \cap C') = \{1, 3, 5, 7, 9, 10\} \cap \{1, 2, 4, 5, 7, 8, 10\} = \{1, 5, 7, 10\}$$

d. $(A \cap C) \times (C - A) \times \{a\}$

$$(A \cap C) \times (C - A) \times \{a\} = \{3, 6, 9\} \times \{6, 9\} \times \{a\} = \{(3, 6, a), (3, 9, a), (6, 6, a), (6, 9, a), (9, 6, a), (9, 9, a)\}$$

Question 3

[3 Marks]

Given the following propositions, answer the following questions:

p: $(x+1)/3$

q: x is odd integer

a. Write a compound proposition using logical connectives for the statement:

$$(x+1)/3 \text{ if and only if } x \text{ is not odd integer} \quad p \leftrightarrow \neg q$$

b. Construct the truth table for the compound proposition in (a)

p	q	$\neg q$	$p \leftrightarrow \neg q$
T	T	F	F
T	F	T	T
F	T	F	T
F	F	T	F

T T T
T F F
F T F
F F T