Student ID - **Name -**

United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

CSE 2217 Spring 2022 Class Test 5 Total Marks: 10

You have to answer here. No extra page will be provided.

Use the value of x in Question 1, where **x** = *last_digit_of your_student_id* = ____ , **y=x-2=____**

1. Find the MST of the given graph using prim's algorithm where the root is v**x**. Show details calculation. **[5]**

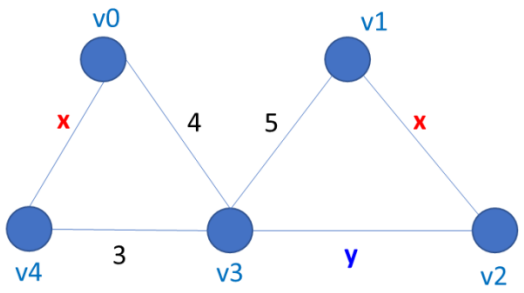

Figure 1

2. (a) Analyze the runtime of the following algorithm **[2]**

```
Dijkstra(G)
    for each v ∈ V
       dist[v] = ∞;
       parent[v] = NIL;
    dist[s] = 0; S = ∅; Q = V;

    while (Q ≠ ∅)
       u = ExtractMin(Q);
       S = S ∪ {u};
       for each v ∈ u->Adj[]
          if (dist[v] > dist[u]+w(u,v))
             dist[v] = dist[u]+w(u,v);
             parent[v] = u;
```

2. (b) When the MST of a graph is guaranteed to be unique? Does the graph in Figure 1 satisfy this condition? **[1]**

2. (c) Your friend has implemented the given shortest path tree algorithm in python. When you provided a graph as input to that code, it said

```
the shortest path from a to f is a b c d e c f
```

Is his implementation correct? Explain your answer. **[2]**