Nirma University

Institute of Technology

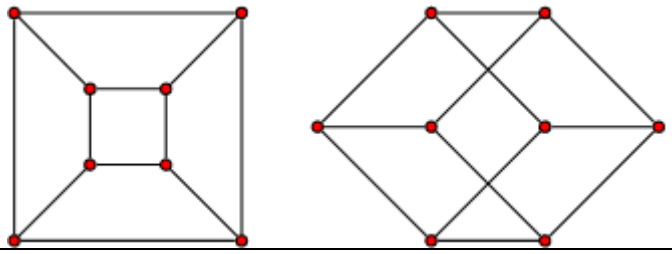
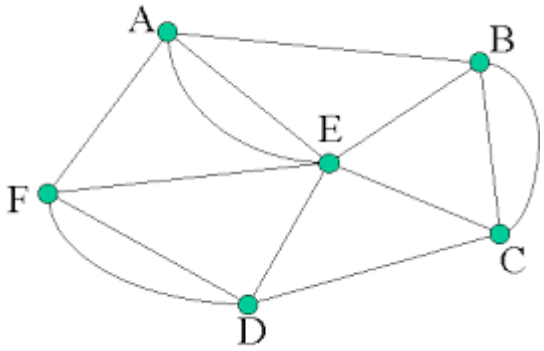
Semester End Examination (IR & RPR), Dec-2020

B. Tech. in Computer Engineering, Semester -III

2CS305 – Discrete Mathematics

Time: 1:30 Hours **Max Marks: 40**

Q-1	**Do as directed**	**[10]**
A CO-1	(a) Find the inverse for the function f(y) = (3y+2)/(y-1). (b) Compute first four terms of the following recurrence sequences: $a_n = na_{n-1}+n^2a_{n-2}$; n>=2; a_n=1; n=0; a_n=1; n=1	[5]
B CO-1	Let S denote the set of real numbers. The operation '*o*' is defined on S like, **a*o*b=a+2ab+b** Then find the value of x, if the solution of the equation is x*o*2*o*7=82.	[5]
Q-2	**Do as directed**	**[10]**
A CO-2	Consider the poset ({3, 5, 9, 15, 24, 45}, /), that is, the divisibility relation. (i) Draw its Hasse diagram. (ii) Find its maxima, minima, greatest and least elements when they exist.	[5]
	OR	
A CO-2	Determine whether the posets ({1, 2, 3, 4, 5}, /) and ({1, 2, 4, 8, 16}, /) are lattices	[5]
B CO-2	find the number of integers from set of numbers 1-100 that are not divisible by 2, 3 and 5.	[5]
Q-3	**Do as directed**	**[10]**
A CO-3	For each of these collections of premises, what relevant conclusion or conclusions can be drawn? Explain the rules of inference used to obtain each conclusion from the premises. **a)** "If I take the day off, it either rains or snows." "I took Tuesday off or I took Thursday off." "It was sunny on Tuesday." "It did not snow on Thursday." **b)** "I am either clever or lucky." "I am not lucky." "If I am lucky, then I will win the lottery." **c)** "Every computer science major has a personal computer."	[6]

	"Ralph does not have a personal computer." "Ann has a personal computer."	
	OR	
A CO-3	Use rules of inference to show that the hypotheses "Randy works hard," "If Randy works hard, then he is a dull boy," and "If Randy is a dull boy, then he will not get the job" imply the conclusion "Randy will not get the job."	[6]
B CO-3	Give a proof by contradiction of the theorem "If 3n + 2 is odd, then n is odd."	[4]
Q-4	**Do as directed**	**[10]**
A CO-3	Define concept of bipartite and isomorphism in a graph. Draw a bipartite graph for the degree sequence (3, 3, 3, 3, 3, 3, 3, 3). Identify whether the given graphs below are isomorphic to each other or not. Justify your answer 	[5]
B CO-3	Identify whether the given graph has either Hamiltonian circuit or Euler circuit or both circuits. (you can choose any initial vertex)  If it exists, write down the complete path of both Hamiltonian and Euler circuit.	[5]