(Old & NEW)

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I

PAPER–I

(Problem Solving Using C)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Write an algorithm to generate Fibonacci series up to 10 terms. Explain each steps of the algorithm. What are the various ways of algorithm analysis?

2. What is a program? How it is different from an algorithm? Describe the characteristics of a good computer program.

3. What are keywords in C programming? Explain at least 10 keywords used in C programming with examples.

4. Discuss various types of operators used in C programming with examples. What is type conversion?

5. Discuss various decision making statements in C programming with examples.

6. Differentiate between **for** loop and **while** loop? Give examples of each looping statement in C.

7. When is **switch case** statement used while programming in C? When and why **continue** and **break** statements are used? Write a program in C using these keywords.

8. What is a function? Why is it used? Describe different types of functions with examples.

9. Describe malloc(), calloc(), realloc() and free() functions with examples of each.

10. Write short notes on any **two** of the following:—
    (a) Datatypes in C
    (b) Pointers
    (c) Storage class
    (d) Types of variables.

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EXAMINATION PROGRAMME-2023
MCA, Part-I

Date	Papers	Time	Examination Centre
31.05.2023	Paper–I	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
02.06.2023	Paper–II	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.06.2023	Paper–III	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
07.06.2023	Paper–IV	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
09.06.2023	Paper–V	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
12.06.2023	Paper–VI	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
14.06.2023	Paper–VII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
16.06.2023	Paper–VIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
17.06.2023	**Paper–I (Practical)**	**11.30 AM to 1.30 PM**	**Nalanda Open University School of Computer Education & IT, 12th Floor, Biscomaun Tower, Patna-800001**
19.06.2023	**Paper–VI (Practical)**	**11.30 AM to 1.30 PM**	
20.06.2023	**Paper–VIII (Practical)**	**11.30 AM to 1.30 PM**	

(Old & NEW)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–II

(Computer Organization)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Convert the following:—
   (i) (FACD25)16 = ( )8
   (ii) (10000011100011)2 = ( )10
   (iii) (99998)10= ( )2
   (iv) (723416)8 = ( )16
2. What are exclusive gates? How it is different from fundamental gates? Explain using truth tables and Karnaugh map. What is Don't Care condition?
3. Simplify the following using Karnaugh's map in terms of SOP and draw the circuit for the output expression: F (A, B, C, D) = ∑(0, 1, 2, 4, 5, 7, 10, 11, 13, 15)
4. Simplify the expressions and draw the circuit diagram for the expressions given below:
   (i) (A'B)'D'+ (A+C)'+ CD'+ A'BC
   (ii) B'C' + AC'+ D + A'B'D + (ACD)'
5. Draw 8 x 1 multiplexer. How a multiplexer different from decoder? Explain.
6. What is an adder? Explain half adder and full adder with their truth tables and diagram.
7. Explain S-R flip-flop with the help of a circuit diagram and its characteristic table. What are the limitations of S-R flip-flop? How does D flip-flop resolve the limitations of S-R flip flop? Explain.
8. Differentiate between RAM and ROM? What is the role of cache in computer? Explain CD-ROM.
9. Explain ALU with diagram. What are the functions of ALU in Computer?
10. Write short notes on any **two** of the following:—
    (a) JK Flip flop
    (b) Fundamental gates
    (c) Duality property and Absorption property
    (d) Addressing modes

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EXAMINATION PROGRAMME-2023
MCA, Part-I

Date	Papers	Time	Examination Centre
31.05.2023	Paper–I	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
02.06.2023	Paper–II	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
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19.06.2023	**Paper–VI (Practical)**	**11.30 AM to 1.30 PM**	
20.06.2023	**Paper–VIII (Practical)**	**11.30 AM to 1.30 PM**	

(Old & NEW)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–III

(Discrete Mathematics)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. (a) Define contradiction and prove that $(p \wedge q) \wedge \sim p$ is a contradiction.
   (b) Show that $r \wedge (\sim r \vee \sim s)$ is neither a tautology nor a contradiction.

2. Prove that, for all natural number n, $n^2 + 7n + 12$. is an even number.

3. If A = {1, 2, 3} and B = {a, b}. Then find A × B and B × A.

4. If A = {1, 2, 3, 4, 5}, B = {3, 4, 5, 6}, find
   (a) $(A \cap B) \times (A - B)$
   (b) $A \times (A - B)$
   (c) $(A \Delta B) \times (A \cap B)$

5. Let $f : z$ be a function defined by $f(x) = 2x + 3$
   Let $g : z$ be a function defined by $g(x) = 3x + 2$
   Find (a) fog (b) gof

6. (a) In how many ways 7 men and 7 women can stand in a straight line so that no two women stand together.
   (b) Find the value of r if 7Pr = 42.

7. From 7 gentlemen and 4 Ladies a committee of 5 is to be formed. In how many ways can this be done so as to include at least one lady ?

8. Find the independent term of x
   (a) $\left(x^2 - \frac{2}{x^3}\right)^{15}$
   (b) Expand $\left(\frac{3x}{2} - \frac{y}{6}\right)^6$

9. Find the remainder when $(10)^{907}$ is divided by 13.

10. Three balls are drawn at random from a bag containing 6 blue and 4 red balls. What is the chance that two balls are blue and one ball is red ?

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(NEW Course)

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–IV
(Operating System Concepts and LINUX)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer all Questions.

1. Define an operating system. Explain the functions of Operating System in detail.

2. What is Process Control Block (PCB)? What type of information is kept in a PCB? Explain.

3. Explain DMA (Direct Memory Access). How it is useful in bulk data transfer?

4. What is a Virtual Machine? Explain in brief the need of Virtual machine.

5. Write 10 commands in LINUX with their complete syntax and their use.

6. Explain various security measures in Linux file system. Explain the User Mode and Kernal Mode in Linux Operating System.

7. What do you mean by Process? Explain the process state transition diagram.

8. What is "inode"? Explain File and Directory Management of Linux Operating System.

9. What is a Thread? What is the difference between a Multicore System and a Multiprocessor System.

10. Write the short notes on any **two** of the following:—
    (a) Spooling
    (b) Deadlock
    (c) Operating System Services
    (d) Virtual Memory

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–IV (Old)
(Communication Skills)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer all Questions.

1. Read the following passage and answer the questions given below :—

Growing at an annual compound rate of 40% for the past five years, the Information Technology industry has become one of the largest foreign exchange earners in India. During this period, growth achieved by the IT industry seems unattainable for many others in the current economic scenario.

The past five years have seen the Indian IT industry go through fundamental changes. Earlier, IT industry was equated with hardware, which was then the major bread earner. But now software accounts for more than half of the Industry's total revenue. The transition has not happened overnight. Some factors aiding to the downfall of the hardware sector have been the following: Lack of government spending, adverse policies and the Y2K problem which has pumped in millions of dollars into software. The hardware sector faced with huge tariffs was forced into a corner in the early nineties, when manufacturing became unviable. This goaded Indian hardware companies into joint ventures with international majors for marketing their products in India. The sector still faces stiff competition from the unorganized sector.

(a) Give a suitable title for the passage. 4

(b) What is unique about the IT industry in the present economic scenario ? 4

(c) Why did the IT industry go through a fundamental change ? 4

(d) What are the major factors responsible for the downfall of the hardware sector ? 4

(e) Pick out suitable synonyms from the passage for the following words :— 4
yearly, vital, change, compelled

2. Discuss the classification of Reports. 10

3. Why is downward communication important ? Discuss its limitations. 10

4. Explain characteristics and of group discussion benefits. 10

5. Discuss the different types of editing. 10

6. Why is it important to produce effective documents in a business context ? 10

7. Define communication and highlight its importance. 10

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(NEW Course)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–V

(INTERNET CONCEPTS AND WEB DESIGN)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. What is Internet? Discuss the components required for internet services? What are the various application areas of internet?

2. Define IP addressing. Why it is required? Explain various classification of IP address.

3. Define Webpage. Differentiate between Static web page and dynamic web page. Give an example of Dynamic website.

4. What is Domain Name System? Explain Address Resolution mechanism and Record caching in detail.

5. Explain File Transfer Protocol (FTP) and its uses in Internet with reference to File types, Data Structure and Transmission modes used to transfer a file by FTP.

6. Define HTML. Describe 10 HTML tags with their functions.

7. Describe various attributes of HTML. Differentiate between Block-level elements and Text-level elements.

8. Explain the following terms with examples: —
   (i) Semantic linking
   (ii) Meta Information.

9. What is an image? What are the various file formats in which images can be stored? Explain.

10. Write short notes on any **two**:
    (i) Internet Service Provider (ISP)
    (ii) Control structures used in JavaScript
    (iii) Search engines
    (iv) Email.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–V (Old)

(Systems Analysis and Design)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define system. Explain various approaches for development of Information system.

2. Explain the System Development Life Cycle of a system.

3. Describe the symbols used to draw a Data Flow Diagram (DFD). Draw a DFD and develop SRS for Railway Reservation system.

4. Who is a system Analyst? Describe the role and responsibility of a system analyst.

5. Define and describe System Requirement Specification (SRS). What is quality of software?

6. Explain different types of documentation required during software development. Give examples of each type.

7. Discuss various types of feasibility study. What is cost benefit analysis?

8. What is modularity? Explain the concept of coupling and cohesion in modularity.

9. What is a form? What are the characteristics of a form? How it is different from a report? Explain.

10. Write short notes on any **two** of the following:—
    (i) Testing
    (ii) Project management tools and techniques
    (iii) Fact finding techniques
    (iv) Structure charts.

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(NEW Course)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VI

(Algorithm design and Data Structure)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define stack. Write algorithms for various operations performed on stack.

   Or

   What do you mean by Growth of a function? Describe the concepts used to address the behavior of an algorithm.

2. Explain insertion and deletion operation on a linked list with the help of an example. What are the applications of linked list?

   Or

   Explain divide and conquer technique. Give some examples of Divide and Conquer algorithm.

3. Explain basic operations of queue. What are priority queues? Discuss its applications.

   Or

   What is an algorithm? Write an Algorithm to generate the series of prime numbers up to given n terms.

4. What is a stack? What are the operations that can be performed on a stack?

   Or

   What is backtracking? Write and explain the algorithm of backtracking.

5. Explain the Bubble sort algorithms. Which sorting Algorithm is best?

   Or

   Define the graph Data Structure? What are the applications of graph Data Structure?

6. Define Dynamic programming. Explain the steps of Dynamic programming approach.

   Or

   What are some applications of Data Structures? What is the difference between file structure and storage structure?

7. Differentiate between P, NP and NP complete problem with the help of an example.

   Or

   What is a spanning tree? Explain the all-pairs shortest path problems with algorithm.

8. Explain Kruskal's method for finding Minimum Spanning tree of a Graph. Compare Prim's method with Kruskal's Method with example.

   Or

   Describe RSA public-key cryptosystem with the help of an example.

9. Explain what is a Graph? What is the difference between an array and a linked list?

   Or

   Describe the concept of space and time complexity of an Algorithm. Discuss these complexities in context of a program written to generate the Factorial of a given number.

10. Write short notes on any two:-
    a. Recurrence
    b. Array
    b. Complexity of algorithms
    C. AVL tree

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VI (Old)

(Operating System Concepts and Networking Management)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Compare and contrast UNIX Operating System and Windows Operating System.

2. What is Virtual memory? Explain in brief the need of Virtual memory in a computer system.

3. Write at least 10 commands in LINUX/UNIX with their complete syntax and their use.

4. What is the use of networking devices? List and explain the significance of any five networking devices.

5. Explain the following terms with examples:
   (a) IP address (b) Domain Name System

6. What is internetworking? Explain the concept of tunneling and fragmentation in internetworking.

7. Explain Network File Server. Explain about Backups and Restoration in Network File Server.

8. What are the functionalities of Graphical User Interface? Write a note on Batch Processing.

9. What is the role of transmission media in networking? Differentiate between guided and unguided media with suitable examples.

10. Differentiate between any **two** of the following: —
    (a) Simplex, Half duplex, and Full Duplex Communication.
    (b) Symmetric and asymmetric Cryptography
    (c) NTFS, FAT16 and FAT32 file systems
    (d) Packet Filtering Gateways and Stateful Packet Filtering

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(NEW Course)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VII

(Software Engineering)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define Software Engineering. What are different types of software? Discuss in detail.

2. Explain various phases of System Development Life Cycle (SDLC) in detail.

3. Explain the terms Software process and software project in term of Software engineering.

4. What is Risk? What are different types of Risk? Explain the process of Risk management.

5. Draw a DFD for "School Management System" up to second level. Make necessary assumptions if required.

6. Define modularization. Explain various types of coupling and cohesion in terms of modularization.

7. What is User Interface design? Explain. What are the golden rules of interface design?

8. Describe Software Quality Assurance. What is quality metrics?

9. Define testing? Describe various types of Testing with the help of an example.

10. Write short notes on any **Two** of the following: —
    (i) Capability Maturity Model (CMM)
    (ii) Software Standards
    (iii) Formal Technical Review.
    (iv) Spiral model.

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VII (Old)

(Object Oriented Analysis and Design)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Describe the characteristics of Object Oriented systems.

2. Explain Object Oriented Analysis process in detail with the help of an example.

3. Define Inheritance. Explain different types of Inheritance with examples.

4. What is polymorphism? Differentiate between operator overriding and operator overloading.

5. Draw a DFD for the Library Information system. Assumptions can be made wherever necessary. Draw the DFD's upto 2^{nd} level.

6. What is UML? Discuss different components of UML with diagram.

7. List and describe the elements of event diagram. Give examples.

8. What is concurrency? How is it identified? What are the issues, mechanisms and methods to manage concurrency?

9. Discuss different types of testing in OOAD. Also discuss the issues in Object Oriented Testing.

10. Write short notes on any **Two** of the following: —
    (a) Abstraction
    (b) Activity diagram
    (c) Object Modelling
    (d) Modularization.

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(NEW Course)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VIII

(Advanced Database Concept)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define DBMS. What is the role of data dictionary in DBMS? Differentiate between active and passive dictionary.

2. Discuss in detail Enhanced ER (EER) tools with a suitable example.

3. Define Normalization. What is functional dependency? How does it help in the process of Normalization of Database? Explain.

4. Explain Database Application Life cycle in detail. What are the criteria for physical design?

5. What is deadlock? Explain the process of handling deadlock in Database Management System.

6. Define SQL. Write at least 10 SQL commands with their complete syntax.

7. Define Transaction. Describe the ACID properties of a Transaction. Explain Time Stamp based protocol.

8. Explain the levels of Security in Database. What is access control?

9. Compare and contrast between OODBMS and Object Relational Database.

10. Write short notes on any **Two** of the following: –
    (i) Time Stamp based protocol
    (ii) Lock Table
    (iii) Multiple granularity
    (iv) Triggers.

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परीक्षाफल प्रकाशन से सम्बन्धित आवश्यक सूचना

सम्बन्धित सभी विद्यार्थियों को सूचित किया जाता कि वे अपने विषय के रिजल्ट से सम्बन्धित जानकारी हेतु समय–समय पर (time to time) विश्वविद्यालय के वेबसाईट (www.nou.ac.in) का संदर्भ करेंगे ।

- परीक्षाफल प्रकाशित हो जाने के उपरान्त सभी विद्यार्थियों का e-marksheet उनके Student Login पर मौजूद रहेगा, जिसे वे नालन्दा खुला विश्वविद्यालय में किसी प्रयोजनार्थ व्यवहार में ला सकते हैं ।
- परीक्षा में उत्तीर्ण विद्यार्थी अपने Student Login से निर्धारित तिथियों (जो कि रिजल्ट नोटिस पर मौजूद रहेगा) के अन्तर्गत अगले सत्र में Online Admission लेना सुनिश्चित करेंगे ।

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VIII (Old)
(Data and File Structures)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define algorithm. What are the properties of algorithm? Discuss the steps used to plan an algorithm. Give an example of an algorithm.

2. What is a SPARSE matrix? Write a program for multiplication of two matrices.

3. Write a C program for Insertion and deletion of an element in a linear array.

4. Define Stack. Explain operations on stack with the help of an example. What are the application areas of stack data structure? Describe them with examples.

5. Explain any two sorting methods with example.

6. What is File organization? Why it is important? Describe various types of file organization.

7. Write a procedure to sort the following sequence using quick sort:–
   10, 6, 12, 30, 17, 45, 30, 40, 35, 18.

8. What is a spanning tree? Explain the all-pairs shortest path problems with algorithm.

9. Write programs in C to implement linear search and binary search.

10. Explain any **two** of the following with an example.
    (a) Hashing and probing
    (b) Array
    (c) Complexity of algorithms
    (d) AVL tree.

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परीक्षाफल प्रकाशन से सम्बन्धित आवश्यक सूचना

सम्बन्धित सभी विद्यार्थियों को सूचित किया जाता कि वे अपने विषय के रिजल्ट से सम्बन्धित जानकारी हेतु समय–समय पर (time to time) विश्वविद्यालय के वेबसाईट (www.nou.ac.in) का संदर्भ करेंगे ।

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SET-I

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–I (Old & New)

Problem Solving using C (Computer Practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer any two questions. All questions carry equal marks.

1. Write a program in C language to display the greatest of three numbers entered from the keyboard.

2. Write a program to generate the following pattern below:
   1
   2 2
   3 3 3
   4 4 4 4

3. Write a program in C language to compute the average of 10 consecutive Natural numbers.

SET-II

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–I (Old & New)

Problem Solving using C (Computer Practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer any two questions. All questions carry equal marks.

1. Write a program in C language to print the multiplication table of the number entered from the keyboard.

2. Write a program to generate the following pattern below:
   4 4 4 4
   3 3 3
   2 2
   1

3. Write a program in C language to print the sum of the squares of 10 even numbers.

SET-I

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VI (NEW)

Algorithm design and Data Structure (Computer practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write a program in 'C' language for implementation of various operation on a queue.

2. Write a program in 'C' language to implement binary tree.

SET-II

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VI (NEW)

Algorithm design and Data Structure (Computer practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write a program in 'C' language for the implementation deletion from a queue.

2. Write a program in 'C' language for the multiplication of two matrices using arrays.

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VI (Old)

Operating System concepts and Networking Management (Computer practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write a shell program to find the sum and average of first "n" odd numbers.

2. List and execute the following UNIX commands:
   (a) To display the content of a file.
   (b) To display the top 10 lines of the file.
   (c) To count no. of words in a given text file.
   (d) To search the pattern "abc" in the text file.
   (e) To list the content of the directory with all information.

SET-II

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VI (Old)

Operating System concepts and Networking Management (Computer practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write a shell program to find the sum and average of first "n" natural numbers.

2. List and execute the following UNIX commands:
   (a) To create a file.
   (b) To write and display "hello" in file.
   (c) To count no. of lines in a given text file.
   (d) To create a file in a sub-directory with name abc.txt.
   (e) To change the read and write permission of the file.

SET-I

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VIII(NEW)

Advanced Database Concept

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write at least 10 SQL Commands with their syntax and functions.

2. What is an E-R diagram? Draw an E-R diagram for "University Admission System".

SET-II

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VIII(NEW)

Advanced Database Concept

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write at least 10 SQL Commands with their syntax and functions.

2. What is an E-R diagram? Draw an E-R diagram for "University Examination System".

SET-I

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VIII (Old)

Data and File Structure (Computer practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write a program in 'C' language for implementation of various operation on a queue.

2. Write a program in 'C' language to implement Linked List.

SET-II

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-I

PAPER–VIII (Old)

Data and File Structure (Computer practical)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the questions. All questions carry equal marks.

1. Write a program in 'C' language for the implementation deletion from a queue.

2. Write a program in 'C' language for implementation of a stack with insertion and deletion.

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–IX
(Internet Concepts and Web Design)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.

1. What is Domain Name? Explain the concept of different Internet domains with examples.
2. What do mean by web-browser? Explain web server, website, webpage and addressing system of web-address.
3. Explain in detail the development phases of a website.
4. What is Website? How many types of pages in website. Discuss each type of pages with two examples of each.
5. What is Internet and ISP? Differentiate between Intranet and extranet.
6. Discuss various HTML tags and their attributes with examples.
7. Define Video-conferencing. Discuss the hardware, software and internet connections requirements for Video-conferencing. Compare CU-SeeMe and Microsoft NetMeeting.
8. How will you link different webpages among each other? What are the necessary HMTL tags and required for it. Explain it with an example.
9. Describe different types of control structure used in JavaScript with examples of each.
10. Write short notes on any **two** of the following:—
    (a) HTTP and HTTPS
    (b) Ordered and Unordered list
    (c) Search Engines
    (d) Website address and URL

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EXAMINATION PROGRAMME-2023
MCA, Part-II

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–X
(Computer Graphics and Multimedia)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define Computer graphics. Discuss various applications of Computer Graphics.

2. Describe various input and output devices used for Computer graphics.

3. What are the performance parameters of a monitor? Explain.

4. Compare and contrast between CPU and GPU. Explain graphic pipeline with a diagram.

5. Explain Polygon filling techniques.

6. Explain Digital Differential Analyzer (DDA) algorithm. Give an example of DDA algorithm.

7. What is 3D rotation and shearing? Explain with help of a diagram.

8. What do you mean by composite transformation in 3D transformation? Explain with the help of an example.

9. Define and describe Bezier Curve. What are the properties of Bezier curve?

10. Write short notes on any **two** of the following:–
    (i) Window view-port mapping
    (ii) Raster scan
    (iii) Graphics Standards
    (iv) Animation techniques

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EXAMINATION PROGRAMME-2023
MCA, Part-II

Date	Papers	Time	Examination Centre
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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XI
(Software Engineering)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define software engineering. Discuss the need application of software engineering.

2. Compare and contrast RAD model, Spiral model and Prototype model. Discuss the advantages of each the models.

3. What are the components of DFD? Draw DFDs, up to second level for a Railway Reservation System.

4. Define modularization? Why it is important? Explain coupling and cohesion in context of modularization.

5. Define Testing and explain the usage of testing. Compare and contrast between Black box testing and White box testing with examples.

6. Describe various attributes of software quality with examples.

7. What is the use of version control in software development? What is the use of maintenance of software?

8. What is implementation and training of software? Why it is so important in software development life cycle.

9. What is Risk? What are different types of Risk? Explain the process of Risk management.

10. Write short notes on any **two** of the following:—
    (a) Capability Maturity Model (CMM)
    (b) Golden rules of Interface Design
    (c) COCOMO model
    (d) SDLC (System Development Life Cycle)

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XII
(Management and Information System)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. What is MIS? What are the objectives, advantage and disadvantage of MIS? Give three examples of MIS.
2. What are the different methods of data collection? How the quality of the information can be measured? Discuss.
3. Define Expert system. How it is beneficial in decision making of an organization?
4. Describe the relationship between ESS, MIS and DSS with the help of an example.
5. Explain Global and social impact of information system with the help of an example.
6. Discuss Vertical and Horizontal organization structure. What is the need of organization structure?
7. Discuss the factors contributing to the success and failure of MIS in an organization.
8. Difference between Management Information System (MIS) and Decision Support System (DSS).
9. Explain with examples of different types of Information Systems and their Applications.
10. Write short notes on any **two** of the following: —

    (a) Enterprise systems (b) Data mining

    (c) Transaction processing systems (d) Multimedia database

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EXAMINATION PROGRAMME-2023
MCA, Part-II

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIII
(Operating System)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Explain the structure of Operating system. What are the functions of an operating system?

2. Differentiate between process and thread. What do you mean by process creation and process termination? Explain process control block.

3 Explain system call with the help of an example?

4. What are the states in which a process can exist? Explain with help of a diagram.

5. Why page replacement policies required in Operating system? Discuss any two page-replacement algorithm with the help of an example. What is hit ratio?

6. Define and describe different type's memory hierarchy in computers. What is the role of memory in computers?

7. Describe Distributed File system. Discuss its advantages and disadvantages.

8. What is Direct Memory Access (DMA)? How does it affect the throughput of a system?

9. Define UNIX. Write at least ten commands in UNIX and explain their functions.

10. Write short notes on any **two** of the following:—
    (i) Process scheduling
    (ii) Virtual Machines
    (iii) Deadlock
    (iv) Context Switch.

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EXAMINATION PROGRAMME-2023
MCA, Part-II

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIV
(Database Management Systems)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define DBMS. Explain the components of DBMS in detail.
2. What is SQL? How many types of SQL commands? Explain each type with examples.
3. Why views of table created? Explain. Write the syntax to create a view of the table.
4. What are constraints? Describe various types of constraints used in DBMS.
5. What do you understand by the term Normalization in DBMS? Explain the properties of Normalization? Discuss second Normal form with examples.
6. Define and compare with example between Spatial Database and Mobile Database.
7. What is an E-R diagram? What are its basic components? How these components are represented in a diagram? Explain.
8. What is the role of Database Manager? Explain the important components of database manager with the help of a diagram.
9. Discuss different type of databases in the emerging trend of IT technology. Explain them with suitable example of each.
10. Write short notes on any **two** of the following:—
    (a) File based system
    (b) Data Security
    (c) Shadow paging
    (d) BCNF

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EXAMINATION PROGRAMME-2023
MCA, Part-II

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XV
(Object Oriented Programming using Java)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1 Explain various types of Object Oriented methodologies. What are the benefits of Object Oriented Programming (OOP)? Give some application areas of OOPs.

2. Describe at least 10 keywords used in Java with their functions.

3. Define and discuss arithmetic operators and relational operators used in Java with examples.

4. Define Constructors. When do we use constructors? Write a program in Java using Constructors.

5. Differentiate the following, with the help of example:—
(i) Structure Approach and Object Oriented Approach
(ii) Overriding and Overloading

6. Explain different types of inheritance with the help of examples. When and why Inheritance is required while programming?

7. What is Stream Tokenizer? Explain the different instance variables defined in Stream Tokenizer. Also, explain use of Stream Tokenizer with the help of an example.

8. How files are handled in Java? Write a program in Java to explain the concept of file handling.

9. What are applets? How do we write applets? Describe some applications of applets.

10. Write short notes on any **Two** of the following:—
(i) Encapsulation
(ii) String and String Buffer
(iii) finalize() method in Java
(iv) Servlet.

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EXAMINATION PROGRAMME-2023
MCA, Part-II

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XVI
(Computer Networking)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. What are the basic components of data communication? Discuss the services, advantages and disadvantages provided by the network.

2. What are digital and Analog Transmission? Explain their characteristics and advantages.

3. Describe Star and Mesh topologies in LAN. Give the diagram, advantages and disadvantages of both the topologies.

4. Compare and contrast between OSI and TCP/IP reference model. What are the drawbacks of OSI and TCP/IP model?

5. Why multiplexing of transmission channels requited in networking? Explain different types of multiplexing with examples.

6. Explain Cycle Redundancy Check (CRC) codes for error detection with the help of an example.

7. Explain the functions of Physical layer and Presentation layer of OSI model? Which layer is responsible for congestion control? Explain.

8. Compare and contrast between Virtual circuit and Datagram subnet. Describe the various categories of internetwork addresses.

9. Explain various network devices with their functions and the layers at which they operate in OSI model.

10. Write short notes on the following:
    (i) Sliding window protocol
    (ii) Transmission modes
    (iii) Bandwidth
    (iv) Switching techniques.

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EXAMINATION PROGRAMME-2023
MCA, Part-II

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-II

PAPER–IX - Practical

(Internet Concepts and Web Design)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the Questions. All questions carry equal marks.

1. Create the following table in HTML with Dummy data (Five records) :
   Enrolment no. Course code Registration no. Course Fee Remarks.

2. Write a JavaScript code to create a pull down menu box.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-II

PAPER–IX - Practical

(Internet Concepts and Web Design)

Annual Examination, 2023

Time : 2 Hours. **Full Marks : 20**

Answer all the Questions. All questions carry equal marks.

1. Create the following table in HTML with Dummy data (Five records) :
   Enrolment no. Course code Registration no. Course Fee Remarks.

2. Write a JavaScript code to create a pull down menu box.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-II

PAPER–XIII [Practical]

(Operating System)

Annual Examination, 2023

Time : 2 Hours. **SET–A** **Full Marks : 20**

Answer all the Questions.
All questions carry equal marks.

1. Define Operating System. Discuss the structure of UNIX Operating System.
2. Write 10 UNIX Command with their syntax and functions.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-II

PAPER–XIII [Practical]

(Operating System)

Annual Examination, 2023

Time : 2 Hours. **SET–B** **Full Marks : 20**

Answer all the Questions.
All questions carry equal marks.

1. Define Operating System. Discuss the file system of UNIX Operating System.
2. Write 10 UNIX Command with their syntax and functions.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIV [Practical]
(Database Management System)
Annual Examination, 2023

Time : 2 Hours. **SET–A** **Full Marks : 20**

Answer all the Questions.
All questions carry equal marks.

1. Write at least 10 SQL Commands with their syntax and functions.

2. What is an E-R diagram? Draw an E-R diagram for "School Management System".

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIV [Practical]
(Database Management System)
Annual Examination, 2023

Time : 2 Hours. **SET–B** **Full Marks : 20**

Answer all the Questions.
All questions carry equal marks.

1. Write at least 10 SQL Commands with their syntax and functions.

2. What is an E-R diagram? Draw an E-R diagram for "Library Information System".

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-II

PAPER–XV [Practical]

(Object Oriented Programming Using Java)

Annual Examination, 2023

Time : 2 Hours. **SET–A** **Full Marks : 20**

Answer all the Questions.
All questions carry equal marks.

1. Explain the properties of Object Oriented Programming Languages.

2. Write a program in Java to implement inheritance.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-II

PAPER–XV [Practical]

(Object Oriented Programming Using Java)

Annual Examination, 2023

Time : 2 Hours. **SET–B** **Full Marks : 20**

Answer all the Questions.
All questions carry equal marks.

1 Discuss various data types used in Java programming with examples.

2. Write a program in Java to implement polymorphism.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XVII
(Accounting and Financial Management)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. What do you mean by Cash Flow Statement ? How does it differ from fund flow statement ?
2. What is Break Even Analysis ? Explain its advantages.
3. Define Accounting and Throw light on its scope.
4. Define financial management and describe its features.
5. What is ratio analysis ? Discuss its objectives.
6. Define Cost Accounting. discuss its objectives.
7. Describe in brief the functions of Accounting.
8. Distinguish between Standard Costing and Marginal Costing.
9. What is Inventory ? Discuss the different techniques of inventory management.
10. Write notes on any ***Two*** of the following :–
    (a) Capital Rationing.
    (b) Letter of Credit
    (c) Need for Holding Cash

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EXAMINATION PROGRAMME-2023
MCA, Part-III

Date	Papers	Time	Examination Centre
29.09.2023	Paper–XVII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
03.10.2023	Paper–XVIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.10.2023	Paper–XIX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
07.10.2023	Paper–XX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
10.10.2023	Paper–XXI	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
13.10.2023	Paper–XXII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
16.10.2023	Paper–XXIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
17.10.2023	Paper-XVII (Practical)	**11.30 AM to 1.30 PM**	**Nalanda Open University School of Computer Education & IT, 12th Floor, Biscomaun Tower, Patna-800001**
18.10.2023	Paper–XXIII (Practical)	**11.30 AM to 1.30 PM**	
19.10.2023	Paper–XXIV (Project)	**11.30 AM onwards**	

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XVIII
(Advanced Database Management System)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define SQL. Write at least 10 SQL commands with their complete syntax.

2. Construct an E-R diagram for a University Examination System. Explain each component used in the E-R diagram with their roles.

3. Define Normalization? When a relation does needs to be normalized using third normal form? Explain with the help of an example.

4. What are the basic steps in query processing? How can the cost of query be measured?

5. Explain the concept of Embedded SQL and Dynamic SQL with the help of example. Give at least two complete examples of each.

6. Discuss classification as a tool in Data Mining. Describe various algorithm for classifying data sets with suitable examples.

7. What are stored procedures and triggers in database? Explain with the help of an example.

8. Explain the levels of Security in Database. What is access control?

9. Describe various application areas of Advanced DBMS.

10. Write short notes on any **Two** of the following:
    (i) Recovery algorithms
    (ii) Data dictionary
    (iii) UML
    (iv) Views.

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EXAMINATION PROGRAMME-2023
MCA, Part-III

Date	Papers	Time	Examination Centre
29.09.2023	Paper–XVII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
03.10.2023	Paper–XVIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.10.2023	Paper–XIX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
07.10.2023	Paper–XX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
10.10.2023	Paper–XXI	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
13.10.2023	Paper–XXII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
16.10.2023	Paper–XXIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
17.10.2023	Paper-XVII (Practical)	**11.30 AM to 1.30 PM**	**Nalanda Open University School of Computer Education & IT, 12th Floor, Biscomaun Tower, Patna-800001**
18.10.2023	Paper–XXIII (Practical)	**11.30 AM to 1.30 PM**	
19.10.2023	Paper–XXIV (Project)	**11.30 AM onwards**	

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XIX
(Compiler Design)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define Compiler? Describe phases of Compiler in detail.

2. Discuss the basic terms related to language theory and give examples for each.

3. Define regular expression? Explain the rules for writing regular expressions. Write some regular expressions and explain them.

4. Describe various tools used in compiler design with examples of each.

5. Explain Chomsky classification of Grammar with examples.

6. Discuss Language processing system in detail.

7. What is Parsing? Explain the concept of backtracking with the help of an example.

8. Discuss various types of memory allocation schemes used in Compiler design.

9. Define symbol table. Discuss in detail the attributes of symbol table. What is an Abstract Syntax Tree?

10. Write short notes on any **Two** of the following:—
    (i) Code optimization
    (ii) Preprocessor
    (iii) Ambiguity
    (iv) Parse Tree.

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EXAMINATION PROGRAMME-2023
MCA, Part-III

Date	Papers	Time	Examination Centre
29.09.2023	Paper–XVII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
03.10.2023	Paper–XVIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.10.2023	Paper–XIX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
07.10.2023	Paper–XX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
10.10.2023	Paper–XXI	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
13.10.2023	Paper–XXII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
16.10.2023	Paper–XXIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
17.10.2023	Paper-XVII (Practical)	**11.30 AM to 1.30 PM**	**Nalanda Open University School of Computer Education & IT, 12th Floor, Biscomaun Tower, Patna-800001**
18.10.2023	Paper–XXIII (Practical)	**11.30 AM to 1.30 PM**	
19.10.2023	Paper–XXIV (Project)	**11.30 AM onwards**	

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XX
(Design and Analysis of Algorithms)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define Algorithm. Describe the concepts used to address the behavior of an algorithm. Write an algorithm to display the greatest of three numbers.

2. Discuss in detail the Number Theoretic algorithms with examples.

3. Explain divide and conquer technique. Give some examples of Divide and Conquer algorithm.

4. Define Dynamic programming. Explain the steps of Dynamic programming approach.

5. Explain Prim algorithm of spanning tree. How it is different from Kruskal's algorithm? Explain with the help of an example.

6. Explain Chinese remainder theorem with example

7. Define DFS. In what type of application DFS algorithm can be used? Explain with the help of an example.

7. Describe String Matching Algorithm with suitable example.

8. Describe RSA public-key cryptosystem with the help of an example.

9. Describe 2-SAT and 3-SAT algorithms in detail with the help of an example.

10. Write short notes on any **Two** of the following:—
    (i) Floyd Warshall algorithm
    (ii) Recurrence
    (iii) Complexity of algorithms
    (iv) BFS algorithm.

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EXAMINATION PROGRAMME-2023
MCA, Part-III

Date	Papers	Time	Examination Centre
29.09.2023	Paper–XVII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
03.10.2023	Paper–XVIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.10.2023	Paper–XIX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
07.10.2023	Paper–XX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
10.10.2023	Paper–XXI	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
13.10.2023	Paper–XXII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
16.10.2023	Paper–XXIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
17.10.2023	Paper-XVII (Practical)	**11.30 AM to 1.30 PM**	**Nalanda Open University School of Computer Education & IT, 12th Floor, Biscomaun Tower, Patna-800001**
18.10.2023	Paper–XXIII (Practical)	**11.30 AM to 1.30 PM**	
19.10.2023	Paper–XXIV (Project)	**11.30 AM onwards**	

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXV [Old]
(MCS-53 : Computer Graphics and Multimedia)
Annual Examination, 2021

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Differentiate between Computer Graphics and Animation. What is Random Scan display device?

2. Write Bresenham's line generation algorithm. Use it to draw a line segment joining (20, 10) and (25, 14).

3. Write midpoint circle drawing algorithm. Use it to draw a circle C having entre (5, 2) and radius = 10.

4. Explain different Shading Schemes with their advantages and disadvantages.

5. How are frame buffers used to control color and intensity of any image? You are required to support your answer with suitable diagrams and bit plane tables.

6. Discuss different types of projection with diagram.

7. Define DDA algorithm. Write DDA line drawing algorithm. Use this algorithm to draw a line between (0,0) and (3,3).

8. Explain the following terms: – (i) Z Buffer (ii) Aspect Ratio (iii) Video Conferencing (iv) Ambient light.

9. What is authoring tool? Explain different types of authoring tools.

10. Write short notes on any **Three** of the following:—
    (i) Vector graphics
    (ii) JPEG and GIF
    (iii) Ray Casting
    (iv) Hypermedia.

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EXAMINATION PROGRAMME-2021
MCA, Part-III [Old Batch]

Date	Papers	Time	Examination Centre
28.07.2022	Paper–XXI	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
30.07.2022	Paper– XXII	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
01.08.2022	Paper– XXIV	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
03.08.2022	Paper–XXV	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.08.2022	Paper–XXVII	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
06.08.2022	Paper–XXVIII	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
08.08.2022	Paper–XXIX	2.30 PM to 5.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
23.08.2022	**Paper–XXIII (P)**	**12.00 Noon to 3.00 PM**	**School of Computer Education & IT, 12th Floor, Biscomaun Tower, Patna-800001**
24.08.2022	**Paper–XXVI (P)**	**12.00 Noon to 3.00 PM**	
25.08.2022	**Paper–XXX (Tentative)**	**12.00 Noon to 3.00 PM**	

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXI
(Artificial Intelligence and Knowledge Management)
Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. Define Artificial Intelligence (AI). What is the difference between knowledge and intelligence? Describe various application areas of AI.

2. What is Turing test? Discuss various reasoning techniques. Give examples of each type.

3. Describe any two searching strategies with examples. Give some desirable properties of heuristic search algorithms.

4. What is an argument? Differentiate between Valid and invalid argument with the help of example. Discuss the operators associated with propositional logic.

5. Write at least eight LISP expressions using **car, cdr, member, setq** and evaluate it.

6. Define conceptual dependency. Discuss the concept of Semantic Network, Frame Structure and Scripts in Artificial Intelligence with examples.

7. What is Constraint Satisfaction Problems? Explain the steps of solving Constraints Satisfaction Problems.

8. Define Fuzzy set. Explain various operations of Fuzzy Set with the help of examples. What are the application areas of Fuzzy sets?

9. Discuss the Inference rules and their applications in Propositional Logic (PL).

10. Write short notes on any **two** of the following:
    (i) Goals of AI
    (ii) Tautology
    (iii) Learning.

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EXAMINATION PROGRAMME-2023
MCA, Part-III

Date	Papers	Time	Examination Centre
29.09.2023	Paper–XVII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
03.10.2023	Paper–XVIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
05.10.2023	Paper–XIX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
07.10.2023	Paper–XX	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
10.10.2023	Paper–XXI	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
13.10.2023	Paper–XXII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
16.10.2023	Paper–XXIII	10.30 AM to 1.30 PM	Nalanda Open University, 2nd Floor, Biscomaun Bhawan, Patna
17.10.2023	Paper-XVII (Practical)	**11.30 AM to 1.30 PM**	**Nalanda Open University School of Computer Education & IT,**
18.10.2023	Paper–XXIII (Practical)	**11.30 AM to 1.30 PM**	

19.10.2023	Paper–XXIV (Project)	**11.30 AM onwards**	**12th Floor, Biscomaun Tower, Patna-800001**

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-III

PAPER–XXII

(Numerical and Statistical Computing)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks. Calculator is allowed.

1. (a) Round the number x = 2.2554 to three significant figures. Find the absolute error and the relative error.
   (b) Find the smallest roots of $4x^2 + 8x - 21 = 0$ by successive iteration method.

2. Solve the following system using the Lu decomposition method
$$6x_1 - 2x_2 = 14$$
$$9x_1 - x_2 + x_3 = 21$$
$$3x_1 - 7x_2 + 5x_3 = 9$$

3. Solve the system of Equations
$$16x_1 + 22x_2 + 4x_3 = -2$$
$$4x_1 - 3x_2 + 2x_3 = 9$$
$$12x_1 + 25x_2 + 2x_3 = -11$$
using the Gauss Elimination method.

4. Solve the following system of equations by Gauss Seidel iteration method
$$2x_1 + x_2 - 3x_3 + 9x_4 = 31$$
$$3x_1 - 4x_2 + 10x_3 + x_4 = 29$$
$$2x_1 + 12x_2 + x_3 - 4x_4 = 13$$
$$13x_1 + 5x_2 - 3x_3 + x_4 = 18$$

5. Evaluate the Integral $\int_0^1 \frac{dx}{1+x}$ using Simpson's $\frac{3}{8}th$ rule with $h = \frac{1}{3}$.

6. Explain Regression and its properties.

7. Estimate the sale of a particular quantity for 1966 using the following table

Year	1931	1941	1951	1961	1971	1981
Sales in Thousands	12	15	20	27	39	52

8. Evaluate the Integral $\int_0^6 (x^2 + x + 2)dx$ using Trapezoidal rule with $h = 1.0$.

9. Apply Runga-Kutta fourth order method to find an approximate value of y when x = 0.2 given that y' = x + y with y(0) = 1 and h = 0.2.

10. Explain Binomial Distribution and Normal Distribution.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-III

PAPER–XXIII

(Application Development with .Net Framework)

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 80**

Answer any Five Questions.
All questions carry equal marks.

1. What is garbage collection in .NET Framework? Discuss various phases of garbage collection.

2. Define event driven programming. Discuss the advantages and disadvantages.

3. Explain Textbox Controls and Image controls of Web server.

4. Explain the process of working with form controls in .Net. Discuss exception handling with an example?

5. Create user defined function in VB .Net to enter any number and then display that whether itis prime or not.

6. What is State management? Describe different types of states managed by ASP.NET.

7. How do you enable and disable View State? Explain the role of cookies.

8. Explain the features of Object Oriented Programming concepts. List and explain the types of access modifiers.

9. What is Query String? Explain it using an example. Discuss the limitations of Query String.

10. Write short notes on the following:
    (i) Exceptions in .NET.
    (ii) Common Type System (CTS).
    (iii) Event handling with web server.
    (iv) Common Language Specification (CLS)

NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-III

PAPER–XVII Practical

(Accounting and Financial Management)

SET-A

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 20**

Answer any Two Questions. All questions carry equal marks.

1. Give Journal Entries from the following transaction:—
   (i) Ram introduced a capital of Rs. 6,00,000.
   (ii) Purchased a goods of Rs. 54,000 from Das & Co.
   (iii) Sold goods to Rahim Rs. 2,00,000.
   (iv) Sold goods for Cash Rs. 60,000.
   (v) Salary paid Rs. 15,000.
   (vi) Purchased a Machinery Rs. 75,000.
   (vii) Rent payable Rs. 6,000.

2. Prepare trial balance from the above transactions in Q.No. 1.

3. How you will create a company in Tally ? Write all steps.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-III

PAPER–XVII Practical

(Accounting and Financial Management)

SET-B

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 20**

Answer any Two Questions. All questions carry equal marks.

1. Give Journal Entries from the following transaction:—
   (i) Ram introduced a capital of Rs. 5,00,000.
   (ii) Purchased a goods of Rs. 45,000 from Das & Co.
   (iii) Sold goods to Rahim Rs. 1,55,000.
   (iv) Sold goods for Cash Rs. 75,000.
   (v) Salary paid Rs. 8,000.
   (vi) Purchased a Machinery Rs. 80,000.
   (vii) Rent payable Rs. 5,000.

2. Prepare Balance Sheet from the above transactions in Q.No. 1.

3. How you will create ledger under a company in Tally? Write all steps.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-III

PAPER–XXIII- Practical

(Application Development with .Net Framework)

SET-A

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 20**

Answer all the Questions. All questions carry equal marks.

1. Write a programme in VB.Net to enter any number and check whether it is prime or not using console programming.

2. Design a page in ASP.Net for creating your own resume.

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NALANDA OPEN UNIVERSITY

Master of Computer Application (MCA), Part-III

PAPER–XXIII - Practical

(Application Development with .Net Framework)

SET-B

Annual Examination, 2023

Time : 3 Hours. **Full Marks : 20**

Answer all the Questions. All questions carry equal marks.

1. Design a form in VB.Net for check box like bold, italic and underline. After clicking on the check box display the effect in a label.

2. Design a board in ASP.Net using proper tools to display information of your choice.

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