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Spring 2025
CSE212 – Discrete Mathematics
Quiz-2

Marks: 15 **Section: 66_J** **Time: 30 Minutes**

Q1. A school tracks student participation in three sports: Football (**F**), Cricket (**C**), and Hockey (**H**). The universal set **U** contains all students: [5]

U = {Arif, Bappy, Fahim, Habib, Jannat, Karim, Laila, Maruf, Naim, Rima}.

The sports teams are:

Football (**F**): {Arif, Bappy, Fahim, Jannat}
Cricket (**C**): {Bappy, Fahim, Habib, Karim}
Hockey (**H**): {Fahim, Habib, Laila, Maruf}

a) Draw a single Venn diagram representing these sets and their relationships.
b) Perform the following set operations:
  i. $(F \cup C) \cap H$
  ii. $(F \cap C) \cup (H \cap F)$
  iii. $(F \cup H) \cap (C \cup H)$

Q2. A survey of 150 students asked about their preferences for three extracurricular activities: Chess, Drama, and Painting. The results showed: [5]

80 students participate in Chess.
70 students participate in Drama.
60 students participate in Painting.
35 students participate in both Chess and Drama.
30 students participate in both Drama and Painting.
25 students participate in both Chess and Painting.
15 students participate in all three activities.

a) Determine how many students participate in Drama only.
b) Determine how many students don't participate in any of the activities.

Q3. Let $A = \{1, 2, 3, 4, 5\}$ and a function $f: A \rightarrow Z$ is defined as follows: [5]

$f(x) = 3x - 1$

Now answer the following with justification.

a) Is f a ***one-to-one*** function?
b) Is f an ***onto*** function?
c) If f has an inverse function, find its inverse function $f^{-1}: Z \rightarrow A$.

Let $A = \{1,2,3,4,5\}$ and a function $f: A \rightarrow Z$ be defined as:

$f(x)=4x+2$

a) Is f a one-to-one (injective) function? Justify your answer.
b) Is f an onto (surjective) function? Justify your answer.
c) If f has an inverse function, find its inverse $f^{-1}: Z \rightarrow A$.