109053

3E1201

Roll No. _____ [Total No. of Pages : 4

3E1201

B.Tech. III-Sem. (Main/Back) Examination, January - 2025

Artificial Intelligence and Data Science

3AID2-01 Advanced Engineering Mathematics

AID, CAI, CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1 If X is a random variable such that $Var(X) = 5$, then what will be the value of $Var(2X + 10)$?

2. State Chebyshev's inequality.

3. Define Binomial distribution. What will be the value of p if the binomial distribution is symmetrical?

4. How many number of normal equations required for fitting a polynomial of $2m$ degree, by least square method?

5. Define the Spearman's formula for modified rank correlation coefficient for repeated rank.

6. What is the difference between linear and nonlinear programming problems?

7. State the necessary and sufficient conditions for the minimum of a functions $f(x)$.

8. Consider the following problem:

   Minimize $z = f(X)$,

   Subject to $g_j(X) \leq 0;\ j=1,2,3...., m.$

   Then write the suitable Kuhn—Tucker conditions.

9. Let m and n denotes the numbers of equation and decision variables respectively, then what happens when $m = n$ in a Linear programming problem (LPP)?

10. What do you mean by the unbalanced transportation problem?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Demonstrate the probability of not getting a 7 or 11 total on either of two tosses of a pair of fair dice.

2. If X is a continuous random variable whose pdf is given by

$$f(x) = \begin{cases} c(4x - 2x^2), & 0 < x < 2 \\ 0, & otherwise \end{cases}$$

   Find (a) the value of c and (b) $P(X>1)$.

3. Define exponential distribution, and show that the variance is squares the mean in exponential distribution.

4. Find the most likely price in Bombay corresponding to the price of Rs. 70 at Calcutta from the following:

	Calcutta	Bombay
Average price	65	67
Standard deviations	2.5	3.5

Correlation coefficient between the prices of commodities in the two cities is 0.8.

5. An animal food company must produce 200 kg of a mixture containing ingredients A and B daily. Ingredient A costs Rs. 3 per kg and B costs Rs. 8 per kg. No more than 80 kg of A can be used and at least 60 kg of B must be used. Find the mathematical model corresponding to the above problem.

6. Using the direct substitution method, find minimum value of $x^2 + y^2 + z^2$ when $ax + by + cz = p$.

7. Write the dual of the following problem:

$$
\begin{aligned}
Min. \quad & z = 2x_1 + x_2 \\
Subject\ to \quad & 3x_1 + x_2 \geq 3 \\
& 4x_1 + 3x_2 \geq 6 \\
& x_1 + 2x_2 \geq 2 \\
and \quad & x_1, x2 \geq 0.
\end{aligned}
$$

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. X is normaly distributed and the mean of X is 30 and standard deviation is 5. Find out the probability of the following:

(a) $26 \leq X \leq 40$, (b) $X \geq 45$ and (c)$|X-30|>5$.

Given that P(0 <Z < 0.8) =0:2881.

2. Calculate the correlation coefficient for the following data:

x	65	66	67	67	68	69	70	72
y	67	68	65	68	72	72	69	71

3. What is optimization? Write a short note on the classification of optimization problems based on various parameters.

4. *Minimize* $f(X)=\frac{1}{2}(x_1^2+x_2^2+x_3^2)$

Subject to $g_1(X)=x_1-x_2=0;$

$g_2(X)=x_1+x_2+x_3-1=0$

by Lagrange's multipliers method.

5. Using Big-M method, solve the following linear programming problem:

Max. $z=-2x_1-x_2$

subject to $3x_1+4x_2=3$

$4x_1+x_2\geq 6$

$x_1+2x_2\leq 4$

and $x_1, x_2\geq 0.$

137669

3E1200

Roll No. _____ [Total No. of Pages : 2

3E1200

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
Artificial Intelligence & Data Science
Managerial Economics and Financial Accounting
Common to All Branches

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used! calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1 Define the term economics.

2. What do you mean by profit and loss statement.

3. Differentiate between monopoly and monopolistic competition.

4. What do you mean by opportunity cost.

5. What does financial accounting mean.

6. Why do economic problems arise.

7. What do you mean by marginal product of an input. How is it calculated.

8. What are the determinants of supply.

9. What does liabilities mean.

10. What does the circular flour model dipicts.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Explain the inductine and deductine methods of economic analysis.

2. Discuss the concept of kinked demand curve under oligopoly.

3. Write short notes on ratio analysis.

4. Explain the concept of demand and elasticity of demand.

5. Discuss the concept of least cost combination of inputs.

6. Discuss various concepts of National Income.

7. Explain the methods of demand forecasting.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Critically examine the methods of evaluating capital budgeting proposals.

2. Discuss the price and output determination under perfect competition.

3. Using suitable diagram, explain the law of variable proportions.

4. Explain with the help of curves, relationship between various cost concepts.

5. What do you mean by balance sheet. Discuss.

3E1250

Roll No. _____ [Total No. of Pages : 3

3E1250

B.Tech. III-Sem. (Main/Back) Examination, January - 2025

Artificial Intelligence & Data Science

Technical Communication

Common to All Branches

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1 Why is editing important in Technical communication?

2. What are the three stages of writing?

3. What are linguistic abilities?

4. What is bubble-mapping?

5. Name few characteristics of Technical Reports.

6. How to avoid the problem of style in technical writing?

7. Elucidate few differences in writing style for print and online media.

8. Do you think listening is important in communication? Why?

9. Which factors affect document design?

10. What is the difference between CV and linkedin profile?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. The principle of ABCS in technical writing enhances the effectiveness of a technical document. Elaborate.

2. Write a note on the importance of LSRW skills in technical communication

3. Explain the different methods of note making in detail.

4. Correct the following sentences:

   i) Their going to the store should of been done yesterday.

   ii) My brother's all the books are been stolen.

   iii) She doesn't listen me.

   iv) Make sure that it is a high pay job

5. What are the different types of proposals? Discuss in detail.

6. Define memorandum and write the format of a memo.

7. What are the three stages for writing minutes of a meeting?

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. You are interested in working in the UAE. Write a job application with CV for the advertised post of an engineer at Emaar Properties, Dubai. You are Hussain/ Hashmi living in 15, Nizam Shahi colony, Hyderabad.

2. RTU, kota is planning to take a group of 120 students to shimla on an educational excursion during the summer vacation. Dr. BL sharma, the prof - in charge of 'Excursions and Field Trips' writes a letter to Tours and Travels, kota asking them to organize the tour write a letter giving details of preference such as dates of journey, transport, accommodation etc.

3. Write short notes on the following:

   a) Formal and Non-formal proposals.

   b) Routine and special reports.

   c) 40-20-40 writing process structure.

   d) Characteristics of Technical Reports.

4. Describe the various forms of Technical discourse in detail.

5. Do you think style in technical communication is important? Give valid reasons for your answer with proper examples.

3E1202

Roll No. _____ [Total No. of Pages : 3]

3E1202

B.Tech. III-Semester (Main/Back) Examination, January - 2025
Artificial Intelligence and Data Science
3AID4-05 Data Structures and Algorithms
AID,CAI,CS,IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1 Define Stack

2. What are various operations possible on stacks.

3. What is queue?

4. Define priority queue

5. What is hash table.

6. What is sorting?

7. What an header nodes?

8. Define Thread.

9. What is graph traversel.

10. Define Adjacency representation of a matrix

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Write a program to generate fibonacci numbers.

2. Implement a deque with the help of an array.

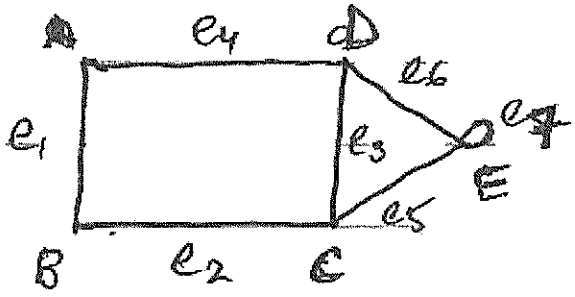
3. Write and explain an Algorithm for sequential search.

4. What is a doubly linked list ? Explain with suitable example.

5. Construct a binary tree with the following expression $(2x+5)\ (3x-y+8)$

6. a) Consider the graph below using adjacency matrix and path matrix

   b) Starting from vertex 'a'. Find the depth first search and breadth first search.



7. Explain directed and undirected graph and give their differences.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Write an Algorithm to convert a postfix expression to Infix expression also convert Portfix to Infix for the 100, 8, 3, * ,50 , 2 , - , + , - **(10)**

2. a) Write a program for implementing queue with the help of Arrays . **(6)**

   b) Write short note on Header linked list. **(4)**

3. Give the performence Analysis of the following types of sorting techniques **(10)**

   a) Bubble sort

   b) Insertion sort

   c) Radix sort

   d) Heap sort

4. What is tree traversal? Explain preorder, Postorder and Inorder traversal with the help of appropriate example. **(10)**

5. a) Explain various operations for a graph with example. **(6)**

   b) Write and explain warshall's modified Algorithm. **(4)**

152095

3E1203

Roll No. _____ [Total No. of Pages : 2

3E1203

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
Artificial Intelligence and Data Science
3AID3-04 Digital Electronics
AID, CAI, CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions Out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given upto 25 words only)

All questions are complusory.

1. State and prove De Morgan's theorem. **(10×2=20)**

2. Convert the following.

a) $(BC)_{16} = (\ )_{10}$

b) $(1000011)_2 = (\ )_{10}$

3. Perform the following (a) Subtraction using 9's complement for the given.

54321 - 41245

4. Convert the following to binary and then to gray code. $(1111)_{16}$

5. Explain the Binary Codes.

6. Mention the types of counter

7. What is a flip-flop?

8. Write about Gray to the binary convertor.

9. Explain briefly about the S-R flip-flop

10. Write a comparison of various logic families.

PART-B

(Analytical/Problem solving questions)

Attempt any Five questions.

1. Explain the: **(5×4=20)**
   a) Encoder -Decoders
   b) BCD to 7 segment decoder.
2. What do you mean by digital system? Explain the characteristics of digital systems.
3. Explain half adder? Implement the full adder using two half adders.
4. Explain the working of Master Slave flip flop and discuss the Race around problem.
5. Implement the following Boolean function using 8:1 multiplexer $F(A,B,C,D) = \Sigma m(0,1,2,5,7,8,9,14,15)$
6. Discuss the following concerns with Logic Families and Semiconductor Memories:
   a) Noise margin
   b) Propagation delay
   c) Fan-in, Fan-out.
7. Draw and explain the 4-bit Universal shift register.

PART-C **(3×10=30)**

(Desriptive/Analytical/Problem Solving/ Design question)

Attempt any Three questions.

1. Discuss the Quine Mccluskey (Tabulation) method using suitable example.
2. Simplify the Boolean expression using K-map and implement using NAND gates $F(A,B,C,D) = \Sigma m(0,2,3,8,10,11,12,14)$
3. Design a Mod-10 Asynchronous counter using J-K FFs.
4. Draw and explain the following using truth table and logic diagrams
   a) J-K Flip flop
   b) D- Flip Flop
   c) T- Flip flop
5. Write a short note on:
   a) TTL Logic
   b) ECL
   c) CMOS Digital logic families.

152096

3E1203

Roll No. _____ [Total No. of Pages : 2

3E1203

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
Artificial Intelligence and Data Science
3AID3-04 Digital Electronics
AID, CAI, CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions Out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given upto 25 words only)

All questions are complusory.

1. State and prove De Morgan's theorem. **(10×2=20)**
2. Convert the following.
   a) $(BC)_{16} = (\ )_{10}$
   b) $(1000011)_2 = (\ )_{10}$
3. Perform the following (a) Subtraction using 9's complement for the given.
   54321 - 41245
4. Convert the following to binary and then to gray code. $(1111)_{16}$
5. Explain the Binary Codes.
6. Mention the types of counter
7. What is a flip-flop?
8. Write about Gray to the binary convertor.
9. Explain briefly about the S-R flip-flop
10. Write a comparison of various logic families.

PART-B

(Analytical/Problem solving questions)

Attempt any Five questions.

1. Explain the: **(5×4=20)**
   a) Encoder -Decoders
   b) BCD to 7 segment decoder.
2. What do you mean by digital system? Explain the characteristics of digital systems.
3. Explain half adder? Implement the full adder using two half adders.
4. Explain the working of Master Slave flip flop and discuss the Race around problem.
5. Implement the following Boolean function using 8:1 multiplexer $F(A,B,C,D) = \Sigma m(0,1,2,5,7,8,9,14,15)$
6. Discuss the following concerns with Logic Families and Semiconductor Memories:
   a) Noise margin
   b) Propagation delay
   c) Fan-in, Fan-out.
7. Draw and explain the 4-bit Universal shift register.

PART-C **(3×10=30)**

(Desriptive/Analytical/Problem Solving/ Design question)

Attempt any Three questions.

1. Discuss the Quine Mccluskey (Tabulation) method using suitable example.
2. Simplify the Boolean expression using K-map and implement using NAND gates $F(A,B,C,D) = \Sigma m(0,2,3,8,10,11,12,14)$
3. Design a Mod-10 Asynchronous counter using J-K FFs.
4. Draw and explain the following using truth table and logic diagrams
   a) J-K Flip flop
   b) D- Flip Flop
   c) T- Flip flop
5. Write a short note on:
   a) TTL Logic
   b) ECL
   c) CMOS Digital logic families.

193944

3E1204

Roll No. _____ [Total No. of Pages : 3

3E1204

B.Tech. III-Semester (Main/Back) Examination, January - 2025

Artificial Intelligence and Data Science

3AID4-06 Object Oriented Programming

AID, CAI, CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given upto 25 words only)

All questions are complusory. **(10×2=20)**

1 Compare C and C++.

2. Explain class and struct with their differences.

3. Find the bugs in the following programs.

```
Class num
{ int x;
    Public : num (int k) { x=k;}
int operator +(num n)
    { num s(o);
    s. x = x–n.x;
    return x ;
    }
};
    void main ()
{ num a(1), b (5), c(o);
    c = a+b; }
```

4. What do you mean by base class and derived class?

5. What is the use of the keyword virtual ?

6. What are the steps involved in using a file in a C++ program?

7. Distinguish Data abstraction and data encapsulation?

8. How does a main () function in C++ differ from main in C?

9. When will you make a function inline? Why?

10. Distinguish between the following two statements:

    time T2 (T1);

    time T2=T1;

    T1 and T2 are objects of time class.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. What is object oriented programming ? How it is different from procedure oriented programming?

2. Find error, if any, in the following C++ statement

    a) Cout << "x = "x ;

    b) Cin >> x; >> y;

    c) Cout << "Enter value:"; cin >> x;

    d) m=5; || n=10; || s=m+n;

3. What are the advantages of function prototypes in C++? Write a function to read a matrix of size m×n from the keyboard.

4. What is a friend function ? What are the merits and demerits of using friend function?

5. What is a constructor? Is it mandatory to use constructors in a class? List some of the special properties of the constructor functions.

6. What is operator overloading ? Why is it necessary to overload an operator?

7. What are nested classes? What is the difference between private and protected access specifiers?

PART - C (3×10=30)

(Descriptive/Analytical/Problem Solving/ Design question)

Attempt any **Three questions.**

1. What do you mean by inheritance ? Describe the various types of inheritance with examples. Write the difference between single and multilevel inheritance.

2. What is a file? Write steps of file operations. Write a program to write and read text in a file. Use of stream and ifstream classes.

3. What is this pointer? Write a program to enter name and age of two persons. Find the elder person use this pointer.

4. What is the difference between operator overloading and function overloading? Write a program to overload < operator and display the smallest number out of two objects.

5. What is copy constructor ? Write a program to demonstrate the use of copy constructor.

214683

3E1205

Roll No. _____ [Total No. of Pages : 2

3E1205

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
Artificial Intelligence and Data Science
3AID4-07 Software Engineering
AID, CAI, CS, IT

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given upto 25 words only)

All questions are compulsory. **(10×2=20)**

1 State any four attributes of good software.

2. Define software quality assurance.

3. Define the term software security.

4. What is prime objective of software engineering.

5. Why accuracy is Important attributes for data dictionaries.

6. Explain the term " Risk analysis"

7. Differentiate object-oriented. Analysis (00A) & Object oriented design (00D)

8. Distinguish process and Method.

9. Define SRS

10. Define software Engineering paradism.

PART - B

(Analytical/Problem Solving questions)

Attempt any Five questions. **(5×4=20)**

1. What is SDLC. Explain MIS Oriented SDLC MODEL.
2. What is UML. How it is Benificial in object oriented Model.
3. Explain water fall model and spiral model with real time example.
4. List and explain the Technique to Enhance software quality and software Reliability.
5. A project size of 200KLoc to be developed. Software development team has average Experience on similar type of project the project schedule is not very tight. Calculate the effort, Development time, average staff size, and productivity of the project.
6. Explain Finite state machine (FSM).
7. What are the approaches of Debugging.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. What are the characteristics of a good design? Describe different type of coupling and Cohesion. How is designed per for med?
2. Explain the following
   a) Use case diagram.
   b) State chart diagram
3. Explain control flow diagram (CFD) & data flow diagram (DFD) in Detail.
4. Explain following concept with example modularity and step wise refinement and in formation hiding.
5. Write short notes on
   a) System specification
   b) Software prototyping
   c) Incremental model
   d) V-model