SECI1013: DISCRETE STRUCTURE
SEM 1 2023/2024

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Marks 15

Question 1 **[3 Marks]**

Fill in the blank with correct properties that relation could be reflexive/ irreflexive/ symmetric/ anti-symmetric/ transitive. (One answer only)

a. Nothing is related to itself — Irreflexive (1m)
b. No one-way streets — Symmetric (1m)
c. Whenever there's a roundabout route, there's a direct route — Transitive (1m)

3

0 one way

Question 2 **[3 Marks]**

Given the relation {(-7,2), (0,4), (2,-1) (-3,0), (-3,3)}

a. State the domain and range of the relation
b. Determine whether the relation is function and explain
c. Create a mapping diagram of the relation

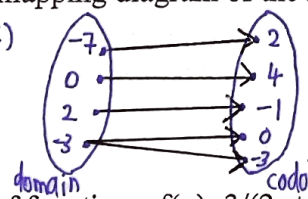
2.(a) Domain = {-7, 0, 2, -3}

Range = {2, 4, -1, 0, 3}

(b) The relation is not a function, because the element of domain which is -3 that is not assigned to a unique value of element in codomain. (1m) (1m) (1m)

3

(c)



Question 3 **[6 Marks]**

Given a pair of functions, f(x)=3/(2x+1), g(x)=2/x. Find:

a. (g∘f)(x)
b. Domain of function.

f(x) and g(x).

3.(a) g[f(x)]

$= \frac{2}{\frac{3}{(2x+1)}}$

$= 2 \times \frac{(2x+1)}{3}$

$(g \circ f)(x) = \frac{4x+2}{3}$

3.(b) Domain of f(x): $2x+1 \neq 0$

$= (-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, \infty)$ $x \neq -\frac{1}{2}$ (3m)

Domain of g(x) $\frac{2}{x}$, $x \neq 0$

$= (-\infty, 0) \cup (0, \infty)$ (3m)

3

Question 4 **[3 Marks]**

Given an arithmetic sequence 5, 37/7, 39/7, 41/7 ....

a. Find the sequence recursive formula
b. Write a Pseudo-code for function a(n)

4.(a) $a_n = a_{n-1} + \frac{2}{7}$, $n \geq 1$, $a_0 = 5$ (1m)

(2m)

(b)

```
a(n)
{
  if (n=0)
    return 5
  return a(n-1) + 2/7
}
```

3