**Tribhuwan University**
**Institute of Science and Technology**
**2077**

Bachelor Level / third-semester / Science — Full marks: 60
**Computer Science and Information Technology(CSC206)** — Pass marks: 24
(Data Structures and Algorithms) — Time: 3 hours
Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

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**Long questions:**

**Attempt any Two questions:(2 x 10 = 20)**

**1. What is stack? What are the different applications of stack? Explain stack operations with example.(1 + 3 + 7)**

**2. Differentiate between singly linked list and doubly linked list. How do you insert and delete a node from doubly linked list? Explain.(3+7)**

**3. What is shortest path? Explain Dijkstra algorithm for finding shortest path using suitable example.(2+8)**

**Short questions:**

**Attempt any Eight questions:(8 x 5 = 40)**

**4. What is dynamic memory allocation? Compare data structure with abstract data type.(2+3)**

**5. Explain algorithm for evaluation of postfix expression using stack.(5)**

**6. Explain queue as an ADT.(5)**

**7. Write a recursive program to find GCD of two numbers.(5)**

**8. What is linked list? How is it different from array?(2+3)**

**9. Hand test bubble sort with array of numbers 53, 42, 78, 3, 5, 2, 15 in ascending order.(4+1)**

**10. What is hashing? Explain concept of hash table and hash function with example.(1 + 4)**

**11. What is minimum spanning tree? Explain.(5)**

**12. Write short notes on: (2 x 2.5 = 5)**

**a. Tail recursion** **b. Collision resolution techniques**

 