

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

(Problem Solving Using C)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What do you mean by algorithm? What are the rules for writing a algorithm? Write a algorithm to display a series of first 100 natural numbers.
2. Write a program that calculates the sum of the digits of an integer. For example, the sum of the digits of the number 2155 is 2 + 1 + 5 + 5 or 13.The program should accept any arbitrary integer typed in by the user.
3. Mention differences between While loop and do...While loop with the help of an example. What do you understand Nested Loop?
4. Explain String handling functions in C. Write a C program to concatenate the given two strings and print new string.
5. What is recursion? Explain with example. Differentiate between Iteration and Recursion.
6. What is Function? Explain different types of functions with examples. Discuss about Global and Local variables.
7. Write a program to copy the contents of one array into another in the reverse order using pointer.
8. Describe different types of operators in C with examples.
9. Explain Function Prototypes with an example for each. Write a program to print first 10 even numbers using goto statement.
10. Write short notes on any **Four** of the following :—
 - (a) Formatted Input Output Function
 - (b) Increment and decrement operator
 - (c) Nested Loop
 - (d) Call by reference
 - (e) Union in C



Examination Programme, 2019
MCA, Part-I

Date	Papers	Time	Examination Centre
02.09.2019	Paper-I	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
04.09.2019	Paper-II	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
06.09.2019	Paper-III	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
07.09.2019	Paper-IV	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
09.09.2019	Paper-V	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
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13.09.2019	Paper-VII	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
16.09.2019	Paper-VIII	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
19.09.2019	Paper-I (Practical)	12.00 Noon to 3.00 PM	School of Computer Education & IT, 12 th Floor, Biscomaun Tower, Patna-800001
20.09.2019	Paper-VI (Practical)	12.00 Noon to 3.00 PM	
21.09.2019	Paper-VIII (Practical)	12.00 Noon to 3.00 PM	

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

(Computer Organization)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. (a) Convert the following :—
 - (i) $(23456)_8 = ()_{10}$
 - (ii) $(4CD6)_{16} = ()_8$
 - (iii) $(10110000011100110)_2 = ()_8$
 - (iv) $(ABC2E)_{16} = ()_2$
- (b) Draw and describe the circuit of half adder.
2. Draw a circuit diagram 3x8 decoder and explain its working. How multiplexer is different from decoder? Explain.
3. Simplify the following using Karnaugh's map in terms of SOP and draw the circuit for the output expression: **$F(A, B, C, D) = \Sigma(0, 1, 3, 4, 6, 7, 9, 12, 13)$**
4. Describe RS flip-flop and JK flip-flop with their circuit diagram.
5. What are counters? Why are they used? Draw the circuit diagram of 4-bit binary ripple counter.
6. What is a cache? Explain different mapping procedure for cache organization.
7. Discuss some of the arithmetic and Logic instructions with their complete description.
8. Describe the basic structure of ALU. Also discuss the functions of an ALU in a computer system.
9. Describe the tools required for Assembly Language in detail.
10. Write short notes on the following :—
 - (a) Interrupts
 - (b) Device drivers
 - (c) Addressing schemes
 - (d) Directives.

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Examination Programme, 2019
MCA, Part-I

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02.09.2019	Paper-I	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
04.09.2019	Paper-II	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
06.09.2019	Paper-III	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
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21.09.2019	Paper-VIII (Practical)	12.00 Noon to 3.00 PM	

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

(Discrete Mathematics)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. (a) Define converse, inverse and contra positive of an implication with examples.
 (b) Prove that $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow [p \rightarrow r]$ is a tautology.
2. Use the mathematical induction to prove that $1 + \frac{1}{4} + \frac{1}{9} + \dots + \frac{1}{n^2} \leq 2 - \frac{1}{n}; \forall n \in \mathbb{N}$.
3. Construct a truth table for each of the Boolean Expressions
 (a) $xy + x'.y'$
 (b) $x(x + y')$
4. If $A = \{1, 2, 3\}$ and $B = \{2, 4, 5\}$ then find
 (a) $(A \cap B) \times (A - B)$
 (b) $A \times (A - B)$
 (c) $(A \Delta B)$
5. Define Reflexive Relation, Symmetric Relation and Transitive Relations with example.
6. How many arrangement can be formed with letters of the word DELHI. How many of them will begin with D and how many donot ? How many will begin with D and end with I ? How many word LH will be together ?
7. (a) Find the value of n if $2n_{c_3} : n_{c_2} = 44 : 3$.
 (b) In how many ways can 4 students be selected out of 12 students of (i) two particular students are not included at all, (ii) two particular students are included.
8. (a) Find the 3rd term in the expansion of $(2x - 3y)^5$.
 (b) Find the middle term in the expansion of $(1 + x)^{2n}$.
9. What is the chance that a leap year selected at random will contain (i) 53 Sunday, (ii) 53 Thursday or 53 Friday.
10. Find the remainder when $(53)^{49}$ is divided by 36.

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Examination Programme, 2019
MCA, Part-I

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

(Systems Analysis and Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss the constraints and characteristics of a System. What are the elements of a system?
2. Draw Data Flow Diagram and develop SRS for Hotel Management System.
3. What are the various approaches of development of an Information system? Explain in detail.
4. Define SRS. Describe the characteristics of a SRS and the rules for specifying Software requirements.
5. What is Feasibility study? Why it is done? Explain at least five important feasibilities that should be analysed before developing an information system.
6. Why design of a software is considered as one of the important phase? What should be the properties of a good design? Explain concept of modularity in design.
7. What is a Form? Discuss the characteristics of a Form. Design an admission form for Nalanda Open University.
8. Explain the steps used in Database design. What guidelines should be followed while designing a database?
9. What do you mean by conversion plan? Explain various types of conversion plan with the help of an example.
10. Write short notes on any two of the following :—
 - (i) Gantt chart
 - (ii) Project Team
 - (iii) Project life cycle
 - (iv) CASE tools.

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Examination Programme, 2019
MCA, Part-I

Date	Papers	Time	Examination Centre
02.09.2019	Paper-I	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
04.09.2019	Paper-II	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-VI

(Operating System Concepts and Networking Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define an operating system. Describe the functions of an Operating system.
2. Define and describe the structure UNIX operating system with the help of a diagram. Explain the features of User mode and Kernel mode in UNIX operating system.
3. What are different types of operating system? Explain each type with the help of an example.
4. How an Operating system is related to networking of computer? Explain various types of topologies supported by LAN.
5. What are the basic components of Networking? Describe various types of transmission modes with their applications in our day to day life.
6. Explain OSI model of Networking with the functions of each layer. How it is different from TCP/IP model?
7. List and explain the significance of any five networking devices.
8. Explain the file access control methods provided by Linux operating system. Give an example for each.
9. Write at least 10 command in LINUX with their complete syntax and their use.
10. Write the short notes on any two of the following :—
 - (a) Virtual memory
 - (b) Domain Name system
 - (c) NTFS
 - (d) SNMP architecture.



Examination Programme, 2019
MCA, Part-I

Date	Papers	Time	Examination Centre
02.09.2019	Paper-I	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
04.09.2019	Paper-II	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
06.09.2019	Paper-III	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
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21.09.2019	Paper-VIII (Practical)	12.00 Noon to 3.00 PM	

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

(Object Oriented Analysis and Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Explain the concept Object, Class and Encapsulation in Object Oriented systems with the help of an example
2. How an Object Oriented design implemented? Explain with the help of an example.
3. What is Polymorphism? Differentiate between operator overriding and operator overloading.
4. Draw an object model to give a broader view of a University system, which offers online courses. What is the use of object IDs? Explain.
5. Draw a DFD for the Library Information System. Assumptions can be made wherever necessary. Draw the DFD's till level - 2.
6. What is concurrency? How is it identified? What are the issues, mechanisms and methods to manage concurrency?
7. Draw a use-case diagram for a typical flight cancellation system. Identify actors. How are constraints defined and implemented?
8. List and describe the elements of a State Diagram. Give an example of state diagram
9. What is association in Object Oriented System? How association different from aggregation? Explain with the help of an example.
10. Write short notes on any two of the following :—
 - (a) Domain model refinement
 - (b) Inheritance
 - (c) Conceptual Data modelling
 - (d) System sequence diagram.



Examination Programme, 2019
MCA, Part-I

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02.09.2019	Paper–I	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
04.09.2019	Paper–II	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
06.09.2019	Paper–III	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VIII

(Data and File Structures)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is a SPARSE matrix? Write a program for addition of two sparse matrices.
2. What is a circular linked list? Write a program in C to implement Insertion and deletion in a circular linked list.
3. What is Push and Pop operations? Explain with the help of an example. Write an algorithm for push and pop operation.
4. What are the application areas of stack data structure? Describe them with examples.
5. Differentiate between Enqueue and Dequeue. Write the algorithm for both.
6. What is a threaded tree? Why do we need Threaded Binary trees? Describe different types of threaded binary trees.
7. What is a heap sort? Write a program in C to implement heap sort.
8. Define Hashing. Explain the application of hashing in Division remainder method and collision resolution method.
9. Explain the concept of searching and sorting in data structure. Discuss at least two searching algorithms.
10. Define ISAM. Discuss the disadvantages of ISAM. How does VSAM overcome these disadvantages?

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Examination Programme, 2019
MCA, Part-I

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04.09.2019	Paper-II	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
06.09.2019	Paper-III	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Patna
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21.09.2019	Paper-VIII (Practical)	12.00 Noon to 3.00 PM	

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–IX [New]
 (Internet Concepts and Web Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is an Internet Service Provider (ISP)? Discuss some applications of Internet.
2. 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.
3. Define Video-conferencing. Discuss the hardware, software and internet connections requirements for Video-conferencing. Compare CU-SeeMe and Microsoft NetMeeting.
4. Explain in detail the development phases of a Website.
5. What is a Web Server? Describe Web server architecture and its working.
6. Discuss the block-level elements of HTML. Give an example to show their use.
7. Explain the following terms :—
 (i) Semantic linking
 (ii) Meta Information.
8. What is a Style Sheet? Why it is used? Explain how Style sheets are added to a document with the help of an example.
9. Describe different types of control structure used in JavaScript with examples of each
10. Write short notes on the following :—
 (i) HTTP
 (ii) Browsers
 (iii) Search Engines
 (iv) URL.



Examination Programme, 2019
MCA, Part-II (New Batch)

Date	Papers	Time	Examination Centre
06.08.2019	Paper–IX	8.00 AM to 11.00 AM	Nalanda Open University, Patna
08.08.2019	Paper–X	8.00 AM to 11.00 AM	Nalanda Open University, Patna
10.08.2019	Paper–XI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
12.08.2019	Paper–XII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
14.08.2019	Paper–XIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
16.08.2019	Paper–XIV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
20.08.2019	Paper–XV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
22.08.2019	Paper–XVI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
24.08.2019	Paper–IX (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XIII (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
27.08.2019	Paper–XIV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
28.08.2019	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XII [Old]
 (Object Oriented Analysis and Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. A hospital wants a computerized system to manage patients' appointments, maintain their medical records, keep payment records and generate reports. Both doctors and patients are reminded one day in advance through SMS/e-mail about the appointment. The appointment can be fixed by on-line/off-line mode. When the patient makes a call for an appointment, the receptionist will check the schedule as per the earlier date. Perform the following tasks :
 - (i) Draw a class diagram
 - (ii) Draw an object diagram
 - (iii) Draw a use case diagram
 - (iv) Draw a sequence diagrams.
2. What is Abstraction? Explain with the help of an example. In object oriented design, what steps must be taken by the designer to design association? Explain association with the help of a UML diagram.
3. How generalization, specialization and inheritance are closely related? Explain with the help of an example.
4. What are the major features of UML? What is a State Diagram? How are composite states represented in a state diagram? Give an example with suitable diagram.
5. Draw a D.F.D. for "Library Information system". Assumptions can be made wherever necessary. Draw the DFD's till level -2.
6. What is the use of inheritance? How is inheritance readjusted by rearranging classes and operations? Explain the concept of delegation. How is it useful for implementing inheritance?
7. Draw an activity diagram for a Sales Order Management System. The sales order management system includes sending an order by the customer, confirmation of the order through the receipt of the order, checking for condition whether the order is normal or special, confirmation of the order processing and finally dispatch of the order and raising the bill.
8. Describe the following terms with the help of an example :—
 - (i) Polymorphism
 - (ii) Encapsulation
9. Mention the purpose of object diagrams and deployment diagrams. Also draw and explain the appropriate deployment diagram for an Online Admission System. The purpose of the online admission system is to automate the online student admission process. It also maintains students' personal details, academic records, payment details and generates reports.
10. What is Persistency? Explain with an example, how persistent data are identified.



Examination Programme, 2019
MCA, Part-II (Old Batch)

Date	Papers	Time	Examination Centre
06.08.2019	Paper–XII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
08.08.2019	Paper–XIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
10.08.2019	Paper–XIV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
12.08.2019	Paper–XVI	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
14.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
16.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
20.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
22.08.2019	Paper–XI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XX (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–X [New]
(Computer Graphics and Multimedia)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss Applications of Computer Graphics.
2. Compare and contrast between Random scan and Raster scan with help of an example.
3. Discuss some Software tools and Image processing in detail.
4. What do you mean by refracting? What is the size of the pixel on 21-inch diagonal screen with physical aspect ratio 8:5 in 1152x 800 mode?
5. Explain Bresenham's circle generation algorithms with the help of an example.
6. What do you mean by composite transformation in 3D transformation? Explain with the help of an example.
7. Explain the following terms :—
 - (i) Point clipping
 - (ii) Line clipping
 - (iii) Polygon clipping
 - (iv) Text clipping.
8. Describe graphic output primitives and discuss their uses.
9. Describe some basics of animation techniques. What is Ray tracing ?
10. Write short notes on the following :—
 - (i) A-Buffer method.
 - (ii) Depth Sorting method.



Examination Programme, 2019
MCA, Part-II (New Batch)

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28.08.2019	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIII [Old]
(Software Engineering)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Explain the factors affecting the task set for a project. Describe the challenges for Component Based Software Engineering (CBSE).
2. What are the components of DFD? Draw DFDs, up to second level for a Railway Reservation System.
3. Describe the COCOMO model in detail for software estimation. What is cyclomatic complexity?
4. Define Version Control. With the help of an evolutionary graph, discuss the whole process of version control.
5. With reference to the software quality metrics, explain the following: (i) Defect Metrics (ii) Maintainability Metrics.
6. Explain the various steps in requirement engineering process. Explain software reengineering with a diagram.
7. Explain the following testing techniques: (i) Unit Testing (ii) Stress Testing
8. What is a Risk? What are different types of Risks? Explain any one of the Risk Management Techniques.
9. Explain the various levels of SEI-CMM. Write down the several aspects of creating a good design. Explain each step.
10. Write short notes on the following :—
 - (a) Prototype model
 - (b) Spiral model.



Examination Programme, 2019
MCA, Part-II (Old Batch)

Date	Papers	Time	Examination Centre
06.08.2019	Paper–XII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
08.08.2019	Paper–XIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
10.08.2019	Paper–XIV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
12.08.2019	Paper–XVI	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
14.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
16.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
20.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
22.08.2019	Paper–XI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XX (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XI [New]
(Software Engineering)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What are different types of software ? Discuss in detail.
2. Define Software engineering ? Explain the terms Software process and software project in term of Software engineering.
3. Define and describe Capability Maturity model (CMM). What are software standards ?
4. What is Risk ? What are different types of Risk ? Explain the process of Risk management.
5. Discuss how Software Teams are structured for developing a Software. What are the four "organizational paradigms" for software engineering teams ?
6. Draw a DFD for "Railway Ticketing System" up to second level. Make necessary assumptions if required.
7. Explain various types of coupling and cohesion in terms of modularization.
8. What are the golden rules for User Interface design ? Explain.
9. Why testing is important in Software engineering ? Describe various types of Black Box Testing with the help of an example.
10. Write short notes on the following :—
 - (i) Software quality assurance
 - (ii) Quality metrics
 - (iii) Software Reliability
 - (iv) Formal Technical Review.



Examination Programme, 2019
MCA, Part-II (New Batch)

Date	Papers	Time	Examination Centre
06.08.2019	Paper–IX	8.00 AM to 11.00 AM	Nalanda Open University, Patna
08.08.2019	Paper–X	8.00 AM to 11.00 AM	Nalanda Open University, Patna
10.08.2019	Paper–XI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
12.08.2019	Paper–XII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
14.08.2019	Paper–XIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
16.08.2019	Paper–XIV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
20.08.2019	Paper–XV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
22.08.2019	Paper–XVI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
24.08.2019	Paper–IX (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XIII (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
27.08.2019	Paper–XIV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
28.08.2019	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIV [Old]
 (Accounting & Financial Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Describe different kinds of accounting.
2. What is Trial Balance ? What are the objectives of preparing Trial Balance ? Point out its limitations.
3. What is financial accounting ? Distinguish financial accounting from management accounting.
4. Describe the tasks and responsibilities of a modern financial manager.
5. What is Ratio Analysis ? Discuss its importance and limitations in business.
6. Discuss the role of accountants in modern business organization.
7. Frame a Trading Account with appropriate items. What is the difference between Trading Account and Profit & Loss Account ?
8. What is Inventory ? Discuss the different techniques of inventory management.
9. Write notes on any **Two** of the following :–
 (a) Negotiable Instruments
 (b) Letter of Credit
 (c) Capital Rationing.
10. Prepare Fund Flow Statement from the following information's :–

Balance Sheet

Liabilities	Previous Year (Rs.)	Current Year (Rs.)	Assets	Previous Year (Rs.)	Current Year (Rs.)
Share Capital	50,000	80,000	Land & Building	40,000	60,000
Reserve	30,000	40,000	Plant	10,000	5,000
P/L Account	10,000	15,000	Debtors	30,000	20,000
Creditors	30,000	40,000	Stock	20,000	15,000
Provision for Taxation	10,000	20,000	Investment	10,000	50,000
			Cash	5,000	15,000
			Goodwill	10,000	28,000
			Preliminary Expense	5,000	2,000
	1,30,000	1,95,000		1,30,000	1,95,000

Additional information's :–

- (i) Depreciation Charged on building during the year Rs. 20,000.
- (ii) Tax paid during the year Rs. 60,000.

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Examination Programme, 2019
MCA, Part-II (Old Batch)

Date	Papers	Time	Examination Centre
06.08.2019	Paper–XII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
08.08.2019	Paper–XIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
10.08.2019	Paper–XIV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
12.08.2019	Paper–XVI	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
14.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
16.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
20.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
22.08.2019	Paper–XI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XX (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XII [New]
(Management and Information System)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What are the different methods of data collection ? How the quality of the information can be measured ? Discuss.
2. Explain Global and social impact of information system with the help of an example.
3. Describe organizations functions ? What are the characteristics of an organization ?
4. Explain the key system applications in the organization ? Discuss characteristics of computerized MIS.
5. Explain at least four applications of MIS in detail.
6. Describe the relationship between ESS, MIS and DSS with the help of an example.
7. What is the role of a file in MIS ? What are the problems with the traditional File environment ? Discuss.
8. Compare and contrast between Object Oriented Database and Distributed Database.
9. Define Expert system. How it is beneficial in decision making of an organization ?
10. Write short notes on the following :—
 - (i) Sales and marketing system.
 - (ii) Financial system.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XVI [Old]
(Data and File Structures)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Design algorithms for various operations performed on stack.
2. What are the advantages of using lists than arrays while implementing a queue ? Explain with the help of an example.
3. Write a procedure to find minimum cost spanning tree for a graph using Prim's algorithm.
4. Write a procedure to create, insert and display the content of a singly linked list.
5. Write a procedure to create, insert and delete an element in queue.
6. Explain the all-pairs shortest path problems with algorithm.
7. Write a procedure to sort the following sequence using heap sort :—
25 57 48 37 12 92 86 33.
8. Explain using example each of the following for binary trees :—
 - (i) Inorder traversal
 - (ii) Preorder traversal
 - (iii) Postorder traversal
9. Explain insertion sorting with an example. Give other situations in which insertion sort is most efficient. Also, explain how the worst case can be avoided.
10. Explain any two of the following with an example :—
 - (a) Spanning Tree
 - (b) Column Major Order
 - (c) Weakly Connected Graph.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER—XIII [New]
(Operating System)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Explain in detail the basic functions of an operating system.
2. Differentiate between process and thread. What are the advantages of using threads ?
3. What is process scheduling ? Explain FCFS and Round Robin Scheduling algorithms with the help of an example.
4. Explain Semaphore with the help of an example. What is race condition and how does it occur in an operating system ?
5. Explain the methods for addressing the possibility of deadlock.
6. Compare paging with segmentation. Explain the concept of first-fit, best-fit and worst-fit algorithms with the help of an example.
7. Compare and contrast between FIFO, OPT and LRU page replacement policies. Give an example to reflect the comparison.
8. How an Operating System manages Disk space storage ? Explain.
9. Explain booting in Windows 2000. Also discuss security in windows 2000.
10. Write short notes on the following :—
 - (i) Overlays and swapping.
 - (ii) Belady's Anamoly.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XVII [old]
(Operating System Concepts and Networking Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Describe the structure and characteristics of any two different types of guided transmission media.
2. Describe the data structure of a process in LINUX, giving its components and the structure of each. How does the data structure of a process differ from that of a thread ?
3. What are the different layers of the TCP/IP protocol suite ? Write the function of each. Give a mapping between the TCP/IP layers and the OSI layers.
4. What is RAID ? List the RAID levels. What are the limitations of disk striping ?
5. Explain the meaning and utility of unicasting, multicasting and broadcasting. What is the mesh topology ? How is it different from star topology ?
6. Explain multiprocessor operating system? How can one encrypt a file using EFS in Windows XP ?
7. Explain the function of any two protocols in the TCP/IP suite. What are Data Terminal Equipment and Data Communication Equipment ?
8. What is a firewall and what are its functions ? Describe how it is useful and explain its limitations.
9. Name any two network protocols supported by Windows 2000. What is a roaming user profile in Windows 2000 ? List six events that can be audited on a Windows 2000 computer.
10. Write short notes on any two of the following :—
 - (a) Backups, describing all the three types of it.
 - (b) Working of Windows 2000 in User mode and Kernel mode.
 - (c) Group Policy in Windows 2000.
 - (d) Installation classes while installing LINUX.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIV [New]
(Database Management Systems)
Annual Examination, 2019

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 an E-R diagram ? What are its basic components? How these components are represented in a diagram ? Explain.
3. Write at least ten queries in SQL with their complete syntax and meaning.
4. Describe the following relational algebra operations with the help of an example :—
 - (i) Selection
 - (ii) Projection
 - (iii) Difference
 - (iv) Union
5. Differentiate between Functional dependency and multivalued dependency with the help of an example. How does it support in normalization of DBMS.
6. Explain the concept of concurrent transaction with the help of an example. What are the SQL commands that support transaction ?
7. Describe various locking techniques used in DBMS.
8. Explain the following concepts :—
 - (i) Primary Index
 - (ii) Secondary Index
 - (iii) Clustered Index
 - (iv) Hashing Techniques
9. Compare and contrast between OODBMS and RDBMS.
10. Write short notes on the following :—
 - (i) Shadow paging.
 - (ii) Data Security issues.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XVIII [Old]
(Introduction to Database Management Systems)
Annual Examination, 2019

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 an E-R diagram ? What are its basic components? How these components are represented in a diagram ? Explain.
3. Write at least ten queries in SQL with their complete syntax and meaning.
4. Describe the following relational algebra operations with the help of an example :—
 - (i) Selection
 - (ii) Projection
 - (iii) Difference
 - (iv) Union
5. Differentiate between Functional dependency and multivalued dependency with the help of an example. How does it support in normalization of DBMS.
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8. Explain the following concepts :—
 - (i) Primary Index
 - (ii) Secondary Index
 - (iii) Clustered Index
 - (iv) Hashing Techniques
9. Compare and contrast between OODBMS and RDBMS.
10. Write short notes on the following :—
 - (i) Shadow paging.
 - (ii) Data Security issues.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XV [New]
(Object Oriented Programming using Java)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define the concept of inheritance. Explain the advantage of inheritance with the help of an example.
2. Write a Java Program which takes two 3 x 3 matrices as input and find sum of the two matrices ? Define constructor for initializing matrix objects.
3. What is Polymorphism ? Explain advantage of polymorphism. Differentiate between overloading and overriding with the help of suitable example.
4. What is an exception ? Explain difference between checked and unchecked exceptions with an example of each. What is the difference between throw and throws keywords used in Java ? Explain with an example.
5. Differentiate the following, with the help of example :—
 - (i) Application and Applet
 - (ii) Structure Approach and Object Oriented Approach
 - (iii) String and String Buffer
6. Write a class complex to represent complex numbers, with suitable constructor and function to find the sum of two complex numbers.
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. "Java is architecture neutral, secure and distributed programming language." Justify the statement. What is private access specifier ? Explain with an example, how it is different from public and protected access specifiers.
9. What is finalize() method in Java. Give an example to demonstrate its use. Explain use of super keyword in Java, with an example.
10. Write short notes on any **Two** of the following :—
 - (i) HTTP
 - (ii) TCP client and TCP server socket
 - (iii) Servlet.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XIX [Old]
(Object Oriented Technologies and Java Programming)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define the concept of inheritance. Explain the advantage of inheritance with the help of an example.
2. Write a Java Program which takes two 3 x 3 matrices as input and find sum of the two matrices ? Define constructor for initializing matrix objects.
3. What is Polymorphism ? Explain advantage of polymorphism. Differentiate between overloading and overriding with the help of suitable example.
4. What is an exception ? Explain difference between checked and unchecked exceptions with an example of each. What is the difference between throw and throws keywords used in Java ? Explain with an example.
5. Differentiate the following, with the help of example :—
 - (i) Application and Applet
 - (ii) Structure Approach and Object Oriented Approach
 - (iii) String and String Buffer
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9. What is finalize() method in Java. Give an example to demonstrate its use. Explain use of super keyword in Java, with an example.
10. Write short notes on any **Two** of the following :—
 - (i) HTTP
 - (ii) TCP client and TCP server socket
 - (iii) Servlet.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-II
PAPER–XVI [New]
(Computer Networking)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define LAN. Describe the characteristics that differentiate one LAN from another.
2. Explain various topologies of LAN with their advantages and disadvantages.
3. What do you mean by modes of transmission? Describe different types of modes of transmission.
4. Define Multiplexing. Compare and contrast between Frequency Division Multiplexing and Time Division Multiplexing.
5. Describe the two sublayers of Datalink Layer. What are the functions of Datalink Layer in the network? Explain.
6. What is a Bridge? Discuss the functions of a Bridge. Describe various types of bridges used in networking.
7. Describe the following :—
 - (i) CSMA
 - (ii) CSMA/CD.
8. Explain the reasons of Network congestion. How this congestion problem can be corrected.
9. What are different types of encryption techniques? Explain at least two of them briefly.
10. Write short notes on the following :—
 - (i) Transmission impairments
 - (ii) Transmission media.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XVII (New)
 (Accounting and Financial Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Describe in brief the functions of Accounting.
2. What is accounting Standard ? Discuss the need of accounting standard.
3. Give the specimen of Profit and Loss Account and Balance sheet with imaginary figures.
4. Discuss the methods of financial analysis.
5. What is ratio analysis ? Discuss its objectives.
6. What do you mean by cash flow statement ? How does it differ from fund flow statement ?
7. Define Cost accounting. Discuss its objectives.
8. What is Break Even Analysis ? Explain its advantages.
9. Distinguish between Standard Costing and Marginal Costing.
10. Define dividend. Discuss the different forms of dividend.

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Examination Programme, 2019
MCA, Part–III
(New Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
20.08.2019	Paper–XXIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
22.08.2019	Paper–XVII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXIV (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXI [OLD]
(MCS-041 : Operating Systems)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define an Operating system. What are the functions of an operating system ? Name some operating systems.
2. Define a Process. Explain various states of a process. How does a process differ from a thread ?
3. What is a Critical Section ? Give a monitor solution to the Dining philosophers' problem and explain.
4. Consider the page reference string : 1, 2, 3, 4, 2, 5, 3, 4, 2, 6, 7, 8, 7, 9, 7, 8, 2, 5, 4 and Calculate how many page faults would occur for LRU and FIFO page replacement algorithms, when the number of frames is 3. Assume all frames are initially empty.
5. With the help of a neat diagram, explain segmented paging and paged segmentation.
6. Explain RAID with different levels. Give the features of each level.
7. Discuss SCAN and C-SCAN disk scheduling algorithms with the help of an example. List the advantages of SCAN over C-SCAN algorithm.
8. What is a Deadlock? When does it occur? Discuss the necessary conditions of deadlock with the help of an example.
9. Write at least 10 commands in UNIX with their full syntax.
10. Give short notes on any two of the following :—
 - (i) Thrashing
 - (ii) Access Matrix
 - (iii) Overlays and Swapping



Examination Programme, 2019
MCA, Part–III
(Old Batch)

Date	Paper	Time	Examination Centre
06.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper– XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper– XXIV	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XXV	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
20.08.2019	Paper–XXIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
22.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXVI (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXX (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XVIII (New)
(Advanced Database Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss in detail Enhanced ER (EER) tools with a suitable example.
2. What is functional dependency? How does it help in the process of Normalization of Database? Explain.
3. Explain Database Application Life cycle in detail. What are the criteria for physical design?
4. What are stored procedures and triggers in database? Explain with the help of an example.
5. What is UML? Discuss the features of automated database design and implementation tools.
6. Define methods used for evaluation of expressions? How you define cost based optimization?
7. What are recovery algorithms in database? Explain using a suitable example.
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.



Examination Programme, 2019
MCA, Part–III
(New Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
20.08.2019	Paper–XXIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
22.08.2019	Paper–XVII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXIV (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXII [OLD]
(MCS-043 : Advanced Database Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss in detail Enhanced ER (EER) tools with a suitable example.
2. What is functional dependency? How does it help in the process of Normalization of Database? Explain.
3. Explain Database Application Life cycle in detail. What are the criteria for physical design?
4. What are stored procedures and triggers in database? Explain with the help of an example.
5. What is UML? Discuss the features of automated database design and implementation tools.
6. Define methods used for evaluation of expressions? How you define cost based optimization?
7. What are recovery algorithms in database? Explain using a suitable example.
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.



Examination Programme, 2019
MCA, Part–III
(Old Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper– XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper– XXIV	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XXV	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
20.08.2019	Paper–XXIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
22.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXVI (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXX (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XIX (New)
 (Compiler Design)
Annual Examination, 2019

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 various construction tools of Compilers.
3. What is a regular expression? Explain the rules for writing regular expressions. Write some regular expressions and explain them.
4. Define Finite state machine. Differentiate between DFA and NFA.
5. Explain Chomsky classification of Grammar with examples. What is a parse tree?
6. Explain the following terms with help of an example :—
 (i) Left recursion
 (ii) Right recursion
 (iii) Ambiguity.
7. Define Yacc. Explain it using an example.
8. Define symbol table. Discuss in detail the attributes of symbol table. What is an Abstract syntax tree.
9. Discuss the design issues in intermediate code. Translate the following expression into postfix form:
 $-(a+b) * (c-d)-(a-b+c)$
10. Write short notes on any two of the following :—
 (i) Peephole optimization
 (ii) Quadruple
 (iii) Memory allocation
 (iv) Semantic Analyser.



Examination Programme, 2019
MCA, Part–III
(New Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
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22.08.2019	Paper–XVII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXIV (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXIV [OLD]
(MCS-51 : Advanced Internet Technologies)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Assume there is a table named 'customer' in the "Bank" database with the following fields' cust_id, cust_name, dob, email. Write a code for servlet and JDBC to connect to the "Bank" database and display customer records.
2. The telephone directory is usually displayed in the department order hierarchy and shows for each department, the name, designation and telephone number of each employee working in it. Create an XML file containing some directory data.
3. What is Java Naming and Directory Interface authentication? Explain it with a suitable example.
4. Describe the following HTTP authentication mechanisms for authentication of a user to a web server :—
(i) HTTP Basic Authentication
(ii) MT Client Authentication
5. How can two servlets share information using the system property list? In an inventory application, one servlet stores the stock of an item in a system property. Another servlet uses this property to find whether an order quantity can be fulfilled or must be declined. Show how this can be done through a Java program.
6. Explain the need of entities in XML documents. Describe all the three types of entities with the help of an example.
7. What are the different recovery procedures in security implementation? Explain.
8. Explain the purpose of different types of JDBC SQL statements.
9. Explain how business logic and presentation logic are separated using Java server page.
10. Differentiate between the following :—
(i) Get and Post
(ii) Servlet engine and Servlet chaining
(iii) SGML and XML
(iv) Data integrity and System

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Examination Programme, 2019
MCA, Part–III
(Old Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XX (New)
(Design and Analysis of Algorithms)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What do you mean by analysis of algorithms? Explain various criteria for analyzing algorithms.
2. Explain divide and conquer technique. Give some examples of Divide and Conquer algorithm.
3. Explain Matrix chain multiplication and Longest Common Sequence with the help of an example.
4. What is backtracking? Write and explain the algorithm of backtracking.
5. Compare and contrast between BFS and DFS algorithms. Give an example for each type.
6. Differentiate between P, NP and NP complete problem with the help of an example.
7. Describe RSA public-key cryptosystem with the help of an example.
8. Discuss about the random variables and basic inequalities with an example. Define the distribution function for the random variables.
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) Branch and Bound
 - (ii) Recurrence
 - (iii) Clique
 - (iv) Polynomials.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER-XXV [Old]

(MCS-53 : Computer Graphics and Multimedia)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Differentiate between any **Two** of the following :—
 - (i) Computer Graphics and Animation
 - (ii) Random Scan and Raster Scan display devices
 - (iii) Printer and Plotter
2. Write Bresenham's line generation algorithm. Use it to draw a line segment joining (20, 10) and (25, 14).
3. Find the transformation matrix for reflection about the line $y = 4x$.
4. Compare and contrast any **Two** of the following :—
 - (i) Vector Graphics and Bitmap Graphics
 - (ii) JPEG and GIF
 - (iii) Key Frame Animation and Cel Animation
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. Briefly discuss the term "Windowing Transformation". Support your discussion with a suitable diagram and related mathematical equations.
7. Explain the following :—
 - (i) Perspective Projection
 - (ii) Orthographic Projection
 - (iii) Oblique Projection.
8. Define DDA algorithm. Write DDA line drawing algorithm. Use this algorithm to draw a line between (0,0) and (3,3).
9. Compare and contrast between the following :—
 - (i) Simulating positive acceleration and Simulating negative acceleration in Animation.
 - (ii) Hypertext and Hypermedia.
 - (iii) Computer assisted animation and Computer generated animation.
10. Write short notes on any **Three** of the following :—
 - (i) Anti-aliasing
 - (ii) Hidden Surface Removal Algorithm
 - (iii) Ray Casting
 - (iv) Hypermedia

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXI (New)

(Artificial Intelligence and Knowledge Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define Artificial Intelligence (AI). Discuss the application areas of AI.
2. What are the components of Intelligence ? Explain them.
3. What is un-informed search ? Describe some of the informed search strategies.
4. Evaluate and elaborate the following LISP expressions :—
 - (i) `(+(setq x 10) (setq y 4))`
 - (ii) `car(cdr (car (a b c d e f g)))`
 - (iii) `(cdr (x y z))`
 - (iv) `(member 'a ' (a b c d))`
 - (v) `(list 'a `(b c))`
5. What is Constraint Satisfaction Problems ? Explain the steps of solving Constraints Satisfaction Problems.
6. What is Fuzzy logic ? Discuss different types of operations on fuzzy logic with the help of an example.
7. Explain the following properties of Well Formed Formulas :—
 - (i) Valid/ Tautology
 - (ii) Satisfiable
 - (iii) Contradiction
8. What is resolution principle in AI ? Explain. Let $P(x)$ and $Q(x)$ represent "x is a rational number" and "x is a real number", respectively. Symbolize the following sentences :—
 - (i) Every rational number is a real number.
 - (ii) Some real numbers are rational numbers.
 - (iii) Not every real number is a rational number.
9. What is Prolog ? Define the properties of PROLOG. Explain backtracking and Unification inferencing system in PROLOG with the help of an example.
10. Write short notes on the following :—
 - (i) Hill-climbing Search
 - (ii) Expert System.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXVII [Old]

(MCSE-003: Artificial Intelligence and Knowledge Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define Artificial Intelligence (AI). Discuss the application areas of AI.
2. What are the components of Intelligence ? Explain them.
3. What is un-informed search ? Describe some of the informed search strategies.
4. Evaluate and elaborate the following LISP expressions :—
 - (i) `(+(setq x 10) (setq y 4))`
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 - (iii) Contradiction
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 - (i) Every rational number is a real number.
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 - (iii) Not every real number is a rational number.
9. What is Prolog ? Define the properties of PROLOG. Explain backtracking and Unification inferencing system in PROLOG with the help of an example.
10. Write short notes on the following :—
 - (i) Hill-climbing Search
 - (ii) Expert System.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXII (New)
(Numerical and Statistical Computing)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

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

1. (a) Round the number $x = 3.25568$ to four significant figures. Find the absolute error and 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 following systems using the Gauss elimination method

$$3x_1 + 2x_2 + 3x_3 = 5$$

$$x_1 + 4x_2 + 2x_3 = 4$$

$$2x_1 + 4x_2 + 8x_3 = 8$$

4. Solve the systems using Gauss-Seidel method

$$2x + y + z = 5$$

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

$$-x + y + 6z = 4$$

5. 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

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

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

7. Evaluate the Integral $I = \int_1^2 \frac{2x dx}{1+x^4}$ using the Gauss Legendre 3 point quadrature rules.

8. Using Runge Kutta method of order 4 compute $y(0.2)$ and $y(0.4)$ for the IVP $10y' = x^2 + y^2$, $y(0) = 1$ taking $h = 0.1$.

9. Explain Normal distribution and Chi-square distribution.

10. Explain Regression and its properties.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXVIII (Old)
(Numerical and Statistical Computing)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

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

1. (a) Round the number $x = 3.25568$ to four significant figures. Find the absolute error and 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

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8. Using Runge Kutta method of order 4 compute $y(0.2)$ and $y(0.4)$ for the IVP $10y' = x^2 + y^2$, $y(0) = 1$ taking $h = 0.1$.

9. Explain Normal distribution and Chi-square distribution.

10. Explain Regression and its properties.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXIII (New)

(Application Development with .Net Framework)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define .NET Framework. Explain the architecture of .NET Framework.
2. Explain ASP.NET 2.0 Features in detail.
3. Explain different Web Server Controls. What is user controls.
4. Explain the state management technique of web page.
5. List and explain data types supported by VB.NET.
6. Explain various looping statements in VB.NET. Discuss how errors are handled.
7. Discuss and differentiate List and Combo controls. Brief the role of Tree views.
8. Explain the features of Object Oriented Programming concepts. List and explain the types of access modifiers.
9. What are Delegates ? Explain the role of delegates on VB.NET.
10. Write short notes on the following :—
 - (i) Exceptions in .NET.
 - (ii) CLS

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXIX [Old]

(Application Development with .Net Framework)
Annual Examination, 2019

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 .NET Servers. Describe the roles performed by .NET server.
3. How can a User Control be created ? Explain the process to use a User Control.
4. Explain the process of working with Form Controls in VB.NET.
5. What are assemblies ? Explain its versions. Differentiate between private and shared assemblies.
6. What are the platform requirements to start and execute ASP.NET ? Explain.
7. List the types of file extensions that are handled by ASP.NET. Explain the ASP.NET folder structure.
8. Discuss the concept of JavaScript. Analyze JavaScript objects and variables.
9. Explain various classes of ADO.NET. What is transaction ? Explain.
10. Write short notes on the following :—
 - (i) CLR
 - (ii) CLS

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XVII (New)
 (Accounting and Financial Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Describe in brief the functions of Accounting.
2. What is accounting Standard ? Discuss the need of accounting standard.
3. Give the specimen of Profit and Loss Account and Balance sheet with imaginary figures.
4. Discuss the methods of financial analysis.
5. What is ratio analysis ? Discuss its objectives.
6. What do you mean by cash flow statement ? How does it differ from fund flow statement ?
7. Define Cost accounting. Discuss its objectives.
8. What is Break Even Analysis ? Explain its advantages.
9. Distinguish between Standard Costing and Marginal Costing.
10. Define dividend. Discuss the different forms of dividend.

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Examination Programme, 2019
MCA, Part–III
(New Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
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22.08.2019	Paper–XVII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXIV (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXI [OLD]
(MCS-041 : Operating Systems)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define an Operating system. What are the functions of an operating system ? Name some operating systems.
2. Define a Process. Explain various states of a process. How does a process differ from a thread ?
3. What is a Critical Section ? Give a monitor solution to the Dining philosophers' problem and explain.
4. Consider the page reference string : 1, 2, 3, 4, 2, 5, 3, 4, 2, 6, 7, 8, 7, 9, 7, 8, 2, 5, 4 and Calculate how many page faults would occur for LRU and FIFO page replacement algorithms, when the number of frames is 3. Assume all frames are initially empty.
5. With the help of a neat diagram, explain segmented paging and paged segmentation.
6. Explain RAID with different levels. Give the features of each level.
7. Discuss SCAN and C-SCAN disk scheduling algorithms with the help of an example. List the advantages of SCAN over C-SCAN algorithm.
8. What is a Deadlock? When does it occur? Discuss the necessary conditions of deadlock with the help of an example.
9. Write at least 10 commands in UNIX with their full syntax.
10. Give short notes on any two of the following :—
 - (i) Thrashing
 - (ii) Access Matrix
 - (iii) Overlays and Swapping

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Examination Programme, 2019
MCA, Part–III
(Old Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XVIII (New)
(Advanced Database Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss in detail Enhanced ER (EER) tools with a suitable example.
2. What is functional dependency? How does it help in the process of Normalization of Database? Explain.
3. Explain Database Application Life cycle in detail. What are the criteria for physical design?
4. What are stored procedures and triggers in database? Explain with the help of an example.
5. What is UML? Discuss the features of automated database design and implementation tools.
6. Define methods used for evaluation of expressions? How you define cost based optimization?
7. What are recovery algorithms in database? Explain using a suitable example.
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.



Examination Programme, 2019
MCA, Part–III
(New Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
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26.08.2019	Paper–XXIV (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXII [OLD]
(MCS-043 : Advanced Database Design)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss in detail Enhanced ER (EER) tools with a suitable example.
2. What is functional dependency? How does it help in the process of Normalization of Database? Explain.
3. Explain Database Application Life cycle in detail. What are the criteria for physical design?
4. What are stored procedures and triggers in database? Explain with the help of an example.
5. What is UML? Discuss the features of automated database design and implementation tools.
6. Define methods used for evaluation of expressions? How you define cost based optimization?
7. What are recovery algorithms in database? Explain using a suitable example.
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.



Examination Programme, 2019
MCA, Part–III
(Old Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper– XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper– XXIV	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XXV	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
20.08.2019	Paper–XXIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
22.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXVI (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXX (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XIX (New)
 (Compiler Design)
Annual Examination, 2019

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 various construction tools of Compilers.
3. What is a regular expression? Explain the rules for writing regular expressions. Write some regular expressions and explain them.
4. Define Finite state machine. Differentiate between DFA and NFA.
5. Explain Chomsky classification of Grammar with examples. What is a parse tree?
6. Explain the following terms with help of an example :—
 - (i) Left recursion
 - (ii) Right recursion
 - (iii) Ambiguity.
7. Define Yacc. Explain it using an example.
8. Define symbol table. Discuss in detail the attributes of symbol table. What is an Abstract syntax tree.
9. Discuss the design issues in intermediate code. Translate the following expression into postfix form:
 $-(a+b) * (c-d)-(a-b+c)$
10. Write short notes on any two of the following :—
 - (i) Peephole optimization
 - (ii) Quadruple
 - (iii) Memory allocation
 - (iv) Semantic Analyser.



Examination Programme, 2019
MCA, Part–III
(New Batch)

Date	Paper	Time	Examination Centre
06.08.2019	Paper–XVII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper–XVIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
10.08.2019	Paper–XIX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
12.08.2019	Paper–XX	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
14.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
16.08.2019	Paper–XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
20.08.2019	Paper–XXIII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
22.08.2019	Paper–XVII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
24.08.2019	Paper–XXIII (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXIV (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXIV [OLD]
(MCS-51 : Advanced Internet Technologies)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Assume there is a table named 'customer' in the "Bank" database with the following fields' cust_id, cust_name, dob, email. Write a code for servlet and JDBC to connect to the "Bank" database and display customer records.
2. The telephone directory is usually displayed in the department order hierarchy and shows for each department, the name, designation and telephone number of each employee working in it. Create an XML file containing some directory data.
3. What is Java Naming and Directory Interface authentication? Explain it with a suitable example.
4. Describe the following HTTP authentication mechanisms for authentication of a user to a web server :—
(i) HTTP Basic Authentication
(ii) MT Client Authentication
5. How can two servlets share information using the system property list? In an inventory application, one servlet stores the stock of an item in a system property. Another servlet uses this property to find whether an order quantity can be fulfilled or must be declined. Show how this can be done through a Java program.
6. Explain the need of entities in XML documents. Describe all the three types of entities with the help of an example.
7. What are the different recovery procedures in security implementation? Explain.
8. Explain the purpose of different types of JDBC SQL statements.
9. Explain how business logic and presentation logic are separated using Java server page.
10. Differentiate between the following :—
(i) Get and Post
(ii) Servlet engine and Servlet chaining
(iii) SGML and XML
(iv) Data integrity and System

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Examination Programme, 2019
MCA, Part–III
(Old Batch)

<i>Date</i>	<i>Paper</i>	<i>Time</i>	<i>Examination Centre</i>
06.08.2019	Paper–XXI	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
08.08.2019	Paper– XXII	12.00 Noon to 3.00 PM	MGM College, Kankarbagh Main Road, Patna-26
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24.08.2019	Paper–XXVI (P)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
26.08.2019	Paper–XXX (Tentative)	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XX (New)
(Design and Analysis of Algorithms)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What do you mean by analysis of algorithms? Explain various criteria for analyzing algorithms.
2. Explain divide and conquer technique. Give some examples of Divide and Conquer algorithm.
3. Explain Matrix chain multiplication and Longest Common Sequence with the help of an example.
4. What is backtracking? Write and explain the algorithm of backtracking.
5. Compare and contrast between BFS and DFS algorithms. Give an example for each type.
6. Differentiate between P, NP and NP complete problem with the help of an example.
7. Describe RSA public-key cryptosystem with the help of an example.
8. Discuss about the random variables and basic inequalities with an example. Define the distribution function for the random variables.
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) Branch and Bound
 - (ii) Recurrence
 - (iii) Clique
 - (iv) Polynomials.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXV [Old]

(MCS-53 : Computer Graphics and Multimedia)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Differentiate between any **Two** of the following :—
 - (i) Computer Graphics and Animation
 - (ii) Random Scan and Raster Scan display devices
 - (iii) Printer and Plotter
2. Write Bresenham's line generation algorithm. Use it to draw a line segment joining (20, 10) and (25, 14).
3. Find the transformation matrix for reflection about the line $y = 4x$.
4. Compare and contrast any **Two** of the following :—
 - (i) Vector Graphics and Bitmap Graphics
 - (ii) JPEG and GIF
 - (iii) Key Frame Animation and Cel Animation
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. Briefly discuss the term "Windowing Transformation". Support your discussion with a suitable diagram and related mathematical equations.
7. Explain the following :—
 - (i) Perspective Projection
 - (ii) Orthographic Projection
 - (iii) Oblique Projection.
8. Define DDA algorithm. Write DDA line drawing algorithm. Use this algorithm to draw a line between (0,0) and (3,3).
9. Compare and contrast between the following :—
 - (i) Simulating positive acceleration and Simulating negative acceleration in Animation.
 - (ii) Hypertext and Hypermedia.
 - (iii) Computer assisted animation and Computer generated animation.
10. Write short notes on any **Three** of the following :—
 - (i) Anti-aliasing
 - (ii) Hidden Surface Removal Algorithm
 - (iii) Ray Casting
 - (iv) Hypermedia

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER-XXI (New)

(Artificial Intelligence and Knowledge Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define Artificial Intelligence (AI). Discuss the application areas of AI.
2. What are the components of Intelligence ? Explain them.
3. What is un-informed search ? Describe some of the informed search strategies.
4. Evaluate and elaborate the following LISP expressions :—
 - (i) `(+(setq x 10) (setq y 4))`
 - (ii) `car(cdr (car (a b c d e f g)))`
 - (iii) `(cdr (x y z))`
 - (iv) `(member 'a ' (a b c d))`
 - (v) `(list 'a `(b c))`
5. What is Constraint Satisfaction Problems ? Explain the steps of solving Constraints Satisfaction Problems.
6. What is Fuzzy logic ? Discuss different types of operations on fuzzy logic with the help of an example.
7. Explain the following properties of Well Formed Formulas :—
 - (i) Valid/ Tautology
 - (ii) Satisfiable
 - (iii) Contradiction
8. What is resolution principle in AI ? Explain. Let $P(x)$ and $Q(x)$ represent "x is a rational number" and "x is a real number", respectively. Symbolize the following sentences :—
 - (i) Every rational number is a real number.
 - (ii) Some real numbers are rational numbers.
 - (iii) Not every real number is a rational number.
9. What is Prolog ? Define the properties of PROLOG. Explain backtracking and Unification inferencing system in PROLOG with the help of an example.
10. Write short notes on the following :—
 - (i) Hill-climbing Search
 - (ii) Expert System.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER—XXVII [Old]

(MCSE-003: Artificial Intelligence and Knowledge Management)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define Artificial Intelligence (AI). Discuss the application areas of AI.
2. What are the components of Intelligence ? Explain them.
3. What is un-informed search ? Describe some of the informed search strategies.
4. Evaluate and elaborate the following LISP expressions :—
 - (i) `(+(setq x 10) (setq y 4))`
 - (ii) `car(cdr (car (a b c d e f g)))`
 - (iii) `(cdr (x y z))`
 - (iv) `(member 'a ' (a b c d))`
 - (v) `(list 'a '(b c))`
5. What is Constraint Satisfaction Problems ? Explain the steps of solving Constraints Satisfaction Problems.
6. What is Fuzzy logic ? Discuss different types of operations on fuzzy logic with the help of an example.
7. Explain the following properties of Well Formed Formulas :—
 - (i) Valid/ Tautology
 - (ii) Satisfiable
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8. What is resolution principle in AI ? Explain. Let $P(x)$ and $Q(x)$ represent "x is a rational number" and "x is a real number", respectively. Symbolize the following sentences :—
 - (i) Every rational number is a real number.
 - (ii) Some real numbers are rational numbers.
 - (iii) Not every real number is a rational number.
9. What is Prolog ? Define the properties of PROLOG. Explain backtracking and Unification inferencing system in PROLOG with the help of an example.
10. Write short notes on the following :—
 - (i) Hill-climbing Search
 - (ii) Expert System.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXII (New)
(Numerical and Statistical Computing)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

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

1. (a) Round the number $x = 3.25568$ to four significant figures. Find the absolute error and 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 following systems using the Gauss elimination method

$$3x_1 + 2x_2 + 3x_3 = 5$$

$$x_1 + 4x_2 + 2x_3 = 4$$

$$2x_1 + 4x_2 + 8x_3 = 8$$

4. Solve the systems using Gauss-Seidel method

$$2x + y + z = 5$$

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

$$-x + y + 6z = 4$$

5. 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

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

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

7. Evaluate the Integral $I = \int_1^2 \frac{2x dx}{1+x^4}$ using the Gauss Legendre 3 point quadrature rules.

8. Using Runge Kutta method of order 4 compute $y(0.2)$ and $y(0.4)$ for the IVP $10y' = x^2 + y^2$, $y(0) = 1$ taking $h = 0.1$.

9. Explain Normal distribution and Chi-square distribution.

10. Explain Regression and its properties.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXVIII (Old)
(Numerical and Statistical Computing)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

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

1. (a) Round the number $x = 3.25568$ to four significant figures. Find the absolute error and 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

$$6x_1 - 2x_2 = 14$$

$$9x_1 - x_2 + x_3 = 21$$

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9. Explain Normal distribution and Chi-square distribution.

10. Explain Regression and its properties.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXIII (New)

(Application Development with .Net Framework)
Annual Examination, 2019

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Define .NET Framework. Explain the architecture of .NET Framework.
2. Explain ASP.NET 2.0 Features in detail.
3. Explain different Web Server Controls. What is user controls.
4. Explain the state management technique of web page.
5. List and explain data types supported by VB.NET.
6. Explain various looping statements in VB.NET. Discuss how errors are handled.
7. Discuss and differentiate List and Combo controls. Brief the role of Tree views.
8. Explain the features of Object Oriented Programming concepts. List and explain the types of access modifiers.
9. What are Delegates ? Explain the role of delegates on VB.NET.
10. Write short notes on the following :—
 - (i) Exceptions in .NET.
 - (ii) CLS

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-III
PAPER–XXIX [Old]

(Application Development with .Net Framework)
Annual Examination, 2019

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 .NET Servers. Describe the roles performed by .NET server.
3. How can a User Control be created ? Explain the process to use a User Control.
4. Explain the process of working with Form Controls in VB.NET.
5. What are assemblies ? Explain its versions. Differentiate between private and shared assemblies.
6. What are the platform requirements to start and execute ASP.NET ? Explain.
7. List the types of file extensions that are handled by ASP.NET. Explain the ASP.NET folder structure.
8. Discuss the concept of JavaScript. Analyze JavaScript objects and variables.
9. Explain various classes of ADO.NET. What is transaction ? Explain.
10. Write short notes on the following :—
 - (i) CLR
 - (ii) CLS

