

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
Semester Examination – May - 2019

Branch: Information Technology

Sem.:- IV

Subject with Subject Code:- Discrete Structure and Applications BTITC403

Date:- 20/5/2019

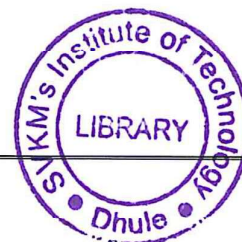
Marks: 60

Time:- 3 Hr.

Instructions to the Students

1. Attempt any five questions of the following.
2. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
3. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

- (Marks)**
- Q.1.**
- A. What is tautology? Prove that $[(A \rightarrow B) \wedge A] \rightarrow B$ is tautology (4)
- B. Explain with example – i) Power set ii) Partitions iii) Multi Set iv) cardinality of set (4)
- C. In a group of 60 people, 27 like cold drinks and 42 like hot drinks and each person likes at least one of the two drinks. How many like both coffee and tea? (4)
- OR**
- D. Explain with example predicate, Quantifier and nested Quantifier (4)
- Q.2.**
- A. Prove that using mathematical induction- $1 + 2 + 3 + \dots + n = \frac{1}{2} n(n + 1)$ (4)
- B. What is a function? Explain – Injective, subjective and bijective function (4)
- C. Explain job scheduling problem with suitable example (4)
- OR**
- D. Explain with example- Composition, inverse and identity of function (4)
- Q.3.**
- A. Define permutation. Explain permutation with repetition with suitable example. (4)
- B. What is pigeonhole principle? Explain generalized pigeonhole principle with example (4)
- C. Explain recurrence relation with Fibonacci series. (4)
- Q.4.**
- A. Find the transitive closure for relation $R = \{(1,2)(2,1)(2,3)(3,4)\}$ using Warshall algorithm (6)
- OR**
- B. Explain with suitable example Reflexive, Symmetric and transitive closure. (6)
- C. What is equivalence relation? Explain with example? (6)



Q.5.

- A. Explain How Hamiltonian path is useful in travelling salesman problem. (4)
- B. Explain – i) Multi Graph ii) Weighted graph iii) Complete graph iv) Paths and circuit (4)
- C. What graph coloring? Explain any one application of graph coloring (4)

Q.6

- A. Define the following terms
- i) Algebraic Structure ii) Semi group iii) Monoid (6)
- iv) Group v) Abelian group vi) Permutation Group
- B. When the set of Real numbers and Integers Satisfied algebraic structure for operations $(+, -, \times, \div)$? (6)

END

