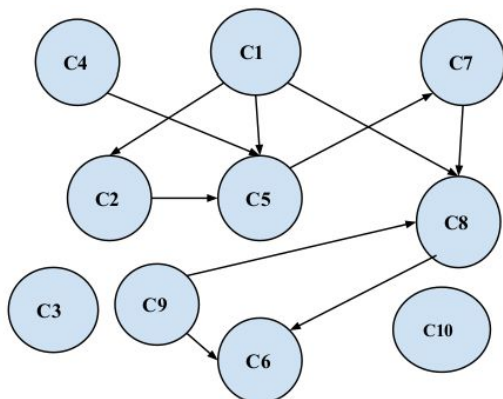


Name: _____

Roll No: _____

Q1. In the following directed graph, vertices indicate courses and edges indicate a prerequisite relationship between courses. E.g. if there is an edge directed from C1 towards C5 then C1 is a prerequisite for C5. Determine the **minimum** number of semesters needed to complete the **entire** coursework. Assume that all courses are offered in each semester and there is no limit on the number of courses that can be taken per semester.. [5 marks]



Minimum number of semesters needed to complete the entire coursework 6

Mention **which** courses should be taken in the following semesters.

Semester-1: C1, C3, C4, C9, C10	Semester-2: C2	Semester-3: C5
Semester-4: C7	Semester-5: C8	Semester-6: C6
Semester-7:	Semester-8:	Semester-9:

Q2. Run Depth-First-Search on the following directed graph G. **Start DFS from node 5.** During DFS, when there is choice for next vertex to explore, **pick the lower numbered one**. Write pre and post numbers for each vertex in the table. [7 marks]

		Pre-number	Post-number
	Node 1	2	7
	Node 2	3	6
	Node 3	4	5
	Node 4	9	10
	Node 5	1	16
	Node 6	8	11
	Node 7	13	14
	Node 8	12	15

6

How many strongly connected components are there in G? 3

How do pre/post numbers help you in determining the **sink** strongly connected components?

Explain briefly and clearly.

Run DFS on G^{Reverse} and determine the pre and post numbers. Now, run undirected connected components algorithm on G and during DFS process vertices in **decreasing order** of their post numbers.