BIT201-2082 ✡ Exam Roll No. 80020095

Tribhuvan University
Institute of Science and Technology
2082
✡

Bachelor Level / Second Year/ Third Semester/ Science
Bachelors in Information Technology (BIT 201)
(Data Structure and Algorithms)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

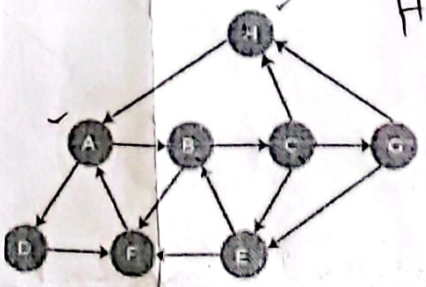
Long Answer Questions.
Attempt any TWO questions. **(2 × 10 = 20)**

1. Why do we need sorting? Trace the Quick sort for the input {12, -9, 56, 23, 4, 8, 6, 9, 23, 21}. [2+8]
2. Define primitive data type with example. What are the advantages of hashing? With your own example show the hash collision and how do you handle it? Explain. [2+2+6]
3. Distinguish between static and dynamic list structure. Explain about linked list implementation of stack and queue. [2 + 8]

Section B

Short Answer Questions.
Attempt any EIGHT questions. **(8 × 5 = 40)**

4. Why do we need circular queue? Explain. [5]
5. Traverse the following graph using BFS and DFS. [5]



H, A, B, C, G, E, F, D
H, A, D, F, B, C, E, G

6. Convert the infix expression 7 * 8 + 10 - 2 to postfix using stack. [5]
7. Explain the insertion and deletion of a node at first and last position of doubly circular linked list. [5]
8. Define time and space complexity. Discuss about Round Robin Algorithm for MST. [1 + 4]

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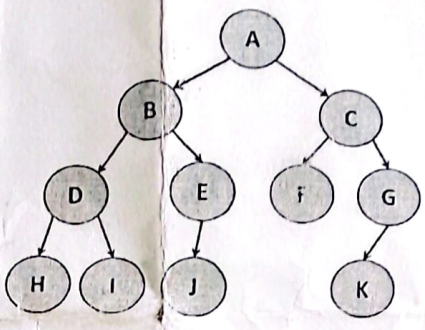
9. Traverse the following tree in pre-order and in-order. [5]



10. Define binary tree and binary search tree. List the applications of Binary tree. [2 + 3]

11. List the limitation of recursion. How do you delete the node in BST? [2 + 3]

12. What is simple queue? Describe about any three types of graphs. [2 + 3]

BIT202-2082

Exam Roll No...80020095

Tribhuvan University

Institute of Science and Technology

2082

Bachelor Level / Second Year/ Third Semester
Bachelors in Information Technology (BIT 202)
(Database Management System)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions.
Attempt any TWO questions. **(2 × 10 = 20)**

1. What is a transaction? Describe how lost update and dirty read problems occur in concurrent execution of transactions? Illustrate with examples. [2+8]

2. What is the need for an ER diagram? Design an ER diagram that contains at least five entities. One of the entities must be a weak entity. There should be many to many relationships between the two strong entities. One of the entities should have derived and multi-valued attributes. Any one strong entity should have total participation in a relationship with another entity. Use your own assumptions as per the required. [2+8]

3. Why is normalization required? Define 1NF, 2NF and 3NF with suitable examples. [2+8]

Section B

Short Answer Questions.
Attempt any EIGHT questions. **(8 × 5 = 40)**

4. Write SQL statements to create a table and update value in a table. Also mention the use of cascade on delete while creating the table. Use your own assumption for the table and update conditions. [5]

5. How is the Group By Having clause used in SQL statements? Mention the syntax and example. [5]

6. Describe the three schema architecture. How does the architecture create data independence? [3+2]

7. What is database recovery? How can shadow paging be used for database recovery? [1+4]

8. How data is stored and retrived in NoSQL databases? Illustrate with examples. [5]

9. What is a two phase locking protocol? How can it lead to the deadlock condition? [3+2]

10. Discuss the various types of constraints used on Extended ER Model, [5]

11. What is the view? How can you create a view in SQL? Illustrate with an example. [2+3]

12. Given following relations, write relational algebra statements for [5]
    Person(*Pid, pname, dob, padd*)
    Doctor(*Did, pid, dname, dspeciality*)
    a. Retrieving name of person who is doctor.
    b. Retrieving all doctors whose specialty is pediatric.

BIT203-2082 ✡ Exam Roll No 80020095

Tribhuvan University
Institute of Science and Technology
2082
✡

Bachelor Level / Second Year/ Third Semester
Bachelors in Information Technology (BIT 203)
(Numerical Methods)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions
Attempt any TWO questions. **(2 × 10 = 20)**

1. Explain how bisection method differs from secant. Derive the formula for Newton Raphson. Use Newton Raphson method to solve the equation $f(x) = x^3 + 2x - 2$ correct upto three decimal places. [2+4+4]
2. Write an algorithm and program to compute the value of interpolation using Newton's divided difference method. [5 + 5]
3. List out any two applications of system of linear equation. Differentiate between Gauss-Seidel and Jacobi iteration method. Solve the following system of equations using Jacobi iteration method: *[2+3+5]*

$$4x + y + z = 7$$
$$x + 5y - 2z = 3$$
$$3x + 2y + 6z = 14$$

Section B

Short Answer Questions
Attempt any EIGHT questions. **(8 × 5 = 40)**

4. Differentiate between round-off error and truncation error. Explain how they affect numerical computations, with the help of an example. [2+3]
5. Derive the formula for two points forward and backward difference. [2.5+2.5]
6. Fit the exponential curve $y=ae^{bx}$ for (1, 15), (2,22), (3, 33), (4,48), (5,70) using least square method. [5]
7. Solve the following system of linear equation using Cholesky decomposition method. [5]

$$4x+6y-8z=-8$$
$$6x+13y-11z=-1$$
$$-8x-11y+29z=57$$

8. Find the first and second derivative at x=2.5 or the following data points. [5]

	0	1	2	3	4	5
X	1.5	2	2.5	3	3.5	4
f(x)	2.375	4.5	7.625	12	17.875	23

9. Integrate $\int_0^3 (2x^3 + 1)dx$ using simpson's 1/3 rule with n= 6. [5]

10. Solve $\frac{dy}{dx} = x^2 + y$, with y(0) =1 for x=1.5, using RK fourth order method. [5]

11. Explain boundary value problem with example. Describe how higher order differential equation can be solved. [2+3]

12. Define eigenvalue and eigenvector. Distinguish between regression and interpolation. [2.5+2.5]

BIT204-2082 ✡ Exam Roll No. 80020095

Tribhuvan University
Institute of Science and Technology
2082
✡

Bachelor Level / Second Year/ Third Semester
Bachelors in Information Technology (BIT 204)
(Operating Systems)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions

Attempt any TWO questions. **(2 × 10 = 20)**

1. Differentiate between user thread and kernel thread. Given the following information about processes, compute the average waiting time and turnaround time for FCFS and Round Robin (Quantum = 2). [2+8]

Processes	CPU Burst Time	Arrival Time
A	9	2
B	11	1
C	1	0
D	2	3
E	7	4

2. When does page fault occur? Given the page reference strings 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3, find the number of page fault using Optimal Page Replacement, FIFO and Second Chance Replacement algorithm. Assume the size of page frame is 4. [1 + 9]

3. Discuss about controller and memory mapped I/O. Differentiate between interrupt based I/O and DMA based I/O. [5 + 5]

Section B

Short Answer Questions

Attempt any EIGHT questions. **(8 × 5 = 40)**

4. Define system call? What are its objectives? [2 + 3]
5. Explain about operating system components in brief. [5]
6. Discuss about working mechanism of banker's algorithm. [5]
7. Why do we prefer segmentation with paging? Explain. [5]
8. Describe about error handling and formatting in disk management. [5]
9. Explain about file system and directory system implementation. [5]
10. Define interrupt. Describe about device controller. [2 + 3]
11. Explain about batch system and time sharing operating system. [5]
12. What is virtual machine? Discuss about system protection. [2 + 3]

MGT205-2082 ✡

Exam Roll No: 80020095

Tribhuvan University
Institute of Science and Technology
2082
✡

Bachelor Level / Second Year/ Third Semester
Bachelors in Information Technology (MGT 205)
(Principles of Management)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions.
Attempt any TWO questions. **(2 × 10 = 20)**

1. "It is essential for a manager to study the business environment to sustain and grow the business". Elaborate this statement.
2. Introduce planning. Explain the steps of planning process.
3. State and explain the contemporary issues in leadership.

Section B

Short Answer Questions.
Attempt any EIGHT questions. **(8 × 5 = 40)**

4. State and explain the major roles of manager.
5. Explain the various decision making conditions.
6. Distinguish between vertical and horizontal dimensions of organization structure.
7. What are the main techniques that managers apply to motivate employees? Discuss.
8. Mention the characteristics of charismatic leadership.
9. State and explain the qualities of good controlling system.
10. Explain the importance of organizational culture.
11. What is communication? Discuss the communication styles of men and women employees.
12. Explain the different tools of financial control.