



MALLA REDDY UNIVERSITY

Telangana State Private Universities (Establishment and Regulations) (Amendment) Act No.13 of 2020
G.O.No.Ms.14, Higher Education (UE) Department, Telangana State
Maisammaguda, Kompally, Hyderabad – 500 100

SCHOOL OF ENGINEERING

CYBER SECURITY

II Year–II Semester

QUESTION BANK



SCHOOL OF ENGINEERING

CYBER SECURITY

R20 Regulations

I Year – II Semester Subjects

S No	Subject Code	Subject	Credits	Max. Marks	
				INT	EXT
1	MR20-1BS0104	Discrete Mathematics	3	40	60
2	MR20-1CS0103	Operating System	3	40	60
3	MR20-1CS0106	Java Programming	3	40	60
4	MR20-1CS0107	Design and Analysis of Algorithms	3	40	60
5	MR20-1CS0403	Applied Cryptography	3	40	60
6	MR20-1CS0405	Wireless Sensor Networks & Security	3	40	60



SCHOOL OF ENGINEERING
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IMPORTANT QUESTIONS
DISCRETE MATHEMATICS



QUESTION BANK

SUB NAME : Discrete Mathematics

SUB CODE: IBS0104

UNIT-I: SETA AND RELATIONS

1 (a) Suppose a list A contains 30 students in a mathematics class, and a list B contains 35 students in an English class, and suppose there are 20 names on both the lists. Find the number of students:

(i) Only on list A , (ii) only on list B , (iii) on list A or B (or both), (iv) on exactly one list.

(b) In a survey of 120 people, it was found that:

65 read <i>Newsweek</i> magazine,	20 read both <i>Newsweek</i> and <i>Time</i> ,
45 read <i>Time</i> ,	25 read both <i>Newsweek</i> and <i>Fortune</i> ,
42 read <i>Fortune</i> ,	15 read both <i>Time</i> and <i>Fortune</i> ,
8 read all three magazines.	

(i) Find the number of people who read at least one of the three magazines.

(ii) Draw its Venn diagram.

(iii) Find the number of people who read exactly one magazine.

2 (a) Using laws of set theory prove that

$$(A \cap B) = B - (B - A) \text{ and } \overline{A \cup (B \cap C)} = (\overline{C} \cup \overline{B}) \cap \overline{A}.$$

(b) If $A = \{1, 2, 3, 4\}$ and $B = \{x, y, z\}$. Let R be the following relation from A to B :

$$R = \{(1, y), (1, z), (3, y), (4, x), (4, z)\}$$

(i) Determine the matrix of the relation.

(ii) Draw the arrow diagram of R .

(iii) Find the inverse relation R^{-1} of R .

3 (a) Prove that for any positive integer m , the relation congruence modulo m is an equivalence relation on the integers.

(b) If $X = \{1, 2, 3, 4, 5, 6, 7\}$ and R is a relation defined as $(x, y) \in R$ iff $x - y$ is divisible by 3. Find the elements of R and show that R is an equivalence relation.

4 (a) Prove that $f(x) = 5x^3 - 1$ is a one-one function from $R \rightarrow R$ where R is set of real numbers. Also, prove that $f^{-1} \circ g^{-1} = (g \circ f)^{-1}$ for $f, g: Q \rightarrow Q$ such that $f(x) = 2x$ and $g(x) = x + 2$.

(b) Show that the functions $f: R \rightarrow (1, \infty)$ and $g: (1, \infty) \rightarrow R$ defined by $f(x) = 3^{2x} + 1$, $g(x) = \frac{1}{2} \log_3(x - 1)$ are inverses.

5 (a) Define one-one and onto functions and explain the composition of functions with diagram. Let f and g are two functions from $R \rightarrow R$ where R is set of real numbers. Find $(f \circ f)(x)$ if $f(x) = 3x^2$ and $(f \circ g)(x)$, $(g \circ f)(x)$ if $f(x) = x^2 - 2$ and $g(x) = x + 4$.

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(b) Define function and inverse functions and explain the concept of congruence modulo ' m '. Let $I = \{0, 1, 2\}$ and define functions f and g from I to I as follows:

For all x in I , $f(x) = (x^2 + x + 1) \bmod 3$ and $g(x) = (x+2)^2 \bmod 3$. State whether $f = g$.

6 (a) Let A , B and C be any three sets in the universal set U . Then prove the following associative laws:

(i) $A \cup (B \cup C) = (A \cup B) \cup C$

(ii) $A \cap (B \cap C) = (A \cap B) \cap C$

(iii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

(b) If $A = \{1, 2, 3, 4, 6, 8, 12, 24\}$ then show that the relation 'divides' is partial ordering.

QUESTION BANK**SUB NAME : Discrete Mathematics****SUB CODE: IBS0104****UNIT-II: MATHEMATICAL LOGIC AND INDUCTION**

1 (a) Define logical equivalence and show that $(p \rightarrow q)$ and $(\Box p \vee q)$ are logically equivalent.

(b) Determine the contrapositive of each statement:

(i) If Erik is a poet, then he is poor.

(ii) Only if Marc studies he will pass the test.

2 (a) Prove that $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$ is a tautology and the argument $[(p \rightarrow q) \wedge \neg p] \rightarrow \neg q$ is a fallacy.

(b) Construct the truth tables of the following compound propositions

(i) $(p \wedge q) \rightarrow r$ (ii) $q \wedge (\Box r \rightarrow p)$

3 (a) Symbolize the following argument and check for its validity:

If a boy is hungry, then he cries.

If a boy is not mad, then he does not cry.

If a boy is mad, then he has a red face.

Therefore, if a boy is hungry, he has a red face.

(b) Check for the validity of the following expression:

$$r \rightarrow s$$

$$p \rightarrow q$$

$$r \vee p$$

$$\therefore s \vee q.$$

4 (a) Define quantifiers and symbolize the following argument and check for its validity:

All Men are fallible.

All Kings are Men.

Therefore, all Kings are fallible.

(b) Explain universal and existential quantifiers. Symbolize the following argument and check for its validity:

Lions are dangerous animals.

There are Lions.

Therefore, there are dangerous animals.

5 (a) Prove the formula $1 + 2 + 2^2 + 2^3 + \dots + 2^n = 2^{n+1} - 1$ using mathematical induction.

(b) Using strong mathematical induction prove that the function $b(n) = 2(3)^n - 5$ is the unique function defined by

(1) $b(0) = -3$, $b(1) = 1$, and



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(2) $b(n) = 4b(n-1) - 3b(n-2)$ for $n \geq 2$.

6 (a) Prove the formula $\frac{n(n+1)}{2}$ for the sum of the first n positive integers using mathematical Induction.

(b) Show that

- (i) $(p \vee q) \vee (p \leftrightarrow q)$ is a tautology?
- (ii) $(p \vee q) \wedge (p \leftrightarrow q)$ is a contradiction,
- (iii) $(p \vee q) \wedge (p \rightarrow q)$ is a contingency.

QUESTION BANK**SUB NAME : Discrete Mathematics****SUB CODE: IBS0104****UNIT-III: ELEMENTARY COMBINATORICS**

1 (a) How many ways are possible to select 6 students from a class of 10? Justify it using binomial coefficients.

(b) The license plates of a certain state require 3 English letters followed by 4 digits, how many different plates can be manufactured (i) if repetition of letters and digits are allowed? (ii) if only the letters can be repeated? (iii) if only the digits can be repeated? (iv) if no repetitions are allowed at all?

2 (a) In how many ways can we draw a heart or a spade from an ordinary deck of playing cards? A heart or an ace? An ace or a king? A card numbered 2 through 10? A numbered card or a king?

(b) In how many ways can the letters of the English alphabet be arranged so that there are exactly 5 letters between the letters a and b?

3 (a) There are 30 females and 35 males in the junior class while there are 25 females and 20 males in the senior class. In how many ways can a committee of 10 be chosen so that there are exactly 5 females and 3 juniors on the committee?

(b) Enumerate the number of ways of placing 20 indistinguishable balls into 5 boxes where each box is nonempty.

4 (a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and the other 3 will have 5 books each?

(b) Find the number of arrangements of letters in the word TALLAHASSEE.

5 (a) How many solutions will be possible for $x_1 + x_2 + x_3 + x_4 + x_5 = 25$ such that $x_1 > 1, x_2 > 2, x_3 > 3, x_4 > 4, x_5 > 5$?

(b) Find the coefficient of $x_1^2 x_3 x_4^3 x_5^4$ in $(x_1 + x_2 + x_3 + x_4 + x_5)^{10}$.

Ques. 6 (a) Show that for all integers $n, r \geq 0$, if $n+1 > r$, then $P(n+1, r) = \left(\frac{n+1}{n+1-r}\right) P(n, r)$.

(b) Prove the following identities: (i) $C(n+1, r) = C(n, r-1) + C(n, r)$

(ii) $C(m+n, 2) - C(m, 2) - C(n, 2) = mn$

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UNIT-IV: ADVANCE COUNTING TECHNIQUES

1 (a) Find the solution of the recurrence relation $a_n = a_{n-1} + \frac{1}{n(n+1)}$, $a_0 = 1$, $n \geq 1$.

(b) Solve the Tower of Hanoi recurrence relation $a_n = 2a_{n-1} + 1$ with $a_1 = 1$, $n \geq 2$.

2 (a) Solve $a_n - 7a_{n-1} + 10a_{n-2} = 7 \cdot 3^n$, $n \geq 2$.

(b) Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = n^2 \cdot 4^n$, $n \geq 2$.

3 (a) Using generating function, solve the recurrence relation $a_n - 9a_{n-1} + 20a_{n-2} = 0$ for $n \geq 2$ with $a_0 = -3$, $a_1 = -10$.

(b) Write the solution of the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$ with $a_0 = 2$ and $a_1 = 7$.

4 (a) Find an explicit formula for the Fibonacci numbers.

(b) Solve the recurrence relation $a_k = 3a_{k-1}$ for $k = 1, 2, 3, \dots$ and initial condition $a_0 = 2$ using generating functions.

5 (a) Find the coefficient of x^{18} in $(x + x^2 + x^3 + x^4 + x^5)(x^2 + x^3 + x^4 + \dots)^5$.

(b) Find the number of integral solutions of the equation $x_1 + x_2 + x_3 = 20$ such that $2 \leq x_1 \leq 5$, $4 \leq x_2 \leq 7$, $-2 \leq x_3 \leq 9$.

6 (a) Determine the number of positive integers 'n' such that $1 \leq n \leq 100$ and 'n' is not divisible by 2, 3 or 5.

(b) Solve the Divide and Conquer recurrence relation $a_n = c a_{\frac{n}{d}} + e$ for $a_1 = e$, $c \neq 0$ & $n = d^k$

where c, d & e are constants.

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UNIT-V: GRAPH THEORY

1 (a) Define

- (i) ‘multigraphs’ and its ‘multiplicity’,
- (ii) ‘bipartite’ graphs
- (iii) ‘cycles’ and ‘wheels’
- (iv) ‘simple directed graph’,
- (v) ‘pseudo-graphs’,
- (vi) ‘isomorphic graphs’
- (vii) degree of a vertex in an undirected graph,
- (viii) Statement of Handshaking theorem.

(b) Draw a graph with the adjacency matrix

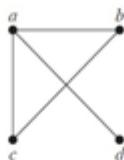
$$\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$$

with respect to the ordering of vertices a, b, c, d .

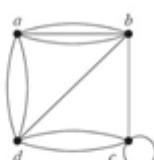
2 (a) Suppose that a connected planar simple graph has 20 vertices, each of degree 3. Into how many regions does a representation of this planar graph split the plane?

(b) What are rooted trees? Prove that a tree with n vertices has $(n - 1)$ edges.

3 (a) Use an adjacency matrix to represent the (a) graph and (b) the pseudo-graph shown below:



(a)



(b)

(b) How many edges are there in a graph with 10 vertices each of degree six?

4 (a) Form a binary search tree for the words *mathematics*, *physics*, *geography*, *zoology*, *meteorology*, *geology*, *psychology*, and *chemistry* (using alphabetical order).

(b) Find a breadth-first search spanning tree and a depth-search spanning tree for the following graph:

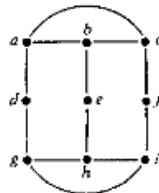


QUESTION BANK

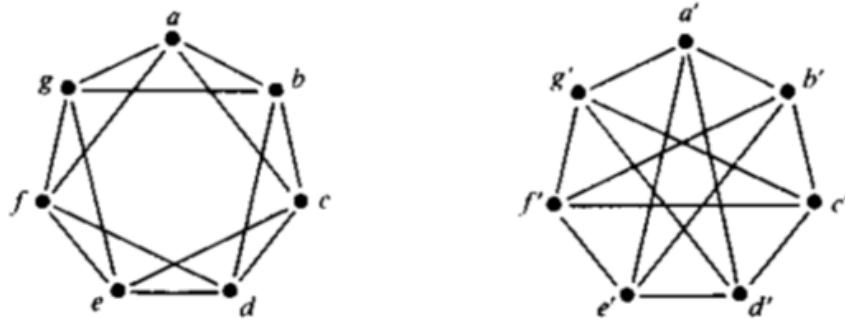
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5 (a) Find a Hamiltonian path for the following graph:

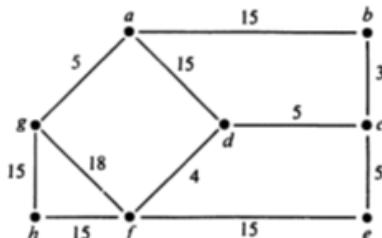


(b) Show that the following graphs are isomorphic:



6 (a) State and prove Euler's formula and show that the complete bipartite graph $K_{3,3}$ is not a planar graph.

(b) State Kruskal's algorithm and using this determine spanning tree for the following graph:





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IMPORTANT QUESTIONS

OPERATING SYSTEM

QUESTION BANK**SUB NAME : Operating System****SUB CODE: 1CS0103****UNIT-I: INTRODUCTION TO OPERATING SYSTEM**

1. List out different services of Operating Systems and explain each service.
2. Explain the following terms and their working with diagram
 - a) Simple Batch System
 - b) Parallel Processing
 - c) Time sharing
 - d) Distributed Operating System
 - e) Real-time Operating System
3. Explain the Layered Architecture of an Operating System in detail
4. Explain the Linux File system in detail.
5. Explain File handling utilities of Linux with example

QUESTION BANK**SUB NAME : Operating System****SUB CODE: 1CS0103****UNIT-II: PROCESS AND CPU SCHEDULING**

1. Explain about process scheduling? Explain different types of schedulers?
2. a) Differentiate between process and threads
b) Write a note on Process states with diagram
3. a) Explain Priority scheduling algorithm with example
b) Explain Round Robin scheduling algorithm with example.
c) Explain FCFS scheduling algorithm with example.
d) Explain SJF scheduling algorithm with example
4. What is starvation? Explain the technique to overcome Starvation.
5. a) What is meant by Context Switching?
b) What does PCB contain?

QUESTION BANK

SUB NAME : Operating System

SUB CODE: 1CS0103

UNIT-III: PROCESS MANAGEMENT AND SYNCHRONIZATION

1. What is deadlock? Explain deadlock prevention in detail.
2. a) Explain about resource allocation graph (RAG)?
b) Mention the Safe State and Unsafe State in Deadlock Avoidance
3. Find the safe sequence of the processes to avoid deadlock using banker's algorithm.

Considering a system with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken:

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

4. Explain in detail how the hardware synchronization and software synchronization mechanisms are used for process synchronization.
5. Explain the Classical Problems of Synchronization in detail.

QUESTION BANK**SUB NAME : Operating System****SUB CODE: 1CS0103****UNIT-IV: MEMORY MANAGEMENT AND VIRTUAL MEMORY**

1. Explain in detail the importance of inter process communication in OS.
2. Explain the following
 - a) mailbox b) pipe c) FIFO
3. Differentiate message passing and shared memory mechanism
4. a) What is swapping and what is its purpose?
b) Distinguish between Internal and External Fragmentation.
5. Explain the basic concepts of segmentation in detail.
6. Why is paging necessary in OS? Explain in detail with a neat diagram.
7. Consider a system which is having LAS=4GB, PAS=64MB, page size=4kb.
Find the a) No of pages b) No of frames c) No of entries in page table d)
Size of page table
8. Find the page fault and page hit ratio for the given reference string using
optimal and LRU (least recently used) algorithm.
Ref string: **70120304230321201701**
9. a) what is virtual memory and explain how multitasking is possible with
virtual memory
b) Explain page fault handling and thrashing.

QUESTION BANK**SUB NAME : Operating System****SUB CODE: 1CS0103****UNIT-V: FILE SYSTEM INTERFACE AND OPERATIONS**

1. Explain different Disk scheduling algorithms FCFS, SCAN, C-SCAN.
2. Write a detail note on the file system Architecture
3. Explain about single-level, two-level directory structure?
4. Discuss in detail various Disk Space Allocation Methods.
5. a) Write a short note on file system mounting.
b) Explain system protection with its goals.



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IMPORTANT QUESTIONS

JAVA PROGRAMMING



QUESTION BANK

SUB NAME : Java Programming

SUB CODE: 1CS0106

UNIT-I: JAVA PROGRAMMING AND CLASSES AND OBJECTS

1. List and explain the features of object-oriented programming.
2. a) What is Type Casting? List and explain types of type casting methods with suitable example.
b) List the primitive data types available in Java and explain
3. Define Constructor. Illustrate various types of Constructors.
4. Explain about control statements in java with example.
5. a) Describe different levels of access specifies in Java
b) Define an Array. How do you declare and access the array in java? Give an example.

QUESTION BANK**SUB NAME : Java Programming****SUB CODE: 1CS0106****UNIT-II: INHERITANCE AND POLYMORPHISM**

1. Define Inheritance. Explain the following with suitable example.
 - a) has-a-relationship
 - b) is-a-relationship
2. Explain about prevention of Inheritance with suitable example.
3. a) Explain Super and “this” key words with suitable example.
b) Why Java does not support multiple Inheritance and Hybrid Inheritance? Explain it.
4. a) Illustrate method overloading and method overriding.
b) What is Polymorphism? Explain the concepts of polymorphism with suitable example.
5. Define an abstraction. Illustrate abstract classes and its methods.

QUESTION BANK**SUB NAME : Java Programming****SUB CODE: 1CS0106****UNIT-III: INTERFACES AND PACKAGES**

1. What is meant by interface? State its need and write syntax and features of interface with example program.
2. a) Explain how interface is used to achieve multiple Inheritances in Java with suitable example.
b) Differentiate between interfaces and abstract class?
3. Define package. How to create and access user defined package in Java? Explain it.
4. a) What are the ways to access package from another package? Explain with an example.
b) Write a java program to extend interface assuming suitable data.
5. a) Define inner classes. List and explain types of Inner Classes with suitable example.
b) List any five built-in packages from Java API along with their use.

QUESTION BANK**SUB NAME : Java Programming****SUB CODE: 1CS0106****UNIT-IV: EXCEPTION HANDLING AND MULTITHREADING**

1. Define exception. How an exception can be handled in Java? And also List the benefits of Exception Handling.
2. a) What are try, catch, and finally keywords in java? Explain it with an example.
b) Differentiate between Checked and Unchecked exceptions?
3. Explain the usage of throw and throws keyword in Exception Handling.
4. a) Explain in detail the process of creating thread with an example.
b) What is a thread? Explain the states of a thread with a neat diagram. (Thread Life Cycle)
5. a) Discuss about producer consumer pattern with an example.
b) Distinguish between multi-tasking and multi-threading?
c) How do we set priorities for threads? Explain it.

QUESTION BANK**SUB NAME : Java Programming****SUB CODE: 1CS0106****UNIT-V: EVENT HANDLING AND GUI PROGRAMMING WITH JAVA**

1. Explain the concept of Java collection frame. Write a brief overview on it.
2. a) Explain briefly about Vector class with an example.
b) What is hash table? Explain with an example.
3. a) Demonstrate about stack class with an example.
b) Explain briefly about Array List with an example.
4. a) Illustrate text input/output File operations.
b) Illustrate binary input/output file operations with examples.
5. How a file can be managed using file class? Explain it.



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IMPORTANT QUESTIONS

DESIGN AND ANALYSIS OF ALGORITHMS

QUESTION BANK**SUB NAME : Design and Analysis of Algorithms****SUB CODE: 1CS0107****UNIT-I: INTRODUCTION AND DIVIDE AND CONQUER**

1. a) Define an algorithm. Give characteristics of an algorithm with advantages and disadvantages.
 b) Explain asymptotic notations.
2. Illustrate Merge sort algorithm and discuss its time complexity.
3. Explain Strassen's matrix multiplication and its time complexity.
4. a) Give the general procedure of divide and conquer method.
 b) Simulate Quick sort algorithm for the following example
 25,36,12,4,5,16,58,54,24,16,9,65,78.
5. Write an algorithm for Binary search with example and discuss its complexity.

QUESTION BANK**SUB NAME : Design and Analysis of Algorithms****SUB CODE: 1CS0107****UNIT-II: DISJOINT SET OPERATIONS AND BACKTRACKING**

1. a) Define Disjoint Set? Show that set $A=\{2,5,6\}$ and $B=\{4,7,8\}$ are disjoint sets. Write an algorithm for Simple Union and Simple find.
b) What is an articulation point? How to find articulation point for a given graph.
2. a) Define spanning tree? Narrate few applications of spanning trees with example.
b) Write in detail about Hamiltonian cycles. Give example to it.
3. Construct State Space Tree for Sum of Subset Problem, given weights are $w[1:6]=\{ 5,10,12,13,15,18\}$ such that sum of subset is 30.
4. Discuss in detail about N- queen's problem using backtracking.
5. Explain Graph Coloring problem using back tracking with an example graph.

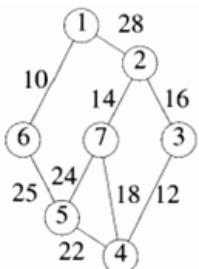
QUESTION BANK

SUB NAME : Design and Analysis of Algorithms

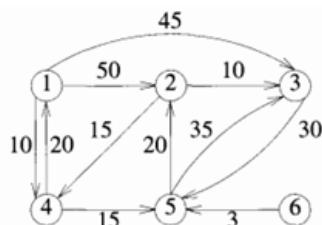
SUB CODE: 1CS0107

UNIT-III: GREEDY METHOD

1. a) Explain General method of Greedy method.
b) Find the greedy solution for the following job sequencing with deadlines problem $n = 7$,
 $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (3, 5, 20, 18, 1, 6, 30)$, $(d_1, d_2, d_3, d_4, d_5, d_6, d_7) = (1, 3, 4, 3, 2, 1, 2)$.
2. a) Explain knapsack problem in Greedy method.
b) Discuss about Greedy Job sequencing with deadlines.
3. Define Greedy knapsack. Find the optimal solution of the Knapsack instance $n= 7$, $M=15$,
 $(p_1, p_2, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$ and $(w_1, w_2, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$.
4. How do you construct a minimum Cost Spanning tree using Prim's and kruskal's algorithm for the below weighted graph.



5. Explain Single source shortest path problem for the following graph.



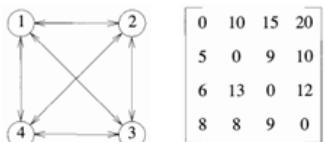
QUESTION BANK

SUB NAME : Design and Analysis of Algorithms

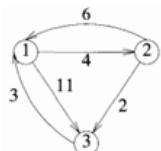
SUB CODE: 1CS0107

UNIT-IV: DYNAMIC PROGRAMMING

1. Solve a travelling sales person problem using dynamic programming by considering the following directed graph and edge length matrix.



2. Explain the chained matrix multiplication with suitable example.
 3. Give optimal solution for all pairs shortest path problem using dynamic programming for the given digraph.



4. Provide optimal solution for the 0/1 knapsack instance $n = 3$, $(p_1, p_2, p_3) = (1, 2, 5)$, $(w_1, w_2, w_3) = (2, 3, 4)$ and $m = 6$ by using dynamic programming.
 5. a) Define Principle of optimality. Discuss general method of dynamic programming.
 b) Differentiate between Greedy Method and Dynamic Programming.

QUESTION BANK**SUB NAME : Design and Analysis of Algorithms****SUB CODE: 1CS0107****UNIT-V: BRANCH AND BOUNS AND NP-HARD AND NP-COMPLETE PROBLEMS**

1. Draw the state space tree generated by LCBB for the following instance of 0/1 knapsack problem
 $n= 4$, $M=15$, profits: {10,10,12,18} and weights: {2,4,6,9}.
2. Generate reduced cost matrices by considering the traveling sales person instance defined by the cost matrix corresponding to each node.

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

3. a) Explain general method of Branch and Bound algorithm design technique.
b) Elaborate non deterministic algorithm.
4. Discuss in detail about the class NP-hard and NP-complete problems.
5. a) Explain briefly FIFO and LC Branch and Bound method.
b) Differentiate between NP - Hard and NP-Complete classes.



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IMPORTANT QUESTIONS

APPLIED CRYPTOGRAPHY

QUESTION BANK**SUB NAME : Applied Cryptography****SUB CODE: 1CS0403****UNIT-I: INFORMATION SECURITY**

1. Explain Confidentiality, Integrity and Availability with example.
2. Define Computer Security according to NIST. Describe CIA Triad with help of diagram.
3. Define the term Authentication and its types, authorization and Non-repudiation with example.
4. Describe Digital signature. Explain step-by-step procedure of Digital Signature. Write some Application areas of Digital Signatures in Real-World.
5. Write a short notes on
 - a) Secure Key/Cryptographic Key
 - b) Identity based public cryptography
6. Explain the term hashing. what is role of hash function in cyber security and Crypto currency.

QUESTION BANK**SUB NAME : Applied Cryptography****SUB CODE: 1CS0403****UNIT-II: SYMMETRIC ENCRYPTION & ASYMMETRIC ENCRYPTION**

1. What is Symmetric and Asymmetric Encryption Algorithm? Explain Block cipher and Stream cipher with examples.
2. Explain the DES and Triple-DES Algorithm with example.
3. Describe the Creation of keys in Advanced Encryption Standard (AES) Algorithm. Explain the encryption and decryption process of AES algorithm using 128-bits keys.
4. Explain the RSA Algorithm in cryptography with its characteristics.
5. Describe the Oblivious Transfer (OT) Protocol with 1-out-of 2 and 1-out of-n for private information retrieval.
6. Explain Homomorphic encryption with examples.
7. What is Elliptic Curve Cryptography? Give some advantages & Application areas of it.
8. Explain Esoteric protocol in context of secure election
 - a. Major SIX requirements of Electronic Voting
 - b. Simplistic Protocols (1 & 2)
 - c. Voting with ANDOS
 - d. Voting with blind Signature

QUESTION BANK**SUB NAME : Applied Cryptography****SUB CODE: 1CS0403****UNIT-III: HASHING AND MESSAGE DIGESTS & MESSAGE AUTHENTICATION**

1. What is Cryptographic Hash Function? Explain with suitable example.
2. Explain the Authentication Standards – Kerberos with suitable diagram.
3. Write short notes on “Application of Hashing in Data integrity in email.”
4. Explain Hash functions based on Cipher Block Chaining (CBC) with examples.
5. Why we need for MAC based on Hash Functions (HMAC) in cryptography. Explain HMAC algorithm with operations and diagram.
6. Describe the simple hash function and its features for ensuring the security.
7. Describe the Secured Hash (SHA) Function and its applications in details.
8. Write short notes on “Application of Hashing in Password Storage” with suitable example.

QUESTION BANK**SUB NAME : Applied Cryptography****SUB CODE: 1CS0403****UNIT-IV: INFORMATION THEORY**

1. Describe Lucifer and Madryga Algorithm with neat and clean Diagram?
2. Explain the 3-Way cryptographic algorithm with encryption and decryption.
3. Describe the GOST algorithm with Sub keys in Different Rounds.
4. Clarify the CRAB and Rivest Cipher 5(RC5) cryptographic algorithm.
5. Illustrate Double Encryption (2-DES) and Triple Encryption (3-DES) with suitable diagram.
6. Write a short notes on
 - a) CDMF Key Shortening and Whitening
 - b) NewDES Cryptographic Algorithm

QUESTION BANK**SUB NAME : Applied Cryptography****SUB CODE: 1CS0403****UNIT-V: APPLYING CRYPTOGRAPHY ALGORITHMS**

1. What is a smart card? How Do Smart Cards Work? How you can use smart card in E-passport and ID cards.
2. What is Mobile Device Security and why it is important in cyber security? Explain Components of mobile device security.
3. Explain secure payment System with example. What Is Bitcoin and How Does it work?
4. Explain Pohlig–Hellman Algorithm with example.
5. Illustrate Elliptic-curve cryptography/cryptosystem with suitable example.
6. Write a short notes on
 - a) SDA/DDA/CDA Bank Cards
 - b) McEliece cryptosystem



MALLA REDDY UNIVERSITY

SCHOOL OF ENGINEERING

CYBER SECURITY

IMPORTANT QUESTIONS

WIRELESS SENSOR NETWORKS AND SECURITY

QUESTION BANK**SUB NAME : Wireless Sensor Networks and Security****SUB CODE: 1CS0405****UNIT-I: INTRODUCTION**

1. What is an Adhoc Network? Explain how to build an Adhoc network and its operating principle?
2. Explain different challenges in wireless Adhoc networks?
3. Explain different issues in wireless Adhoc networks?
4. Explain with neat chart classification of MAC protocols?
5. Explain the following?
 - a. MAC Protocols Using Directional Antennas
 - b. Multiple-Channel MAC Protocols
6. Explain different Routing protocols based on update routing information update mechanism in Adhoc Networks?
7. Explain various Power-Aware routing metrics in wireless Adhoc networks?
8. Explain different types of wireless sensor networks? Differentiate between infrastructure based and infrastructure less network?
9. Explain the concept of contention based MAC protocols with MACAW protocol?
10. Explain block diagram of communication system? Classify different channels?

QUESTION BANK**SUB NAME : Wireless Sensor Networks and Security****SUB CODE: 1CS0405****UNIT-II: TRANSPORT & QoS IN SENSOR NETWORKS**

1. Explain briefly TCP's challenges and Design Issues in wireless Ad Hoc Networks?
2. Explain in detail various Transport protocols for wireless ad hoc networks in security environment?
3. Explain in detail Issues and Challenges in providing QoS in wireless adhoc networks?
4. Discuss briefly classification of quality of service approaches used in wireless adhoc networks?
5. Explain MAC layer QoS solutions used in wireless adhoc networks?
6. Explain Network layer QoS solutions used in wireless adhoc networks?
7. Explain in detail complete QoS frame work model with neat sketch in wireless adhoc networks?
8. Explain bandwidth routing protocol used in wireless adhoc networks?
9. Explain about on demand QoS routing protocol used in wireless adhoc networks?
10. Explain about IEEE 802.11 CSMA / CA protocol in detail?

QUESTION BANK**SUB NAME : Wireless Sensor Networks and Security SUB CODE: 1CS0405****UNIT-III: MAC & ROUTING IN WIRELESS SENSOR NETWORKS**

1. Explain the following architectures?
 - a) Layered network architecture
 - b) Clustered network architecture
2. Explain design issues and characteristics of wireless network architecture.
3. Discuss different sources of energy wastage and various problems on MAC layer?
4. Explain various low duty cycle protocols and wake up concepts in MAC layer?
5. Explain in detail in various steps in S-MAC protocol?
6. What is zigbee alliance? Explain various zigbee network applications?
7. Explain in detail IEEE 805.15.4 MAC protocol?
8. Explain in detail device types and its operating modes in IEEE 805.15.4 MAC protocol?
9. Explain about schedule based protocols in WSN?
10. Explain in detail about Zigbee protocol in WSN environment?



QUESTION BANK

SUB NAME : Wireless Sensor Networks and Security SUB CODE: 1CS0405

UNIT-IV: TRANSPORT & QoS IN WIRELESS SENSOR NETWORKS

1. Explain the following
 - i. Data centric networking
 - ii. Contention based networking
2. Explain the concept of congestion flow control in network processing?
3. Explain various operating systems for wireless sensor networks?
4. Discuss few examples in operating systems for wireless sensor networks?
5. Explain transport layer in wireless sensor networks?
6. Explain QoS in wireless sensor networks?

QUESTION BANK**SUB NAME : Wireless Sensor Networks and Security****SUB CODE: 1CS0405****UNIT-V: SECURITY IN WIRELESS SENSOR NETWORKS**

1. Discuss various security issues in wireless sensor networks?
2. Explain the concept of key distribution and management for security in WSN?
3. Explain the concept of intrusion detection in security of a WSN?
4. Explain software based anti-tamper techniques?
5. Explain about water marking techniques?
6. Explain about Defence against routing attacks Secure Ad hoc routing protocols?
7. Explain the concept of Broadcast authentication WSN protocols?
8. Explain the concept of TESLA?
9. Explain the concept of Biba Sensor Network Security Protocols?
10. Explain the concept of SPINS?