National Academy of Science & Technology

Dhangadhi Kailali

First Unit Test

Level: Bachelor
Program: BE Computer IV
Course: Applied Mathematics

Semester : IV_Spring

Year : 2024
F. M. : 40
P. M. : 18
Time : 1 hr.

SET-A

Attempt all the questions. [5*8=40]

1) Show that u = sinx coshy is a harmonic or not? If yes, Find the corresponding analytic function f(z) =u+iv

2) Find the Laurent's series of the function

$$f(z) = \frac{z^2 - 1}{(z+2)(z+3)}$$

in the region i) $|z| < 2$ ii) $2 < |z| < 3$

3) *Calculate the residue of the function f(z) at each of its singular points, where*

$$f(z) = \frac{z+2}{(z-2)^2(z^2+1)}$$

4) Define Z-transform of a function f(t). Find the Z-transform of $e^{i\frac{n\pi}{2}}$ and hence find $Z[\cos(\frac{n\pi}{2})]$ *and* $Z[\sin(\frac{n\pi}{2})]$

5) Using Z-transform,solve the difference equation $y_{n+2} + 3y_{n+1} + 2y_n = 0$, $y_0 = 0$, $y_1 = 1$.

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First Unit Test

Level: Bachelor | Semester : IV_Spring | Year : 2024

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Time : 1 hr.

SET-B

Attempt all the questions. **[5*8=40]**

1) Show that u = cosx coshy is a harmonic or not? If yes, Find the corresponding analytic function f(z) =u+iv

2) Find the Laurent's series of the function

$$f(z) = \frac{z^2 - 3}{(z+1)(z+2)}$$

in the region i) $|z| < 1$ ii) $1 < |z| < 2$

3) Evaluate: $\int \frac{z-23}{z^2-4z-5} dz$, c: $|z-2| = 4$.

4) Find $Z(e^{-iat})$ and hence deduce the values of z(cosat) and z(sinat)

5) Using Z-transform,solve the difference equation

$y_{n+2} - 3y_{n+1} + 2y_n = 4^n$, $y_0 = 0$, $y_1 = 1$.

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First Unit Test

Level: Bachelor | Semester: IV_Spring | Year : 2024

Programme: B.E. Computer | F.M. : 40

Course: **Advance Java Programming** | P.M. : 18

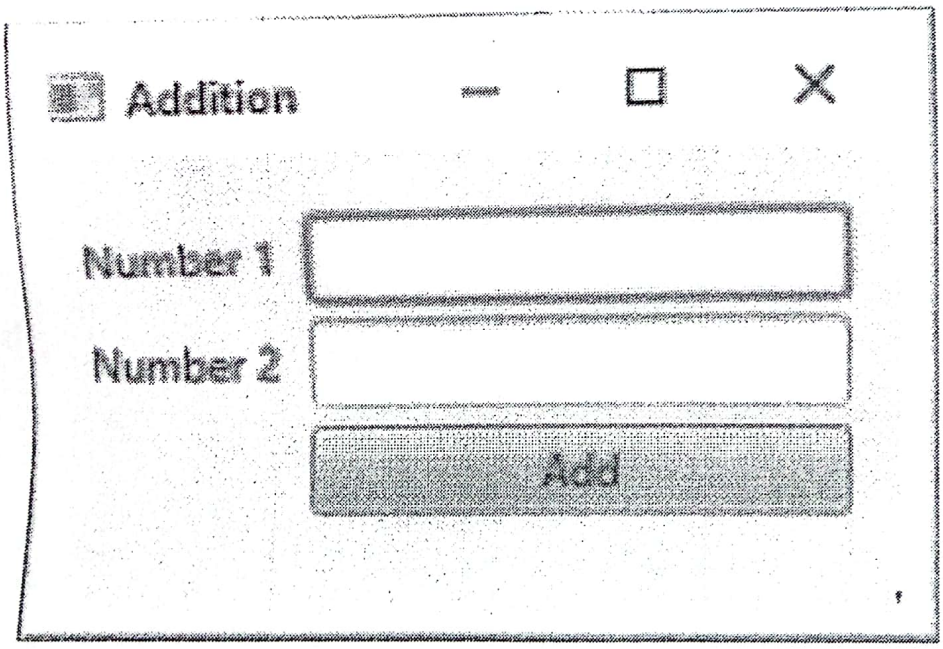
Time : 1 hr.

SET-A

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

Attempt any four questions.

1. Define Class Object and Constructor with code example (7)
2. Write the use of try, catch, throw, throws and finally keywords in exception handling. Write down the code to handle user defined exception. (8)
3. Explain Different Swing Controls with example (7)
4. Define Event. Explain different types of event handling with example.
5. Write down the JavaFx code to take input two number when user click on add button it should display result. (8)



6. Write short notes on (**Any two**) **(2x5 = 10)**
   a) Swing and class hierarchy
   b) Abstract class and Interface
   c) extends vs super keywords

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First Unit Test

Level: Bachelor
Programme: B.E. Computer
Course: **Advance Java Programming**

Semester: IV_Spring

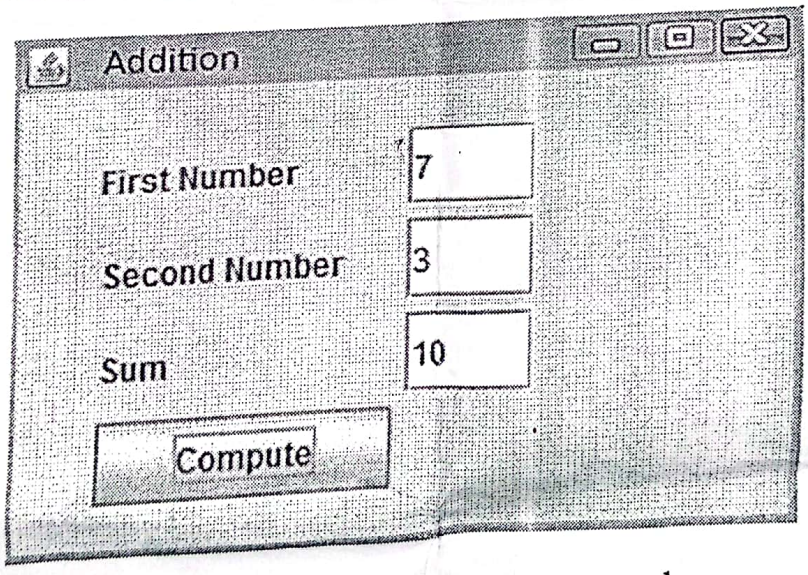
Year : 2024
F.M. : 40
P.M. : 18
Time : 1 hr.

SET-B

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

Attempt any four questions.

1. What is the use of conditional statements? Write down with example
2. Why do we need exception handling in Java Programming? Explain with code example how do you handle it.
3. Define Layout Management. Explain different types of Layouts in brief with example.
4. Write down the Swing code to take input two number when user click on add button it should display result.



5. Explain different JavaFX Controls with example

6. Write short notes on **(Any two)** **(2 x 5 = 10)**
   a) OOPs
   b) Polymorphism
   c) upcasting and down casting

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First Unit Test

Level: Bachelor | Semester: IV_Spring | Year : 2024

Programme: B.E. Computer | F.M. : 40

Course: **Advance Java Programming** | P.M. : 18

Time : 1 hr.

SET-C

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

Attempt any four questions.

1. What is the use of looping statement? Write down with code example
2. Define inheritance. Explain different types of inheritance with code example.
3. Wrote down the Swing code to design a login page as shown in the figure below when user click on login button test the username is "nast"and password is "BeComp#4" or not

4. What is the use of collection framework? Explain with code example
5. Define JavaFX Layout. Explain different types of JavaFX using in desktop development with example

6. Write short notes on **(Any two)** **(2x5=10)**

a) Method Overloading vs Method Overriding

b) final vs finally keywords

c) Access Modifier

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First Unit Test

Level: Bachelor Semester : IV_Spring Year : 2024

Programme: B.E Computer Full Marks : 40

Pass Marks: 18

Course: Theory of Computation Time : 1 hr

Candidates are required to give their answers in their own words as far as practicable.

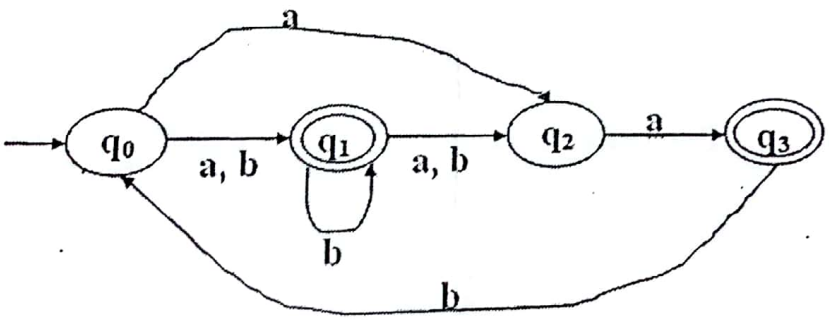
The figures in the margin indicate full marks.

Attempt all the questions.

SET A

1. a) What is the significance of FA? Construct finite automata that accepts the set of string of language L = {am b an: m , n > 0} 7

   b) Consider the following NFA to its equivalent DFA. 8



2. a) When the grammar is ambiguous? For given grammar rule: 7

   $S \longrightarrow aSa$

   $S \longrightarrow bSb$

   $S \longrightarrow c$

   Check Ambiguity for grammar.

   b) For all n>=1, prove that $1^2 + 2^2 + 3^2 + ... + n^2 = n(n+1)(2n+1)/6$ by using mathematical induction. 8

3. Write short notes on following **(Any Two)** 5x2

   a) Chomsky Hierarchy

   b) Derivation Tree

   c) CNF and GNF

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First Unit Test

Level: Bachelor | Semester : IV_Spring | Year : 2024

Programme: B.E Computer | Full Marks : 40 | Pass Marks: 18

Course: Theory of Computation | Time : 1 hr

Candidates are required to give their answers in their own words as far as practicable.

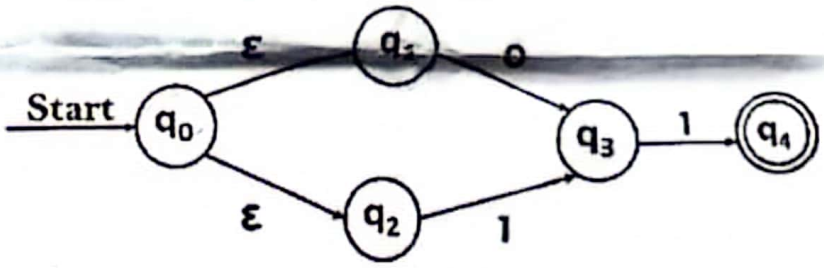
The figures in the margin indicate full marks.

Attempt all the questions.

SET B

1. a) Construct a finite automata equivalent to $10 + (0 + 11)0^* 1$. 7

   b) Convert the NFA With Epsilon to DFA. 8



2. a) Prove that if n is integer and $n^3 + 5$ is odd, then n is even using contradiction. 8

   a) Define CNF. Convert the following grammar into CNF. 7

   $S \rightarrow ASB \mid \in$, $A \rightarrow aAS \mid a$, $B \rightarrow AB \mid b \mid \in$

3. Write short notes on following **(Any Two)** 5x2
   a) Pigeon Hole Principle
   b) Ambiguity in Grammar
   c) Function and Relation

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First Unit Test

Level: Bachelor | Semester – Spring | Year : 2024
Programme: B.E Computer | Full Marks : 40
Pass Marks: 18
Course: Theory of Computation | Time : 1 hr

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

SET C

1. c) Design a DFA which accepts the language L = {**w ∈ (0, 1)*** / second symbol of w is '0' and fourth symbol is 1}. 7

   d) Convert the NFA M= ({q_0, q1, q2, q3}, {0, 1}, δ, q_0, {q3}) to its equivalent DFA. δ is given by 8

States	0	1
q_0	q_0, q_1	q_0
q_1	q_2	q_1
q_2	q_3	q_3
q_3	-	q_2

2. d) Prove that if 3n+2 is odd, then n is odd (n is integer) using contradiction. 8

   e) Construct a left most and right most derivation tree for the string aabbabba for the CFG given by, 7

   S → aB | bA
   A → a | aS | bAA
   B → b | bS | aBB

3. Write short notes on following **(Any Two)** 5x2

   d) Diagonalization
   e) CFL and CFG
   f) Regular Expression and Regular Language

SET-I

National Academy of Science and Technology

Dhangadhi, Kailali

Unit Test-I

Level: Bachelor | Semester : Spring_IV | Year : 2024
Program: B.E. Computer | F.M. : 40
Course: Numerical Methods | P.M. : 18
Time : 1 hrs.

Candidates are required to give their answer in their own words as far as practicable.
The figure in the margin indicate full marks.

Attempt all Questions.

1.a) Using secant method, find a root of the equation $2x^3 - x - 3 = 0$ correct to three decimal places. [7]

b) Find a root of the equation $\sin x - 2x + 1 = 0$ using suitable root bracketing method. Give a reason for the choice of your method. [8]

2.a) Using factorization method, solve: [8]

$2x+2y+z=6;\quad 4x+2y+3z=4;\quad x-y+z=0$

b) Solve the following system of equations using an iterative method: [7]

$27x + 6y - z = 85;$
$x + y + 54z = 110;$
$6x + 15y + 2z = 72.$

3.a) Estimate f(10) using Newton's divided difference formula [5]

x	3	7	11
f(x)	15	39	145

b) Fit a linear curve of the form $y = ax + b$ from the data: [5]

x	10	20	30	40
y	8	10	15	21

SET-II

National Academy of Science and Technology

Dhangadhi, Kailali

Unit Test-1st

Level: Bachelor
Program: B.E. Computer
Course: **Numerical Methods**

Semester : **Spring_IV**

Year : 2024
F.M. : 40
P.M. : 18
Time : 1 hrs.

Candidates are required to give their answer in their own words as far as practicable.
The figure in the margin indicate full marks.

Attempt all Questions.

1. a) Using False position method, find a root of the equation $2x^3 - x - 3 = 0$ correct to three decimal places. [7]

   b) Find a root of the equation $\sin x - 2x + 1 = 0$ using suitable root non- bracketing method. Give a reason for the choice of your method. [8]

2. a) Using Gauss Jordan method, solve: [8]

   $3x_1 + 2x_2 + 7x_3 = 4;$
   $2x_1 + 3x_2 + x_3 = 5;$
   $3x_1 + 4x_2 + x_3 = 7.$

   b) Solve the following system of equations using Gauss Seidel method: [7]

   $x + 6y - 10z = -3;$
   $10x - 5y - 2z = 3;$
   $4x - 10y + 3z = -3$

3. a) Estimate f(8) using Lagrange's interpolation formula [5]

x	3	7	11
f(x)	15	39	145

   b) Fit a linear curve of the form $y = a + bx$ from the data: [5]

x	5	12	15	20
y	8	10	15	21

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Dhangadhi Kailali

First Unit Test

Level: Bachelor
Programme: B.E. Computer
Course: Computer Architecture

Semester: IV_Spring

Year : 2024
F.M. : 40
P.M. : 18
Time : 1 hr.

SET-A

Attempt all the questions.

1	a) Differentiate between computer architecture and computer organization.	7
	b) Write a VHDL program for a and gate.	8
2	a) Multiply 7 and -9 using Booth's algorithm.	8
	b) Divide 13 by 5 using restoring algorithm.	7
3	Write short notes on **any two**:	2×5
	a) Shift micro-operation	
	b) History of computer	
	c) VHDL	

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First Unit Test

Level: Bachelor | Semester: IV_Spring | Year : 2024

Programme: B.E. Computer | F.M. : 40

Course: Computer Architecture | P.M. : 18

Time : 1 hr.

SET-B

Attempt all the questions.

1	a) Differentiate between computer architecture and computer organization.	7
	b) Write a VHDL program for or gate.	8
2	a) Multiply -8 and 14 using Booth's algorithm.	8
	b) Divide 11 by 4 using restoring algorithm.	7
3	Write short notes on **any two**:	2x
	a) Arithmetic micro-operation	
	b) Floating point representation	
	c) VHDL	

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First Unit Test

Level: Bachelor | Semester: IV_Spring | Year : 2024

Programme: B.E. Computer | F.M. : 40

Course: **Research Fundamentals** | P.M. : 18

Time : 1 hr.

SET-A

Answer the following questions **(8×5 = 40)**

1) What do you mean by research? Differentiate between qualitative and quantitative research.
2) What are the different Features of research?
3) What are the 6ps of research? Elaborate.
4) Write the Purpose and objectives of a literature review.
5) Mention the rights of people directly involved in the research process.

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First Unit Test

Level: Bachelor | Semester: IV_Spring | Year : 2024

Programme: B.E. Computer | F.M. : 40

Course: **Research Fundamentals** | P.M. : 18

Time : 1 hr.

SET-B

Answer the following questions (8×5 = 40)

1) What do you mean by literature review? Mention the sources of literature.
2) What are the types of research? Differentiate between applied and basic research.
3) Mention the responsibilities of an ethical researcher in the research process.
4) Write the difference between action research and ethnography?
5) What is triangulation in research? Mention the types of triangulation in a research project.