Total No. of Question : [4] **Registration No. :** | | | | | | | | | |

Programme Name : Bachelor of Computer Science Engineering
Regular S.Y.B.Tech. ESE (A.Y. 2023-24) Sem. III Nov.2023
III SEMESTER (2022 BATCH)
201CSL202-Discrete Mathematics & Structures-TH

Duration : [11:00 AM - 01:00 PM]
Date : 23 Nov, 2023
Day : Thursday

Marks : 50

Instructions :

(Q1) **All Questions are Compulsory** [20.0]

CO :- C202.1
Blooms Taxonomy :- Understand

(1.1) **i) Explain PCNF and PDNF with Example.** **[3] M** [6.0]

ii) Demonstrate that R∧(P∨Q) is a valid inference from the premises P∨Q, Q→R, P→M, ~M **[3] M**

CO :- C202.1
Blooms Taxonomy :- Understand

(1.2) **i) Consider the set X= {1,2, 3,..7}and R={(x,y)/(x-y) is divisible by 3}.** **[4] M** [7.0]
- **a) Write the relation set R.**
- **b) Identify Which properties are satisfied by R**
- **c) Is R a equivalence relation?**
- **d) Write the matrix of R and sketch its graph**

ii) If A={ α, β} and B={1,2,3}What are A × *B*, *B*×A,(A × *B*) ∩ (*B*×A) **[3] M**

CO :- C202.2
Blooms Taxonomy :- Apply

(1.3) **i) Define SemiGroup with example w.r.t algebraic structure.** **[3] M** [6.0]

ii) Let X= {1,2,3,4} and f: X -> X be given by f = {<1,2> ,<2,3> ,<3,4>, <4,1>} F is closed under a operation of composition <F,o>.Find f^0, f^1, f^2, f^3 and find which properties of algebraic structure are satisfied by F. **[4] M**

CO :- C202.3
Blooms Taxonomy :- Evaluate

(Q2) **All Questions are Compulsory** [10.0]

(2.1) **i) Draw the Hasse Diagram of following sets under the partial ordering relation "divides"** [4.0]
a) {1,2,3,6,12}
b){3,5,15}

CO :- C202.3
Blooms Taxonomy :- Evaluate

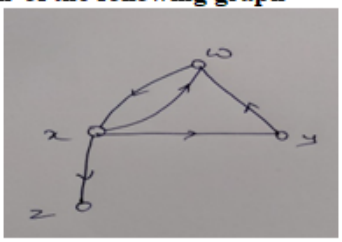
(2.2) **ii) Let S={1,2,3} Draw the diagram of <ρ(S),⊆>.** [6.0]

OR [2.2 / 2.3]

(2.3) **iii) Define Distributive Lattice & Totally ordered set with suitable example.** [6.0]

(Q3) **All Questions are Compulsory** [10.0]

(3.1) **i) Explain storage representation of the following graph** [3.0]



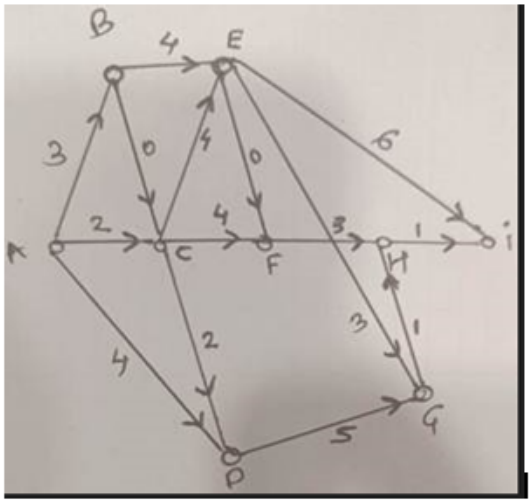
CO :- C202.4
Blooms Taxonomy :- Understand, Apply

OR [3.1 / 3.2]

(3.2) **ii) Define the following w.r.t graphs with example:** [3.0]
- **a) Path**
- **b) converse of graph**
- **c) weighted graph**

CO :- C202.4
Blooms Taxonomy :- Understand, Apply

(3.3) **ii)** [7.0]



Compute TE and TL values of the above PERT graph.Also compute its critical Path.

CO :- C202.4
Blooms Taxonomy :- Understand, Apply

(Q4) **Attempt any two out of three questions** [10.0]

(4.1) **i) Define Rule of sum and Rule of Product with example.** [5.0]

CO :- C202.5
Blooms Taxonomy :- Evaluate

(4.2) **ii) A box contains 4 red, 3 white and 2 blue balls. Three balls are drawn at random. Find out the number of ways of selecting the balls of different colors?** [5.0]

CO :- C202.5
Blooms Taxonomy :- Evaluate

(4.3) **iii) A pack contains 4 blue, 2 red and 3 black pens. If a pen is drawn at random from the pack, replaced and the process is repeated 2 more times, what is the probability of drawing 2 blue pens and 1 black pen?** [5.0]

CO :- C202.5
Blooms Taxonomy :- Evaluate

****