

NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-I
(Problem Solving and Programming)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. What do you understand by function prototype ? Differentiate between call by value and call by reference methods of parameters passing to a function giving an example of each.
2. List and explain looping constructs in "C" language with an example for each type.
3. What do you mean by scope of a variable ? Differentiate between Global and Local variables giving an example for each type.
4. Compare and contrast switch case statement with if else statement in 'C' language. Give examples to explain your answers.
5. Draw a flowchart and write the program in 'C' to add first 10 even numbers.
6. What is pointer in "C"? How is a pointer variable declared ? How pointer can be used to pass an entire array to a function in C ? Explain with the help of an example.
7. Write a program in C to add two matrices of size (3 x 3).
8. Why C is called a middle level language ? Give a flowchart to explain the program execution process. Explain each step in detail.
9. Draw a flowchart and write a program in 'C' to print the greatest of three numbers.
10. Write short notes on :—
 - (a) I/O functions in C.
 - (b) Data-types in C.
 - (c) Structures in C



Examination Programme-2013
Master in Computer Application (MCA), Part-I

<i>Date</i>	<i>Papers</i>	<i>Time</i>	<i>Examination Centre</i>
30.03.2014	Paper-I	8.00 AM to 11.00 AM	Nalanda Open University, Patna
31.03.2014	Paper-II	8.00 AM to 11.00 AM	Nalanda Open University, Patna
01.04.2014	Paper-III	8.00 AM to 11.00 AM	Nalanda Open University, Patna
02.04.2014	Paper-IV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
03.04.2014	Paper-V	8.00 AM to 11.00 AM	Nalanda Open University, Patna
04.04.2014	Paper-VII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
05.04.2014	Paper-VIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
06.04.2014	Paper-IX	8.00 AM to 11.00 AM	Nalanda Open University, Patna
07.04.2014	Paper-X	8.00 AM to 11.00 AM	Nalanda Open University, Patna
09.04.2014	Paper VI (Practical)	8.00 AM to 11.00 AM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY

Master of Computer Application

PART-I, PAPER-II

(Computer Organization and Assembly Language Programming)

Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Explain the architecture of computer system. Explain different types of memories required in a Computer system.
2. Draw all the fundamental gates. Explain the difference between combinational circuits and sequential circuits.
3. Compare and contrast between Horizontal micro-operation and Vertical micro-operation ? Explain their use in computer architecture.
4. Simplify and draw a circuit diagram for the following Boolean function in SOP form using K-Map, :—
 $F(A, B, C, D) = \Sigma(0,1, 4, 6, 7,11,12,14,15)$
5. What are counters ? Draw and explain synchronous counter with its table.
6. Write short notes on :—
 - (a) Types of Interrupts
 - (c) Don't Care condition
7. What is the role of control Unit in Computers. What is the difference between hardwired control and micro-program control? What are their advantages and disadvantages.
8. Write an Assembly Language program to print the first 10 natural numbers. Write explanation for each step.
9. Explain the following terms :—
 - (a) ALU
 - (b) Cache Memory
 - (c) Multiplexer
10. What the use of pipelining in Computer ? Explain working procedure of instruction pipelining. Discuss the pipeline performance measures.

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NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-III
(Discrete Mathematics)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Which of the following sentences are statements ? What are the reasons for your answer ?
 - (a) The sun rises in the west.
 - (b) How far is Delhi from here ?
 - (c) Smoking is injurious to health.
 - (d) What is a beautiful day ?
2. (a) For any two propositions p and q , show that $\approx (p \vee q) \equiv \approx p \wedge \approx q$.
(b) Prove that, 'If $x, y \in z$ such that xy is odd then both x and y are odd', by proving its contrapositive.
3. Define AND-gate, OR-gate and NOT-gate.
4. Use mathematical induction to prove that $1 + \frac{1}{4} + \frac{1}{9} + \dots + \frac{1}{n^2} \leq 2 - \frac{1}{n} \forall n \in N$.
5. Define the following with examples :—
 - (a) Proper subset
 - (b) Power set
 - (c) Super set
 - (d) Symmetric difference of two sets.
6. Let $f(x) = \frac{1}{x}$ and $g(x) = x^2 + 2$. Find the following functions, where $x \in R$
 - (a) $(f + g)(x)$
 - (b) $(f - g)(x)$
 - (c) $(fg)(x)$
 - (d) $(f/g)(x)$
7. How many permutations are there of the letters, taken all at a time, if the words
 - (a) ASSESSES
 - (b) PATTIVEERANPATTI
8. An urn contains 15 balls, 8 of which are red and 7 are black. In how many ways can,
 - (a) 5 balls be chosen so that all 5 are red.
 - (b) 7 balls be chosen so that at least 5 are red.
9. A die is rolled once. What are the probabilities of the following events ?
 - (a) Getting an even number.
 - (b) Getting at least 2.
 - (c) Getting at most 2.
 - (c) Getting at least 10.
10. How many "Words" can be formed using four XS and Two YS ?



NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-IV
(System Analysis and Design)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. What is SRS. Develop a SRS for Library Information System.
2. Who is a System Analyst? What is his role in software development.? List some basic attributes of a system analyst.
3. What is Risk Management? Describe different types of risk associated with a software.
4. Why is maintenance required in software? Explain various issues involved in software maintenance, with appropriate examples.
5. Explain database design. Also differentiate between hierarchical and network model. Differentiate between coupling and cohesion.
6. What is fact-finding technique? What kind of fact finding techniques would you use for investigating the information requirements for a hospital which is presently doing manual registrations ? Which kind of techniques do you think will be more effective ?
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. Draw ERD for a student information system for a college. Explain the concept of cardinality through it. What do you mean by internal information, external information and turnaround document ?
9. (a) What role does an end user play in the system development ? Give examples of SDLC models to support the answer.
(b) Categorize system documentation. Give few examples of documentation.
10. Write short notes on any **Two** of the following :—
 - (a) CASE Tools
 - (b) Prototype
 - (c) Modularity.



NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-VII
(Design and Analysis of Algorithm)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. What are the building blocks of algorithm? Explain the characteristics of an algorithm. Give an algorithm to find the factorial of a number.
2. Describe some well known Asymptotic functions and Notations with examples for each type.
3. Compare and contrast between Heap sort and Merge sort. Give examples for each type.
4. What is Randomized Quick sort. Explain giving an example.
5. Write short notes on :—
 - (a) Depth First search.
 - (b) Breadth First search
 - (c) Best First Search
6. Explain Principal of Optimality. Give an example of chained matrix multiplication.
7. Describe different types of minimum spanning trees with examples.
8. What is Regular expression ? Give rules to define Regular Expressions. Give 5 regular expressions and draw automata for each.
9. Explain Chomsky classification of grammar. Draw a Push Down Automata (PDA) to accept a string which is a palindrome in {a,b}.
10. Explain the following concepts :—
 - (a) Context Free Grammar(CFG)
 - (b) Turing Machine
 - (c) Undecidable problems.

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NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-VIII
(Advanced Discrete Mathematics)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. (a) Draw at least 3 non-Isomorphic graphs on four vertices.
(b) Prove that any graph can only have an even number of odd vertices.
2. (a) Find the number of bijections on a set of n -elements, $n \geq 1$.
(b) Prove the Binomial Identity :- $C(n, 1) + 3C(n, 3) + 5C(n, 5) + \dots = n(2)^{n-2}$
3. Solve the sixth order linear, homogeneous recurrence relation
 $u_n + u_{n-1} - 11u_{n-2} - 13u_{n-3} + 26u_{n-4} + 20u_{n-5} - 24u_{n-6} = 0$
4. Solve the recurrence $a_n = 4a_{n-2}$, where
 - (a) $a_0 = 4, a_1 = 6$
 - (b) $a_0 = 6, a_2 = 20$
 - (c) $a_1 = 6, a_2 = 20$
5. 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.
6. Show that C_6 is bipartite and K_3 is not bipartite.
7. What is the difference between an Eulerian graph and an Eulerian circuit ?
8. (a) Find all the graphs that have edge chromatic number 1.
(b) Colour the edges of the graphs K_3, K_4, K_5 .
9. Construct a graph with chromatic number 5.
10. 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 $m = (k + 1)p - 2q$.



NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-IX
(Data Communication and Computer Networks)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. Compare and contrast between Data link layer and Transport layer of OSI model. Give an example to explain your answer.
2. What is Transmission media ? Why it is used. Explain different types of Transmission media with examples of each type.
3. What happens in congestion avoidance and congestion detection phases of TCP's congestion control mechanism ? Discuss through an illustration. How does the size of congestion window increase in congestion avoidance phase.
4. Explain different types of Multiplexing with examples of each type. How does statistical TDM try to resolve shortcomings inherent in synchronous TDM ?
5. (a) What is count to infinity problem ? Explain through an example.
(b) Show the status of sender's and receivers window of 4 bit sliding window mechanism. How does it increase utilization of channel bandwidth?
6. (a) What is silly window syndrome ? How it is created by the sender? What is the proposed solution ?
(b) Explain the operation of CSMA/CD. What happens when a station detects a collision ?
7. How is OSPF implemented in IP network. Explain different types of protocol used at Network layer.
8. Explain TCP header format in detail. Also describe the utility of each field in the format.
9. Differentiate between the following :—
(a) Virtual circuit and datagram subnet.
(b) Upward and Downward multiplexing.
10. Describe application layer of OSI model in detail. What are the protocols used at application layer ? Explain.

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NALANDA OPEN UNIVERSITY
Master of Computer Application
PART-I, PAPER-X
(Management of Information System)
Annual Examination, 2013

Time : 3 Hours.

Full Marks : 80

Answer any Five Questions. All questions carry equal marks.

1. List any five management systems. What are vertical and horizontal organizations ? Explain their organizational structures and the benefits.
2. What is the importance of requirement analysis in management system? Explain the tools and methods for requirement analysis.
3. Explain the different information systems required at different levels of management to support an organization. What are the main functional requirements which must be available in the portfolio management solutions ?
4. Write short notes on the following :—
 - (i) Discount Cash Flow
 - (ii) Payback Period
 - (iii) Neural Network Method
 - (iv) Decision Support System
5. (a) Explain in detail why do companies need to implement Business Intelligence (BI).
(b) Explain the knowledge flow using the knowledge model. Also, explain the activities performed in knowledge creation and transfer.
6. Show the various stages in data warehousing and business analytics and also explain it in brief.
7. What are the features of transaction processing system? What are the different types of transaction processing and its major functions and sub-functions?
8. Identify new technological trends and its impacts. Also discuss the ethical issues related to technologies advancement.
9. Explain all the important metrics of business performance management?
10. How do conventional application package and ERP differ? How to ensure that the ERP implementation should not fail?

