SECI1013: DISCRETE STRUCTURE
SEM 1 2023/2024

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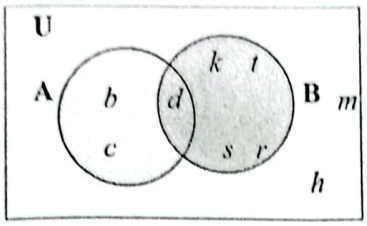
Marks 12½ / 15

Question 1 **[6 Marks]**

Given the Venn Diagram, answer the following questions:



a. List the elements of set A, B. (2 m)

b. Find |U| (1 m)

c. List **ALL** the subsets of A. (3 m)

Question 2 **[6 Marks]**

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

a. $(A \cup B) \cap C$ (1 m)

b. $A' - B$ (1 m)

c. $B' \cap (U \cap C')$ (2 m)

d. $(A \cap C) \times (C - A) \times \{a\}$ (2 m)

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 if and only if x is not odd integer (1 m)

b. Construct the truth table for the compound proposition in (a) (2 m)

No.:

Question 1

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

$B = \{d, k, r, s, t\}$ /2

b) $|U| = 9$ /1

c) Total subsets $= 2^3 = 8$

$\{b,c,d\}, \{b\}, \{c\}, \{d\}, \{b,c\}, \{b,d\}, \{c,d\}, \{\} \subset A$ /3

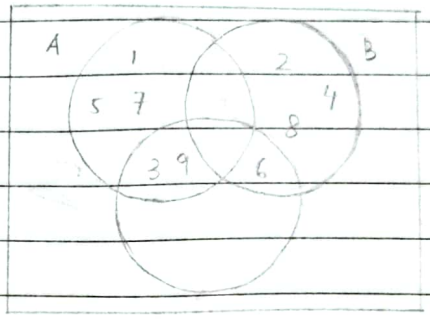
Question 2

$U = \{x \in Z, 0 < x \leq 10\}$

$A = \{1, 3, 5, 7, 9\}$

$B = \{2, 4, 6, 8\}$

$C = \{3, 6, 9\}$



a) $(A \cup B) \cap C = \{3, 6, 9\}$ /1

b) $A' - B = \{\}$ ✓

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

$= B' \cap C' = \{1, 5, 7\}$ ✓ 1/2

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

$A \cap C = \{3, 9\}$

$C - A = \{6\}$

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

$= \{3, 6\}, \{9, 6\}$

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

$= \{3, 6\}, \{9, 6\} \times \{a\}$

$= \{3, 6, a\}, \{9, 6, a\}$ /2

No.:

Question 3

p : (x + 1) / 3

q : x is odd integer

a) (x + 1) / 3 if and only if x is not odd integer

$p \leftrightarrow \sim q$

b)

p	q	~q	$p \leftrightarrow \sim q$
T	T	F	F
T	F	T	T
F	T	F	T
F	F	T	F