**SECI1013: DISCRETE STRUCTURE**
**SEM 1 2023/2024**
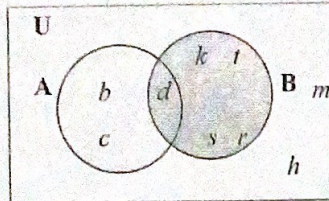
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Marks
14½
15

## Question 1 [6 Marks]

Given the Venn Diagram, answer the following questions:



a. List the elements of set A, B. (2 m)
   $A = \{b, c, d\}$   $B = \{d, k, r, s, t\}$

b. Find |U| (1 m)
   $|U| = 9$

c. List **ALL** the subsets of A. (3 m)
   $A = \{\}, \{b\}, \{c\}, \{d\}, \{b, c\}, \{b, d\}, \{c, d\}, \{b, c, d\}$

## Question 2 [6 Marks]

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

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

b. $A' - B = \{10\}$ (1 m)

c. $B' \cap (U \cap C') = \{1, 5, 7, 10\}$ (2 m)

d. $(A \cap C) \times (C - A) \times \{a\} = \{\{3, 6, a\}, \{9, 6, a\}\}$ (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)
$p \leftrightarrow \sim q$

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

| P | q | ~q | p ↔ ~q |
|---|---|-----|--------|
| T | T | F | F |
| T | F | T | T |
| F | T | F | T |
| F | F | T | F |