Cochin University of Science And Technology
Department of Computer Science

**First Semester M.Sc. (Five-Year Integrated) in Computer Science
(Artificial Intelligence & Data Science)**

First Series Examination – February 2025
23-813-0402: Numerical Methods

Duration: 2 Hours | Maximum Marks: 20

Answer all questions.

1. a. Define error. What are different types of errors? [CO1, DL-1, BTL-1] 4 marks

   b. Write a short note on significant digits. Explain with four examples.

   [CO1, DL-2, BTL-2] 3 marks

2. a. Find the root of the given equation using bisection method.

   $x^3 - 4x - 9 = 0.$ [CO1, DL-2, BTL-3] 3 marks

   b. Find a root for the equation "$x^3 - 3x + 1 = 0$" using the false position method and correct it to three decimal places with three iterations. [CO2, DL-2, BTL-2] 3 marks

3. Solve the system of linear equations given below by using Gauss Jordan Method.

   $$x + y - z = -3$$
   $$2x + 3y - 8z = -18$$
   $$5x + 6y - 10z = -25$$

   [CO3, DL-2, BTL-3] 4 marks

4. Solve the system of linear equations given below by using Relaxation Method

   $$8x + y + z = 8$$
   $$2x + 4y + z = 4$$
   $$x + 3y + 5z = 5$$

   [CO3, DL-2, BTL-3] 3 marks

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

Programme: I Semester CS MDC		
Course Code & Title:24-813-0103 : Computational Thinking for Problem Solving		
Name of Examination: Series 1	Max. Marks: 20	Semester: I
Batch: 2025-30	Duration: 1 Hour	Date: 16.09.2025	Time: 2:00 PM – 3:00 PM

PART- A (ANSWER ALL QUESTIONS) (4 X 2=8)

(2 Marks) [CO5, DL-2, BTL-3]

1   Predict the output of the following code snippet
```
vowels = ['a', 'e', 'i', 'd', 'u']
print(vowels[-2])
vowels[3]='o'
print(vowels)
```

2   Prepare a short note on pattern recognition step of computational thinking
(2 Marks) [CO1, DL-1, BTL-1]

3   You have a list of numbers: [2, 4, 6, 8, 10, 12]. You need to write a Python program to print each number in the list more efficiently.
(2 Marks) [CO5, DL-3, BTL-2]

4   Predict the output
```
x=7
y=2
print( x==7)
print(str(x)+3)
```
(2 Marks) [CO5, DL-1, BTL-3]

PART-B (ANSWER ANY THREE QUESTIONS) (3 X 4=12)

6   You are a junior programmer at a weather forecasting company. Your team has asked you to write a program that can analyze the daily temperature to provide a simple report. Write a Python program that fulfills the following requirements:
1. **Ask the user** to input today's temperature in degrees Celsius. Make sure to convert this input to an integer or float.
2. Use an appropriate control **statement** to check the temperature and print a corresponding message based on the following rules:
   - If the temperature is **above 30°C**, print: It's a hot day! Stay hydrated.
   - If the temperature is **between 20°C and 30°C** (inclusive), print: The weather is moderate and pleasant.
   - If the temperature is **below 20°C**, print: It's a cold day. Don't forget your jacket.

(4 Marks) [CO5, DL-3, BTL-3]

7   Prepare a note in details with examples on the topic 'mathematical functions in python'
(4 Marks) [CO5, DL-1, BTL-2]

8   Prepare a note in detail on 'Computing and Different Domains of Computing'
(4 Marks) [CO1, DL-1, BTL-2]

9   You are a developer creating a health and fitness application. One of the core features is a Body Mass Index (BMI) calculator. Your task is to write a Python program that uses a user-defined function to calculate a person's BMI based on their weight and height.
(4 Marks) [CO5, DL-3,BTL-4]
Hint : The formula for calculating BMI is

$$BMI$$

Programme: Five Year Integrated M.Sc. in Computer Science (Artificial Intelligence and Data Science)

Course Code & Title: 23-813-0503: CLOUD COMPUTING

Name of Examination: Series I		Max. Marks: 20	Semester: I
Batch: 2023-2028	Duration: 2 Hours	Date: 17.9.2024	Time: 9 AM – 11 AM

Section I: Choose the best answer among the options given (4 marks)

1. Which among the following is NOT an advantage of cloud computing?
   a) Metered billing   b) Batch processing   c) Resource Pooling   d) Vendor lockin

2. Identify the model of computing, where distributed computation is performed in the network and information is shared to the server and client side.
   a) Fog computing model   b) IaaS based model
   c) Client-server model   d) Micro-server based model

3. Which among the following is NOT a cyber security objective in cloud?
   a) Confidentiality   b) Scalability   c) Integrity   d) Accessibility.

4. An SDK provided for development in cloud is an example of which computing model?
   a) IaaS   b) PaaS   c) SaaS   d) DaaS

Section II: Answer the following (Total 16 Marks)

5. What are the principles of cloud computing?   (4 marks)

6. What is the difference between monolithic and microservices model in cloud computing?
                                                                                   (4 marks)

7. What is denial of service attack? Provide solutions against it.   (4 marks)

8. What is difference between symmetric and asymmetric key cryptography?   (4 marks)

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COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

Programme: Five Year Integrated M.Sc. in Computer Science (Artificial Intelligence and Data Science)

Course Code & Title: 23-813-0503: CLOUD COMPUTING

Name of Examination: Series I		Max. Marks: 20	Semester: I
Batch: 2023-2028	Duration: 2 Hours	Date: 17.9.2024	Time: 9 AM – 11 AM

Section I: Choose the best answer among the options given (4 marks)

1. Which among the following is NOT an advantage of cloud computing?
   a) Metered billing   b) Batch processing   c) Resource Pooling   d) Vendor lockin

2. Identify the model of computing, where distributed computation is performed in the network and information is shared to the server and client side.
   a) Fog computing model   b) IaaS based model
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COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

Programme: I Semester CS MDC

Course Code & Title:24-813-0103 : Computational Thinking for Problem Solving

Semester: I

	Max. Marks: 20	Time: 2:00 PM – 3:00 PM
Name of Examination: Series I	Date: 16.09.2025	
Batch: 2025-30	Duration: 1 Hour	

PART- A (ANSWER ALL QUESTIONS) (4 X 2=8)

(2 Marks) [CO5, DL-2, BT

1 Predict the output of the following code snippet

```
vowels = ['a', 'e', 'i', 'd', 'u']
print(vowels[-2])
vowels[3]='o'
print(vowels)
```

2 Prepare a short note on pattern recognition step of computational thinking

(2 Marks) [CO1, DL-1, BT

3 You have a list of numbers: [2, 4, 6, 8, 10, 12]. You need to write a Python program to print each num in the list more efficiently.

(2 Marks) [CO5, DL-3, BT

4 Predict the output

```
x=7
y=2
print( x==7)
print(str(x)+3)
```

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PART-B (ANSWER ANY THREE QUESTIONS) (3 X 4=12)

6 You are a junior programmer at a weather forecasting company. Your team has asked you to write a program tha analyze the daily temperature to provide a simple report. Write a Python program that fulfills the follo requirements:

1. **Ask the user** to input today's temperature in degrees Celsius. Make sure to convert this input integer or float.
2. Use an appropriate control **statement** to check the temperature and print a corresponding mes based on the following rules:
     ○ If the temperature is **above 30°C**, print: It's a hot day! Stay hydrated.
     ○ If the temperature is **between 20°C and 30°C** (inclusive), print: The weather is mod and pleasant.
     ○ If the temperature is **below 20°C**, print: It's a cold day. Don't forget your jacket.

7 Prepare a note in details with examples on the topic 'mathematical functions in python'

(4 Marks) [CO5, DL-3, BT

8 Prepare a note in detail on 'Computing and Different Domains of Computing'

(4 Marks) [CO5, DL-1, BT

9 You are a developer creating a health and fitness application. One of the core features is a Body Mass I (BMI) calculator. Your task is to write a Python program that uses a user-defined function to calcul person's BMI based on their weight and height.

Hint : The formula for calculating BMI is:

$$BMI = \frac{\text{weight in kilograms}}{(\text{height in meters})^2}$$

(4 Marks) [CO5, DL-3,BT

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

Programme: I Semester CS MINOR- DSC C			
Course Code & Title:24-813-0101 : Computational Thinking with Python			
Name of Examination: Series I			
Batch: 2025-30	Duration: 1 Hour	Max. Marks: 20	Semester: I
		Date: 17.09.2025	Time: 2:00 PM – 3:00 PM

PART- A (ANSWER ALL QUESTIONS) (4 X 2=8)

1   Predict the output of the following code snippet
   a.   b=0

```
for i in range(10):
   b=b+i
print(b)
```
                                                                    (2 Marks) [CO2, DL-2, BTL-3]
   b.
```
x = 10
if x > 5:
   print("Greater than 5")
elif x > 8:
   print("Greater than 8")
else:
   print("Less than or equal to 5")
```

2   Define the following terms
      a.   computational thinking
      b.   Algorithmic thinking

3   State the significance of break statement in while loop With an example python snippet
                                                                    (2 Marks) [CO1, DL-1, BTL-1]

                                                                    (2 Marks) [CO2, DL-3, BTL-2]
4   Predict the output
```
x=7
y=2
print(x//y)
print(y**3)
```

                                                                    (2 Marks) [CO2, DL-2, BTL-3]

PART-B (ANSWER ANY THREE QUESTIONS) (3 X 4=12)

6   Write a Python program that input a number from the user prints different outputs based on a set of rules involving divisibility. for multiples of three, print "Fizz" instead of the number. For multiples of five, print "Buzz". For numbers which are multiples of both three and five, print "FizzBuzz", otherwise (if none of the above conditions are met). print the number itself.

                                                                    (4 Marks) [CO2, DL-3, BTL-3]
7   Prepare a note in details with examples on the topic 'List and its functions in python'.
                                                                    (4 Marks) [CO2, DL-1, BTL-2]
8   Prepare a note in detail in on the topic 'Components of computational Thinking'

                                                                    (4 Marks) [CO1, DL-1, BTL-2]
9   You have a list of book titles: ['The Hobbit', '1984', 'To Kill a Mockingbird', 'The Great Gatsby', 'Moby Dick'].A visitor asks you if the book **1984** is in the library's collection.
   Create a Python function called find_book() that takes two arguments: book_list: a list of strings representing the book titles and target_book: a string representing the book the visitor is looking for.
   The function should use a **linear search** to iterate through the book_list and check if target_book is present.If the book is found, the function should return True and print a message like: The book 1984 is available.
   If the book is not found after checking the entire list, the function should return False and print a message like: The book 1984 is not in the collection.
                                                                    (4 Marks) [CO2, DL-3, BTL-4]

Programme: I Semester M.Tech Computer Science & Engineering with specialization in Data Science and Artificial Intelligence/M.Tech Computer Science & Engineering (Artificial Intelligence and Software Engineering) Course Code & Title: 24-479-0101: Mathematics for Computing/24-502-0101: Mathematics for Computing		
Name of Examination: Series I	Max. Marks: 20	Semester: I
Batch: 2025-27	Duration: 2 Hours	Date: 15.09.2025	Time: 09:00 AM – 11:00 AM

Answer all questions.

1.
   a) Translate the following statement into logical expressions and then negate it.
      For all real no x if x>2 then $x^2 > 4$.   (2 marks)[CO1, DL-2, BTL-3]
   b) Determine whether the logical expression $(p \lor \neg q) \to (p \land q)$ is satisfiable and valid.
                                                      (2 marks)[CO1, DL-1, BTL-3]
   c) Determine whether the conclusion t logically follows from the premises $p \land q$, $(p \lor s) \to \neg r$ and $r \lor t$ using logical deductions.   (2 marks)[CO1, DL-1, BTL-3]

2.
   a) Given that n is an integer, prove that n is even if and only if 5n+6 is even.
                                                      (2 marks)[CO1, DL-1, BTL-3]
   b) Prove that $\sqrt{3}$ is irrational using proof by contradiction.   (2 marks)[CO1, DL-2, BTL-3]
   c) Prove De morgan's law for set theory $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
                                                      (2 marks)[CO1, DL-1, BTL-2]

3.
   a) Define the Well ordering principle and give an example.   (1 mark)[CO1, DL-1, BTL-1]
   b) Prove that $2+4+6+\ldots+2n = n(n+1)$ for all $n \geq 1$ using mathematical induction.
                                                      (2 marks)[CO1, DL-2, BTL-3]

4.
   a) Determine whether the set of all real three-dimensional row matrices {[a b c]} with standard scalar multiplication but vector addition defined as follows is vector space.
      [a b c] $\oplus$ [x y z] = [a+x b+y+1 c+z]   (3 marks)[CO2, DL-1, BTL-3]
   b) Represent the vectors u=[2 -3] and v=[-4 2] geometrically and perform their addition geometrically.
                                                      (2 marks)[CO2, DL-1, BTL-3]