University of Mumbai

Examinations Summer 2022

Program: **Computer Engineering**

Curriculum Scheme: **Rev2016**

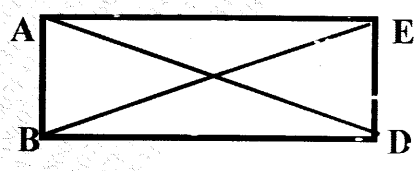
Examination: **SE** Semester: **III**

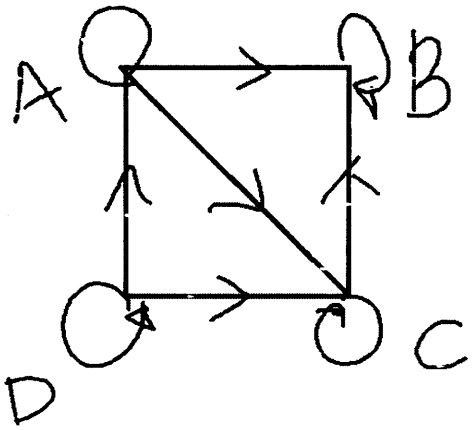
Course Code: **CSC303** and Course Name: **Discrete Mathematics**

Time: 2 hours 30 mins Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	**Find the power set of {c,d}**
Option A:	{{Ø},{c},{d},{c,d}}
Option B:	{{c,d}}
Option C:	{{c},{d},{c,d}}
Option D:	{{},{c},{d},{c,d}}
2.	**Let A={a,b,c,d}.Find which relation possess the irreflexive property.**
Option A:	A= { (a,a), (b,b), (c,c),(d,d)}
Option B:	A={ (a,a),(b,c) (c,b),(d,d)}
Option C:	A={(a,a),(b,b),(c,c),(c,d)}
Option D:	A={(a,b),(b,c)(c,d)}
3.	**Which of the statement not a Proposition?**
Option A:	Oh my god! how this happened?
Option B:	1st May is celebrated as Maharashtra day.
Option C:	2+2=4
Option D:	Apples come in red and green colour.
4.	**If P is proposition having truth value as F then find the value of the following expression ~(~(~(~(~(~P)))))**
Option A:	True
Option B:	Multiple Negations cannot be applied
Option C:	False
Option D:	Error in the expression
5	**If B-A =A-B then what we can interpret ?**
Option A:	Set A and Set B cannot be empty sets.
Option B:	Set A and Set B are complement set of each other.
Option C:	Set A and Set B are equal set or empty set.
Option D:	Set A and Set B are disjoint sets.
6	**Given relation R is not reflexive relation. How you will find the reflexive closure to make the relation as reflexive relation.**
Option A:	Add diagonal elements pair into the relation.
Option B:	Add upper triangular matrix elements into the relation
Option C:	Find the transpose of given matrix and add those pair into the relation
Option D:	Add lower triangular matrix elements into the relation

7.	**A={1,2,3,4} R={ (1,1) (1,2),(2,3),(2,2), (3,3)(1,3),(4,4)}**
Option A:	R is equivalence relation
Option B:	R represent poset (partially ordered sets}
Option C:	R is both partially order set and equivalence relation
Option D:	R is symmetric relation.
8	**Which is true in case of isomorphic graph**
Option A:	Two graphs to be isomorphic they should not have same no. of vertex.
Option B:	Two graphs to be isomorphic they should not have same no. of edges.
Option C:	Two graphs to be isomorphic every node of the graph should not have self-loop.
Option D:	Two graphs to be isomorphic they should not have one to one correspondence between the nodes.
9	**If n(A) = 20 and n(B) = 30 and n(A ∪ B) = 40 then n(A ∩ B) is?**
Option A:	40
Option B:	50
Option C:	10
Option D:	30
10	**The graph in which, there is a closed trail which includes every edge of the graph is known as?**
Option A:	Hamiltonian Graphs
Option B:	Euler Graphs
Option C:	Planar graph
Option D:	Directed Graph

Q2.	**Solve any Two Questions out of Three** **10 marks each**
A	Define Euler path and Circuit as well as Hamiltonian Path and Circuit. Find for the following graph if any Euler path and Circuit or Hamiltonian path and circuit is existing or not? If it exists give the path and circuit if not, then justify why it is not existing. 
B	Prove that sum of the n can be found as follow 1+3+5+...+(2n−1)=n21+3+5+...+(2n−1)=n2 for n=1,2,...
C	Define Abelian group. Check set A={0,1,2,3,4,5} is an abelian group or not under addition modulo 6.

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Apply Warshall's algorithm on the following graph and explain the need of Warshall algorithm. 
B	Among 50 patients admitted to a hospital, 25 are diagnosed with pneumonia, 30 with bronchitis, and 10 with both pneumonia and bronchitis. Determine: (a) The number of patients diagnosed with pneumonia or bronchitis (or both). (b) The number of patients not diagnosed with pneumonia or bronchitis.
C	A bag contains 3 red balls and 4 black balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) black (ii) not black.

Q4	**Solve any four Questions out of six** **5 marks each**
A	Define injective, surjective and bijective function with diagram and suitable example.
B	Write the condition for semigroup ,monoid and group.
C	Define equivalence relation and partial order set with one suitable example
D	Define Pigeon hole principle with one example.
E	Draw Venn diagrams representing subset, set difference and symmetric difference.