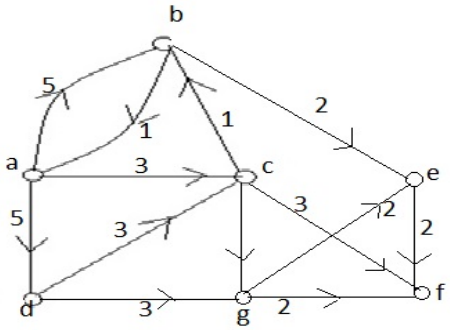
Sanjay Ghodawat University, Kolhapur 2020-21
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Year and Program:2020-21 **School of Technology** **Department of CSE**
S.Y. B. Tech
Course Code: CST203R1 **Course Title: Discrete Structure** **Semester – III**
Day and Date: **End Semester Examination (ESE)** **Time: 2 Hrs.**
Max Marks: 50

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Non-programmable calculator is allowed.

Q.1	**Solve the following (any Two)**	Marks	Bloom's Level	CO
a)	Explain composition of two relations? Calculate R◦ P , S◦R , 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: P={< x,2x> | x ∈ I}, R = { < x,3x> | x ∈ I } S= { < x , 4x> | x ∈ I }	08	L2	CO1
b)	 Calculate the earliest completion time(T_E) & latest completion time (T_L)of the given graph.Where node a is the source & node f is destination	08	L2	CO3
c)	1.Translate the following formula into prefix & postfix form.Assume the following precedence ⌉, ∧, ∨, →, ⇄ where ⌉ having highest precedence & ⇄ having lowest. i. ⌉P∧Q∧⌉(R⇄P∧Q) ⇄P→Q ii. R⇄P∧Q→⌉R∨P⇄Q 2.Convert following prefix & postfix formulas into completely parenthesized form i. →∨⌉PQ⇄→PR⌉S ii. PQ→QR→PR→∨→ Calculate the following i) g ◦ f , ii) f◦ g , iii) s◦ g◦ h , iv) f◦ s◦ h	08	L2	CO1

If X: {1 ,2,3} and f, g, h and s be functions from X to X given by
f = {<1,2>, <2,3 >, <3, 1 >} , g = {<1,2>,<2, 1 >,<3,3 >}
h = {< l, I >, <2,2>, <3,1>}, s = {<1, 1 >,<2,2>,<3,3>}

Q.2 **Solve the following (any Two)**

a) Translate the given formula into principle conjunctive normal form (PCNF) and principle disjunctive normal form (PDNF) 07 L2 CO2

$(\rceil P \rightarrow Q) \wedge (R \rightleftarrows P)$

b) Demonstarte whether the conclusion C follows from the premises $H_1, H_2, \ldots H_n$ in the following case. 08 L3 CO3

i. H_1: $P \rightarrow Q$ H_2: $Q \rightarrow R$ C: $P \rightarrow R$

ii. H_1: $\rceil P \vee Q$ H_2: $\rceil(Q \wedge \rceil R)$ H_3: $\rceil R$ C: $\rceil P$

iii. H_1: $P \rightarrow Q$ H_2: $\rceil P$ C: Q

iv. H_1: $P \rightarrow Q$ H_2: $\rceil Q$ C: $P \rightarrow \rceil Q$

c) For the following Boolean expressions. Express product of sum canonical forms of 08 L2 CO2

i. $(p_1 \oplus p_3)$ * p_1

ii. $(p_1 \oplus p_2)$ '* $(p_2' \oplus p_3)$

Q.3 **Solve the following (any Two)**

a) 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. 09 L3 CO3

b) i. Calculate number of ways we can form four-digit decimal numbers that contain no repeated digits 09 L2 CO4

ii. Calculate how many different ways 03(three) examinations be scheduled within 05(five) day period so that no 02(two) examinations are schedules on the same day?

iii. Calculate how many numbers of different messages that can be represented by sequences of 03(three) dashes and 02(two) dots

c) Calculate the follwing , Among 15 MP's(Member of parliament) 09 L2 CO4

i. How many ways to select a commite of 6 members.

ii. How many ways to select a commite of 6 members so that a particular MP- A is always included.

iii. How many ways to select a commite of 6 members so that particular MP-A & MP-B is always included.

iv. How many ways to select a commite of 6 members so that particular MP-A is always included & MP- B is always excluded.