

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-I [New]
(Problem Solving and Programming)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Describe the all the steps in writing the program. Design an algorithm and draw a corresponding flowchart and write a C program to print even numbers up to 10.
2. How an algorithm analyzed? What are asymptotic notation? Explain giving examples.
3. What are the building blocks for simple programs? Explain some programming tools.
4. What is structured programming? Explain the benefits of structured programming.
5. Describe different types of operators in C with examples.
6. Write a program to illustrate initialization of two arrays and display their elements.
7. What are the functions in C? Give examples to explain the recursive function.
8. Differentiate between arrays and pointers? Give examples to explain the difference.
9. Write a program in C using recursion for finding the Fibonacci series upto n terms.
10. Write short notes on any **Four** of the following :—
 - (a) UNION in C
 - (b) Enumeration types
 - (c) Bit fields
 - (d) Files and streams
 - (e) Command line Argument



Examination Programme, 2017
MCA, Part-I

Date	Papers	Time	Examination Centre
12.05.2017	Paper-I	8.00 AM to 11.00 AM	Nalanda Open University, Patna
16.05.2017	Paper-II	8.00 AM to 11.00 AM	Nalanda Open University, Patna
18.05.2017	Paper-III	8.00 AM to 11.00 AM	Nalanda Open University, Patna
20.05.2017	Paper-IV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
22.05.2017	Paper-V	8.00 AM to 11.00 AM	Nalanda Open University, Patna
24.05.2017	Paper-VI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
25.05.2017	Paper-VII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
26.05.2017	Paper-VIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna

नोट : जिन पत्रों में प्रायोगिक कार्य (Practical) सन्निहित है, उन पत्रों के प्रायोगिक परीक्षा की तिथि एवं समय की घोषणा दिनांक 26.05.2017 को की जाएगी ।

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-I [old]
(Problem Solving and Programming)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Describe the all the steps in writing the program. Design an algorithm and draw a corresponding flowchart and write a C program to print even numbers up to 10.
2. Write a program to illustrate initialization of two arrays and display their elements.
3. What are the building blocks for simple programs? Explain some programming tools.
4. What is structured programming? Explain the benefits of structured programming.
5. Describe different types of operators in C with examples.
6. Discuss all the control statements in C with examples. What is the difference between while and do while statement.
7. What are the functions in C? Give examples to explain the recursive function.
8. Differentiate between arrays and pointers? Give examples to explain the difference.
9. Write a program in C using recursion for finding the Fibonacci series upto n terms.
10. Write short notes on any **Four** of the following :—
 - (a) UNION in C
 - (b) Enumeration types
 - (c) Bit fields
 - (d) Files and streams
 - (e) Command line Argument

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Examination Programme, 2017
MCA, Part-I

Date	Papers	Time	Examination Centre
12.05.2017	Paper-I	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
16.05.2017	Paper-II	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
18.05.2017	Paper-III	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
20.05.2017	Paper-IV	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
22.05.2017	Paper-V	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
24.05.2017	Paper-VI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, 12 th Floor, Patna
25.05.2017	Paper-VII	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
26.05.2017	Paper-VIII	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
27.05.2017	Paper-IX	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
29.05.2017	Paper-X	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–II [New]
(Computer Organization)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. (a) Convert the following :—
 - (i) $(11100)_2 = ()_{10}$
 - (ii) $(776)_8 = ()_{16}$
 - (iii) $(1000011100110)_2 = ()_{16}$
 - (iv) $(B4CE)_{16} = ()_8$(b) Explain the concept of fixed point and floating point representation.
2. Explain Von Neumann Architecture with diagram. What are the bottlenecks of Von Neumann architecture?
3. Simplify the following using Karnaugh's map in terms of SOP and draw the circuit for the output expression: **$F(A, B, C, D) = \Sigma(1, 2, 4, 7, 8, 11, 12, 13)$**
4. Discuss all the fundamental gates with diagram and their truth tables. What are universal gates?.
5. Compare and contrast J-K flip-flop with master-slave flip-flop and draw their characteristic tables. Also draw the circuit of these flip-flops.
6. Describe encoders and decoders. How are they different from S-R flip-flop? Explain.
7. What are interrupts? Discuss various types of interrupts. How interrupts are handled? Explain.
8. What is I/O Interface? Explain the major functions of I/O interface? What are the advantages of using device controller?
9. Write an assembly language program to add two numbers and display their results.
10. Write short notes on any **Four** of the following :—
 - (a) Direct Memory Access (DMA)
 - (b) Addressing schemes
 - (c) Instruction Pipelining
 - (d) Multiplexer
 - (e) Basic CPU Structure

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नोट : जिन पत्रों में प्रायोगिक कार्य (Practical) सन्निहित है, उन पत्रों के प्रायोगिक परीक्षा की तिथि एवं समय की घोषणा दिनांक 26.05.2017 को की जाएगी ।

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

(MCS-012: Computer Organization and Assembly Language Programming)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. (a) Convert the following :—
 - (i) $(10001100)_2 = ()_{10}$
 - (ii) $(7576)_8 = ()_{16}$
 - (iii) $(101011100110)_2 = ()_{16}$
 - (iv) $(D4CE)_{16} = ()_8$
 (b) Explain the concept of fixed point and floating point representation.
2. Explain Von Neumann Architecture with diagram. What are the bottlenecks of Von Neumann architecture?
3. Simplify the following using Karnaugh's map in terms of SOP and draw the circuit for the output expression: $F(A, B, C, D) = \Sigma(2, 4, 7, 8, 11, 12, 13, 15)$
4. Discuss all the fundamental gates with diagram and their truth tables. What are universal gates?.
5. Compare and contrast J-K flip-flop with master-slave flip-flop and draw their characteristic tables. Also draw the circuit of these flip-flops.
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7. What are interrupts? Discuss various types of interrupts. How interrupts are handled? Explain.
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9. Write an assembly language program to add two numbers and display their results.
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 - (a) Direct Memory Access (DMA)
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 - (d) Multiplexer
 - (e) Basic CPU Structure

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Examination Programme, 2017
MCA, Part-I

Date	Papers	Time	Examination Centre
12.05.2017	Paper–I	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
16.05.2017	Paper–II	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
18.05.2017	Paper–III	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
20.05.2017	Paper–IV	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
22.05.2017	Paper–V	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
24.05.2017	Paper–VI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, 12 th Floor, Patna
25.05.2017	Paper–VII	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
26.05.2017	Paper–VIII	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
27.05.2017	Paper–IX	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
29.05.2017	Paper–X	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER—III [New + Old]
(Discrete Mathematics)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. (a) Define conjunction and disjunction with its truth table.
(b) Name the quantifiers and its types.
2. (a) What is mathematical induction ?
(b) Use mathematical induction to show that $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)} = \frac{n}{n+1}$ for all $n \geq 1$.
3. Define a basic OR gate. Compare it with the AND gate.
4. If $A = \{1, 2, 3, 4, 5\}$, $B = \{2, 4, 6, 8, 10\}$, $C = \{3, 6, 9, 12, 15\}$, find that
(a) $(A \cup B) \cap C$ (b) $A \cup (B \cap C)$ (c) $(A \cap C) \cup B$
5. Define the following terms :—
(a) Reflexive Relations.
(b) Symmetric Relations.
(c) Transitive Relations.
(d) Equivalence Relations.
6. The English language consists of 21 consonants and 5 vowels. How many 5 lettered words, consisting of at least a vowel and two consonants, can be formed from them.
7. A football stadium has 4 gates on the south boundary and 3 gates on the North boundary.
(a) In how many ways can a person enter through a south gate and leave by a north gate ?
(b) In how many different ways in all can a person enter and get out through different gates.
8. Expand :—
(a) $\left(3x - \frac{y}{2}\right)^4$.
(b) Find the term independent of x in the expansion of $\left(x - \frac{1}{x}\right)^{10}$.
9. What does the inclusion-exclusion principle state ?
10. Explain Binomial and Poisson distribution.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-IV [New]
(Communication Skill)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer all Questions.

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

Gandhiji always loved his people-Muslims as much as Hindus. Even when Pakistan was formed, he spoke for the Muslims of India who were so few in number in comparison to Hindus. Many Hindus thought that he favoured the Muslims too much. Nathuram Godse held misguided ideas of his kind. At a prayer meeting at Birla House in New Delhi, Godse shoot Gandhiji on 30th January, 1948. The great soul died with 'Hey Ram' on his lips. He was murdered, yet he was calm and peaceful even in death. It seemed as if he were sleeping.

 - (a) Why was Gandhiji shot dead ? 5
 - (b) Where and when was he assassinated ? 5
 - (c) How did he look after murder ? 5
 - (d) Say whether the following statements are true or false :— 5
 - (i) Gandhiji favoured the Muslims.
 - (ii) Gandhiji was shot dead at Birla House.
 - (iii) Nathuram Godse was a Muslim.

2. Elaborate the various steps involved in the process of communication. 10
3. Discuss the different steps one should take while preparing for an interview. 10
4. What is group discussion ? Explain its characteristics. 10
5. How do managers communicate different types of messages in organizations. 10
6. What is editing ? Discuss the different types of editing. 10
7. What are the various skills required to make a good presentation ? 10



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–IV [old]
(MCS-014: Systems Analysis and Design)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Draw a Data Flow Diagram (DFD) and develop SRS for Railway Reservation System.
2. Define a system? Explain the Components and characteristics of a system.
3. Explain various criteria and specifications to be considered while designing forms and Reports. Give an example of a structure chart and explain it.
4. Discuss data dictionary? Mention the uses of data dictionary by a system analyst.
5. What is feasibility study? Describe different types of feasibility study required for developing a system.
6. List any five fact finding techniques for system study and explain any two of them in detail. Differentiate between these two with respect to their merits and demerits.
7. What are the security issues in a computer system? How does an organization prevent its database from security concerns? Illustrate with an example.
8. What is MIS, DSS, TPS and OAS? Explain with examples.
9. Why is maintenance required in software? Explain various issues involved in software maintenance, with appropriate examples.
10. Write short notes on the following :—
 - (i) Testing
 - (ii) Version control
 - (iii) Decision Tree
 - (iv) Types of Coupling



Examination Programme, 2017
MCA, Part-I

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12.05.2017	Paper–I	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
16.05.2017	Paper–II	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
18.05.2017	Paper–III	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
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22.05.2017	Paper–V	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
24.05.2017	Paper–VI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, 12 th Floor, Patna
25.05.2017	Paper–VII	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
26.05.2017	Paper–VIII	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
27.05.2017	Paper–IX	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna
29.05.2017	Paper–X	8.00 AM to 11.00 AM	Nalanda Open University, 2 nd Floor, Patna

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-V [New]
(Systems Analysis and Design)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Draw a Data Flow Diagram (DFD) from context level till second level clearly showing various processes, data flow and data repositories for a "Railway Reservation system".
2. Define 'Modularity'. Write any two goals of a good design. Also write at least four guidelines for achieving the goals mentioned. Define the term 'Cohesion'. Explain any two types of cohesion
3. Explain how both waterfall model and prototyping model can be accommodated in the spiral model.
4. Explain relational, hierarchical and network models of database design, with examples.
5. Describe the characteristics of a good interface. List some guidelines to design output screens, icons and graphics.
6. Prepare an outline of SRS for a "Library Information System". Make suitable assumptions wherever necessary.
7. What is a Form? What are the advantages of having forms as part of user interface? What are the criteria used for Form Design?
8. Explain any two ways of Requirements Gatherings. What are their shortcomings? Use examples to explain.
9. Define the term "Decision Support System". Explain its various components. How does Reverse Engineering differ from Forward Engineering? Explain with example.
10. Write short notes on any **Two** of the following :—
 - (a) Fact finding technique
 - (b) Feasibility study
 - (c) Role of an Analyst
 - (d) Software testing.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-V [old]
(Communication Skill)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer all Questions.

1. Read the following passage and answer the questions given below :—
It was a chilled winter night. Saint Socrates was preaching to his disciples. His wife warned him of ending the discourse. Socrates did not oblige her. At midnight she got angry. She took a bucket of water and poured it on him. Socrates was just laughing. But the disciples were annoyed with this behaviour. Socrates told them, 'I am a saint who is expected not to lose patience and temper even in precarious situation. My wife tested me and I got success. She is my preceptor. Don't revile her'. Having heard this, she fell on the feet of Socrates and begged of his pardon. Since then she became a good wife and a humane woman.
 - (a) What was Socrates doing in midnight ? 5
 - (b) What did the wife do ? 5
 - (c) What did he explain to his disciples ? 5
 - (d) Say whether the following sentences are true or false :— 5
 - (i) Socrates was a leader.
 - (ii) His wife loved him very much.
 - (iii) He beat his wife.
2. Fill in the blanks in the following dialogue using the words in the box below :— 10
(extension, thank you, give, speaking, hold, available, bad connection, number, call back, message)
 - A. Hello, Ajay_____. Can I help you ?
 - B. Hello, I can't hear you at all; this seems to be a _____.
 - B. Can you get me _____ 456 please ? I'm calling from CMC.
 - A. Sure, could you please _____ the line ?
 - A. I'm sorry, Mr. Biswas is not _____ right now, can I take a _____ ?
 - B. Yes please, can you ask him to _____ me _____ ? My telephone _____ is 011-3547663. Tell him it's regarding my meeting with him. I won't be able to make it tomorrow.
 - A. All right, I shall _____ this message to Mr. Biswas.
 - B. _____, Goodbye.
3. Use the following phrasal verbs to fill in the blanks below :— 10
(Call back, get through, hang up, cut off, hold on, looked up, putting through, picking up)
 - (i) Sheila could not _____ to Ramesh on the intercom, she dialed 01 to get a call back from his phone once it was free.
 - (ii) The secretary kept calling the Chamber of Commerce, no one was _____.
 - (iii) The operator asked Sudhakar to _____ as the MD's line was busy.
 - (iv) Anita could not find the restaurant's number in her telephone diary, she _____ the city telephone directory.
 - (v) The sales people at the local supermarket are very rude,. They _____ on you even before you finish enquiring.
 - (vi) Krishna could not complete his conversation with his mother since the line was suddenly _____.
 - (vii) Pratap's girlfriend was not available he left a message with her mother asking her to _____ him _____.
 - (viii) "Can you get me the manager please ?" "Yes sir, _____ you _____".
4. Prepare a conversation between two persons about distance education through an open University. 10
5. It is a recession time and your company, suggesting ways of economizing on the use of paper, electricity etc. 10
6. You have been asked to prepare a brief talk for executives at all levels on the subject of how to run a productive and meaningful meeting. Research this topic and prepare a presentation. 10
7. Write an essay on different types of editing (250 words). 10

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

(Operating System Concepts and Networking Management)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What are the functionalities of Graphical User Interface ? Write a note on Batch Processing.
2. What is a Distributed Operating system ? Explain in Detail.
3. Describe the different types of Networks. What are the different types of Modems ? What is Optical fiber ? List the Advantages of Optical fiber.
4. Write the advantages and disadvantages of Infrared Transmission. With reference to ISO-OSI Reference model, explain the different types of connecting devices in detail.
5. Explain about the TCP/IP Related protocols. Discuss about shell scripts in detail.
6. Write the short notes on Network File Server. Explain about Backups and Restoration.
7. Describe briefly about Group Accounts Administration. How will you enable the offline file features ? Give the steps how to use the Mapped Drive.
8. Explain the following terms :–
 - (a) Packet Filters
 - (b) Trust Relationships in Windows 2000
9. Write the use of following LINUX commands and their complete syntax, with an example for each :–
 - (a) cmp
 - (b) sort
 - (c) grep
 - (d) chmod
10. Write the short notes on the following :–
 - (a) Intrusion Detection System (IDS)
 - (b) Fault Tolerant Systems
 - (c) NTFS File System



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VI [old]
(C and Assembly Language Programming)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Four Questions.
All questions carry equal marks.

1. Write a program to count number of vowels, consonants and spaces in a given string.
2. Write a program in C language which reverses a three digit number and displays it.
3. Write a program in C language which prints the multiplication table of the given number n.
4. Write a program in C language to find the factorial of number given by user.
5. Write a program in 8086 assembly language calculate the average of three given numbers stored in memory.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VII [New]
(Object Oriented Analysis and Design)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss the Object Oriented System Development Life in detail.
2. With appropriate examples and diagrams for each, explain the following Modelling techniques.
 - (i) Object Modelling
 - (ii) Dynamic Modelling
3. Explain the UML Diagram Classification with an example. Discuss rational unified process.
4. What is Package diagram? Discuss the utility of Package diagram with an example.
5. Draw a DFD for the student admission/ registration process for a new programme at NOU. Assumptions can be made wherever necessary. Draw the DFD's till level - 2.
6. Explain class diagram using an appropriate example. How objects are related to class? Explain.
7. Discuss Use case diagram and sequence diagram with an example of each.
8. List and describe the elements of a State Diagram. Give an example of state diagram .
9. Describe include and extend relationships between use cases. Give an example to explain the concept.
10. Write short notes on any two of the following :-
 - (a) Domain model refinement
 - (b) Inheritance
 - (c) Conceptual Data modelling.
 - (d) System sequence diagram.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER-VII [old]
(MCS-031 : Design and Analysis of Algorithm)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Arrange the following growth rates in increasing order of time and give the space complexity for each :
 $O(x^3)$, $O(2x)$, $O(x^2)$, $O(5 \log x)$, $O(x \log x)$, $O(x^2 \log x)$
2. Differentiate between dynamic programming and greedy approach to solve different problems.
3. Write a recursive function to multiply two natural numbers.
4. Explain the difference between Push down Automata (PDA) and Finite Automata (FA) with an example.
5. Define "Halting Problem" of Turing Machines. Show stepwise sorting of elements using Heapsort algorithm to the following max heap.
6. What is Context-Free Language? Define ambiguity in Context-Free Grammar (CFG). Show that the grammar: $E \rightarrow E + E / E * E / a$ is ambiguous.
7. If L_1 and L_2 are two Context-Free languages, then show that $L_1.L_2$ is also Context - Free language.
8. Compare and contrast between Heap sort and Merge sort. Give examples for each type.
9. Write short notes on :-
 - (a) Depth First search.
 - (b) Breadth First search
 - (c) Best First Search
10. Describe different types of minimum spanning trees with examples.



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VIII [New]
(Data and File Structures)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss different types of asymptotic notation. What is the purpose of asymptotic notation ?
2. What are linked lists ? Discuss different types of linked lists with examples of each type.
3. What are priority queues ? Explain priority queue implementation with an example.
4. What is a queue ? Write an algorithm to insert and delete a node in the queue.
5. What is a stack ? Write a program in C to implement insertion and deletion from the stack.
6. Discuss different types of search methods with an example of each type.
7. Compare and contrast between merge sort and quicksort sorting algorithms with examples of each type.
8. Write a procedure to sort the following sequence using heap sort :–
36, 27, 50, 37, 10, 92, 12, 33, 45, 66
9. Explain the following terms :–
 - (i) Tail recursion
 - (ii) Garbage collection
 - (iii) Huffman algorithm
10. What is hashing function? Discuss some of the hashing functions.



Practical Examination Programme, 2017
MCA, Part-I
(Only for New Batch Students)

<i>Practical Papers</i>	<i>Enrollment No.</i>	<i>Date</i>	<i>Time</i>
Paper–I	160190001 to 160190090	29.05.2017	10.30 AM to 1.30 PM
	160190091 to 160190198	29.05.2017	2.00 PM to 5.00 PM
Paper–VI	160190001 to 160190090	30.05.2017	10.30 AM to 1.30 PM
	160190091 to 160190198	30.05.2017	2.00 PM to 5.00 PM
Paper-VIII	160190001 to 160190090	31.05.2017	10.30 AM to 1.30 PM
	160190091 to 160190198	31.05.2017	2.00 PM to 5.00 PM
Venue : School of Computer Education (IT), Nalanda Open University, 12th Floor, Biscomaun Tower, Patna-800001			

NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VIII [old]
(Advanced Discrete Mathematics)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Find the number of bijections on a set of n elements $n \geq 1$.
2. Show that every non-negative integer can be written as a unique sum of distinct powers of 2.
3. Solve the recurrence $a_n = 4a_{n-2}$, where
 - (a) $a_0 = 4, a_1 = 6$
 - (b) $a_0 = 6, a_2 = 20$
 - (c) $a_1 = 6, a_2 = 20$
4. Prove that :—
 - (a) The sum of the degrees of all the vertices of any graph is even.
 - (b) Any graph can only have an even number of odd vertices.
5. What is the difference between an Eulerian graph and an Eulerian circuit ?
6.
 - (a) Find all the graphs that have edge chromatic number 1.
 - (b) Colour the edges of the graphs K_3, K_4, K_5 .
7. Construct a graph with chromatic number 5.
8. Let G be a (p, q) graph each of whose vertices had degree k or $k + 1$. If G has m vertices of degree k and r vertices of degree $k + 1$ then show that $m = (k + 1)p - 2q$.
9. Show that C_6 is bipartite and K_3 is not bipartite.
10. Show that K_5 is not planar.

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NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–IX [old]
(Data Communication and Computer Networks)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss all the layers of OSI model and their respective functionalities.
2. What is Transmission mode ? Why it is used. Explain different types of Transmission mode with examples of each type.
3. Describe different type of topologies with diagram. Give the advantages and disadvantages of each topology.
4. How data link layer different from transport. Discuss some protocols of transport layer.
5. What is routing ? Describe all the routing algorithms and their advantages.
6. Describe different types of devices used for networking. Also state the OSI levels at which they are used.
7. Explain IPv4 header format in detail. Also describe the utility of each field in the format.
8. Explain the following with example :–
 - (a) Sliding window protocol
 - (b) Multiplexing.
9. Discuss the hierarchy and addressing issues surrounding the construction of large Networks.
10. Write short notes on any **Two** of the following :–
 - (a) Network security
 - (b) FDDI
 - (c) CRC
 - (d) FTP



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VI [New] - SPL
(Operating System Concepts and Networking Management)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is an Operating System? Discuss different types of Operating System. What is a system call?
2. What is Buffering? How Buffering can improve the performance of a Computer system?
3. Discuss different types of networks? Discuss different types of transmission media used in computer networking.
4. What is a packet? Discuss packet switching in details.
5. What do you understand by the term Internetworking? Discuss Domain Name System (DNS)?
6. Discuss the features of Unix operating system. What are the different types of file used in Unix operating system.
7. Discuss the features of Windows server 2012. Discuss the importance of Windows Firewall.
8. What do you mean by computer security? What are the potential losses due to security attack?
9. Discuss any five networking devices. Discuss different networking Topologies.
10. Explain each of the following with an appropriate example :—
 - (a) Virus and Worm
 - (b) Cyber Crime



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–VII (Old) - SPL
(Design and Analysis of Algorithm)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is an algorithm ? Explain the characteristics of an algorithm. Give an algorithm to find the factorial of a number.
2. Write a recursive procedure for the following :—
 - (a) To print the sum of first 10 natural numbers.
 - (b) To print the sum of first 10 factorial numbers.
3. Compare and contrast different sorting algorithms with their complexities.
4. Write short notes on the following :—
 - (a) Regular expression
 - (b) Context free grammar
5. What is Push Down Automata ? How is it different from Finite Automata.
6. Compare and contrast between Heap sort and Merge sort. Give examples for each type..
7. Explain Principal of Optimality. Give an example of chained matrix multiplication.
8. Describe different types of minimum spanning trees with examples.
9. What is best case analysis ? Perform the best case analysis for Quick Sort.
10. Explain each of the following, with an appropriate example :—
 - (a) Greedy algorithms..
 - (b) Halting Problem



NALANDA OPEN UNIVERSITY
Master of Computer Application (MCA), Part-I
PAPER–X [old]

(Principles of Management and Information Systems)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Explain in detail TPS, MIS, DSS and EIS in an organization with an example.
2. How OLAP is different from Data Mining ? Can we use OLAP as a tool for strategic management. Comment.
3. What do you understand by the term "TOTAL COST OF OWNERSHIP" (TCO) of an information system ? Evaluate the factors which affect 'TCO' of any information system implementation in an organization.
4. What is Business Intelligence (B.I.) ? Identify two B.I. tools from open source category and two from proprietary category, briefly discuss one tool from each category.
5. What is the role of Information Technology (IT) in Risk management of any organization. Explain the role of Decision Support System at different stages of management.
6. Discuss the term "Knowledge Management". What is the importance of knowledge management in an organization.
7. Compare and contrast the following :–
 - (i) Hacking and Cracking
 - (ii) Cyber War and Cyber Terrorism
8. Explain evolutionary algorithm. What are different branches of evolutionary algorithms ? Compare and contrast conventional AI and computational Intelligence techniques.
9. Why are management systems required? List any five management systems. Explain their organizational structures and the benefits.
10. Write short notes on the following :–
 - (i) Discounted cash flow
 - (ii) Customer relationship management
 - (iii) Decision Support System

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

(CS-032: Object Oriented Analysis and Design)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Draw a state diagram for the submission of an examination form. Following are some of the considerations :–
 - (i) All the assignments pertaining to the semester needs to be submitted on the due date.
 - (ii) Demand draft for all the courses to be approved need to be taken (@ Rs.60/- per course).
 - (iii) Examination form need to be filled up.
 - (iv) It should be verified by the verifying officer.
 - (v) The attested form should be submitted to the Regional center concerned.
2. Draw a component diagram for an ATM. With the help of illustration for each, explain the following with respect to Decomposition :–
 - (i) Process-oriented decomposition.
 - (ii) Object-oriented decomposition.
3. What is design optimization? Describe the factors that contributes to the "Design Optimization".
4. Draw a D.F.D. for "Library Management System of NOU". Assumptions can be made wherever necessary. Draw the DFD's till level -2.
5. Discuss the following with reference to unidirectional Implementation in a class diagram :–
 - (i) Optional Association.
 - (ii) Associations with multiplicity.
6. Draw an object model for the payment process involved in a sales order system. Conventional notation for diagram should be followed.
7. What is collaboration diagram? Draw a collaboration diagram for the Inventory Control System.
8. Discuss the following in detail with examples :–
 - (i) Deployment diagram
 - (ii) Composite States
9. Explain how the integrity constraints are applied in the Object Oriented Model.
10. Write short notes on any **Two** of the following :–
 - (i) Advantages and disadvantages of GOAD
 - (ii) Metaclass and metadata
 - (iii) Mapping Generalizations to tables



Examination Programme, 2017
Master of Computer Application, Part-II

Date	Papers	Time	Examination Centre
02.06.2017	Paper–XII	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
06.06.2017	Paper–XIII	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
08.06.2017	Paper–XIV	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
10.06.2017	Paper–XVI	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
12.06.2017	Paper–XVII	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
14.06.2017	Paper–XVIII	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
16.06.2017	Paper–XIX	12.00 Noon to 3.00 PM	Nalanda Open University, 2 nd Floor, Biscoman Bhawan, Patna
19.06.2017	Paper–XI (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, 12 th Floor, Biscoman Tower, Patna
20.06.2017	Paper–XV (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, 12 th Floor, Biscoman Tower, Patna
21.06.2017	Paper–XX (Practical)	12.00 Noon to 3.00 PM	Nalanda Open University, 12 th Floor, Biscoman Tower, Patna

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

(CS-034: Software Engineering)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Describe the COCOMO model in detail for software cost estimation.
2. Describe Component Based software Engineering. What are the challenges for it?
3. With the help of a neat diagram, explain the Spiral model to develop the software.
4. What are different types of Control Flow Graph? Draw a control flow graph (CFG) for a simple C program with a looping-construct within it.
5. Discuss different types of Risks. Explain the "Risk Manager Tool" with the help of a neat diagram.
6. Describe various attributes of software quality. Why quality of the software important?
7. Explain any issues or challenges for managing the web-based projects. Describe the features of Java Device Test Suite (JDTS) and its applications.
8. Explain the software Re-engineering life cycle with the help of a suitable illustrative project.
9. Explain the parameters for s/w measurement. Also explain some of the common software measures.
10. Write short notes on the following :-
 - (a) Human Computer Interface design
 - (b) Software Reliability
 - (c) Cohesion
 - (d) Coupling

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

(Accounting and Financial Management)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Discuss the role of accountants in modern business organization.
2. What is financial accounting ? Distinguish financial accounting from management accounting.
3. Discuss the objectives and goals of financial management.
4. What is Trial Balance ? What are the objectives of preparing Trial Balance ? Point out its limitations.
5. 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.
6. What are the objectives of preparing Final Account ? Explain the components of Final Account.
 7. What is Inventory ? Discuss the different techniques of inventory management.
 8. What is Ratio Analysis ? Discuss its importance and limitations in business.
 9. What are the sources of working capital finance ? Throw light on the importance of working capital for a manufacturing firm.
 10. Write notes on any **Two** of the following :—
 - (a) Negotiable Instruments
 - (b) Letter of Credit
 - (c) Capital Rationing.



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

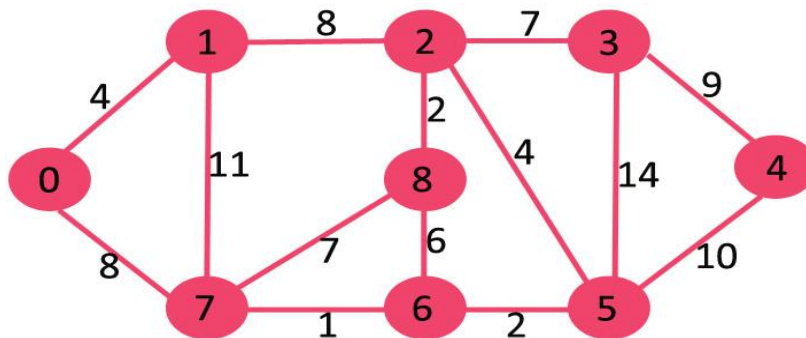
(MCS-021: Data and File Structures)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Compare and contrast between linked list and queue. Write an algorithms for the insertion and deletion operations on the circular queue.
2. Write a procedure to create, insert and display the content of a linked list and doubly linked list.
3. Explain "Depth First Search" Algorithm with an example. How it is different from Breadth First algorithm ?
4. What is the need for external sorting? Explain any one method to perform external sorting with an example.
5. What is a stack ? Write a program in C to implement all the operations on a stack.
6. Compare and contrast between heap sort and quicksort. Write a procedure to sort the following sequence using heap sort :-
20, 15, 30, 77, 10, 92, 12, 33, 45, 66.
7. What are Binary Search Trees? Create a binary search tree for following numbers starting from empty BST :-
45, 26, 10, 60, 70, 30, 40, 12, 22, 11
8. Write Prim's algorithm for constructing Minimum Cost Spanning Tree and trace the algorithm for the following graph.



9. Explain the following with an example :-
 - (a) AVL trees.
 - (b) The process of converting any Tree into a Binary Tree.
10. What are arrays ? Write a function to sort a matrix row wise. Also calculate the complexity at this code using **Big "O"** notation.

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

(MCS-022 : Operating System Concepts and Networking Management)

Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is a Computer Network? Discuss its advantages and disadvantages in detail.
2. Differentiate between Multiprogramming and multithreading. Discuss layered architecture of Windows 2000 operating system.
3. Discuss the important features of LINUX operating system. Write a shell script in LINUX to count the number of words in a given file.
4. Explain in detail two computer security mechanism. Explain the logical and physical structure of active directory with reference to Windows 2000.
5. Discuss the concept of Backups and restoration in LINUX operating system. What are wild cards? Discuss their importance with examples.
6. Mention the usage of following LINUX commands with an example of each :–
 - (i) tail
 - (ii) grep
 - (iii) chmod
 - (iv) sort
7. Explain the broad classification of advanced Operating system. What happens if you try to "cat" a non-existing file? Explain the steps taken by OS to handle this.
8. Explain in detail various types of transmission media with their advantages and disadvantages.
9. Discuss Virtual Private Network remote access in windows 2000. Explain FTP and TELNET. Discuss their importance and uses.
10. Write short notes on the following :
 - (i) Domain Name System.
 - (ii) Peer-to-Peer Network.
 - (iii) Concept of pipes, filters and redirection in LINUX
 - (iv) Firewall.



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

(MCS-023 : Introduction to Database Management Systems)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Consider the following relations :-
hotel (hotel_no, hotel_name, city)
room (room_no, hotel_no, type, price)
booking (hotel_no, guest_no, date_from, date_to, room_no)
guest (guest_no, g_name, g_address)
Write appropriate Queries in SQL as well as in relational algebra, for the following :-
 - (i) Find the average price of a room
 - (ii) List the names and address of all guests with bookings for a hotel in London, alphabetically ordered by name.
 - (iii) Find the total income from all the rooms of the hotels in New York
 - (iv) List the name(s) of guest(s) at the Winner Hotel, who are paying highest price for a room.
2. Why is normalization important ? Differentiate between BCNF and 3NF. Why BCNF is considered as a stronger form of 3NF ?
3. Briefly discuss the concept of catalogs in distributed databases. How catalogs are used to maintain the consistency of database in a distributed environment. Use suitable example to justify your answer.
4. Design an ER diagram for keeping track of the details of your favorite sports team. You should store the matches played, the score in each match and individual player statistics for each match. Identify the entities, relationships and also mention the cardinality of ER diagram.
5. How serial schedule is different from serializable schedule? What are the problems associated with both schedules ? How you will identify that a schedule is serializable or not, use suitable example, in support of your answer.
6. What are the additional functions does a distributed DBMS have over centralized DBMS ? Describe the shadow paging recovery technique. Under what circumstances does it not require a log ?
7. What is a view in SQL ? How is it defined ? Discuss the problems that may arise when one attempts to update a view.
8. What is the difference between centralized and client-server architectures? How relational DBMS is evolved from the centralized architecture to the client server architecture? What for ODBC is used in this context ?
9. What do you mean by the term "TRANSACTION" in DBMS? Briefly discuss the properties of transaction ? Violation of which property leads to which problem, when transactions are executed in a concurrent environment.
10. Write short notes on any **Two** of the following :-
 - (i) 2 - Phase locking
 - (ii) 2 - Phase commit
 - (iii) Time stamping
 - (iv) Check point

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

(MCS-024 : Object Oriented Technologies and Java Programming)

Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is multithreading ? Explain how does it help Java in its performance ? Differentiate between throw and throws ?
2. What is Inheritance ? Explain different types of inheritance in Java. Briefly explain importance of super keyword in Java ?
3. What are shift operators ? How many types of shift operators are available in Java ? Write a Java program to explain the concept of shift operators.
4. Explain how exception handling is done in Java, with the help of an example. What is a package in Java ? Explain how package is created in Java.
5. Distinguish between the following terms with examples :
 - (i) Exception and Error
 - (ii) Method overloading and overriding
 - (iii) Final and Finally
 - (iv) Instance variables and class variables.
6. What is constructor ? Explain constructor overloading in Java with an example.
7. What is URL ? Explain two constructor for URL, in Java.net package. Explain how you may connect to a URL in Java.
8. Compare the different layout managers in brief. Write a servlet program that fetches all data from client and stores it in a database successfully.
9. What do you mean by an event ? Explain different components of an event.
10. What are the different types of AWT components ? How are these components added to the container. Explain using an example.

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

(MCS-041 : Operating Systems)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is a semaphore? Give solution to sleeping barber problem with the help of semaphore.
2. Draw the Gantt chart for the FCFS and SJF policy, considering any four set of processes that arrive at time 0, with the length of CPU time given in milliseconds. Also calculate the average waiting and average turnaround time. (Assume four process with variable time period in milliseconds).
3. What is segmentation? Explain with an example. How segmentation different from paging.
4. Explain algorithm for deadlock prevention. Give a suitable example to explain the algorithm.
5. Give a short note on mutual exclusion in a distributed system. Explain token based mutual exclusion in the context of it.
6. Implement FCFS, SCAN, LOOK and 8C - LOOK scheduling for the following disk queues :-
50, 91, 150, 42, 130, 98, 18, 138, 140.
Assume that the disk head is initially at cylinder 50. Calculate the total head count.
7. Discuss hardware support in paging. How is overlay different from swapping? Explain.
8. Explain pipes and filters in UNIX (with examples). Give a diagram to explain various states of a process. Explain the PCB or TCB also.
9. Explain paging address translation by and give suitable diagrams and examples also :-
 - (i) Direct Mapping.
 - (ii) Associative Mapping.
10. Give short notes on the following :-
 - (i) Disk Organization in UNIX.
 - (ii) DOS and NOS.
 - (iii) Multiprocessor Interconnection.
 - (iv) Macintosh OS.

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

(MCS-043 : Advanced Database Design)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Construct an E-R diagram for a training institute which imparts soft skills. The institute maintains records about instructors, students, classes, assignments, results (Theory as well as practicals) class timings for each student. The number of subjects, in which the candidate is enrolled and past performances in different subjects is recorded. Document all assumptions that you make about the mapping constraints.
2. How is the check pointing information used in the recovery operation following a system crash in DBMS? Explain.
3. Explain the concept of inheritance in object oriented database system, with the help of an example. How can you protect your database from statistical query attacks?
4. Distinguish between the followings with appropriate examples.
 - (i) Centralized two phase locking and Distributed two phase locking.
 - (ii) XML and HTML
5. What is multimedia database? What are challenges in designing multimedia databases? Discuss.
6. Describe the reference architecture of a distributed DBMS with the help of a block diagram.
7. What is semi structured data? Explain with an example. Define Hash join and explain the process and cost calculation of Hash join with the help of an example.
8. Describe two phase commit protocol in distributed databases. List the features of semantic database.
9. Discuss the 5th normal form and domain key normal form with a suitable example in each.
10. What do you mean by deadlock in DBMS? How can you detect a deadlock? Suggest a technique that can be used to prevent it.



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

(Advanced Internet Technologies)

Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. Explain the differences between JDBC and ODBC. Write a servlet code to fetch and display all the fields of PRODUCT table with attributes :–
Product id, product name, Product quantity, product price, model and description.
2. Explain the benefits offered by EJB component architecture to Application developers and customers, in brief.
3. Name any five JSP implicit objects and mention, the class they belong to. Write a JSP code fragment to insert the following fields into a database after extracting them from an HTML form: last name, phone, e-mail.
4. Differentiate between SGML and XML. What are the advantages of using Java's multiple layer security implementation?
5. Explain the different types of JDBC drivers along with their advantages and disadvantages.
6. Differentiate between the following :–
 - (i) Get and Post
 - (ii) Generic Servlet and http Servlets
 - (iii) Servlet Context and Servlet Config
 - (iv) Stateful Session Bean and Entity Bean
 - (v) Low Level Introspection and High Level Introspection
7. Explain EAI layer software context architecture with diagram.
8. Assume that there is a table named CUSTOMER in MS-Access with fields — (Cust_id, Cust_name, Cust_phone and Cust_address). Write a code for servlet which will display all the fields of Customer Table in a tabular manner.
9. Explain the different development goals of XML document. Write an XML DTD to represent the grade card of a student which contains the following :–
 - (i) Name — last, middle and first
 - (ii) Subject — five subjects
 - (iii) Marks
 - (iv) Grade
 - (v) Reserved Category (yes/no)
10. What are customs tags in JSP? What are the components that make up a tag library in JSP ?



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

(MCS-053 : Computer Graphics and Multimedia)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is staircase effect ? Do you agree with the statement "Staircase effect facilitates smooth line generation" ? Justify your answer with suitable arguments.
2. Compare and contrast the 2D Euclidean coordinate system with the 2D Homogeneous coordinate system with the help of an example. Determine the perspective projection of point $P(x, y, z)$ on $z = 0$ plane, where the center of projection is at $E(0, 0, -10)$.
3. How does frame buffer differ from the display buffer? How does frame buffer overcome the limitation of display buffer? How does frame spacing influence the simulation of acceleration in an animation? Justify your answer with suitable illustrations.
4. Differentiate between window and viewport region? Explain how window to viewport mapping is performed. What is Aliasing? Explain how Antialiasing overcomes the problem of Aliasing.
5. Write the pseudocode for Bresenham circle generation algorithm, and use it to produce an arc of radius $r = 4$ units, in the first quadrant from $x = 0$ to $x = y$.
6. Differentiate between the following :–
 - (i) Scan line polygon fill algorithm and flood fill algorithm.
 - (ii) Parallel projection and Perspective projection.
7. Determine the final coordinates of the perspective projection of an object, when the object is first rotated w.r.t. y -axis by 30° in clockwise direction and then w.r.t. x -axis by 45° in clockwise direction and finally it is projected on to $z = 0$ plane with the centre of projection at $(0, 0, -5)$.
8. Explain the following :–
 - (i) Cel Animation
 - (ii) Frame Animation
 - (iii) Sprite Animation
9. Write short notes on the following :–
 - (i) Compression in digital video
 - (ii) Authoring tools
 - (iii) Morphing
10. Write the pseudocode for Z-buffer algorithm for visible surface detection. What is the maximum number of objects that can be handled by Z-buffer algorithm? Give two advantages and two disadvantages of Z-buffer algorithm.



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

(MCSE-003: Artificial Intelligence and Knowledge Management)

Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions.
All questions carry equal marks.

1. What is Prenex Normal Form? Explain with the help of an example.
2. Write FOPL to represent the following statements, and prove whether the conclusion follows from the premises or not :—
 - (i) All dancers love to dance.
 - (ii) Everyone who sings and plays an instrument loves to dance.
 - (iii) Therefore, all dancers sing and play an instrument.
3. What do you mean by Non-monotonic reasoning system? What are the constituent components of such systems?. Describe the interrelation between the components of such systems.
4. Explain 'script' knowledge representation technique and write a script for a supermarket.
5. Write a LISP program to convert the temperature in Fahrenheit to that in Centigrade. Evaluate the following LISP expressions :—
 - (i) '(+ 9 3)
 - (ii) (expt 2 5)
 - (iii) (evenp (+ 9 6))
 - (iv) (equal '(two one) '(one two))
6. List the limitations of using propositional logic to represent the knowledge base. Write a well formed formula (wff) for the following :—
 - (i) God loves everyone who loves someone.
 - (ii) Every person has a mother.
7. Differentiate between forward and backward chaining. What factors affect the decision to choose forward or backward chaining?
8. What is a Turing Test? Do you know about any machine which passed the Turing Test ? Write the importance of Expert System.
9. What do you mean by local maxima with respect to search technique? Explain with an example.
10. What do you mean by Agent in Artificial Intelligence? Discuss the properties and role of Agents in artificial intelligence. Represent the following statement in PROLOG :—
Rita reads a book.



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

(Numerical and Statistical Computing)
Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

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

1. Round off the following numbers to four significant digits.
(a) 450.92 (b) 48.3668 (c) 9.3265 (d) 8.4155 (e) 0.80012
2. (a) Obtain the positive root of the equation $x^2 - 1 = 0$ by Reguli Falsi method.
(b) Find the smallest positive root of $x - 2\cos x = 0$ with the help of Newton-Raphson method.
3. Solve the following systems using the Lu decomposition method
 $4x + y + 2z = 3.6$
 $x + 3y + z = 2.5$
 $2x + y + 2z = 4.0$
4. Solve the following system using the Gauss elimination method.
 $3x_1 + x_2 = 5$
 $x_1 + 3x_2 + 6x_3 = 6$
 $4x_1 + x_3 + 3x_4 = 7$
 $x_3 + 5x_4 = 8$
5. Estimate the sale of a particular quantity for 1966 using the following table :—

Year	1931	1941	1951	1961	1971	1981
Sale (in thousands)	12	15	20	27	39	52
6. Calculate the value of the Integral $\int_4^{5.2} \log x \, dx$ by
(a) Trapezoidal Rule (b) Simpson's $\frac{1}{3}$ rd Rule.
7. Evaluate the Integral $I = \int_1^2 \frac{2x \, dx}{1 + x^4}$, using the Gauss Legendre 1 point quadrature rules.
Compare with the exact solution.
8. Solve the initial value problem $u' = -2tu^2$ with $u(0) = 1$ and $h = 0.2$ on the interval $[0, 1]$. Use the fourth order classical Runge Kutta method.
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–XXIX

(Application Development with .Net Framework)

Annual Examination, 2017

Time : 3 Hours.

Full Marks : 80

*Answer any Five Questions.
All questions carry equal marks.*

1. What is garbage collector? Discuss the various phases of garbage collection.
2. Explain .NET servers. Discuss the role performed by the .NET server.
3. Explain the process of working with form controls. What is exception handling?
4. Differentiate between private and shared assemblies. Explain the working of CLR.
5. What is namespace? Explain different types of namespaces.
6. Explain the ASP.NET folder structure? List the types of file extensions that are handled by ASP.NET.
7. Discuss the concept of JavaScript. Write a program defining array and using join() method.
8. How do you enable and disable ViewState? Explain the role cookies.
9. Explain the significance of ADO.NET data providers. What are the various classes of ADO.NET?
10. Differentiate between clone and copy methods of dataset. Describe the methods provided by a command object.

