27/30

SCHOOL OF COMPUTING

SESSION 2019/2020 SEMESTER 2

SCSI1013-06

Discrete Structure

Assignment : 01

Group Members:

1. Bayes Ahmed Shoharto (A18CS4051)
2. Md. Shakil Chowdhury (A18CS4047)

Lecturer:

Dr. Suhaila Mohamad Yusuf

Submission Date:

14 October 2019 (Monday)

1. Given,

$A = \{1, 2, 3, \ldots, 50\}$

a) $B = \{x \mid x \in Z, 2x^2 \in A\}$

$\therefore B = \{-5, -4, -3, -2, -1, 1, 2, 3, 4, 5\}$ 2

b) $C = \{x \mid x \in R, x + \left(\frac{x}{2}\right) \in A$

$\therefore C = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32\}$

2.

People = 20

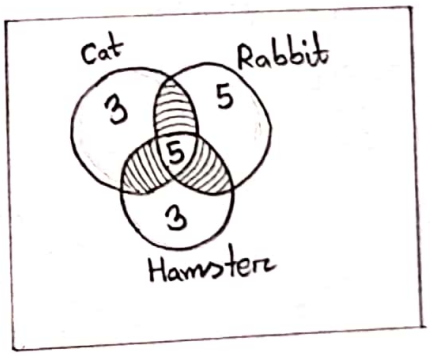
5 people = {cat, rabbit, hamster} - 3 pet

3 people = {Hamster} - 1 pet

5 people = {Rabbit} - 1 pet

3 people = {Cat} - 1 pet

4 people = 2 pets -



Total pets = $(5 \times 3) + (3 \times 1) + (5 \times 1) + (3 \times 1) + (4 \times 2)$

$= 34$ pets

So, there are 34 pets in neighbourhood.

4

3. Show,

$$(A \cap B) \cup (A' \cup B)' = A$$

L.H.S.

$= (A \cap B) \cup (A' \cup B)'$

$= (A \cap B) \cup (A')' \cap B'$

$= (A \cap B) \cup (A \cap B')$

$= A \cap (B \cup B')$

$= A \cap U$

$= A$

$\therefore$ L.H.S = R.H.S (Showed)

4. $P(x)$: a, b are odd integers.

$Q(x)$: $a \times b$ is odd integers

$\therefore a \times b = (2n+1) \times (2m+1)$

$= 4mn + 2n + 2m + 1$

$= 2(2mn + n + m) + 1$

$= 2k + 1$ [$2mn + m + n = k$ let]

$\therefore$ The product of a and b is an odd integer.

So, $\forall x (P(x) \rightarrow Q(x))$ is true.

p: I shop online

q: I purchase goods

r: I receive my allowance

a) $r \rightarrow (q \wedge \neg p)$ ✓ 3

b) $r \wedge \rightarrow (\sim p \wedge \sim q)$ ✗

6. a) The domain of x is all students on your class = $\forall(x)$

*Let, $M(x)$ = all students that attend class on Monday.

$N(x)$ = attend class in the morning. ✓

~~$\therefore \forall(x)$~~ $\therefore \forall x (M \in x) \rightarrow N(x)$ ✓ 3

b) The domain of x is all integers.

when, $x^2 + 2x - 3 = 0$

$\Rightarrow (x+3)(x-1) = 0$

$x + 3 = 0$	$x - 1 = 0$
$x = -3$	$x = 1$

✓

$P(x)$ is the predicate $x^2 + 2x - 3 = 0$

then,

$\exists x P(z)$ is true since $P(1)$ and

$P(-3)$ are true.

$\therefore \exists x P(x)$. ✓ 3

c) Let, $R(x)$ be, "x" is a red flowers.

$D(x)$ be, "x" is edible.

$\therefore \exists x (R(x) \wedge D(x))$. Ans

3