DMCS01

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Data Structures

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Write about different operations of circular linked lists.

Q2) Explain the representation of polynomial expression using single linked list?

Q3) Write an algorithm to convert an infix expression into prefix expression.

Q4) Explain the operations of a Queue with an example.

Q5) What is binary search tree? Explain the procedure to inserting and deleting an element from a binary search tree.

Q6) Sort the following elements using the Bucket sort and also write its pseudocode 314, 726, 534, 112, 378, 299, 101, 869, 8, 3, 6, 27.

Q7) Using single source Shortest path algorithm find shortest distance between a to z:

Q8) Write a recursive algorithm for factorial of a given number?

Q9) Write an algorithm to insert an element into circular queue.

Q10) Explain the construction of Tree from given In-order and Pre-order traversals:

In-order sequence: D B E A F C

Pre-order sequence: A B D E C F

DMCS01

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Data Structures

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q11) Write the operations of B – trees.

Q12) Write a procedure to sort the large object.

Q13) Describe representation of binary tree using arrays.

Q14) Illustrate topological sorting algorithm with example.

Q15) Construct Eulerian path and circuit for the following graph.

Q16) What are the applications of stack?

Q17) Define closed hashing.

Q18) What is expression tree?

Q19) Define heap condition.

Q20) Define degree of vertex.

DMCS02

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Object Oriented Programming

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Discuss different ways to passing the parameters in C++ with proper example.

Q2) Write a C++ Program for Dynamic Initialization using constructors.

Q3) Explain the concept of friend function.

Q4) What are driving factors of object oriented programming paradigm? List the basic concepts of OOP.

Q5) Write a function template for finding the minimum value contained in an array.

Q6) What is Virtual function? What are the rules for Virtual functions?

Q7) What are the file operations? Explain each one with an example.

Q8) What is reference variable? What is its use? Give the example.

Q9) Write a C++ program to find transpose of Given matrix.

Q10) What are objects? How are they created?

DMCS02

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Object Oriented Programming

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) How to declare a nested class? Give an example.

Q2) What is the purpose of destructor? Give the syntax.

Q3) Explain about multi-level and hierarchical inheritance with example.

Q4) What is Exception? How to catch multiple exceptions.

Q5) Define late binding.

Q6) What is use of new and delete operators?

Q7) What data abstraction?

Q8) Why does C++ have type modifiers?

Q9) What is operator overloading?

DMCS03

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Computer Organization

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain the operation of clocked SR flip – flop.

Q2) Implement the function: using 4 : 1 multiplexer.

Q3) Explain how multiplication is done for floating point numbers with flow chart.

Q4) What is Micro operation? Briefly explain the arithmetic micro operations?

Q5) Explain the steps involved in the execution of a complete instruction.

Q6) Discuss about different CPU organizations with examples.

Q7) What is a mapping function? What are the ways the cache can be mapped? Explain.

Q8) How do we represent the signed integers? Explain with examples.

Q9) Design a digital circuit for 4-bit binary adder.

Q10) Explain different memory reference instructions.

x x x

DMCS03

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Computer Organization

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) State the differences between hardwired control and micro programmed control.

Q2) Explain the basic symbols used in register transfer.

Q3) Write about register stack and memory stack.

Q4) Describe Asynchronous data transfer using Strobe contr ol.

Q5) What is associate memory? Explain with block diagram.

Q6) What is binary counter?

Q7) Define instruction cycle.

Q8) What are the error detection codes?

Q9) Define pseudo instruction.

Q10) Define Cache memory.

x x x

DMCS04

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Discrete Mathematical Structures

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

1 Prove the statement, "for all real numbers x and y, if $x+y>-100$ then $x>-50$ or $y>-50$" by the method of contradiction.

2 Verify that , for primitive statements p, q, r.

3 Let A = {1, 2, 3, ... 19, 20} and R be the equivalence relation on A defined by aRb if and only if $a - b$ is divisible by 5. Find the partition of A induced by R.

4 A survey of 500 televisions viewers of sports channel produced the following information: 285 watch Cricket, 195 watch Hockey, 115 watch Football, 45 watch Cricket and Football, 70 watch Cricket and Hockey, 50 watch Hockey and Football and 50 do not watch any of the three kinds of games.

i) How many viewers in the survey watch all three kinds of games?

ii) How many viewers watch exactly one sport.

5 Show that monoid homomorphism preserves the property of invertibility.

6 In any group (G, *), by proving the inverse of every element is unique. Show that

7 Draw the K-maps of these sum-of-products expansions in three variables:

8 Check the following graph are Eulerian or Hamiltonian.

9 Verify the following graphs are isomorphic or not.

10 Prove that "A complete graph K_n is planar iff n <– 4".

11 Define distributed lattice.

12 Define Abelian group.

DMCS04

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Discrete Mathematical Structures

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

1 Write the statement in symbolic form then negate statements:

2 Some Drivers do not obey the speed limit.

3 All Elephants has trunk.

4 Find the disjunctive normal of

5 Let $f(x) = 2x + 1$ and $g(x) = x^2 - 2$ for x R. Determine the composition functions $g \circ f$ and $f \circ g$.

6 Let A = {1, 2, 3, 4}, R = {(1, 2), (2, 3), (3, 4), (2, 1)}. Find the transitive closure of R.

7 Draw the Hasse diagram of the Lattice L of all sub sets of {*a, b, c*} under intersection and union.

8 Show that (2, 5) encoding function defined by e(00) = 00000, e(01) = 01110, e(10) = 10101 is group code.

9 State and explain 4 – color problem.

10 Represent the following graphs into adjacency matrix and adjacent list notation:

11 Define Well – formed formulae.

12 Define binary relation.

DMCS05

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Software Engineering

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain Spiral model with suitable example. Also explain how it differs from Software Prototyping model.

Q2) What is class based components? Discuss various issues are considered for Conducting component level design.

Q3) Discuss decomposition levels of abstraction and modularity concepts in software design?

Q4) Explain in detail the design issues while designing User Interface.

Q5) Explain the integration testing process and system testing process and discuss their outcomes.

Q6) Describe evolutionary process models.

Q7) Compare Procedural Design with Object Oriented Design.

Q8) How do you measure the software quality? Explain one metric in detail.

Q9) Write note on functional and behavioral models.

Q10) What are the components dataflow oriented design?

DMCS05

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Software Engineering

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Describe the golden rules for interface design.

Q2) Write the software failures and faults? What are test coverage criteria?

Q3) What are the objectives and guidelines for debugging? Briefly discuss common approaches in debugging?

Q4) Define cohesion.

Q5) What is cyclomatic complexity?

Q6) Define smoke testing.

Q7) Define horizontal partitioning.

Q8) What is meant by software prototyping?

DMCS06

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

First Year

COMPUTER SCIENCE

Distributed Operating Systems

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain about the taxonomy of parallel and distributed computer systems.

Q2) Explain about Asynchronous Mode Networks in detail.

Q3) Explain about the Clock Synchronization Algorithms.

Q4) Explain about the scheduling in Distributed System.

Q5) Discuss about Consistency models.

Q6) What is the difference between an MIMD computer and an SIMD computer?

Q7) The terms loosely - coupled system and tightly - coupled system are often used to described distributed computer systems. What is the different between them?

Q8) Explain about the Group Communication.

Q9) Explain about Schedular Activations.

Q10) Explain about A Receiver - Initiated Distributed Heuristic Algorithm.

DMCS06

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2020

First Year

COMPUTER SCIENCE

Distributed Operating Systems

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain about the Semantics of File Sharing.

Q2) Explain about the Achieving Sequential Consistency.

Q3) Explain about Distributed Shared Memory?

Q4) What is Loose synchrony and virtual synchrony?

Q5) What is the wound - wait deadlock prevention algorithm.

Q6) What is Transient fault and intermittent fault?

Q7) What is primary copy replication?

Q8) What is Strict Consistency?

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DMCS07

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Database Management Systems

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Explain the unary and binary relational operations with suitable example.

b) Construct an E-R Diagram for an insurance company with a set of customers, each of whom owns number of cars, also each can have number of recorded accident associated with it.

Q2) Write about the following SQL commands with syntax and example:
i) Drop ii) Truncate iii) Alter iv) Commit v) Nested Queries

Q3) a) Write about static and dynamic hashing.

b) Explain about file organization strategies.

Q4) What is normalization? Explain the need for normalization. Discuss various types of normal forms.

Q5) Discuss lock based protocols and timestamp based protocol for concurrency control.

Q6) Describe the limitations of file systems? How to overcome these limitations by DBMS?

Q7) What are the various symbols used in E – R diagrams?

Q8) What are the data types are allowed SQL?

Q9) Describe different types join operations in relational algebra.

Q10) Write about different integrity constraints with example.

DMCS07

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

COMPUTER SCIENCE

Database Management Systems

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Describe the structure of magnetic disks.

Q2) Briefly explain deadlock detection mechanism.

Q3) State and explain about ACID properties.

Q4) Define views.

Q5) Define schema and instance.

Q6) Define multi valued dependency.

Q7) What is trigger?

Q8) Define candidate key and composite key.

x x x

DMCS08

ASSIGNMENT 1
M.Sc. DEGREE EXAMINATION, MAY - 2020
(First Year)
COMPUTER SCIENCE
Theory of Automata and Formal Language
MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) a) Obtain DFA from the following NFA : M = ($\{p, q, r, s\}$, $\{0, 1\}$, δ, p, $\{s\}$).

Present State	Next State	
	0	1
p	{p, q}	{p}
q	{r}	{r}
r	{s}	-
s	{s}	{s}

b) Construct Moore machine, which prints the residue modulo 3 of the input from binary value {0, 1}.

Q2) Prove that "Let r be the regular expression, then there exists an NFA with ε - transition that accepts L(r).

Q3) a) Eliminate ε - productions from CFG :

S ABCD, A CDa, B Cb, C a | ε, D bD|ε.

b) Convert the following CFG into CNF grammar : S ~S | [S S] | p | q.

Q4) Write the mathematical description of PDA. Construct NPDA for the language

$L = \{ww^R \mid w \{a, b\}^*\}$.

Q5) Design Turing machine for the language

$L = \{a^n b^n c^n \mid n \geq 1\}$.

Q6) Construct NFA for the language L contains set of all strings such that 5th symbol from right end is 1.

Q7) Prove that

$(1 + 00^*1) + (1 + 00^*1)\,(0 + 10^*1)^*\,(0 + 10^*1) = 0^*\,1\,(0 + 10^*1)^*$.

Q8) Show that the language $L = \{a^n b^n \mid n \geq 1\}$ is not regular.

Q9) Construct FA for the regular expression
$(00 + 01)\,(0 + 1)^*1$.

DMCS08

ASSIGNMENT 2
M.Sc. DEGREE EXAMINATION, MAY - 2020
(First Year)
COMPUTER SCIENCE
Theory of Automata and Formal Language
MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain the terms left most derivation, right most derivation and derivation trees.

Q2) Construct PDA for M equivalent to following CFG :

S 0BB, B 0S | 1S | 0.

Q3) Explain about Universal Turing machine.

Q4) Show that the Post Correspondence problem with the two lists.

$x = (b, bab^3, ba)$ and $y = (b^3, ba, a)$ has solution.

Q5) Define Moore and Machines.

Q6) Give the regular expression for language

$L = \{a^m b^n \mid m + n \text{ is even}\}$

Q7) Define Greibach Normal form.

Q8) Define Null production?

Q9) Define context sensitive grammar.

x x x

DMCS09

ASSIGNMENT 1
M.Sc. DEGREE EXAMINATION, MAY - 2020
(First Year)
COMPUTER SCIENCE
Computer Networks

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain the Simple Mail Transfer Protocol and File Transfer Protocol in detail.

Q2) a) Write about packet switched network and circuit switched network.

b) Write about network transmission media devices.

Q3) Compare and contrast additive increase / multiplicative decrease TCP congestion control algorithm with slow start TCP congestion control.

Q4) Illustrate Link-State Routing algorithm with example.

Q5) a) What type of errors can be detected by Parity Check Code? How is it implemented? Explain with suitable example.

b) Describe the architecture of IEEE 802.11.

Q6) Briefly explain about services of World Wide Web.

Q7) Write about multiplexing and de-multiplexing.

Q8) Explain Distance Vector Routing with example.

Q9) Compare and contrast UDP and TCP.

Q10) Explain IPv4 datagram format and importance of each filed.

DMCS09

ASSIGNMENT 2
M.Sc. DEGREE EXAMINATION, MAY - 2020
(First Year)
COMPUTER SCIENCE
Computer Networks

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) What is the role of Domain Name Server (DNS) in Internet? Explain the hierarchy of various domain names.

Q2) Explain the working principle of bridges.

Q3) Write a note on Ethernet cabling.

Q4) Draw UDP data gram format?

Q5) Define channel allocation.

Q6) What is peer – to – peer process?

Q7) Differentiate Connection oriented versus Connectionless services.

Q8) What is the use of Hub and Switch?

x x x

DMCS10

ASSIGNMENT 1

M.Sc. DEGREE EXAMINATION, MAY- 2020

(First Year)

COMPUTER SCIENCE

Design & Analysis of Algorithms

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain the sequence of steps involved in designing and analysis of an algorithm.

Q2) Sort the following numbers using Merge sort. Give the output of each pass. Write an algorithm for Merge sort: 27, 6, 18, 25, 48, 59, 98, 34.

Q3) Write equation for Chained matrix multiplication using Dynamic programming. Find optimal sequence for multiplication: A[5×4], B[4×6], C[6×2], and D[2×7].

Q4) Find the feasible solution for the following list of jobs. Also find the total profit earned. Assume that each job needs one unit time in a single machine.

Job No	1	2	3	4	5
Profit vector	50	30	10	20	15
Dead line	2	1	3	2	4

Q5) Solve the following instance of the Knapsack problem using branch and bound algorithm with W = 16.

Item	Weight	Value	Value/Weight
1	4	40	10
2	7	42	6
3	5	25	5
4	3	12	4

Q6) Express the following relations into Big O and Omega Ω Notation.

i) $f(n) = 4n^{1.5} + ^{3} + \log n$ ii) $f(n)= 36n^3 + 43n$

Q7) Describe union and find operations and how to represent them in memory.

Q8) Write down Strassen's matrix multiplication equations.

Q9) Explain in brief characteristics of greedy algorithms.

Q10) Write a Kruskal's algorithm to construct minimum spanning tree.

DMCS10

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY- 2020

(First Year)

COMPUTER SCIENCE

Design & Analysis of Algorithms

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

Q1) Explain all pair shortest path algorithm with suitable example.

Q2) Explain the solution of 4 – Queen's problem.

Q3) Find the subset from the given sum using back tracking: S = {1, 2, 5, 7} and d = 8.

Q4) Define small o notation for algorithm complexity.

Q5) State the quick hull problem.

Q6) Define principle of divide – and – conquer technique.

Q7) What is Huffman tree?

Q8) Define backtracking.

Q9) Write the algorithm for matrix addition and compute time complexity of the algorithm usingstep – count method.