3E1201

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

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

   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:

Min. $z = 2x_1 + x_2$

Subject to $3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \geq 2$

and $x_1, x2 \geq 0$.

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 $f(X) = \dfrac{1}{2}(x_1^2 + x_2^2 + x_3^2)$

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 $3x_1 + 4x_2 = 3$

$\qquad\qquad 4x_1 + x_2 \geq 6$

$\qquad\qquad x_1 + 2x_2 \leq 4$

and $\qquad x_1, x_2 \geq 0$.

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3E1250

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

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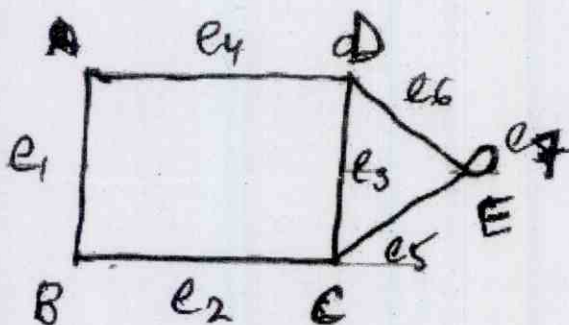
7.   Explain directed and undirected graph and give their differences.

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 performance 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)**

3E1203

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

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

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.

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3E1204

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)

(Desriptive/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.

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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

3E1102

3E1102

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

HSMC Aeronautical Engineering

3AN1-02 Technical Communication

(All Branches)

Time : 2 Hours   Maximum Marks : 80

Min. Passing Marks : 28

Instructions to Candidates:

*Attempt all **Five questions** from Part A, **Four questions** out of six questions from Part B and **Two questions** out of three 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.   (5×2=10)

1. Why is linguistic ability crucial in technical communication?
2. Highlight the role of listening skills in effective technical communication.
3. Identify three factors affecting information and document design.
4. What are the primary characteristics of a technical article?
5. Give two advantages of possessing effective technical communication skills.

PART - B
(Analytical / Problem Solving Questions)
Attempt any Four questions.   (4×10=40)

1. Discuss the aspects of technical communication in detail.
2. Summarize the text given below in your own words in no more than 100 words:

    In today's fast-paced world, technology has become an essential part of everyday life. From smartphones to computers, technology has revolutionized the way we work, communicate, and learn. In education, technology plays a crucial role by providing access to a wealth of resources online, making learning more interactive and accessible. Teachers and students can use various tools like digital textbooks, educational apps, and online platforms to enhance the learning experience. However, while technology brings many benefits, it also poses challenges such as distractions, the digital divide, and the potential loss of traditional skills.

3. You are the **Marketing Manager of XYZ Solutions Pvt. Ltd.** and need to invite potential clients to a webinar titled **"Revolutionizing Business with AI"**. Write a formal email.

4. **Attempt any Five:**

   1. Which of the following sentences is grammatically correct?
      - a) He don't know the answer.
      - b) She doesn't likes ice cream.
      - c) They doesn't play football.
      - d) She doesn't like ice cream. .

   2. Identify the sentence with correct subject-verb agreement:
      - a) Neither of the boys were present.
      - b) The list of items are on the table.
      - c) Everyone is invited to the party.
      - d) There is many reasons to leave.

   3. Choose the sentence with the correct use of punctuation:
      - a) I have three things to do, clean the house cook dinner and finish my work.
      - b) I have three things to do: clean the house, cook dinner, and finish my work.
      - c) I have three things to do clean the house, cook dinner and finish my work.
      - d) I have three things to do; clean the house cook dinner and finish my work.

   4. Which sentence uses the correct form of the verb?
      - a) She has went to the market.
      - b) He have completed his assignment.
      - c) They has arrived at the station.
      - d) She has gone to the market.

   5. Select the sentence with the correct use of an article:
      - a) He is an university student.
      - b) She bought a orange yesterday.
      - c) They are staying in a hotel.
      - d) It is an one-time offer.

   6. Identify the sentence with correct adjective order:
      - a) She wore a red beautiful dress.
      - b) He bought a small wooden table.
      - c) They have a dog brown cute.
      - d) I saw an old small house.

   7. Choose the correctly written conditional sentence:
      - a) If it will rain, we will stay inside.
      - b) If he had studied, he will pass the exam.
      - c) If I knew her, I would invite her.
      - d) If they works hard, they will succeed.

   8. Which sentence correctly uses a preposition?
      - a) She is good in mathematics.
      - b) He is interested about photography.
      - c) They are fond of reading books.

9. Identify the correctly written sentence with a pronoun:
   a) Each of the students have their own book.
   b) Someone forgot their bag in the classroom.
   c) Everyone must bring his or her ID card.
   d) The committee gave their unanimous decision.

10. Select the sentence with the correct tense:
   a) He will visiting us tomorrow.
   b) She has been studying since morning.
   c) They are play in the park.
   d) I am knowing the answer to the question.

5. What are technical project proposals, and how are they structured? Provide a brief explanation.

6. Imagine you are applying for the position of **Software Engineer** at **Tech Solutions Pvt. Ltd.,** a leading company specializing in AI-driven applications. Write a formal job application.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)
Attempt any Two questions.   (2×15=30)

1. What is technical communication, and why is it important in professional fields?

2. You are the **team leader of a project titled "Enhancing Digital Literacy among Rural Youth"**. Write a detailed report addressed to the **Head of the Organization**, including the following in very brief.
   - Title of the report
   - Introduction to the project
   - Objectives and scope of the project
   - Methodology and activities conducted
   - Key findings and outcomes
   - Challenges faced and solutions implemented
   - Recommendations for future projects
   - A formal conclusion

3. Write a detailed article on The Role of Technology in Education.