

Mid-West University
Examinations Management Office
End-Semester Examinations -2080

Bachelor level/ B.E. Computer/3rd Semester

Time: 3 hours

Subject: Discrete Structures(CO431/CO505)

Full Marks: 50

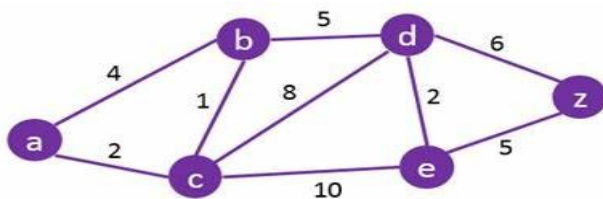
Pass Marks: 25

- Attempt all the questions
- Figures in the margin indicate full marks.
- Assume suitable values, with a stipulation, if necessary.
- Candidates are required to answer the questions in their own words as far as possible.

Attempt All Questions.

[10x5=50]

1. What is the logic behind studying discrete structure? Explain the operations in propositional logic. [1+4]
2. Define predicate logic. Prove the validity of the following arguments using truth table.
P: If today is Saturday it is holiday.
Q: If it is holiday then campus is closed. [1+4]
3. Define binary tree. What do you mean by finite state automata? Let **p** be the statement “Sita learns discrete structure” and **q** the statement “Sita will find a good job.” Express the statement **p**→**q** as a statement in English. [1+1+3]
4. Define graph and classify them. Find the **shortest path length** of the below graph between node **a** to **z** using Dijkstra Algorithm. [1+4]



5. List out the application of graph coloring. Prove that $[p \wedge (p \rightarrow q)] \rightarrow q$ is a tautology. [1+4]
6. State the closure properties of regular expression. Design a deterministic finite automata of a language $L = \{\text{strings containing binary string starting with } 00\}$ over the alphabet $\Sigma = \{0, 1\}$. [1+4]
7. What are the rules of inference? Find the solution of recurrence relation of the linear homogeneous equation $a_n = 6a_{n-1} - 9a_{n-2}$ with initial conditions $a_0 = 1$ and $a_1 = 6$. [1+4]
8. Explain walk path & connectedness graph algorithm with your own example. [2+3]
9. How can you justify tree as directed graph? What are the use of tree and graph in discrete structure? [3+2]
10. Write short Notes on (**Any Two**): [2.5+2.5]
 - A. Eulerian Graph
 - B. Formal and informal proof
 - C. Cutset & Cutvetrics
 - D. Sequential circuits

The End