SECI1013: DISCRETE STRUCTURE
SEM 1 2023/2024

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Date : 22/11/2023

Marks: 14 / 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)

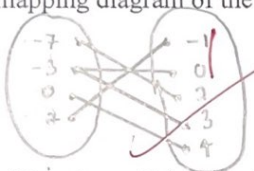
a. Nothing is related to itself — reflexive (1m)
b. No one-way streets — anti-symmetric (1m)
c. Whenever there's a roundabout route, there's a direct route — transitive (1m)

3.

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 — domain = {-7, 0, 2, -3} range = {2, 4, -1, 0, 3} (1m)
b. Determine whether the relation is function and explain — b. the relation is not a function because the function f(-3) = 0, 3 (1m)
c. Create a mapping diagram of the relation (1m)



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Question 3 **[6 Marks]**

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

a. (g∘f)(x) — $g(f(x)) = \frac{2}{\frac{3}{2x+1}} = 2 \times \frac{2x+1}{3} = \frac{4x+2}{3}$ (3m)
b. Domain of function. — for f(x), domain is all real number except $x = -1/2$; for g(x), domain is all real number except $x = 0$ (3m)

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Question 4 **[3 Marks]**

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

a. Find the sequence recursive formula — $a_n = a_{n-1} + \frac{2}{7}$; $n \geq 1$ (1m)
b. Write a Pseudo-code for function a(n) (2m)

```
f(n)
{
if (n = 1)
  return = 5;
return f(n+1) + 2/7;
}
```

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