Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

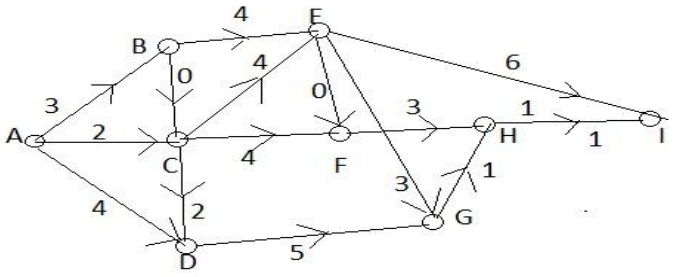
Year and Program:SY-B.Tech. **School of Technology** **Department: CSE**

Course Code: CST203R1 **Course Title: Discrete Structures** **Semester:III**

Day:Wednesday **End Semester Examination** **Time:2 Hrs.**
Date:03.02.2021 **Max Marks:50**

Instructions: 1) All Questions are compulsory.
2) Assume suitable data wherever necessary.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (Any Two)**–			
a)	Define Cartesian Product of A, B sets? Show that $(A \cap B) \times (C \cap D) = (A \times C) \cap (B \times D)$	8	1	CO1
b)	Explain composition of two relations? Calculate R◦P, R◦P◦R and P◦S◦R, R◦P◦S◦P , if given three relations P, R and S be two relations on a set positive integers I={1,2,3……..n} P={< x,3x> | x ∈ I},R = { < x,4x> | x ∈ I } S= { < x , 5x> | x ∈ I }.	8	2	CO1
c)	Calculate Earliest completion time(T_E) , Latest completion time(T_L) and find the critical path for the nodes in the PERT network, wheher A is the start node and I is the end node.	8	2	CO3



Q.2	**Answer the following (Any two) –**			
a)	1.Convert the following formula into prefix & postfix form.Assume the following precedence ⌉, ∧, ∨, →, ⇄ where ⌉having highest precedence& ⇄ having lowest. i. $Q \wedge P \rightarrow \neg (R \vee P \rightarrow Q) \rightleftarrows P \rightarrow Q$ ii. $R \rightleftarrows P \wedge Q \rightarrow \neg R \rightleftarrows P \vee Q$ 2. Show the following implications by constructing the truth table? $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R) \Rightarrow R$	8	3	CO3

b)	Translate the given formula into principle conjunctive normal form (PCNF) and principle disjunctive normal form (PDNF) $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$	8	2	CO2
c)	Solve the following Boolean identities. i. $a \oplus (a' * b) = a \oplus b$ ii. $a' * [(b' \oplus c)' \oplus (b * c)] \oplus [(a \oplus b')' * c] = a' * b$	8	3	CO2

Q.3 Answer the following (Any two) –

a)	i. Calculate in how many ways can the student choose 10 questions? If a student has to answer 10 questions, choosing at least 4 from each of Parts A and B. If there are 6 questions in Part A and 7 in Part B. ii. Calculate How many different 3-letter code "words" can we form using the letters of set S= {a,b,c,d,e} without using repeated letters? iii. The heavy-metal band Death Maggot normally performs 10 songs during a concert. One night, however, they found that they would only have enough time to perform 7songs, due to the fact that their opening act got called back for three encores. If the bandrandomly chooses 7 songs to play, calculate how many different outcomes are possible?	9	3	CO4
b)	Calculate the follwing , Among 13 MP's(Member of parliament) i. How many ways to select a commite of 5 members. ii. How many ways to select a commite of 5 members so that a particular MP- X is always included. iii. How many ways to select a commite of 5 members so that particular MP-X & MP-Y is always included. iv. How many ways to select a commite of 5 members so that particular MP-X is always included & MP- Y is always excluded.	9	2	CO3
c)	Calculate the probability for the item which is selected at a random is defective and it is produced by the machine M_3? If the M_1, M_2, M_3 are three machines manufacturing an item. if 20 percent items were produced by machine M_1. if 30 percent items were produced by machine M_2 and 50 percent items were produced by machine M_3. if 2 percent of the items produced by machine M_1 are defective, 2 percent of the items produced by machine M_2 are defective and 3 percent of the items produced by machine M_3 are defective.	9	2	CO4

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