

(DMCS01)

Total No. of Questions : 18]

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M.Sc. DEGREE EXAMINATION, MAY – 2017

COMPUTER SCIENCE

First Year

DATA STRUCTURES

Time : 3 Hours

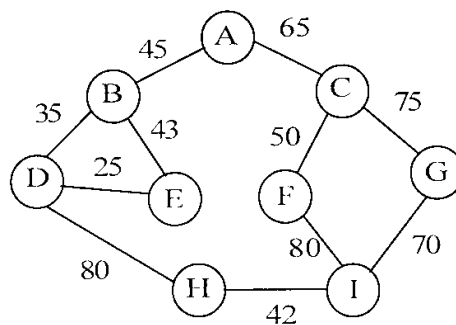
Maximum Marks : 70

SECTION – A

(3 × 15 = 45)

Answer any three questions.

- Q1)** Write the following subroutines of double linked list
- Insert a new node at the end
 - Delete the first node
 - Insert a node after a specific node
- Q2)** Describe various queue operations. How to implement queues using single linked lists.
- Q3)** Explain about linear and linked representation of binary tree with suitable example.
- Q4)** Consider the following list elements : 67, 12, 89, 26, 38, 45, 22, 79, 53, 9, 61 Sort these elements using heap sort.
- Q5)** What is minimum spanning tree? Construct Minimum Spanning Tree for the following graph using Prim's algorithm.



SECTION – B (5 × 4 = 20)

Answer any Five questions

- Q6)** Describe the applications of queues.
- Q7)** Convert the following infix expression into prefix and post – fix notation.
 $(A + B * D)/(E - F) + G$
- Q8)** Construct binary search tree for the following :
J, R, D, G, T, E, M, H, P, A, F, Q
- Q9)** Write short notes on B – trees.
- Q10)** What is meant by expression tree? Give suitable example.
- Q11)** Describe various ways to representing graphs into computer memory.
- Q12)** Explain about Hamiltonian circuit with example.
- Q13)** Briefly explain about bucket sorting with example.

SECTION – C

(5 × 1 = 5)

Answer all questions

- Q14)** What is sparse matrix?
- Q15)** What is De – queue?
- Q16)** What is heap tree?
- Q17)** Define graph.
- Q18)** Define in – order and post – order of tree traversing.



(DMCS02)

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M.Sc. DEGREE EXAMINATION, MAY – 2017

First Year

COMPUTER SCIENCE

OBJECT ORIENTED PROGRAMMING

Time : 3 Hours

Maximum Marks : 70

SECTION – A

(3 × 15 = 45)

Answer any three questions.

- Q1)** Discuss about different control structures used in C++.
- Q2)** What is the significance of function overloading? Write a program to calculate area of triangle, circle and rectangle by overloading the functions.
- Q3)** What is meant by class and object? Illustrate with an example the concept of data abstraction and message passing mechanism.
- Q4)** What is meant by exception? How to handle exceptions in C++? Describe different types of exceptions.
- Q5)** What are I/O streams in C++? Give the stream class hierarchy with syntax.

SECTION – B

(5 × 4 = 20)

Answer any Five questions from the following

- Q6)** Give the differences between C and C++.
- Q7)** What are inline functions? What are the advantages of inline functions?
- Q8)** Explain static data members and static member functions.
- Q9)** List down any four string handling functions with its purpose.
- Q10)** Briefly explain about multiple inheritance with example.
- Q11)** What is destructor? Give the example of destructors.

Q12) How to create function template? Give the example.

Q13) Describe the various file mode operations available.

SECTION – C

(5 × 1 = 5)

Answer all questions

Q14) What is use of scope resolution operator?

Q15) Define constructor.

Q16) Define late binding.

Q17) Define template.

Q18) Define operator overloading.



(DMCS03)

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M.Sc. DEGREE EXAMINATION, MAY – 2017

First Year

COMPUTER SCIENCE

Computer Organization

Time : 3 Hours

Maximum Marks : 70

SECTION-A

Answer Any 3 Questions

(3×15=45)

- Q1)** Design a Combinational Circuit that converts Binary Code to Excess-3 Code.
- Q2)** Explain about the RTL for Arithmetic and Logical Micro operations.
- Q3)** Explain about the design of Address Sequence generator in microprogrammed control.
- Q4)** Explain about the Computer Instructions.
- Q5)** Explain about Associate Memory in detail.

SECTION-B

Answer Any 5 Questions

(5×4=20)

- Q6)** Explain about Shift Registers.
- Q7)** Explain about Error Detection Codes.
- Q8)** Explain about the ALU.
- Q9)** Explain about Timing and Control Unit of basic computer.
- Q10)** Explain about Control Memory.
- Q11)** Explain about stack organization.
- Q12)** Explain about the asynchronous data transfer.
- Q13)** Explain about memory hierarchy?

SECTION-C
Answer All Questions

(5×1=5)

Q14) Explain about one's Complement.

Q15) What is a Micro Operation?

Q16) What is the purpose of Program Counter?

Q17) Explain about floating point numbers.

Q18) What is Cache Memory?

→ → →

(DMCS04)

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M.Sc. DEGREE EXAMINATIONS, MAY - 2017

(First Year)

COMPUTER SCIENCE

Discrete Mathematical Structures

Time : 3 Hours

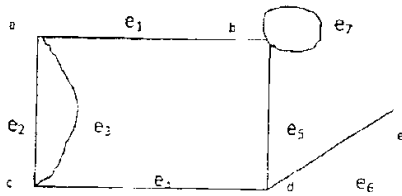
Maximum Marks : 70

SECTION - A

Answer any Three questions

(3 × 15 = 45)

- Q1)** a) Prove that, for any three propositions p, q, r the compound proposition
$$[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$$
is tautology
b) Show that $R \rightarrow S$ can be drawn from the premises $P \rightarrow (Q \rightarrow S)$, $\neg R \vee P$ and Q.
- Q2)** a) State and describe rules of inference.
b) Show that the statement “ $\sqrt{2}$ irrational” by prove by contradiction.
- Q3)** a) Let $A = \{a, b, c\}$ be a set and relation R on A is as $= \{(a, a), (a, b), (b, c), (c, c)\}$. Is R
i) Reflexive
ii) Symmetric
iii) Transitive
b) If R and S are equivalence relations on a set A. Prove that $R \cap S$ is an equivalence Relation
- Q4)** a) Prove that the intersection of any two subgroups of a group G is again subgroup of G.
b) Show that in any Boolean algebra, $(a + b)(a' + c) = ac + a'b + bc$.
- Q5)** a) Find the Adjacency matrix and Incidence matrix of the following graph



b) State and explain graph coloring problem.

SECTION – B

(5 × 4 = 20)

Answer any five questions

Q6) Write the statement in symbolic form then negate statements.

“Some Drivers do not obey the speed limit”

Q7) Using truth table prove that $P \rightarrow Q \equiv \neg P \vee Q$

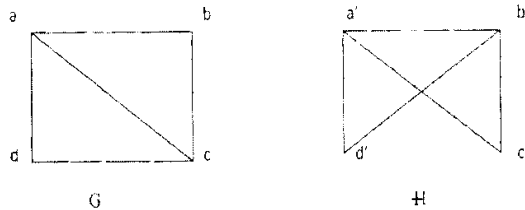
Q8) Let $X = \{1, 2, 3, 4, 5, 6\}$ and R be a relation defined as $(x, y) \in R$ if and only if $x - y$ is divisible by 3. Find the elements of relation of R.

Q9) If A and B are any two sets, then $A \cap (B - A) = \Phi$.

Q10) In a lattice (L, \leq, \wedge, \vee) , state and prove the laws idempotent, commutative.

Q11) Prove that the intersection of any two subgroups of a group G is again in subgroup of G.

Q12) Check whether the graphs G and H are Isomorphic or not



Q13) Explain about Chromatic number with example.

SECTION – C

Answer all questions.

[5 × 1 = 5]

Q14) Define clause form.

Q15) What is Hasse diagram?

Q16) Define homomorphism.

Q17) Define cyclic graph

Q18) Define Eulerian path



(DMCS05)

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M.Sc. DEGREE EXAMINATION, MAY – 2017

First Year

Computer Science

SOFTWARE ENGINEERING

Time : 3 Hours

Maximum Marks : 70

SECTION – A

(3 × 15 = 45)

Answer any three questions.

- Q1)** Explain about spiral model and incremental model with neat sketch.
- Q2)** Explain in detail about structural modeling and data modeling.
- Q3)** Discuss about user interface design with the help of golden rules.
- Q4)** Explain alpha, beta and smoke testing.
- Q5)** Explain in detail about rapid proto typing techniques.

SECTION – B

(5 × 4 = 20)

Answer any Five questions of the following

- Q6)** Briefly write about software myths.
- Q7)** Describe the fundamental activities of software process.
- Q8)** How do you measure the software quality? Briefly explain.
- Q9)** Briefly explain about functional and non – functional requirements.
- Q10)** Describe various types coupling.
- Q11)** Write about different levels of DFD's.
- Q12)** List the errors that can be found using black box testing.
- Q13)** What are the various types of system testing?

SECTION – C

(5 × 1 = 5)

Answer all questions

Q14) What is cohesive module?

Q15) What is CMM?

Q16) Define data dictionary

Q17) Define vertical partitioning.

Q18) What is cyclomatic complexity?



(DMCS07)

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M.Sc. DEGREE EXAMINATION, MAY – 2017

First Year

COMPUTER SCIENCE

Database Management Systems

Time : 3 Hours

Maximum Marks : 70

SECTION – A

Answer any three Questions

(3 × 15 = 45)

Q1) Explain the following with their advantages and disadvantages.

- i) Hierarchical database model
- ii) Network database model
- iii) Relational database model.

Q2) What is Relational Algebra? Enlist and explain the fundamental operation of relational algebra with suitable example.

Q3) Discuss aggregate functions and nested queries in SQL with syntax.

Q4) Explain about structures of magnetic disks and RAID levels.

- Q5)**
- a) Explain various deadlock prevention methods.
 - b) Write about the view serializability with example.

SECTION – B

Answer Any Five questions

(5×4 = 20)

Q6) Explain in detail the duties of DBA.

Q7) Draw symbols for following in ER diagram.

Q8) Explain Database Triggers.

Q9) What is functional dependency? Explain its usage in database design.

- Q10)** Write about static and dynamic hashing.
- Q11)** What is a transaction? Explain its four important properties.
- Q12)** Explain 1NF, 2NF and 3NF with example.
- Q13)** Briefly explain about time stamp based protocols.

SECTION – C

Answer All Questions

(5 × 1 = 5)

- Q14)** Define primary key.
- Q15)** Define instance and schema.
- Q16)** Define atomicity.
- Q17)** What are the DCL commands?
- Q18)** What are the Correlated Queries?

(DMCS 08)

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M.Sc. DEGREE EXAMINATION, MAY – 2017

First Year

COMPUTER SCIENCE

Theory of Automata and Formal Languages

Time : 3 Hours

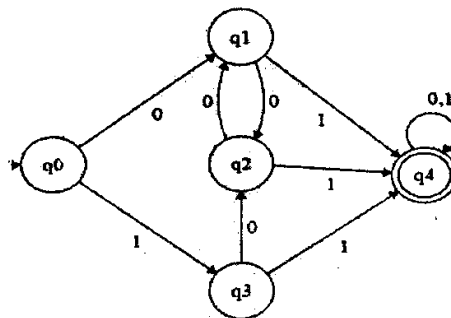
Maximum Marks: 70

SECTION - A

Answer Any three questions.

(3 × 15 = 45)

Q1) Write a procedure to minimizing the DFA and also minimize the following DFA



Q2) Construct FA's for the following regular expressions:

- a) $(0+1)^*(00+11)(0+1)^*$
- b) $(10+1)^*01$

Q3) Let G be the grammar as $S \rightarrow aB|bA$, $A \rightarrow a|aS|bAA$, $B \rightarrow b|bS|aBB|$ for the string 'aabbabab', Find

- a) Derivation tree

- b) Rightmost derivation
- c) Leftmost derivation.

Q4) Design push down automata for the language contains equal number of a's and equal number of b's over the alphabets $\{a,b\}$

Q5) Explain about Universal Turing machine, counter machine and church hypothesis.

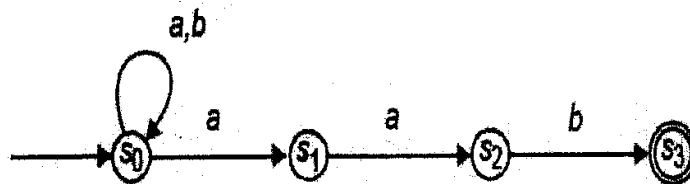
SECTION - B

Answer Any Five questions.

(5 × 4 =

20)

Q6) Convert the NDA to equivalent DFA for each of the following:



Q7) Explain about moore and mealy machines.

Q8) Show that $L = \{a^n | n \text{ is perfect square}\}$ is not regular.

Q9) Eliminate all the ϵ –productions from the following CFG:

$S \rightarrow AaB \mid aaB, A \rightarrow \varepsilon, B \rightarrow bbA \mid \varepsilon$

Q10) Convert the following CFG into CNF grammar.

$S \rightarrow \sim S \mid [S \supset S] \mid p \mid q$

Q11) Describe the closure properties of CFL.

Q12) Design Turing machine for the language $L = \{a^n b^n \mid n \geq 1\}$.

Q13) Show that “Post Correspondence Problem is un-decidable”.

SECTION - C

Answer all questions.

(5 × 1 = 5)

Q14) Define DFA.

Q15) What is meant by ambiguity in CFG?

Q16) Define homomorphism.

Q17) What is meant by nullable and unit productions?

Q18) Define context sensitive language.

(DMCS09)

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M.Sc. DEGREE EXAMINATION, MAY – 2017

First Year

COMPUTER SCIENCE

Computer Networks

Time : 3 Hours

Maximum Marks : 70

Section - A

(3 x 15 = 45)

Answer any three questions

- Q1)** Explain about the internet protocol stack.
- Q2)** Explain about the Electronic Mail in the internet.
- Q3)** Explain about the Connection-Oriented Transport protocol.
- Q4)** Explain about a Link State Routing Algorithm.
- Q5)** Explain about address resolution protocol.

Section - B

(5 x 4 = 20)

Answer any five questions

- Q6)** Explain about End Systems, Clients and Servers.
- Q7)** List the various network application user agents that you use on a daily basis.
- Q8)** Is it possible for application to enjoy reliable data transfer even when the application runs over UDP?
- Q9)** Explain about UDP.

Q10) Explain about IPV6 Packet Format.

Q11) Explain about IP Addressing.

Q12) Explain about data link layer services.

Q13) Explain about error detection methods.

Section - C

(5 x 1 = 5)

Answer all questions

Q14) What is meant by a handshaking protocol?

Q15) Explain about Telnet.

Q16) Explain about logical communication.

Q17) Explain about gateway routers.

Q18) Explain about hub.



(DMCS10)

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M.Sc. DEGREE EXAMINATION, MAY - 2017

First Year

Computer Science

Design and Analysis of Algorithms

Time : 3 Hours

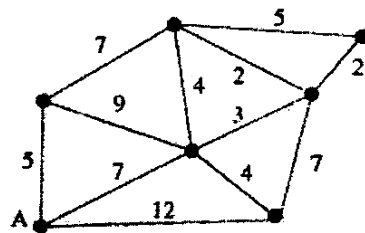
Maximum Marks : 70

SECTION - A

Answer any Three questions

(3 × 15 = 45)

- Q1)** Discuss various asymptotic notations used to measure the running time of algorithm.
- Q2)** Divide and conquer paradigm involves three steps at each level of recursion. What are all they? Show that merge-sort algorithm closely follows these steps. Illustrate the operation of merge sort on the array $A = \{3, 41, 52, 26, 38, 57, 9, 49\}$
- Q3)** Given weight vector $(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2, 3, 5, 7, 1, 4, 1)$ and profit vector $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10, 5, 15, 7, 6, 18, 3)$ and Knapsack of capacity 15. Find optimal solution for 0/1 knapsack problem
- Q4)** Construct Minimum spanning tree for the following graph using prims algorithm



- Q5)** Explain travelling salesman problem. Solve using branch and bound strategy.

∞	7	3	12	8
3	∞	6	14	9
5	8	∞	6	18
9	3	5	∞	11
18	14	9	8	∞

SECTION – B

(5 × 4 = 20)

Answer any five from the following

Q6) Solve the following recurrence relation using master's theorem.

$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ T(n-1) + n(n-1) & \text{if } n \geq 2 \end{cases}$$

Q7) State and describe the connected and bi-connected components

Q8) Describe the activity selection problem for job sequencing.

Q9) Compare and contrast DFS and BFS.

Q10) What do you mean by dynamic programming? What is difference between dynamic programming and greedy method?

Q11) Describe any string matching algorithm. Also calculate its time complexity.

Q12) State and explain about 4 – queen's problem.

Q13) Find the subset from the given sum using back tracking.

$$S = \{1, 2, 5, 7\} \text{ and } d = 8$$

SECTION – C

Answer all questions.

[5 × 1 = 5]

Q14) State quick hull problem.

Q15) What is Huffman tree?

Q16) What is the best and worst case complexities of merge sort?

Q17) State general method of branch and bound.

Q18) Define optimal BST.

