[This question paper contains 3 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **1811** **GC-4**

Unique Paper Code : 32341201

Name of the Course : **B.Sc.(Hons.) Computer Science**

Name of the Paper : Programming In Java

Semester : II

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **all** questions from **Section A**.

(c) Attempt any **four** questions from **Section B**.

SECTION - A

1. (i) What is the difference between String and StringBuffer classes ? What is the role of replace () function in String class ? 2

(ii) When Integer ("abc") is called, what kind of exception is thrown ? 2

(iii) Write code in java to create an applet that displays a label with the caption "Welcome". 2

(iv) Differentiate between == and equals ( ) method as applied to String objects. 2

P.T.O.

(v) Is the following statement.

void vaTest (int .....v)

correct ? Comment. 2

(vi) What are the two ways to create a thread ? Write a code segment to create a class my Thread using both the ways. 3

(vii) Define an Enumeration Day with values (Mon, Tue, Wed, Thu, Fri, Sat, Sun). Write a code segment to display all values of enumeration Day. What is the result of ordinal () method ? 4

(viii) What is the purpose of param tag in case of applets ? How are parameters retrieved using the method get Parameter ( ) ? Give an example. 4

(ix) Given an integer variable int a = -1, what is the output for a >>24 and a>>>24 ? 4

(x) What is the error in the following codes : 4

a). int a (1⊙);

System. out.printIn (a [2]);

b) class A

{

public static void main (String args [ ])

{

L1: for (int i=0; i<4; i++)

```
        {
          System. out. print ("Pass" + i + ": ");
        }
        for (int j=0; j<100; j++)
    {
        if (j==10) break L1;
        System.out.print (j + " ");
    }
  }
}
```

(xi) State the use of keywords final, finally and finalize () in Java. 6

SECTION - B

2. (i) Write a for-each loop to find sum of all elements of an integer array. 2

(ii) What are static functions ? Can a static method access a non-static data or method ? Explain with the help of suitable example. 4

(iii) Write a Java code segment to create a mutable string with size 30 bytes and store "Hello" in that. What is the output of length ( ) and capacity ( ) function on the created string ? 4

3. (i) How does an interface differ from a class in Java ? Define an interface which has a method to convert length given in inches to centimeters (one inch=2.54 cm). Define a class called rectangle that implements the interface and finds area in cm^2 given its side in inches. 4

(ii) Consider the following files f1. java and f2. java : 6

f1.java

```
package myPack1;
public class A
{
    int i;
private int j ;
protected int k;
public int 1;
:
}
class B
{
:
}
class C extends A
{
:
```

```
}
f2. java
package myPack2;
import myPack1.*;
class D
{
    :
}
class E extends A
{
    :
}
```

Which variables of class A are accessible in classes B,C,D and E ? Why ?

4. (i) What do you understand by AWT controls ? List name of two AWT controls. 2

(ii). What is the purpose of getsize ( ) and setsize ( ) functions in case of Window class ? 2

(ii) Write a java program to read a text file and display its contents. Name of the file is input from command line. Also handle the appropriate exceptions. 6

5. (i) What is the advantage of using try-with-resources statement ? Give an example. 3

(ii) Write a Java code segment to read name of student from the command line. If the first letter of the name is not a capital letter, then throw an exception. 3

(iii) What is the output of following code : 4

```
class PassObjRef
{
    public static void main (string args[ ])
    {
        Test ob=new Test (15,20);
        int k = 10;
        System.out. print In ("ob.a, ob. b, k
        before call: " + ob.a + ob.b + k);
        ob.meth (ob,k);
        System. out. print In ("ob.a, ob.b, k
        after call: " + ob.a + ob.b + k);
    }
}
class Test
{
    int a,b;
    Test (int i, int j)
    {
        a=i;
        b=j;
```

```
    }
    void meth (Test o, int index)
    {
            o.a *=2;
            o.b /=2;
            index = index *10;
    }
}
```

4

6. (i) Write a Java Applet to display "Hello World" in blue color. 4

(ii) What do you understand by event listener interfaces ? Name event listener interface that is notified when following event occur : 6

(a) When component is resized

(b) When mouse is pressed

(c) When mouse is moved

(d) When window gains or loses input focus

7. (i) Give output of following: 2

```
Class A
{
public static void main (String args [ ])
{
```

```
Boolean b=true;
if (b) System. out. printIn ("b is true");
 character ch= 'x';
char ch2=ch;
System.out. printIn ("ch2 is " + ch2);
   }
}
```

(ii) What is checked exception ? How is it different from unchecked exception ? Give an example of each. 3

(iii) State the purpose of each of the following methods in context of a thread: 5

(a) run ()

(b) sleep ()

(c) start ()

(d) join ()

(e) is Alive ()

[This question paper contains 7 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **1812** **GC-4**

Unique Paper Code : 32341202

Name of the Course : **B.Sc.(Hons.) Computer Science**

Name of the Paper : Discrete Structures

Semester : II

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) **Section A** (Question **1**) is compulsory and Carries **35** marks (7×5=35).

(c) Attempt any **four** questions from **Section B** (Question **2-7**)

(d) Parts of a question must be answered together.

(e) Symbols have their usual meanings.

P.T.O.

SECTION - A

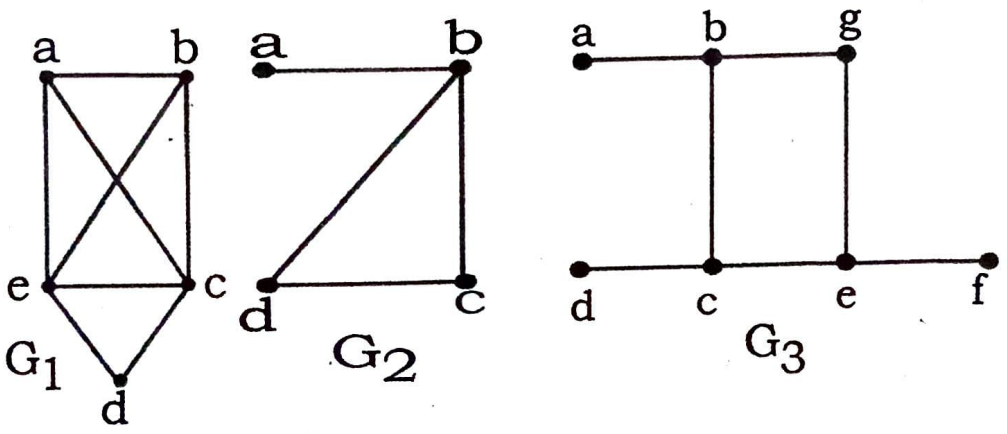
1. (a) Among 100 students, 32 study mathematics, 20 study physics, 45 study biology, 15 study mathematics and biology, 7 study mathematics and physics, 10 study physics and biology and 30 do not study any of the three subjects.

(i) Find the number of students studying all three subjects.

(ii) Find the number of students studying exactly one of the 3 subjects.

(b) Let A= { 1,2,3,4,5,6,7} and R={(x,y) : x-y is divisible by 3}. show that R is an equivalence relation. 5

(c) Define Hamilton path and Hamilton circuit. Classify the following graph as a Hamilton path and/or a Hamilton circuit. 5



(d) Define Bipartite Graph and Complete Bipartite Graph. Check whether the graph C_6 is Bipartite or not ? Justify your answer. 5

(e) Determine the numeric function for the following generating function : 5

$A(Z) = 1/(5 - 6Z - Z^2)$

(f) Show that the following system is inconsistent : 5

$P \rightarrow Q, P \rightarrow R, Q \rightarrow \neg R, P$

(g) Use Master method to find the asymptotic bounds for the following recurrence 5

$T(n) = 2T(n/2)+n^2$

P.T.O.

SECTION - B

2. (a) Show that :

$1.2^1+2.2^2+3.2^3+.....+n.2^n=(n-1)2^{n+1}+2$ by induction. 5

(b) Determine whether the function f is a bijection from R to R. Find $f \circ g$ and $g \circ f$ for the functions f and g where $f(x)=2x^2+3$ and $g(x)=x+1$. Is $f \circ g = g \circ f$? 5

3. (a) In how many ways can four students be selected out of twelve students, if : 5

(i) Two particular students are not included at all ?

(ii) Two particular students are included.

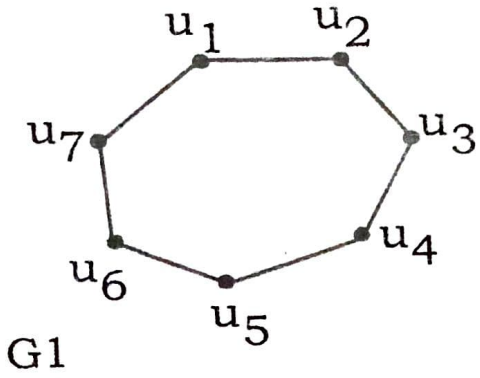
(b) Let A= {1,2,3,4,6,8,9,12,18,24} and let R be a partial ordered relation on A defined by xRy if and only if "x divides y". 5

(i) Draw the Hasse Diagram of R.

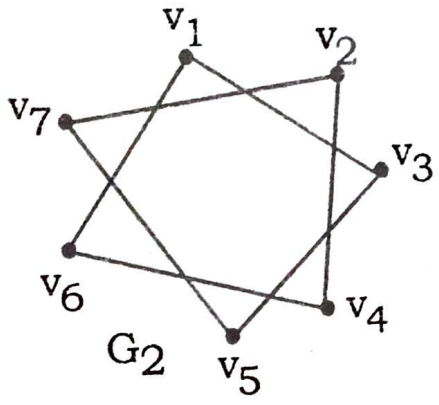
(ii) Find the Maximal and Minimal elements in A.

4. (a) Define planar graph. Is $K_{3,3}$ planar. Justify your Answer. For any connected planar graph, show that v-e+r=2, where v,e and r are the number of vertices, edges and regions of the graph respectively. 5

(b) What do you mean by graph invariant ? Determine whether the graphs G1 and G2 are isomorphic. 5



G1



G2

5. (a) (i) What is the chromatic number of C_n where $n \geq 3$ and $k_{m,n}$?

(ii)Prove that a connected graph is a tree if and only if the number of vertices in the graph is one more than the number of edges. 5

(b) Let $f(n)=n^2+4n$ and $g(n)=n^2$, $n \geq 0$. Show that $f(n)=O(g(n))$ 5

P.T.O.

6. (a) Solve the following recurrence relation :

$a_r - 7a_{r-1} + 10a_{r-2} = 3^r$, given that $a_0 = 0$ and $a_1 = 1$.

5

(b) Suppose that the number of bacteria in a colony triples every hour. 5

(i) Set-up a recurrence relation for the number of bacteria after n hours have elapsed.

(ii) If 100 bacteria are used to begin a new colony, how many bacteria will be in the colony in 10 hours ?

7. (a) Show the validity of the following argument: If Ram gets the job and works hard, then he will be promoted. If Ram gets promotion, then he will be happy. He will not be happy. Therefore, either he will not get the job or he will not work hard.

5

(b) (i) Write the Contrapositive, Converse and Inverse of the following statement :

"The home team wins whenever it is raining" 5

(ii) Show that

$$\neg(p \leftrightarrow Q) \Xi (P \vee Q) \wedge \neg(P \wedge Q)$$

This question paper contains 4 printed pages.

Sl. No. of Ques. Paper : **42** **G**

Unique Paper Code : **234261**

Name of Paper : **Data Structure (Computer Sc. – II)**

Name of Course : **B.Sc. (Prog.) Physical / Mathematical Sciences**

Semester : **II**

Duration : **3 hours** *Maximum Marks* : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Section A is compulsory.
Attempt any five questions from Section B.

SECTION A

1. (a) Write full form of FIFO and LIFO. Which method does stack use— FIFO or LIFO? 2

   (b) Evaluate the following postfix expression. Assume A=1, B=2, C=3.

   ABC+*CBA−+* 2

   (c) In worst case which search is better, linear search or binary search and why? 2

   (d) Write class definition for a node of doubly linked list in C++. 2

   (e) List two main differences between singly and doubly linked list. 2

   (f) If a binary tree contains *m* nodes at level L, how many nodes does it contain, at most, at level L+1? 2

P. T. O.

(g) Define the following:—

(i) Depth of Binary tree

(ii) Binary search tree

(iii) Strictly Binary tree

(iv) Height of Binary tree. 4

(h) Write a recursive function to traverse a binary search tree in preorder. 4

(i) Differentiate between the following:—

(i) Linear Search and Binary Search

(ii) Stack and Queue. 5

SECTION B

Attempt any five questions.

2. (a) Convert the following infix expression into postfix form showing intermediate status of the stack after every step in tabular form:—

$$(A+B)*(C/(D-E)+F)-G$$ 5

(b) List advantages and disadvantages of linked list implementation of stack over array implementation. 4

(c) Name the data structure used for the implementation of recursion. 1

3. (a) Write a function that uses stack to find whether a string is a palindrome or not. (For example, MADAM is palindrome, ANT is not a palindrome.) 5

(b) Give the linked list implementation of a queue.

Write the function to delete an element from the queue. 5

4. (a) Write a function in C++ to count the number of elements in a linked list. 5

(b) Use array implementation to write the push() and pop() function of Stack. 5

5. (a) Define the following terms:—

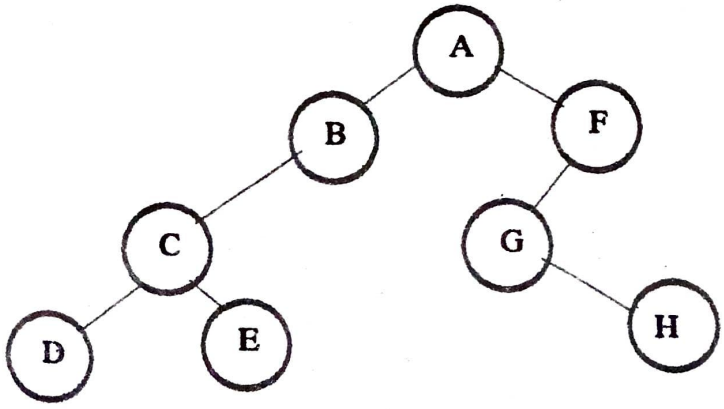
(i) Circular Queue

(ii) Dequeue (Double Ended Queue)

(iii) Linked List. 3

(b) If a binary tree contains *m* nodes at level L, how many nodes does it contain, at most, at level L+1? 2

(c) Perform the Preorder and Postorder traversal of the following binary tree. 5



6. (a) What are the conditions used to determine the overflow and underflow of a queue? How are these conditions handled in case of circular queue? 5

(b) List various ways of implementing priority queues using array implementation.

Write the linked list implementation of priority queue. 5

7. (a) Show the sequence of steps involved in sorting the elements using Insertion sort. The list of elements is as follows:—

7, 12, 3, 2, 4, 9 5

(b) Create a binary search tree using the following values:—

15, 3, 22, 5, 4, 34, 7, 2, 8

Show all the intermediate trees. 5

8. (a) Write a function in C++ for bubble sort.

5 (b) Write a function in C++ for binary search using recursion. 5

This question paper contains **8** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **2395**

Unique Paper Code : **32345201** **GC-4**

Name of the Paper : **Introduction to Database Systems**

Name of the Course : **GE : Computer Science for Honours**

Semester : **II**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt any *four* of question Nos. **2** to **7**.

Parts of a question must be answered together.

Marks are indicated against each question.

1. (*a*) Differentiate between tuples and attributes of a relation. Illustrate by giving an example. 4

(*b*) For the binary relationships given below, suggest the cardinality ratio based on the common sense meaning of entity types.

	Entity1	**Cardinality Ratio**	**Entity2**
(*i*)	STUDENT	.....	TEACHER (Enrolled in a Course)
(*ii*)	CLASSROOM	.....	BLACKBOARD
(*iii*)	COUNTRY	.....	CURRENT_PRESIDENT
(*iv*)	EMPLOYEE	.....	DEPARTMENT

4

(*c*) Justify the following statements : 2×3=6

(*i*) Primary key cannot be null.

(*ii*) Weak entities do not have their own key attributes.

(*d*) Define foreign key. Why is it used ? 2

(e) What is a relational data model ? Explain in the context of a relation 'STUDENT'. 1+2=3

(f) Consider the following database schema.

STUDENT

Name	Student_id	Class	Major	Marks
Smith	17	1	CS	85
Browny	8	1	CS	76
Jane	14	1	CS	65
Bob	5	1	CS	90

Write SQL statements to perform the following operations on the above database.

(*i*) Insert a new student, <'Johnson', 25, 1, 'MATH'>, in the database.

(*ii*) Change the class of 'Smith' to 2.

(*iii*) Delete the record for the student whose name is 'Smith' and whose 'Student_id' is 17. 3×2=6

P.T.O.

(*g*) Differentiate between DROP and DELETE command with the help of one example each. 4

(*h*) Consider the relation given in Q.1. (*f*). Write SQL queries for the following tasks :

(*i*) Display the name and marks of the student who scored highest marks.

(*ii*) Display total number of students.

(*iii*) Display average marks of the class. 3×2=6

2. (*a*) Define the following terms :

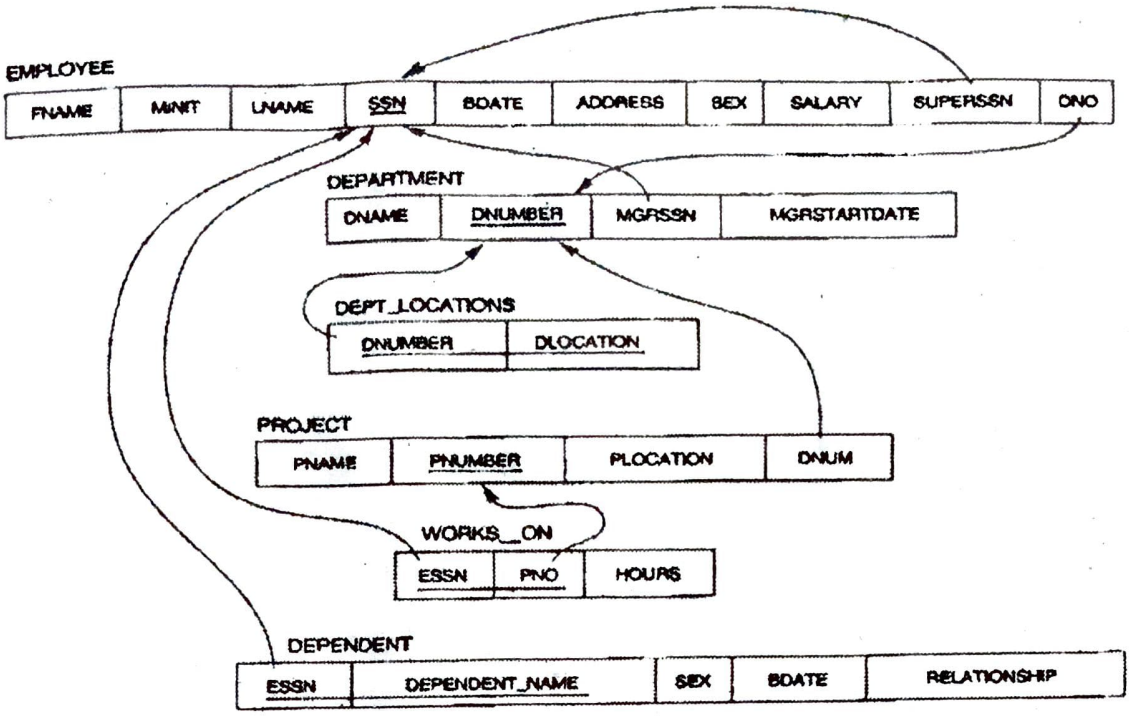
(*i*) Meta data

(*ii*) Candidate key. 2×1=2

(*b*) What are the four types of database users ? Discuss the role of each. 4

(*c*) Differentiate between HAVING and WHERE clause. Illustrate the same by giving *one* example. 4

3. Consider the following COMPANY database schema :



(*i*) Specify six primary and six foreign keys for this database schema. 6

(*ii*) Write CREATE TABLE command for the relation DEPARTMENT specifying primary and foreign key constraints. 4

4. Consider the following set of requirements for a UNIVERSITY database that is used to keep track of students' transcripts.

(*a*) The University keeps track of each student's name, student number, social security number, current address, birthdate and sex.

(*b*) Each department is described by a name, department code, office number, office phone, major department, minor department and degree program (B.A., B.Sc. etc.)

(*c*) Each section has an instructor, semester, year, course and section number.

Design an ER diagram for the above problem. Specify key attributes of each entity. 10

5. (*a*) Consider the following tables:

WORKS (Pname, Cname, Salary)

LIVES (Pname, Street, City)

LOCATED_IN (Cname, City)

MANAGER (Pname, Mgrname)

Where Pname=Person name, Cname=Company name and Mgrname=Manager Name

Write SQL queries for the following :

(*i*) List the names of the people who work for the company Wipro along with the cities they live in.

(*ii*) Find the people who work for the company 'Infosys' with a salary more than Rs. 50,000. List the names of the people, along with the street and city addresses.

(*iii*) Find the names of the persons who do not work for the company 'HCL'. 3×2=6

(*b*) What do you understand by Normalization in database design ? Explain Third Normal Form (3NF) by taking suitable example(s). 4

6. (*a*) What is a relationship set ? 2

(*b*) Give short answers for the following :

(*i*) Properties that describe an entity's characteristics.

(*ii*) Language used to define data in a database.

(*iii*) SQL clause used for sorting the tuples.

(*iv*) SQL clause used for pattern matching in a string. 4×1=4

(*c*) Suggest appropriate data types for the following attributes :

(*i*) Date of birth

(*ii*) Marks of a student

(*iii*) Employee id

(*iv*) Name of a school. 4×1=4

7. (*a*) What is a binary relationship ? Illustrate the same with the help of an example. 4

(*b*) Describe the three level architecture of database approach for a DBMS with the help of a block diagram. What is the difference between logical and physical data independence. 4+2=6

This question paper contains 4 printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **2686**

Unique Paper Code : **32345401** **GC-4**

Name of the Paper : **Information Security and Cyber Laws**

Name of the Course : **Computer Science : Generic Elective for Honours**

Semester : **IV**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory form Section A.

Attempt any *four* questions from Section B.

Section A

1. (*a*) Briefly describe the term authentication. 2

(*b*) What do you understand by password cracker ? List any *two* cracker programs. 3

(*c*) Define electronic signature and denial of service attack. 3

P.T.O.

(*d*) Differentiate between law and ethics. 3

(*e*) What is the punishment under Section 66A for sending offensive messages through communication service under ITAA 2008 ? 3

(*f*) Explain briefly an intrusion detection system. 2

(*g*) What is a security policy ? Explain the contents of a security policy. 4

(*h*) Write notes on (any *two*) : 4

(*i*) Incident Response Plan

(*ii*) Password selection criteria

(*iii*) Section 72 for Breach of confidentiality and privacy.

(*i*) What is a firewall ? Why is it used ? Explain what a firewall can and cannot do ? 5

(*j*) List the *three* security goals of a computer system. 3

(*k*) What do you understand by default accounts in Windows ? What is its disadvantage ? 3

Section B

2. (*a*) What is Computer Crime ? List any *three* examples where computers are used to commit crime. 4

(*b*) What is the difference between vulnerability and threat ? Explain different kinds of threats. 6

3. (*a*) Encrypt the text "Meet me tomorrow at ten" using ceaser cipher with key as 3. 5

(*b*) Explain Section 66F on Cyber Terrorism of ITAA 2008. 5

4. (*a*) What are scanners and why they are used ? 4

(*b*) What is the purpose for security policy ? Also explain durability of security policy. 6

5. (*a*) Explain any *four* means to commit Cyber Crime. 4

(*b*) What do you understand by hacker ? Explain how hackers are classified into different categories. 6

6. (*a*) What do you understand by risk ? What are the strategies for dealing with risks ? 4

(*b*) What is Hijacking ? Explain TCP Session Hijacking. 6

7. Differentiate between : 10

(*i*) Virus and Trojan

(*ii*) Active and Passive Attacks

(*iii*) Fault and Failure

(*iv*) Symmetric and Asymmetric Encryption.

'his question paper contains 8 printed pages.]

Your Roll No.....

. No. of Question Paper : 2796 **GC-4**

nique Paper Code : 32341401

ame of the Paper : Design and Analysis of Algorithms

ame of the Course : **B.Sc. (H) Computer Science**

emester : IV

uration : 3 Hours Maximum Marks : 75

ıstructions for Candidates

Write your Roll No. on the top immediately on receipt of this question paper.

Question No. **1** of **35** marks is compulsory.

Attempt any **four** questions from Q. No. **2** to Q. No. **7.**

(a) Arrange the following functions in the increasing order of their rate of growth : 2^{2^n}, 2^{n^2}, $n^2\log(n)$, n^{2^n} (2)

(b) Consider the ternary search algorithm for searching an element in a given array: divide the array into three equal parts by taking two mid points, viz., left mid and right mid. If the search element is equal to the left mid, output left mid; if it is equal to the right mid, output the

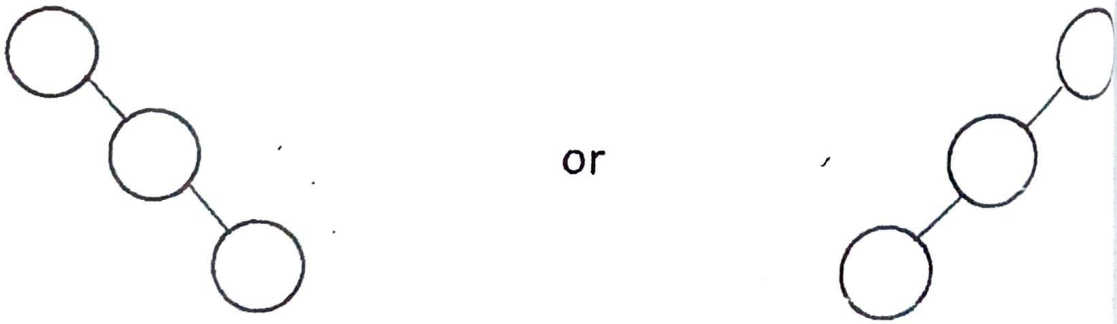
P.T.O.

right mid; if it is smaller than the left mid, perfo
recursive search in the leftmost partition; if it is gre
than the right mid, perform a recursive search in
rightmost partition; else perform a recursive searc
the middle partition. Thus, the algorithm perform
comparisons in each iteration and recurses on one-th
of the array. Write the recurrence relation for the runn
time of the algorithm and solve it.

(c) Consider an instance of the subset sum probl
where bound W = 6, Items with weights $w_1 = 2$, $w_2 =$
$w_3 = 2$.

With the help of the above example argue that t
memorized recursive algorithm solves lesser number
subproblems than the corresponding iterative algorith

(d) Consider a linear chain of 3 nodes shown below :



Argue that such a chain cannot form a red-black tre
For each possible coloring of the three nodes, mentio
the property that is violated. (4)

(e) A shopkeeper has W marbles and n empty bottles. Let c_1, c_2,....., c_n respectively denote the number of marbles the bottles can contain. The shopkeeper wants to store the marbles in the bottles.

(i) Describe a greedy algorithm which minimizes the number of bottles used.

(ii) How would you modify your algorithm if bottle i also has an associated cost price p_i and the goal is to minimize the total cost of the bottles used. (3+4)

(f) Suppose an input to the bucket sort algorithm is not uniformly distributed. Then: (i) will the sort still give correct output? (ii) what will be the impact of relaxing this condition on the running time ? Justify. (3)

(g) Discuss the run time complexity of the naive string matching algorithm. (2)

(h) Compare the space requirements of adjacency list and adjacency matrix representations of a graph having m edges and n vertices. (3)

(i) Give an efficient algorithm to find the minimum element in a max-heap. Give the exact running time of the algorithm. (3)

(j) Would you use BFS to find the shortest path betwee two nodes in a weighted graph with arbitrary edg weights ? Justify your answer. (3

2. (a) Give an efficient algorithm to check if a given undirecte graph has a cycle. Discuss the time complexity of yo algorithm. (5

(b) For each of the following operations does a Red Blac Tree work faster than a Binary Search Tree ? Elaborat your answer.

(i) Search

(ii) Postorder traversal (5

3. (a) A priority queue is implemented in two different way using a max heap and an array sorted in decreasin order of key values (higher key value indicates highe priority). Compare the time complexity of the followin operations when performed on the two differen implementations of the priority queue.

(i) Finding the maximum element

(ii) Deleting the maximum element

(iii) Increase the priority of a certain element (6

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(b) Suppose a graph G has two edge-disjoint spanning trees (two spanning trees that have no edges in common). Argue that in this graph G, every pair of nodes forms part of a cycle. (4)

(a) Consider the following recursive algorithm to find an optimal schedule for weighted interval scheduling problem :

Compute_opt(j)

If j = 0 then

Return 0

Else

Return max(v_j + Compute_opt(p(j)), Compute_opt(j-l))

(i) Explain why does this algorithm take exponential time to run in the worst case.

(ii) What changes should be made to the above algorithm to make it run in polynomial time. (6)

(b) Suppose that an n x n array A consists of 1's and 0's such that in any row of A all the 1's come before any 0's in that row. Give an O(nlgn) algorithm for counting the number of 1's in A. (4)

5. (a) Give an example graph having four nodes that does not have a topological ordering. (3)

(b) Suppose a large array is maintained with the following policy: the list is initially sorted. When new elements are added, they are inserted at the end of the array and counted. Whenever the number of new elements reaches 10, the array is resorted and the counter is cleared. What strategy would be good to use for the resorting of the array ? Why ? (4)

(c) We use Randomized-Select to select the minimum element of the array A = <3, 2, 9, 0, 7>. Describe a sequence of partitions that would result in the worst case performance of the algorithm. (3)

6. (a) Which red-black tree properties may be violated when a node is deleted ? (2)

(b) Will Dijkstra's algorithm still give shortest path between two vertices if the edge weights are allowed to be negative. If yes, justify your answer with an argument. If no give an example. (4)

(c) An instructor has given a test to her class of n students. The maximum marks for the test is 100. The instructor

decided not to give fractional marks while grading the test. The instructor wishes to sort the n integer scores in descending order. Design a linear time algorithm to perform this task. Also list all assumptions (if any) that you make to solve the problem. (4)

(a) Consider a k bit binary counter implemented using an array A such that A[0] stores the lowest order bit and A[k-1] stores the highest order bit. The only operation that can be performed on the counter is 'increment'. Using the aggregate method of analysis, determine the amortised cost per increment operation when a sequence of n increments is performed. (3)

(b) A certain input to the merge sort algorithm is such that the merging step always depicts the worst case behaviour. Determine the running time of the merge sort algorithm for this instance. (3)

(c) Consider the following algorithm that takes as input an array of n integers and an integer T. It finds whether there exist two elements in the array that sum up to T and returns 1 on success and 0 on failure. (4)

```
TargetSum (A, n, T)
    Heapsort (A, 1, n)
    for i = 1 to n
        flag = BinarySearch(A, i+1, n, | T-A[i] | )
        if (flag)
            return 1
        endif
    endfor
    return 0
```

TargetSum uses the following algorithms:

Heapsort (Array, First, Last)

BinarySearch(Array, First, last, element)

Analyze the worst case running time of TargetSum.

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2797 **GC-4**

Unique Paper Code : 32341402

Name of the Paper : Software Engineering

Name of the Course : **B.Sc. (H) Computer Science**

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The paper has **two** sections. **All** questions in **'Section A'** are compulsory.
3. Attempt any **Four** questions from **'Section B'.** Parts of a question must be answered together.

SECTION A

1. (i) List any two characteristics of Software. (2)

   (ii) State three steps for risk projection in software development ? (3)

P.T.O.

(iii) What is Regression Testing ? (3)

(iv) "A high quality SRS reduces the development cost". Comment. (3)

(v) State three types of process flow with the help of a neat diagram. (3)

(vi) How time-line chart helps in scheduling for software development? Show with an example. (3)

(vii) Differentiate between top-down and bottom-up integration testing. (3)

(viii) Explain requirement process with the help of a diagram. (3)

(ix) Write short note on Defect Removal Efficiency. (3)

(x) A system has 3 external inputs, 6 external outputs, external queries, 4 internal logical files, and interfaces with 2 different legacy systems (2 EIFs). All of these data are of average complexity (4, 5, 4, 10, 7) and the overall system is relatively simple. Compute Function Point for the system. (3)

(xi) How do we compute the "expected value" for software size ? (3)

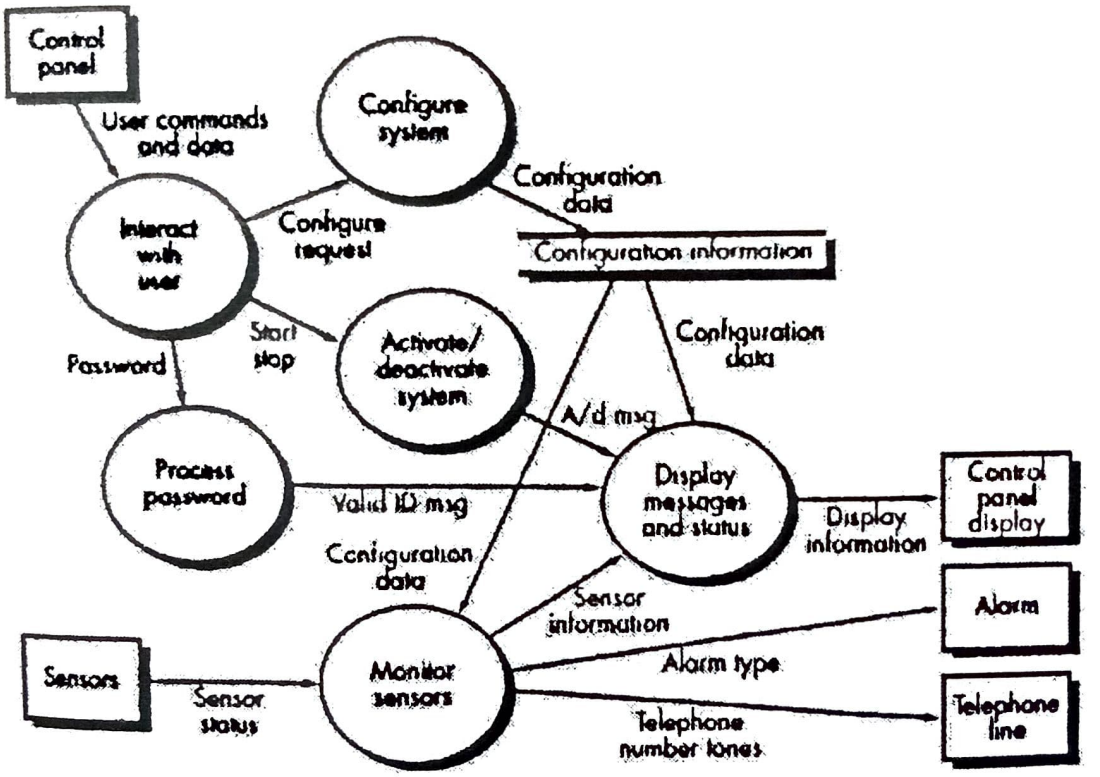
(xii) Differentiate between private and public metrics. (3)

SECTION B

2. (a) What is Cohesion ? State any three levels of Cohesion. (4)

(b) Explain the six process maturity levels in CMMI. (6)

3. (a) What is Transform Mapping ? Perform second level factoring for the DFD given below. (6)



(b) Explain with an example, how defect amplification and removal model reduces the cost for defect removal. (4)

4. (a) Draw a Context level and level 1 data flow diagram for a distance education university. The enrolment process is as follows :

- Students send in an application form containing their personal details and the desired course.
- The university checks that the course is available and that the student has necessary academic qualifications.
- If the course is available, the student is enrolled in the course and the university confirms the enrolment by sending a confirmation letter to the student.
- If the course is unavailable, the student is sent a rejection letter. (7)

(b) Explain the following two measures of Software Quality:

(i) Maintainability

(ii) Integrity (3)

5. Use the flow graph to find Cyclomatic Complexity of the following code. Also show the no. of independent paths and regions : (7)

```
main( )
{
int num1, num2, num3;
printf("Enter the values of numl, num2 and num3\n");
scanf("%d %d %d", &num1, &num2, &num3);
```

```
if (num1 > num2)
    {
        if (num1 > num3)
        {
            printf("num1 is greatest among three \n");
        }
        else
        {
            printf("num3 is greatest among three \n");
        }
    }
else if (num2 > num3)
    printf("num2 is greatest among three \n");
  else
    printf("num3 is greatest among three \n");
}
```

(b) Explain RMMM with the help of an example. (3)

6. (a) Explain prototyping model ? Give one advantage and one disadvantage of using prototyping model for software development. (5)

(b) What is equivalence class partitioning testing ? State the guidelines to create equivalence class partitioning test cases with two examples. (5)

7. (a) Explain Unit Testing. How stubs and drivers are used in Unit Testing ? (5)

(b) Use the COCOMO II model to estimate the effort required to build software that produces 10 screens and 8 reports, and will require approximately 70 software components. Assume that the software has average complexity (Screen-2, Reports-5, 3GL component-10) and average/developer/environment maturity as 13. This system is Component based development so the percent of reuse (%reuse) is 50%. Use the Application Composition model with object points. (5)

This question paper contains 6 printed pages.

Your Roll No. .....

Sl. No. of Ques. Paper	**: 2798** **GC-4**
Unique Paper Code	**: 32341403**
Name of Paper	**: Database Management Systems**
Name of Course	**: B.Sc. (H) Computer Sc.**
Semester	**: IV**
Duration	**: 3 hours**
Maximum Marks	**: 75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

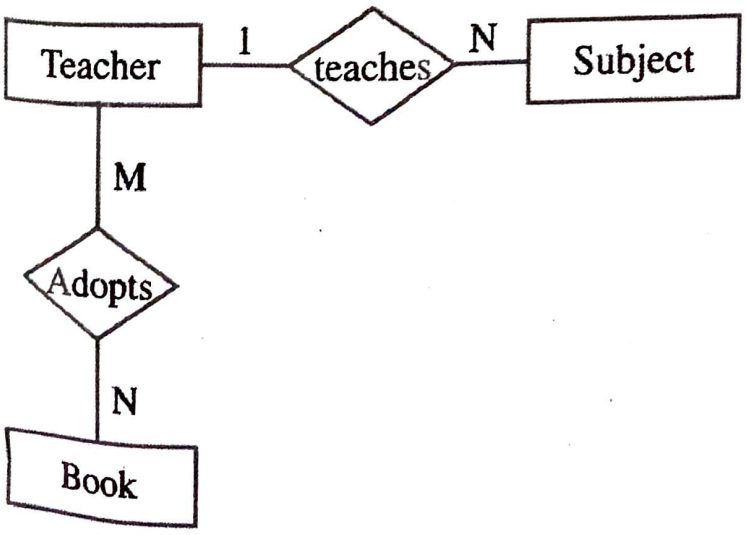
Question 1 is compulsory.

Attempt any four questions out of the remaining questions.

Parts of a question must be answered together.

1. (a) Consider a data file STUDENT (Sid, Sname, CourseNo, Dob, Address). Create the primary index (on Sid) and the secondary index (on CourseNo) on the above file diagrammatically. Which index will take more space and why? 5

   (b) Choose suitable attributes for various entities and convert the following ER diagram to relational tables. 5



(c) Give SQL command to create a relational table using the following information:

A table T with the attributes T1, T2, T3, T4 where:

* T1 is a number (maximum 10 digits in length) and cannot contain null values
* T2 is a character string (50 maximum characters in length)
* (T1, T2) form the primary key
* T3 and T4 are integer values
* Default value of T3 is 6
* T4 is a foreign key referring to T5 from another table S of the database. 5

(d) Consider the following tables A and B:

R

X	Y	Z
10	a	7
25	b	8
30	a	9

S

A	B	C
25	c	9
30	d	8
25	c	7

The attributes X, Y, Z are domain compatible with the attributes A, B, C respectively. Show the results of the following operations:

(i) R U S

(ii) R $\bowtie_{A.Z=B.C}$ S

(iii) R $\rightthreetimes_{R.X=S.A}$ S 1+2+2

(e) Differentiate between the logical and physical data independence with the help of an example. What is the system log used for? 2+2+1

(f) Two sets of FDs for a relation R(A, B, C) are given as follows:

$F = \{A \rightarrow B, A \rightarrow C, C \rightarrow A\}$

$G = (A \rightarrow B, B \rightarrow C, A \rightarrow C, C \rightarrow A\}$

Are F and G equivalent? Justify your answer. 5

(g) Differentiate between Alter table and Update table command in SQL with the help of suitable example. 5

2. Suppose you are given the following requirements for a database for the National Hockey League (NHL). The NHL has many teams.

* each team has a name, a city, a coach, a captain, and a set of players,
* each player belongs to only one team,
* each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
* every team has a team captain, a team captain is also a player.
* injury record of each player is kept with its description (injury_date, injury_type).
* a game is played between two teams (referred to as host_team and guest_team) and has a date (such as April 11th, 2017) and a score (such as 2 to 1).

Identify:

(i) Entities of interest

(ii) Attributes of interest for each entity

(iii) Draw the ER diagram for the above mentioned scenario. Also specify clearly, all constraints on the relationships in the diagram. State any assumptions that you make. 2+2+6

3. (a) Consider the following database giving information of various branches of a library:

Book (BookId, title, PublisherName)

Library_Branch (BranchId, BranchName, address)

Book_Copies(BookId, BranchId, NoOfCopies)

Book–Loans (BookId, BranchId, CardNo, DateOut, DueDate)

Answer the following queries in SQL:

(i) For each library branch, list the number of copies of each title.

(ii) How many copies of the book titled, 'Fundamentals of Database Systems' are owned by each library branch?

(iii) For each book that is loaned out from 'CP' branch, for which the due data is today, retrieve the bok title and publisher name. 2+2+2

(b) What is cardinality ratio? For the binary relationships below, suggest cardinality ratios based on the meaning of the entity types. State any assumptions you make.

ENTITY 1	Cardinality Ratio	ENTITY 2
STUDENT	_____	TEACHER
COUNTRY	_____	CURRENT_PRESIDENT
LIBRARY	_____	BOOK
ITEM (that can be found in an order)	_____	ORDER

4

4. (a) Consider a file with the following key values: 8, 5, 2, 6, 4, 25. Insert these search key values in the given order in a B^+ tree of order $p = 3$ and $p_{leaf} = 2$. Show the tree at each step. 6

(b) Consider an ordered file with number of records $r = 30000$ stored on a disk with block size $B = 1024$ bytes. A primary index is created on this file where the key is 9 bytes long and the block pointer is 6 bytes long. Find the blocking factor and the number of blocks needed for the primary index. 2+2

5. (a) Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of functional dependencies $F = \{\{A, B\} \rightarrow \{C\}, \{B, D\} \rightarrow \{E, F\}, \{A, D\} \rightarrow \{G, H\}, \{A\} \rightarrow \{I\}, \{H\} \rightarrow \{J\}\}$. Find the key of R. Decompose R into 2NF and then 3NF relations. 2+2+2

(b) You are given the following state of the relational scheme R (A, B, C):

A	B	C
a1	b1	c1
a2	b1	c2
a3	b2	c3
a4	b3	c2

Indicate which of the following functional dependencies are satisfied by the current state? Justify your answer.

(i) $B \rightarrow C$

(ii) $A \rightarrow B$ 2+2

6. (a) Consider the tables given below and answer the following queries in relational algebra:

item (<u>ItemCode</u>, ItemName, ItemPrice, ItemQty)

customer (<u>CustCode</u>, CustName, CustAddress, CustPhone, CustCity)

order (<u>OrderCode, ItemCode</u>, OrderDate, QtyOrdered, CustCode)

(i) For each order display the total quantity of all items placed in that order.

(ii) Give the details of all those customers who live in Delhi and who bought item with item code '2020'.

(iii) Give the details of the cheapest item. 2+2+2

(b) Consider the following relations:

Employee

Eno	Ename	Dno
1	Anu	7
2	Ram	8
3	Rakesh	7

Department

Dnum	Dname	Dloc
7	XX	Delhi
8	YY	Mumbai
9	ZZ	Kolkata

Here, Eno is a Primary Key and Dno is a Foreign Key in EMPLOYEE relation.

For each of the following operations, indicate whether it results in constraint violation and if so, why?

(i) Insert <5, 'Pooja', 10> in Employee

(ii) Insert <5, 'Reeta', 7> in Employee

(iii) Delete <7, 'XX', 'Delhi' > from Department

(iv) Insert <10, 'AA', 'Delhi' > in Department 4

7. (a) Illustrate each of the following concepts with the help of an example:

(i) Total and disjoint specializations/generalizations

(ii) Recursive Relationship

(iii) Weak Entity 4+2

(b) Let F = {A → B, A → C, C → A} for a given relational schema R. Find $(BC)^+$ and $(C)^+$. 4

1200

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 795 G

Unique Paper Code : 234601

Name of the Paper : Computer Graphics

Name of the Course : **B.Sc. (H) Computer Science**

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The Question paper-consists of two sections. **Section A** is compulsory. Attempt any **four** questions from **Section B**

Section A

1. (a) What is the number of memory bits required for a 3-bit plane frame buffer for a 256 x 256 raster scan system? (2)

   (b) Briefly explain the interlaced refresh procedure in a raster scan system and its advantage. (3)

P.T.O.

2. (a) What are homogenous coordinates? Why a
in computer graphics?

(b) Prove that two scaling transformations are
i.e. $S_1 S_2 = S_2 S_1$

3. Write the DDA line drawing algorithm to dra
slope less than 1.

4. Derive the rotational transformation matrix for a
provided the rotation is performed about the

5. (a) Prove that parallel line remain par
transformation.

(b) Write a homogenous 3D transformation mat
the size of an object and project it on Z=

6. (a) What is the geometric vector of a hermite

(b) Briefly explain Phong shading method
rendering.

7. Define the following terms:

(a) RGB color Model

(b) Halftoning

(c) Aspect ratio (1)

Section B

8. (a) Briefly explain raster scan display architecture. (5)

(b) Consider a circle with centre as (10,10) and radius as 20. Write an algorithm to the draw the circle between positive y-axis and the line y=x. (5)

9. (a) List the four techniques to draw thick primitives. Describe any two of them. (5)

(b) Use the Cohen Sutherland algorithm to clip line P1 (70,20) and p2(100, 10) against a window lower left hand corner (50,10) and upper right hand corner (80,40). (5)

10. (a) Consider the square A(1,0), B(0,0), C(0,1), D(1,1). Rotate the square ABCD by 45° clockwise about A(1,0). (3)

(b) Derive Dimetric projection matrix where foreshortening of lines along X-axis is equal to foreshortening of lines along Z-axis. (5)

(c) What are principal vanishing points? (2)

11. (a) What are the two data structures used algorithm? Give the structure of each.

(b) Obtain a 2-point perspective projection with endpoints A(3,2,4,1) and B(3,2, plane of projection is z=0 and centre of at y=2 and z=-1. Also obtain the two v

(c) What are oblique projections? List the oblique projections.

12. (a) Derive the basis matrix for a Bezier cu two properties of Bezier curve.

(b) In an Animation, a triangle has to be c quadrilateral, write steps to adju specification so that number of vertices both the frames.

13. (a) Distinguish between diffuse reflection reflection in Phong illumination model.

(b) Describe the Area subdivision algorith surface determination.

This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **796**

Unique Paper Code : **234603** **G**

Name of the Paper : **Information Security**

Name of the Course : **B.Sc. (H) Computer Science**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *all* questions from Section A.

Attempt any *four* questions from Section B.

Section A

1. (*i*) Distinguish between diagrams and trigrams giving suitable examples. Why are these used ? 3

(*ii*) Differentiate between masquerading and replay attacks. 3

(*iii*) Define Trap door and its use. 3

(*iv*) What is the role of proxy server in the information security ? 3

P.T.O.

(v) Explain columnar transposition by giving suitable example. 3

(vi) Which attack, active or passive, is more difficult to detect and why ? 5

(vii) Differentiate between the terms authentication and authorization with the help of suitable example(s). 5

(viii) With the help of an example, explain the SQL injection attack and defense from this attack. 5

(ix) Describe public key infrastructure (PKI). 5

Section B

2. (i) Describe the use of Vigenere cipher with the help of suitable example. 5

(ii) Describe various categories of Computer Criminals by giving an example of each category. 5

3. (i) With suitable sketches, explain the working of Data Encryption Standard (DES) algorithm. 7

(ii) Illustrate the use of fence register in protecting user's program. 3

4. (i) Explain the modification and fabrication security attacks with the help of an example each. 5

(ii) Describe Buffer Overflow attack with the help of a suitable example. 5

5. (*i*) Describe different kinds of malicious codes. Also explain how viruses attach ? 7

(*ii*) List *three* factors that should be considered when developing a security plan. 3

6. (*i*) Which policies would you suggest to be adopted by organizations to potect privacy of its users. 5

(*ii*) Describe the terms copyright, piracy and patents. Also distinguish between patents and copyrights. 5

7. Write short notes on the following : 5+5=10

(*a*) Cryptanalysis

(*b*) Digital signatures.

This question paper contains 7 printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **798**

Unique Paper Code : **234607** **G**

Name of the Paper : **Artificial Intelligence (CSHT-616) (ii)**

Name of the Course : **B.Sc. (H) Computer Science**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt any *four* of Question Nos. **2** to **7**.

Parts of a question must be answered together.

Marks are indicated against each question.

1. (*a*) Write a short note on heuristic search. 2

(*b*) Explain significance of cut and fail predicates in PROLOG. Give *one* example each to illustrate their effect in a knowledge base. 4

(*c*) List out various steps for solving a problem using search state space strategy. 2

P.T.O.

(*d*) Define the term Artificial Intelligence. 2

(*e*) Compute the truth table of $(F \vee G) \& \neg (F \& G)$. 3

(*f*) Consider the following propositions, where :

- p means "Paola is happy",
- q means "Paola paints a picture",
- r means "Renzo is happy".

Formalize the following sentences using propositional logic :

(*i*) "if Paola is happy and paints a picture then Renzo isn't happy".

(*ii*) "if Paola is happy, then she paints a picture".

(*iii*) "Paola is happy only if she paints a picture". 3

(*g*) Define the following terms :

(*i*) State Space Search

(*ii*) Production Rules. 2×2=4

(h) Derive a parse tree for the sentence "Abhinav likes the cake", using the following rules : 4

S → NP VP

NP → N

NP → DET N

VP → V NP

DET → the

V → likes

N → Abhinav | cake

(i) Find the probability of the event A when it is known that some event B occurred. From experiments, it has been determined that P(B/A) = 0.84, P(A) = 0.2 and P(B) = 0.34. 3

(j) What should be the features related to good performance of a rational agent ? 4

(k) Write the conceptual graph and FOPL representation for the following sentences : 4

"Every aeroplane has wings."

P.T.O.

2. (*a*) Compare and contrast "Fully observable environment" and "Partially observable environment". 6

(*b*) Evaluate the statement $(\neg P \vee Q) \& R \rightarrow S \vee (\neg R \& Q)$ for the interpretation given below :

I_1 : P is true, Q is true, R is false, S is true. 4

3. (*a*) Explain the concept of backtracking in PROLOG with an example. 4

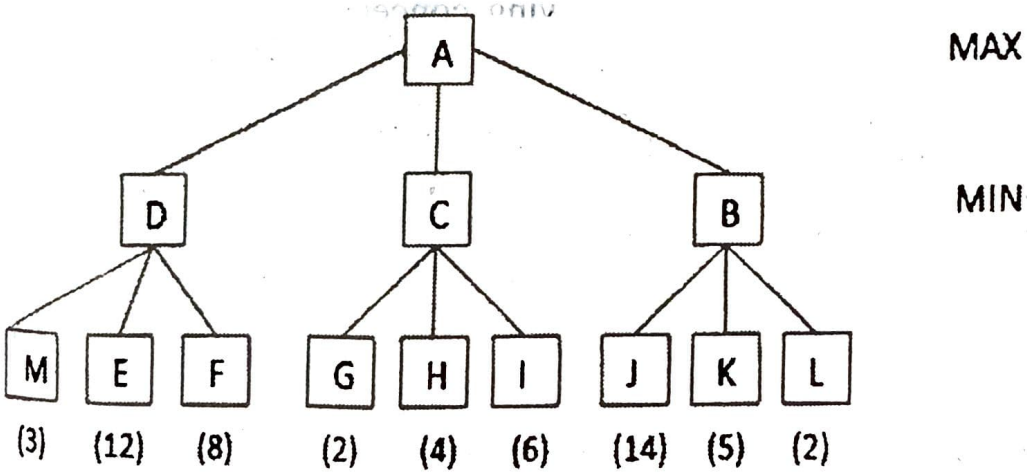
(*b*) Express the following concepts as an associative network structure with interconnected nodes and labeled arcs.

Company ABC is a software development company. Three departments within the company are Sales, Administration and Programming. Joe is the manager of Programming. Bill and Sue are programmers. Sue is married to Sam. Sam is editor for Prentice Hall. They have three children, and they live on Elm street. Sue wears glasses and is five feet four inches tall. 6

4. (*a*) What are the limitations of Hill Climbing search technique ? Explain. 4

(*b*) Explain the utility of alpha and beta cuts in Minimax problem. 4

(*c*) In the following two-ply game tree, the terminal nodes show the utility values computed by the utility function. Use the Minimax algorithm to compute the utility values for other nodes in the given game tree : 2



5. (*a*) Following is a knowledge base :

likes(George, food)

likes(George, wine)

likes(Browny, wine)

likes(Browny, George).

How do you add the following rules in the knowledge base ?

(*i*) Browny likes anything that George likes.

(*ii*) Browny likes anyone who likes wine. 6

(*b*) List out various problem characteristics that are generally helpful in the selection of an appropriate method. Analyze Simple Blocks problem in terms of these problem characteristics. 4

6. (*a*) Given the following :

(1) If x is on top of y, y supports x

(2) If x is above y and they are touching each other, x is on top of y

(3) A cup is above a book

(4) A cup is touching a book.

(*i*) Write the above statements in FOPL. 2

(*ii*) Translate the above statements into clausal form. 2

(*iii*) Show that the predicate supports (book, cup) is true using resolution. 4

(b) Give an example of each of the types 1 and 2 Chomsky's hierarchy of grammars. 2

7. (a) What do you understand by non-monotonic reasoning ? Describe how truth maintenance system works for non-monotonic inference. 5

(b) Differentiate between deterministic and non-deterministic parsers. Illustrate the same by drawing their network. 5

This question paper contains 8 printed pages]

Your Roll No. :.....

Sl. No. of Q. Paper : **802** **G**

Unique Paper Code : 234615

Name of the Course : **B.Sc.(Hons.) Computer Science**

Name of the Paper : Statistical Methodology (STC-402)

Semester : VI

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **15** questions in **all**, Selecting **five** questions from each section.

(c) **All** questions carry equal marks.

(d) Use of non-programmable scientific calculator and statistical tables is allowed.

(e) Symbols have their usual meaning.

P.T.O.

SECTION - A

1. Define coefficient of correlation. The variable X and Y are connected by the equation $aX + bY + c = 0$. Show that the correlation between them is -1 if the signs of a and b are alike and + 1 if they are different.

2. A computer while calculating correlation coefficient between the two variables X and Y from 25 pairs of observations obtained the following results.

$n = 25$, $\Sigma X = 25$, $\Sigma X^2 = 650$, $\Sigma Y = 100$, $\Sigma Y^2 = 460$, $\Sigma XY = 508$

It was, however, later discovered at the time of checking that he had copied down two pairs as

X	Y
6	14
9	6

While the correct values were

X	Y
6	14
9	6

Obtain the correct value of correlation coefficient.

3. Out of two lines of regression given $X+9Y=7$ and $Y+4X=49/3$ which one is the line of regression of X on Y ? Also find the mean of X and mean of Y. If the variance of X is 12, calculate the variance of Y.

4. On the basis of observation made on 39 cotton plants, the total correlation of yield of cotton (X_1), number of bolls, i.e., seed vessels (X_2) and height (X_3) are found to be:

   $r_{12}=0.8$, $r_{13}=0.65$ and $r_{23}=0.7$

   Compute the partial correlation between yield of cotton and the number of bolls, eliminating the effect of height.

5. The coefficient of rank correlation between marks in statistics and marks in mathematics obtained by certain group of students is 0.8. If sum of the squares of the difference in rank is given to be 33, find the number of student in the group.

6. The job rating efficiency of an employee seems to be related to the number of weeks of employment. For a random sample of 10 employees, the following data were observed :

Job Efficiency (Y)	55	50	20	55	75	80	90	30	75	70
Weeks (X)	2	4	1	3	5	9	12	2	7	5

   Fit a curve of the form $Y = ab^x$ to the above data.

SECTION - B

7. State and prove Chebyshev's Inequality.

Suppose we know that the number of items produced in a factory during a week is a random variable with mean 500. If the variance of week's production is known to equal 100, what can be said about the probability that this week's production will be between 400 and 600 ?

8. State Central limit theorem.

The life time of a special type of battery is a random variable with mean 40 hours and standard deviation 20 hours. A battery is used until it fails, at which point it is replaced by a new one. Assuming a stockpile of 25 such batteries, the lifetime of which are independent, approximate the probability that over 1100 hours of use can be obtained ?

9. Let X follows exponential distribution with parameter 1. Determine the Cumulative Distribution Function (CDF) of the largest order statistics $X_{(n)}$ in a random sample of size n.

10. The heights of 1000 students are approximately normally distributed with a mean of 174.5 centimeters and a standard deviation of 6.9 centimeters. If 200 random samples of size 25 are drawn from this population and the mean recorded to the nearest tenth of a centimeter, determine

(a) The mean and standard deviation of sampling distribution of $\bar{X}$

(b) The number of sample means that fall between 172.5 and 175.8 centimeters inclusive.

11. Two independent experiments are being run in which two different types of paints are compared. Eighteen specimens are painted using type A and the drying time, in hours, is recorded on each. The same is done with type B. The population standard deviations are both known to be 1.0. Assuming that the mean drying time is equal for the two types of paint, find $P(\bar{X}_A - \bar{X}_B > 1.0)$, where $\bar{X}_A$ and $\bar{X}_B$ are average drying times for samples of size $n_A = n_B = 18$.

12. Write short notes on the following :

(a) Null and Alternation Hypothesis

(b) Confidence Interval

SECTION - C

13 An electrical firm manufacturers' light bulbs that have a lifetime that is approximately normally distributed with a mean of 800 hours and a standard deviation of 40 hours. Test the hypothesis that $\mu = 800$ hours against the alternative $\mu \neq 800$ hours if a random sample of 30 bulbs has an average life of 788 hours. Use a P-value in the conclusion.

14. An experiment was performed to compare the abrasive wear of two different laminated materials. Twelve pieces of material 1 were similarly tested. In each case, the depth of wear was observed. The samples of material 1 gave an average (coded) wear of 85 units with a sample standard deviation of 4, while the samples of material 2 gave an average of 81 and a sample standard deviation of 5. Can we conclude at the 0.05 level of significance that the abrasive wear of material 1 exceeds that of material 2 by more than 2 units ? Assume the populations to be approximately normal with equal variances.

15. A builder claims that heat pumps are installed in 70% of all homes being constructed today in the city of Richmond. Would you agree with this claim if a random survey of new homes in this city shows that 8 out of 15 had heat pumps installed ? Use a 0.10 level of significance.

16. A soft-drink dispensing machine is said to be out of control if the variance of the contents exceeds 1.15 deciliters. If a random sample of 25 drinks from this machine has a variance of 2.03 deciliters, does this indicate at the 0.05 level of significance that the machine is out of control ? Assume that the contents are approximately normally distributed.

17. A machine is supposed to mix peanuts, hazelnuts, cashews, and pecans in the ratio 5:2:2:1. A can containing 500 of these mixed nuts was found to have 269 peanuts, 112 hazelnuts, 74 cashews and 45 pecans. At the 0.05 level of significance, test the hypothesis that the machine is mixing the nuts in the ratio 5:2:2:1.

18. In a shop study, a set of data was collected to determine whether or not the proportion of defective produced by worker was the same for the day, evening, or night shift worked. The following data were collected :

	Day	Evening	Night
Defective	45	55	70
Nondefective	905	890	870

Use 0.05 level of significance to determine if the proportion of defectives is the same for all three shifts.

his question paper contains 4 printed pages.]

Your Roll No.....

. No. of Question Paper : 48 G

nique Paper Code : 234461

me of the Paper : CSPT-404 : Operating System

me of the Course : **B.Sc. (Phy. Sc.) / B.Sc. (Math. Sc.)**

mester : IV

ration : 3 Hours Maximum Marks : 75

structions for Candidates

Write your Roll No. on the top immediately on receipt of this question paper.

Question No. **1** is compulsory.

Attempt any **five** from remaining **seven** questions.

All parts of a question must be done together.

(a) Define Operating System. (1)

(b) Which scheduling policy is suitable for time sharing systems ? Also give reason. (2)

(c) List one main advantage of acyclic graph directory structure. (2)

P.T.O.

(d) Consider a logical address space of 32 pages of 10
words each, mapped onto a physical memory of
frames.

(i) How many bits are there in the logic
address ?

(ii) How many bits are there in the physic
address ? (

(e) What are system calls ? Discuss any two system cal
regarding to process management. (

(f) Explain bit vector method of free disk spac
management. (

(g) What is race condition and how does it occur ? (

(h) Define process. Explain various states of proces
execution. Also draw the diagram. (

2. Define the following : (10

(a) System programs

(b) Page fault

(c) Convoy effect

(d) Virtual memory

(e) Context switch

(a) Distinguish among Long term, Medium term and Short-term scheduler. (6)

(b) Distinguish between internal and external fragmentation by taking suitable example. (4)

(a) Describe various scheduling criteria for comparing different CPU scheduling algorithms. (5)

(b) Consider the following page reference string :

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

Determine the number of page faults for the FIFO page replacement algorithm. Assume that there are four available frames and all of them are initially empty. (5)

Consider the following set of processes, with the length of the CPU burst time given in ms

Processes	Burst Time	Arrival Time
P1	12	1
P2	6	0
P3	3	2

(i) Draw four Gantt charts illustrating the execution o these processes using FCFS, SJF (non-preemptive), an a RR (time quantum=1) scheduling. (1+1.5+1.5=4

(ii) Calculate average waiting time and averag turnaround time for all above mentioned schedulin algorithms. (6

6. (a) Explain how virtual memory is implemented using deman paging technique. (6

(b) Explain the following terms with respect to file :

File open count

Access rights (4

7. (a) Why the page size is always the power of 2 in pagin memory allocation scheme ? Give reason. Also explai with the help of a suitable example. (5

(b) What is multithreaded programming ? What are it benefits ? (5

8. (a) List various methods of allocating disk space. Explai linked allocation scheme in detail. (5

(b) Explain microkernel approach to Operating Syste design. (5

(400

This question paper contains 4 printed pages.

Your Roll No. .....

GC-4

Sl. No. of Ques. Paper : **2941**

Unique Paper Code : **42344403**

Name of Paper : **Computer System Architecture**

Name of Course : **B.Sc. (Prog.) (Math. Sciences)**

Semester : **IV**

Duration : **3 hours**

Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory. Attempt five questions out of Q. Nos. 2 to 8. Parts of a question must be answered together.

1. (a) What is a flip-flop? Give the drawback of SR Flip-Flop and explain how it is removed in JK Flip-Flop. 1+1+2=4

   (b) Draw the logic diagram and truth table of a 2-to-4 line decoder using only NAND gates with an enable input. 2+2=4

   (c) Perform the following arithmetic operation using signed 2's complement notation for negative numbers. Use 8 bits to accommodate each number together with its sign.

   $$(-36)+(-18)$$ 3

   (d) Show the block diagram of the hardware that implements the following register transfer statement:

P. T. O.

P: R2 ← R1 2

(e) Give two differences between hardwired control and microprogrammed control processors organization. 3

(f) Explain any *two* addressing modes with the help of suitable examples. 2+2=4

(g) Differentiate between isolated and memory mapped I/O. 2

(h) Draw instruction format for a 16 bit instruction that uses 11 bits for address, 3 bits for op code and two bits to specify the addressing mode. 3

2. (a) Simplify the Boolean function F together with don't care conditions d in sum-of-product form using K-Map:

$$F(A, B, C, D)=\Sigma(1, 2, 3, 7, 8, 10)$$
$$d(A, B, C, D)=\Sigma(5, 6, 11, 15)$$ 6

(b) Given the following Boolean function:

$$F=XY'Z+X'Y'Z+XYZ$$

(i) Simplify F using Boolean algebra.

(ii) Draw the logic diagram of the simplified Boolean expression. 2+2=4

3. (a) Explain the working of 4×1 line multiplexer with the help of a logic diagram and function table. 5

(b) Memory unit is specified by the number of words times the number of bits per word. In 4G×64 memory unit:

(i)

What are the number of address lines and input-output data lines?

(ii) What is the number of bytes that can be stored in the memory? 2+1=3

(c) How many flip-flops will be complemented in a 10-bit binary counter to reach the next count after 0011111111? 2

4. (a) Represent decimal number $(687.25)_{10}$ in Binary and then convert from Binary to Hexadecimal and Octal number systems. 2×3=6

(b) Represent the number $(+46.5)_{10}$ as a floating point binary number with 24 bits. The normalized fraction mantissa has 16 bits and the exponent has 8 bits. 4

5. (a) Register A holds the 8-bit binary 11011001. Determine the B operand and the logic micro-operation to be performed in order to change the value in A to 11111101. 5

(b) Explain and design a 4-bit adder-subtractor circuit. 5

6. (a) Define instruction cycle. Describe the sequence of micro-operations of fetch and decode phases of a basic computer. 2+4=6

(b) Describe the sequence of micro-operations of the following instructions in the basic computer:

(i) ADD

(ii) ISZ 2+2=4

7. (a) An instruction is stored at location 300 with its address filed at location 305. The address field has the value 400. A processor register R1 contains the number 200. Evaluate the effective address if the addressing mode used is:

   (i) Direct

   (ii) Indirect

   (iii) Relative

   2×3=6

   (b) Evaluate the arithmetic statement:

   $$X=(A*B)+(C-D)$$

   Using three address instructions use the symbols ADD, SUB, MUL and DIV for the four arithmetic operations, MOV for the transfer-type operation, and LOAD and STORE for transfers to and from memory and AC register. Assume that memory operands are in memory addresses A, B, C and D and the result must be stored in memory at address X.

   2+2=4

8. Write short notes on any *two* of the following:

   (a) Daisy chain priority interrupt

   (b) RISC and CISC

   (c) CPU registers.

   5×2=10

Sl. No. of Q.P: 1549

Unique Paper Code	:	2341401
Name of the Paper	:	Design and Analysis of Algorithms
Name of course	:	B.Tech (Computer Science)
Semester	:	IV
Duration of Examination:		Three Hours
Maximum Marks	:	75 marks

F-8

Instructions:

Question No 1 of 35 marks is compulsory

Attempt any *four* questions from Q No 2 to Q. no 7

Number of Printed Sheets in Question Paper:

1.(a) Argue the runtime of the naïve string matching algorithm. (2)

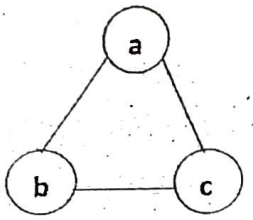
(b) A sequence of n operations is performed on a data structure. The i^{th} operation costs i if i is a power of 3, otherwise it costs 1. Use aggregate analysis to determine the amortised cost per operation. (3)

(c) Show that there are at most $\left\lceil \frac{n}{2^{h+1}} \right\rceil$ nodes of height h in a heap with n elements. (3)

(d) Which properties of a red-black tree can be violated on deleting a node? (take two cases depending on whether the deleted node is red or black) (4)

(e) When does quick sort show its worst case behaviour? What is the runtime in this case? (4)

(f) Run the BFS and DFS algorithms on the following graph and show the corresponding trees. (4)



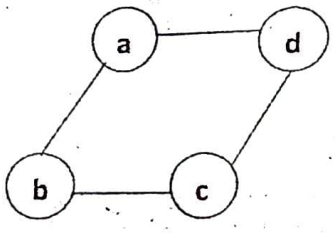
(g) Give an efficient algorithm to find both the minimum and maximum of a given array of n elements. (5)

(h) Name and briefly explain (i) greedy choice property (ii) optimal substructure property. (5)

(i) Illustrate the operation of counting sort on the array <6,0,2,0,1,3,4,6,1,3,2> (5)

2.(a) Find the largest common subsequence in the following sequences: (6)
X = <PQRMPQR>, Y = <RPQN>

(b) Give the adjacency list and adjacency matrix representation of the following graph: (4)

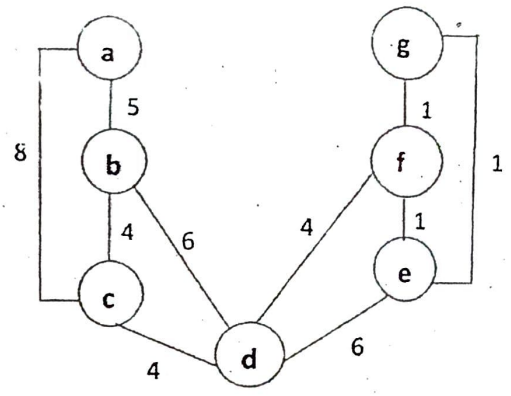


3.(a) Sort the following character array using heapsort: HEAPSORT (5)

(b) Show that the height of an n-node RBT is O(lg n). (5)

4.(a) Derive an expression for the runtime of insertion sort in the worst case. (4)

(b) Find the length of the shortest path between a and g using Dijakstra's algorithm: (6)



5.(a) Consider a stack S on which the following operations can be performed: (5)

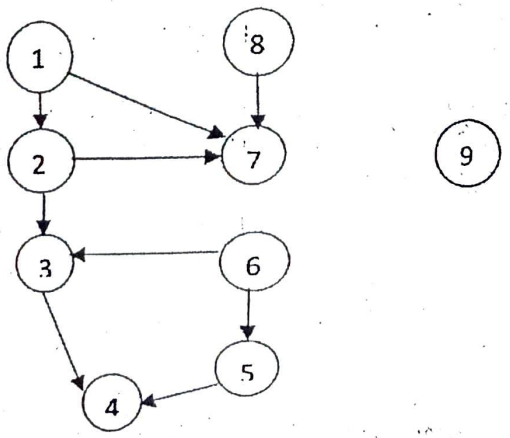
- Push (S, x): push object x onto the stack S
- Pop (S): pop the top element from stack S and return the popped object
- Multipop (S,k): remove k top objects from S

Using the accounting method of analysis, determine the amortised cost per operation when a sequence of n operations is performed on the stack S.

(b) Name the design technique on which Kruskal's and Prim's algorithm are based. What are the two algorithms meant for? Mention the fundamental difference in the way these algorithms work. (5)

6.(a) Are the following algorithms(i) stable (ii) in-place: Merge sort , Quick sort. Briefly explain. (4)

(b) Show the ordering of vertices produced by topological sort when run on the following DAG. (6)



7.(a) A man rides a bike between 2 cities located m kilometres apart. His tank needs to be refilled after every n kilometres. There are p fuel stations $s_1, s_2, \ldots\ldots, s_p$ along the way. The distance between a station s_i and its previous station s_{i-1} is given by $d(s_i)$. The distance between the starting point and the first station is $d(s_1)$ and $0 < d(s_i) \leq n$ for all i. If the man starts with a full tank, suggest how he can minimize (5)

the number of stops during his trip.

(b) A burglar has to decide which items to take from a loot. The maximum weight that his bag can carry is W. There are n items to choose from. The weight and value of the i^{th} item is given by w_i and v_i respectively. Suggest how he can determine the most valuable combination of items to fit into his bag. (5)

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1740 **F-8**

Unique Paper Code : 2341801

Name of the Paper : Web Technologies

Name of the Course : **B.Tech Computer Science**

Semester : VIII

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

Section A

Attempt **all** *questions from this section.*

1. (a) (i) What is the output of following JavaScript code ?

```
<script type="text/javascript">
x=6+5+ "4";
document, write(x);
</script>
```

(1)

(ii) Java Script is a loosely typed language. Comment. (3)

P.T.O.

(iii) How can we embed JavaScript code into an HTML Page ? (2)

(iv) Explain the purpose of onBlur and onClick events in Javascript. (2)

(v) What is the output of following code ?

```
<script type="text/javascript">
var fruits=["Banana", Orange", "Apple", "Mango"];
var energy= fruits.join();
document.write(energy);
</script>
```

(1)

(b) (i) Explain any three types of JSP elements with the help of examples. (3)

(ii) Explain the following statement :

```
<jsp:useBean id="stu" class="college.course.year.student">
</jsp:useBean>
```

(3)

(c) What is the use of statement objects in JDBC ? Explain the use of different statement objects in JDBC. (4)

(d) (i) Should we use AJAX in all HTTP requests? Comment. (2)

(ii) Design a style sheet with the following specification :

- set the body background colour to light blue
- set colour of H1 header to white
- center align the text of H1 header
- set font-family of paragraph to verdana (4)

(e) (i) What is the difference between an abstract class and an interface ? Can we have instances of an interface ? What is meant by default methods in an interface ? Give an example of an interface with default method. (4)

(ii) Explain the difference between

myClass obj;

And

myClass obj = new myClass(); (1)

(iii) Explain the garbage collector feature of Java. (3)

(iv) How can a class call constructor of its superclass ? Explain with an example. (2)

Section B

Attempt any **FOUR** *questions from this section.*

(a) Explain HTTP request/response processing in detail. (5)

(b) Explain the anatomy of a JSP page. Give an examp

3. (a) Name different JDBC drivers. Explain different typ of JDBC drivers.

(b) Write a JDBC program to call a stored procedure nam PROC1 with one OUT parameter of type int.

4. (a) Write a JSP page to access the employee detai (Employee name, Employee Id, Salary and Departmen from an HTML form using JSTL actions. (5

(b) How can you use custom tags in a JSP page ? Explai with the help of a diagram. (5

5. (a) What is the difference between internal and external style sheets ? Give examples. (5)

(b) What is AJAX ? What are the advantages of AJAX over other existing Web Technologies ? (5)

6. (a) Design an HTML form to input the Order details (Customer name (String having less than 20 charcters), Item type (Grocery or Cloths), Price Range (1-5000)) and check whether all the fields have been filled with valid values, at the time of submitting the form. (5)

(b) Explain the use of prompt dialog box in JavaScript using an example. (5)

(a) Point out the errors in the following code : (3)

(i)
```
class myClass
{
int my-var;
final void func 1(int i)
{ // Statements
}
}
class mySubClass extends myClass
{
    int my-var;
    final void func 1(int i)
    {
        // Statements
    }
public void func2()
{ // Statements
    }
public static void main(String[] args)
{
        myClass ob = new myClass();
        ob.func2();
    }
}
```

(ii)
```
interface my Interface{
    int var = 10;
    void func 1();
}
class myClass implements myInterface{
    void func2();
    public static void main(String[] args)
    {
        myInterface objInt = new myClass();
        objInt.var = 20;
    }
}
```

(b) What is the purpose of import statement in a packag
Assume that there are two packages myPack1, myPac
with a class myClass1 in myPack1 and myClass2
myPack2. myClass1 uses a method meth() of myClas
Give skeleton of class myClass1

(i) using import statement

(ii) without using import statement

[This question paper contains 7 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : 1740A F-8

Unique Paper Code : 2341802

Name of the Course : **B.Tech. Computer Science**

Name of the Paper : Mobile Applications on Android Platform

Semester : VIII

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) **Section - A** is Compulsory.

(c) Attempt any **four** questions from **Section - B**.

(d) Parts of a question must be answered together.

SECTION - A

1. (a) Describe the requirement of Kernel layer in Android architecture. 2

(b) Define the purpose of start Activity For Result () method in Android application. 2

(c) Briefly explain virtual device and SDK manager. 2

(d) How is the menu resource (defined in XML file, say "my_menu") inflated in the function on Create Options Menu () ? 3

(e) Explain Delegation Event Model in JAVA. 3

(f) How is the data fetched from SQLite database using Cursor ? 3

(g) Describe the use of intent in Android ? Write a code to view the webpage. 4

(h) Briefly explain the following classes : 4

i. Check Box

ii. Image View

(i) Explain the following layouts : 4

i. Relative Layout

ii. Frame Layout

(j) Differentiate between 'Inner Class' and 'Anonymous Class' with suitable examples. 4

(k) Differentiate between 'throw' and 'Throws in JAVA with a suitable example (s). 4

SECTION - B

2. (a) Briefly describe On Item Selected Listener () used by the Spinner class. 4

(b) Consider the following intent present in : 6

Activity Q :

```
Intent intent = new Intent (Intent.
ACTION_VIEW);
Intent. set Data (Uri. parse ("http://du.ac.in"));
```

Check the compatibility of the following activities (Activity A, Activity B and Activity C with action and data of Activity Q, given above ? Justify your answer.

P.T.O.

1740A

Activity A:

<activity android:name=".Activity A">

<intent-filter>

<action android: name="android.intent.action.
WEB_SEARCH"/>

<action android: name="android.intent.action.
MAIN"/>

< category android: name=" android.intent.
category. LAUNCHER"/>

<data android:scheme="http"/>

</intent-filter>

</activity>

Activity B:

<activity android:name=".ActivityB">

<intent-filter>

<action android:name="android.intent.action.
WEB_SEARCH"/>

<action android:name="android.intent.action.
MAIN"/>

<category android:name="android.intent.
category. DEFAULT"/>

<data android:mime Type="text/plain"/>

</intent-filter>

</activity>

Activity C:

<activity android:name=".Activity C">

<intent-filter>

<action android:name="android.intent.action.
VIEW"/>

<action android:name="android. intent.action.
MAIN"/>

< category android:name="android. intent.
category.DEFAULT"/>

<category android:name="android.
intent.category.LAUNCHER"/>

<data android:scheme="http"/>

<intent-filter>

</activity>

3. (a) Explain grid view with the examples. 4

(b) Describe SQ Lite database. Write code for adding and removing data. from SQ Lite database. 6

4. (a) Differentiate between Abstract class and Interfaces in JAVA. 4

(b) Create a simple registration form (including e-mail id, password with appropriate input type and a button). On clicking the button, pass the details to another activity and display the data. 6

5. (a) Explain activity lifecycle of Android application. 4

(b) Write a code snippet to create a dialog box. 6

6. (a) Briefly describe the features (any **four**) of Android Application. 4

(b) Briefly explain runtime polymorphism and dynamic binding with appropriate examples. 6

7. Write short note on any **five** of the following : 10

(a) ART

(b) Density independent pixel

(c) R.java file

(d) Ninepatch bitmaps

(e) Array adapter

(f) Finally Block (JAVA)

(g) Static Class in JAVA

his question paper contains 2 printed pages.]

Your Roll No.....

. No. of Question Paper : 1751 **F-8**

nique Paper Code : 234-3803

ame of the Paper : Environmental Engineering – Allied Course

ame of the Course : **B.TECH. (COMPUTER SCIENCE)**

emester : VIII

uration : 3 Hours Maximum Marks : 75

nstructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions.
3. **All** questions carry equal marks.

1. Describe the characteristics and collection system for solid waste management. What are the challenges for solid waste management in an industry ? (15)

2. Differentiate between any **three** of the following : (3×5=15)

   (i) Sedimentation and Filtration technology

   (ii) Biological Oxygen Demand and Chemical Oxygen Demand

   (iii) Hazardous and Non-hazardous waste

   (iv) Aerobic and Anaerobic treatment processes

P.T.O.

3. Write explanatory notes on any **three** of the following : (3×5=15)

   (i) Hazardous waste management

   (ii) Principle of waste prevention

   (iii) Chemical waste

   (iv) Air pollution dispersion

4. Give a detailed account of different methods used for waste water treatment. (15)

5. (a) Explain the basic design and operation of a sewage treatment plant. (10)

   (b) Discuss briefly the methods used to manage the emission from moving sources of air pollution. (5)

6. Explain the design and functioning of a sanitary landfill. Discuss the advantages and disadvantages of sanitary landfill for waste management.. (15)

7. Elaborate different standards and guidelines to measure the quality of air and water. (15)

8. (a) Elaborate the concept of material balance to solve environmental engineering problems. (5)

   (b) What do you understand by air pollution control cost ? Discuss the role of environmental engineers to reduce the pollution cost for industrial development. (10)

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2877 **GC-4**

Unique Paper Code : 32343406

Name of the Paper : PHP Programming

Name of the Course : **SEC : Computer Science for Honours**

Semester : IV

Duration : 2 Hours Maximum Marks : 25

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Section A** is compulsory.
3. Parts of a question must be answered together.
4. Attempt any **three** questions from **Section B.**
5. **All** questions in **Section B** carry equal marks.

Section A

(**All** *questions are compulsory.*) (10 marks)

1. (a) Give the output :

```
$a = 100;
echo ++$a," ", $a++;
```

(1)

(b) State whether the following statement is True or False
"Function name in PHP is case sensitive." (1)

(c) What is the role of '<>' operator ? Give an example showing how it can be used as a ternary operator. (1)

(d) Which of the two are valid variable names, why ?

(i) $current_user

(ii) $current-user (1)

(e) Find and correct the error in following code

```
<?php
        $my_string = 'They Don't Know.';
        print $my_string;
?>
```

(2)

(f) Describe the following functions with the help of an example

(i) implode()

(ii) explode()

(2)

2877

(g) Create an associative array for the following data.

one, 1

two, 2

three, 3 (2)

Section B

Attempt any **three** *questions from this section.*
All *questions carry equal marks.*

2. (a) Give the in built function names to

(i) sort a numeric array

(ii) reverse sort a numeric array

(iii) sort an associative array based on the key

(iv) sort an associative array based on the values.

(b) Write a PHP code to find and replace all the occurrences of $sub="to" in the string $mystr="into onto unto".

(c) Describe the working of the following code.

```
<html>
<head>
```

```
<title>Question 2 a</title>

</head>

<body>

Gender:

<input type="radio" name="gender"

<?php if (isset($gender) && $gender=="female") echo
"checked";?>

value="female">Female

<input type="radio" name="gender"

<?php if (isset($gender) && $gender=="male") echo
"checked";?>

value="male">Male

</body>

</html>
```

(2+1+2)

3. (a) What is a query string? Explain with an example.

(b) What is a session ? Write a code snippet to start a session and create a session variable. (2+3)

877

(a) Give the syntax to pass and capture the variables between the PHP webpages during navigation.

(b) Write a function in PHP which takes email address as an input and returns username and domain name in an associative array. (2+3)

5. (a) When is the variable $_SERVER['PHP_SELF'] used ? Give an example.

(b) Certain characters are valid in a string but are interpreted as control characters when inserted in a database and throw an error. Suggest the method to handle this.

(c) Give output/error

```
<?php
        $url = "nachiketh@example.com";
        echo ltrim(strstr($url, "@"),"@");
?>
```

(2+2+1)

6. Localhost has a database named admin with the following Employee table. Write a PHP program to display this table in a web page. (5)

EMPLOYEE table –

ID	NAME	SALARY
101	Amit	10000
102	Jaya	15000
103	Gautam	12000

This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2905 **GC-4**

Unique Paper Code : 32353401

Name of the Paper : Computer Algebra Systems and Related Softwares

Name of the Course : **Mathematics : Skill Enhancement Course for Honours**

Semester : IV

Duration : 2 Hours Maximum Marks : 50

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. This question paper has **four** questions in all.
3. **All** questions are compulsory.

1. Fill in the blanks : (5×1=5)

(i) A list of currently defined variables can be generated with _____ function in R.

(1200

P.T.O.

(ii) _____ command is used to calculate the transpose of the matrix in MATLAB.

(iii) The plotting engine that lies beneath Maxima is called _____ .

(iv) _____ is delayed assignment operator in Mathematica.

(v) To generate the sequence of values in Maple, the _____ function is used.

2. Write the output for the following : (5×1=5)

(i) For [i = 1, i <= 10, i++, i = i + 2; Print[i]]

(ii) A = {{2, 3, 5}, {4, 7, 8}, {3, 7, 5}};
A[[2, 3]] + A[[3, 1]] – A[[3, 2]]

(iii) m : = matrix([[1, 2, 3], [4, 5, 6], [7, 8, 9]]):
evalm(m + m);

(iv) f(n) : = if n < 2 then 1 else f(n – 1) + f(n – 2);
makelist(f(n), n, 1, 10);

(v) A = [2, 4, 5; 1, 7, 4; 5, 3, 2];
4(1 : 2, 2 : 3)

Attempt any **EIGHT** parts from the following : (8×2=16)

(i) Write the commands in Mathematica to evaluate

$\sum_{i=1}^{10}(i+1)^i$ and $\sum_{i=1}^{10}\sum_{j=1}^{10}(i+j)^2$

(ii) Define ifactor( ) function in Maple and use it to give output for the number 703.

(iii) Write the commands in Maxima to get the next prime and the previous prime to the number 2017.

(iv) Write command in Maple to plot the surface

$z = e^{-(x^2+y^2)}$, for $-2 \le x,\ y \le 2$.

(v) Write the command in Mathematica using D[ ] function to get $f'(x)$ and $f''(x)$, where $f(x) = \frac{x}{1+x^2}$.

(vi) Write the commands in MATLAB/ Octave to define matrices $A = \begin{bmatrix} 2 & 6 & 1 \\ 9 & 5 & 2 \\ 8 & 7 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 & 5 \\ 7 & 3 & 6 \\ 9 & 3 & 7 \end{bmatrix}$. Also, write the command for their multiplication.

(vii) Write command in MATLAB to plot $f(x,y) = x^2 + y^2$ for $0 \leq x \leq 10$ and $0 \leq y \leq 10$.

(viii) Explain the block( ) function in Maxima.

(ix) Define hist( ) and boxplot( ) functions in R with example.

(x) Write the commands in R to put the list of values

$$\{6, 3, 9, 0, 8, 1, 3, 3, 7, 0, 4, 1, 2\}$$

into a variable b and sort the array b.

4. Attempt any **FOUR** parts from the following (4×6=24)

(i) Write command in Mathematica to plot the equations

$$x = \sin\phi \cos\theta$$

$$y = \sin\phi \sin\theta$$

$$z = \cos\phi$$

where $0 \leq \phi \leq n$ and $0 \leq \theta \leq 2\pi$. Use the commands for color and title also.

(ii) Write a program in Maple to find the greatest common divisor (gcd) of integers a and b using Euclidean Algorithm.

(iii) Write the commands in MATLAB / Octave for the following :

(a) Create a vector t containing values ranging from 0 to 2π.

(b) Create a vector x containing values $\frac{2\cos t}{1+\sin^2 t}$.

(c) Create a vector y containing values $\frac{2\sin t \cos t}{1+\sin^2 t}$.

(d) Plot x vs. y.

(iv) Write the commands in R for the following :

(a) Put the following values into a variable d

8 5 7 8 3 7

6 5 4 9 4 8

5 4 6 9 4 5

(b) Generate a five number summary of d.

(c) Find mean of d.

(d) Find standard deviation of d.

(v) Write commands in Maxima to solve and plot the following linear system of equations :

$$2x + 3y - z = 5$$

$$x - 2y + 4z = 9$$

$$3x + y - 2z = -1$$

This question paper contains **4** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **2985**

Unique Paper Code : **42343408** **GC-4**

Name of the Paper : **PHP Programming**

Name of the Course : **SEC : Computer Science for B.Sc. Prog.**

Semester : **IV**

Duration : **2 Hours** Maximum Marks : **25**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt any *three* questions from Q. Nos. **2** to **5.**

1. (*a*) "PHP is a dynamically typed scripting language." Justify the statement. 2

(*b*) List *one* advantage and *one* disadvantage of GET method. 2

P.T.O.

(*c*) What will be the output of the following code : 2

```
<?php
    $username="jasoN";
if (ereg("[^a-z])", $username))
echo "Username must be all lowercase !";
else
echo "Username is all lowecase !";
?>
```

(*d*) What is the difference between mysql_fetch_object and mysql_fetch_array ? 2

(*e*) Answer the following : 2

(*i*) Write the prototype of the function to remove all HTML tags from a string passed to a form.

(*ii*) Which two predefined variables are used to retrieve information from forms ?

2. (*a*) Write a PHP program to display the first 'n' even numbers. Take the value of 'n' from the user. 3

(*b*) What is the difference between scope of local and global functions ? 2

3. (*a*) Differentiate between break and continue statements with suitable examples. 3

(*b*) Write a regular expression to match : 2

(*i*) any string containing zero or one 'p'

(*ii*) either of the words "fox" or "fix".

4. (*a*) Write a PHP Script to validate user Login. 3

(*b*) How can you define an associative array ? Describe with syntax. 2

5. Explain the following functions with a suitable example for each : 5

(*a*) sprint( )

(*b*) strcmp( )

(*c*) substr_replace( )

(*d*) strtok( )

(*e*) ltrim( ).

6. (*a*) Create a table employee with the following attributes : 3

(*i*) Name

(*ii*) Employee id

(*iii*) Department

(*iv*) Salary.

Assume suitable data type for the attributes.

(*b*) Insert two rows in the Employee table using a single insert command with appropriate values. 2

This question paper contains **4+1** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **3044**

Unique Paper Code : **62343414** **GC-4**

Name of the Paper : **Search Engine Optimization**

Name of the Course : **SEC : Computer Science for B.A. (Prog.)**

Semester : **IV (CBCS)**

Duration : **2 Hours** Maximum Marks : **25**

(Write your Roll No. on the top immediately on receipt of this question paper.)

All questions in 'Section A' are compulsory.

Attempt any *three* questions from 'Section B'.

Section A

1. Choose the correct option. (Write the question along with the correct option) : 10

(*i*) Which one of these is not a Search Engine activity ?

(*a*) Crawling

(*b*) Copy Writing

(*c*) Processing

(*d*) Indexing

P.T.O.

(*ii*) On-Page SEO includes :

(*a*) Good content, Good keyword selection

(*b*) Copy writing, Giving appropriate title to every page

(*c*) Link building, increasing link popularity

(*d*) Good content, link building

(*iii*) Keyword stuffing is :

(*a*) Placement of keywords within a page to raise the keyword count

(*b*) Repeating keywords in meta tags

(*c*) Creating a rogue copy of a popular website

(*d*) None of the above

(*iv*) Which statement is FALSE ?

(*a*) Use unique keywords

(*b*) Use keywords in meta description tag

(*c*) Page title of few pages can be same

(*d*) A tactic that does not involve deception, is a White Hat SEO tactic

(*v*) In SWOT analysis :

(*a*) Weaknesses and opportunities are beneficial in reaching the business objectives

(*b*) Attempt is to remove threats and opportunities

(*c*) Strengths and Weaknesses are internal environment

(*d*) None of the above

(*vi*) Statement 1 : A tactic should conform to search engine's guidelines

Statement 2 : Websites should include doorway pages

Select the *correct* option :

(*a*) Both Statement 1 and Statement 2 are TRUE

(*b*) Both Statement 1 and Statement 2 are FALSE

(*c*) Only Statement 1 is TRUE

(*d*) Only Statement 1 is FALSE

(*vii*) The two ways of optimization are :

(*a*) On-Page SEO and Crawling

(*b*) Crawling and Indexing

(*c*) Ranking and Processing

(*d*) On-Page SEO and Off-Page SEO

(*viii*) Which statement is false for increasing page rank ?

(*a*) Create a high quality web page

(*b*) Cloaking SEO tactic is favorable

(*c*) A web page should be designed to rank highest in the search engine results

(*d*) Put main keywords in <title> tags

(*ix*) Which of the following is illegal way of SEO ?

(*a*) Link Building

(*b*) Writing Meta Tags

(*c*) Creating sitemap

(*d*) Creating doorway Pages

(*x*) Which of the following are the different techniques used while performing Search Engine Optimisation :

(*a*) White Hat SEO

(*b*) Black Hat SEO

(*c*) Gray Hat SEO

(*d*) Both (*a*) and (*b*)

Section B

2. (*a*) Explain White Hat tactics for Search Engine Optimization. 3

(*b*) Explain search engine optimization process for achieving high page rank. 2

3. (*a*) Explain Canonical tag. Why is it important for Search Engine Optimization. 3

(*b*) What is "Alt" text ? Why should we use this while designing web pages ? 2

4. (*a*) How an image can be optimized by search engine optimization ? 3

(*b*) What is a Meta Description tag ? 2

5. (*a*) Why sitemap is important for a website ? 3

(*b*) Define and explain domain name. 2

6. Write short notes on the following (any *two*) : 5

(*a*) Social Book Mark

(*b*) Door Way Pages

(*c*) Blog submission.

This question paper contains 4+1 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : 9130

Unique Paper Code : 62273426 GC

Name of the Paper : Research Methodology

(Skill Enhancement Course–II)

Name of the Course : B.A. (Prog.) CBCS — SEC

Semester : IV

Duration : 3 Hours Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

(इस प्रश्न-पत्र के मिलते ही ऊपर दिए गए निर्धारित स्थान पर अपना अनुक्रमांक लिखिए ।)

Note :— Answers may be written *either* in English *or* in Hindi; but the same medium should be used throughout the paper.

टिप्पणी :–इस प्रश्न-पत्र का उत्तर अंग्रेज़ी **या** हिन्दी किसी एक भाषा में दीजिए; लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

All questions carry equal marks.

Attempt any *five* questions out of Eight questions.

सभी प्रश्नों के अंक समान हैं।

कुल आठ प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर दीजिए।

P.T.O.

1. (*a*) Explain the characteristics of a good research and discuss the types of research in detail.

(*b*) What is the difference between Quota sampling and snowball sampling ? 10,5

(अ) एक अच्छे शोध की विशेषताएँ बताइए तथा विस्तार से शोध के प्रकार की व्याख्या कीजिए।

(ब) कोटा प्रतिचयन तथा स्नोबॉल प्रतिचयन के बीच अन्तर क्या है ?

2. (*a*) Explain various steps involved in a research process.

(*b*) How a researcher reviews the literature ? Explain various methods for it. 7,8

(अ) एक शोध प्रक्रिया में सम्मिलित विभिन्न कदमों का विश्लेषण कीजिए।

(ब) एक शोधकर्ता कैसे साहित्यिक समीक्षा करता है। इसके लिए विभिन्न पद्धतियों की व्याख्या कीजिए।

3. (*a*) Explain the principles of sampling. What are the methods of drawing a random sample ?

(*b*) What are the essential characteristics of a good questionnaire ? 8,7

(अ) प्रतिचयन के सिद्धान्त की व्याख्या कीजिए। एक दैव प्रतिचयन को निकालने के क्या तरीके हैं ?

(ब) एक अच्छी प्रश्नावली की आवश्यक विशेषताएँ क्या हैं ?

4. (*a*) Enumerate the different methods of collecting data giving one example of each.

(*b*) What are the steps in the process of data preparation ? Explain in detail. 7,8

(अ) प्रत्येक के लिए **एक** उदाहरण देते हुए आँकड़ा संग्रह की विभिन्न विधियों की गणना कीजिए।

(ब) आँकड़ा तैयारी करने की प्रक्रिया में क्या कदम हैं ? विस्तार से समझाइए।

5. (*a*) What are the Ethical issues concerning the research participants of a research activity. Explain.

(*b*) Statistical Analysis plays an important role in research. Justify. 8,7

(अ) एक शोध कार्य के शोध भागीदारी के अन्तर्गत नैतिक मुद्दे क्या हैं ? व्याख्या कीजिए।

(ब) शोध में सांख्यिकीय विश्लेषण एक महत्वपूर्ण भूमिका निभाता है। न्यायसंगत सिद्ध कीजिए।

6. (*a*) Define the main issues which should receive the attention of the researcher in formulating the research problem. Give suitable examples.

(*b*) Explain how qualitative research differs from quantitative research. 10,5

(अ) मुख्य मुद्दों को परिभाषित कीजिए जो शोध समस्या को बनाने में शोधकर्ता को ध्यान आकर्षित करना चाहिए।

(ब) परिमाणात्मक शोध से गुणात्मक शोध कैसे भिन्न होता है ? विश्लेषण कीजिए।

7. (*a*) Explain the various types of sampling techniques used by a researcher for a research activty.

(*b*) How the research report is prepared for any research ? Explain. 7,8

(अ) एक शोध क्रिया-कलाप के लिए शोधकर्ता द्वारा विभिन्न प्रकार के प्रतिचयन तकनीकों के उपयोग का विश्लेषण कीजिए।

(ब) किसी शोध के लिए शोध विवरण कैसे तैयार किया जाता है ? विश्लेषण कीजिए।

8. Write short notes on (any *two*) : 7.5,7.5

(*a*) Research design

(*b*) Types of interviews in any research

(*c*) Referencing systems

(*d*) Sample size.

किन्हीं **दो** पर संक्षिप्त टिप्पणी लिखिये :

(अ) शोध प्रारूप

(ब) किसी शोध में साक्षात्कार के प्रकार

(स) संदर्भ व्यवस्था

(द) प्रतिचयन आकार।

1,900

This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **265**

Unique Paper Code : **234251** **G**

Name of the Paper : **Database Management System**

Name of the Course : **B.A. (Prog.) Discipline Course**

Semester : **II**

Duration : **3 Hours** Maximum Marks : **45**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Part A (Q. No. 1) is compulsory.

Attempt any *three* questions from Part B.

Part A

1. (*a*) Describe the following with respect to database : 2

(*i*) Secondary key

(*ii*) Minimal key.

(*b*) When is a table in 2NF ? 2

(*c*) Write the syntax of the following : 2

(*i*) ALTER TABLE

(*ii*) INSERT.

P.T.O.

(*d*) What is the difference between DDL and DML. 2

(*e*) Why is Entity Relationship Diagram important ? 2

(*f*) State two problems associated with data redundancy. 2

(*g*) What do you mean by stored and derived attributes ? Give example. 3

Part B

2. (*a*) Briefly describe any *four* disadvantages of file systems. 4

(*b*) Explain any *three* relational set operators giving examples. 6

3. (*a*) Describe the following terms : 4

(*i*) Partial functional dependency

(*ii*) Group by clause.

(*b*) Briefly describe logical and physical data independence. 4

(*c*) What is a weak entity set ? Give an example. 2

4. (*a*) Differentiate between JOIN and UNION with example. 5

(*b*) Define normalization. Explain its importance. Give an example to show how normalization is useful in database design. 5

5. (*a*) Explain referential integrity and entity integrity with suitable examples. 4

(*b*) Give *two* advantages and two disadvantages of a network database model. 4

(*c*) Mention different types of database users. 2

6. (*a*) With the help of a diagram, explain the three layered architecture of DBMS. 4

(*b*) Give *two* advantages of using relational data model. 2

(*c*) Write short notes on : 4

(*i*) SQL CONSTRAINTS

(*ii*) VARCHAR.

This question paper contains 4+2 printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **1994**

Unique Paper Code : **62341201** **GC-4**

Name of the Paper : **Database Management Systems**

Name of the Course : **B.A. (Prog.) Discipline Course**

Semester : **II**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Answer any *five* questions from Question Nos. **2** to **8.**

1. (*a*) What are the problems caused due to data redundancy ? 4

(*b*) Explain any *two* functions of DBMS. 4

(*c*) Give full form of the following : 2

(*i*) SQL

(*ii*) DML.

P.T.O.

(*d*) How are entities and attributes represented in ER model ? 2

(*e*) Differentiate between Single-Valued and Multi-Valued attributes with examples. 4

(*f*) Explain the Integrity Rules to design a database. 4

(*g*) What is partial dependency ? Explain with a suitable example. 3

(*h*) Explain Foreign key in a relation. 2

2. What are the components of a database system ? 10

3. A college maintains data about the following entities : 10

(*i*) Courses : including number, title, credits, syllabus, and prerequisites;

(*ii*) Courses offered : including course number, year, semester, section number, instructor(s), timings, and classroom;

(*iii*) Students : including student-id, name, and program;

(*iv*) Instructors : including id_number, name, department and title.

Construct an E-R diagram for the same.

4. Consider the following schema and write SQL for the following :

Student (RollNo, Name, Age, Sex, City)

Student_marks (RollNo, Marks1, Marks2, Marks3)

(*i*) To create the given tables and declare primary keys and foreign keys. 4

(*ii*) Display student details grouped by their city. 2

(*iii*) Display name of students who got more than 75 marks in Marks-1. 2

(*iv*) Delete the table Student_marks. 2

5. Consider the following relations R1 and R2 : 10

Roll No.	Name
1001	Ankit
1002	Suraj
2001	Vivek
2002	Ruchika

R1

Roll No.	Name
1004	Amit
1005	Suraj
2002	Ruchika
1001	Ankit

R2

Give the result of the following operations :

(*i*) **R1** PRODUCT **R2**

(*ii*) **R1** UNION **R2**

(*iii*) **R1** INTERSECTION **R2**

(*iv*) SELECT Roll No. greater than 1005 From **R1**

(*v*) **R1** DIFFERENCE **R2**

6. (*a*) Explain the different data anomalies in a database with example. 6

(*b*) Differentiate between primary key and secondary key in a relation with example. 4

7. (*a*) Explain any *two* advantages of DBMS. 4

(*b*) Explain different types of relationships that exist in a database model. 6

1994

8. Write short notes on any *four* : 10

(*i*) Network Data Model

(*ii*) Connectivity and Cardinality

(*iii*) Relational set operator JOIN

(*iv*) Data Dictionary and System Catalog

(*v*) Third Normal Form.

This question paper contains 4 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : 1995

Unique Paper Code : 62341201 GC-4

Name of the Paper : Database Management Systems

Name of the Course : B.A. (Prog.) Discipline Course

Semester : II

Duration : 3 Hours Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Q. No. 1 is compulsory.

Answer any *five* questions from Question No. 2 to 8.

1. (*a*) What is the importance of entity integrity and referential integrity in a database ? Give examples. 4

(*b*) Define primary key with an example. 2

(*c*) Define Third Normal Form with an example. 4

(*d*) Give full form of : 2

(*i*) RDBMS

(*ii*) DDL.

(*e*) Differentiate between SELECT and PROJECT operators with example. 4

P.T.O.

1995

(*f*) Explain the following data types : 4

(*i*) DATE

(*ii*) VARCHAR(4)

(*g*) Define data redundancy. 2

(*h*) Explain not NULL constraint with syntax. 3

2. Explain the various components of DBMS environment. 10

3. (*a*) Define relationship. Explain the different types of relationship with an example. 8

(*b*) What are composite attributes ? 2

4. (*a*) Differentiate between the following with suitable example : 4

(*i*) Atribute and Tuple

(*ii*) DELETE and DROP command.

(*b*) Explain JOIN relational operator with an example. 6

5. Consider the following relations PERSON1 and PERSON2 : 10

PERSON1	
Name	**Age**
Mark	23
Tom	28
Joe	21
Henry	32

PERSON2	
Name	**Age**
Mac	30
Tomy	42
Joe	21
Henry	32

Give the output of the following operations :

(*i*) PERSON1 UNION PERSON2

(*ii*) PERSON1 INTERSECT PERSON2

(*iii*) PERSON2 DIFFERENCE PERSON1

(*iv*) PERSON2 PRODUCT PERSON1

(*v*) PROJECT name from PERSON1.

6. A car insurance company maintains data about the following entities : 10

(*i*) person : including driver-id, name, address

(*ii*) car : including license, year, model

(*iii*) accident : including report-number, date, location

(*iv*) participated : including driver-id, license, report-number, damage-amount.

Construct an ER diagram for the same.

7. (*a*) Explain hierarchical data model. 4

(*b*) Describe any *three* problems with file system. 6

P.T.O.

8. Consider the following tables :

EMPLOYEE(ENO, ENAME, DOB, ADDRESS, SALARY, DNO)

DEPARTMENT(DNO, DNAME, DLOCATION, JOIN_DATE)

Symbols have their usual meanings.

(*a*) Give the SQL commands to create the given tables and declare primary keys and foreign keys. 4

(*b*) Write a query to get the names of the employees and their departments whose salary is greater than 1,00,000. 2

(*c*) Write a query to calculate total and average salary. 2

(*d*) Write a query to get employee names and the name of the department they work for, who joined on "1 Nov. 2004". 2

This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3006 **GC-4**

Unique Paper Code : 62344414

Name of the Paper : Multimedia Applications

Name of the Course : **B.A. (Prog.) Discipline Course**

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The paper has **two** sections. **All** questions in **'Section A'** are compulsory.
3. Attempt any **five** questions from **'Section B'**. Parts of a question must be answered together.

SECTION A

1. (i) What is Multimedia ? (2)

(ii) Write the difference between Serif and Sans Serif. Give examples also. (4)

P.T.O.

(iii) What do you understand by the Tweening and Kinematics techniques of animation. (4

(iv) What is Vector Drawing ? Give two examples where we use Vector Drawing. (5)

(v) What is the use of color palettes in Multimedia ? (3)

(vi) Write any two uses of Intelligent Multimedia System. (2)

(vii) Explain any two Sound-editing operations in Multimedia. (5)

SECTION B

2. (a) Discuss the differences among Interactive Multimedia, Hypertext, Hypermedia. (6)

(b) Briefly discuss the origin of Cel Animation and the concepts that go into creating these animations. (4)

3. (a) Explain Types of Authoring Tools. (6)

(b) Write the precautions to be taken while Shooting and editing a video for a multimedia project. (4)

4. (a) What is Analog Video. Describe the three channels of Color information in analog video. (6)

(b) What are Image-Editing Tools ? Give any 2 features of Image-Editing Tools. (4)

5. (a) Differentiate between MIDI and Computer Animation. Also explain which audio file format are best used in multimedia project ? (6)

(b) Explain HDTV. (4)

6. (a) Describe the stages of a Multimedia project. (6)

(b) Write the application of Multimedia in Schools and Public places. (4)

7. Write short on **(Any 5)** of the following : (10)

(i) Dithering Process

(ii) Anti aliasing

(iii) Morphing

(iv) Role of Multimedia in Virtual Reality

(v) 3-D Drawing and Rendering

(vi) Codec

8. (a) Differentiate between Web Page Makers and Site builders. Also give an example of both. (5)

(b) Differentiate between Typeface and a Font. Write at least three examples of both. (5)

This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **328**

Unique Paper Code : **234657** **G**

Name of the Paper : **Information Security**

Name of the Course : **B.A. Prog. Discipline Course (CA-3B)**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **45**

(Write your Roll No. on the top immediately on receipt of this question paper.)

The paper has two sections.

All questions in Section 'A' are compulsory.

Attempt any *three* questions from Section 'B'.

Parts of a question must be answered together.

Section 'A'

1. (*a*) Define the terms exploit and exposure. 2

(*b*) What are Risk assessment and Risk control ? 2

(*c*) Define Steganography. 2

(*d*) What is the value of information security for an organization ? 2

P.T.O.

(*e*) What are determining conditions for penalties associated with laws and policies ? 3

(*f*) What is access control ? Describe its different approaches. 4

Section 'B'

2. (*a*) Describe any *five* components of an information system. 5

(*b*) What is C.I.A. triangle with respect to information security ? Explain characteristics of information on which C.I.A. triangle is based. 5

3. (*a*) What do you understand by threat ? Explain any *four* types of threats come under forces of nature. 5

(*b*) How can deviations in quality of service affect the availability of information and system ? 5

4. (*a*) Explain how cultural differences can make it difficult to determine what is and is not ethical when it comes to the use of computer. 5

(*b*) How a defender *know yourself* and *know the enemy* to protect an organization when many threats are constantly attacking ? 5

5. (*a*) Differentiate between trusted network and untrusted network. How do packet-filtering farewell and dynamic packet-filtering firewall work ? 5

(*b*) What is Cryptography ? Differentiate between Symmetric and Asymmetric cryptography. 5

6. Write short notes on any *five* : 10

(*a*) Digital certificate

(*b*) Worms

(*c*) Criminal law

(*d*) Civil law

(*e*) Vulnerability

(*f*) Virus

(*g*) Utility.

This question paper contains **4** printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **330**

Unique Paper Code : **234652** **G**

Name of the Paper : **Internet Technologies-II**

Name of the Course : **B.A. Prog. Discipline Course (CA-2B)**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **45**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Section 'A' is compulsory.

Attempt any *three* questions from Section 'B'.

Section 'A'

1. (*a*) Define the following terms : 2

(*i*) WWW

(*ii*) HTTP.

(*b*) Give the output of the following PHP program :

```
<?php
function printCity($NameOfCity)
{
    print("The city is $NameOfCity.<Br>");
}
```

P.T.O.

```
function California( )
{
    $capital="Sacramento";
    printCity($capital);
}
    function Utah( )
    {
        $capital ="Salt lake City";
    printCity($capital);
    }
function Nation( )
{   global $capital;
    printCity($capital);
}
    $capital="Washington DC";
    Nation( );
    California( );
    Utah( );
    Nation( );
?>
```

(*c*) List the uses of CMS. 2

(*d*) What is Escape Sequence ? Give *two* examples. 2

(*e*) Differentiate between (= =) and (= = =) operators ? 2

(*f*) In pattern matching where and how a period(.), a carat(^) and a dollar sign($) in pattern matching. 3

Section 'B'

2. (*a*) Explain the working of a do-while loop with a suitable example. 5

(*b*) Write a PHP program to Print first ten odd numbers. 5

3. (*a*) Explain the different kinds of data types in PHP with *one* example of each. 6

(*b*) What do you understand by form processing ? Give a suitable example. 4

4. (*a*) Explain the concept of recursive function with the help of a suitable example. 6

(*b*) Write a program to ensure that a ZIP code is in the proper form of five digits followed by a dash and four more digits. 4

5. (*a*) Write short notes on the following : 6

(*i*) Search Engines

(*ii*) Break statement.

(*b*) Write a PHP program to print the following pattern : 4

```
*
* *
* * *
* * * *
```

6. Create a database named "Person" having a table named "Details" on the localhost. The table has following fields : 10

ID	Username	Password	Age	Address	Profession

Write PHP program to insert values into the above table.

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Roll No. | | | | | | | | | | |

S. No. of Question Paper : **331**

Unique Paper Code : **234657** **G**

Name of the Paper : **Information Security**

Name of the Course : **B.A. Prog. Discipline Course (CA-3B)**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **45**

(Write your Roll No. on the top immediately on receipt of this question paper.)

The paper has two sections.

All questions in Section 'A' are compulsory.

Attempt any *three* questions from Section 'B'.

Parts of a question must be answered together.

Section 'A'

1. (*a*) Explain any *two* characteristics of information with respect to security. 2

(*b*) List any *four* threats by forces of nature. 2

(*c*) Write the difference between exposure and vulnerability. 2

P.T.O.

(*d*) Explain the term malware. 2

(*e*) Differentiate between laws and ethics. 2

(*f*) Why is the risk identification important to the risk management process ? 2

(*g*) Describe Non-discretionary access control approach. 2

(*h*) What is Link encryption ? 1

Section 'B'

2. (*a*) Explain various components of information system. 6

(*b*) Explain the term security. 1

(*c*) What is the difference between a denial-of-service attack and a distributed denial-of-service attack ? 3

3. (*a*) What is the most common form of violation of intellectual property ? How does an organization protect against it ? 4

(*b*) Define firewall and describe its various processing modes. 6

4. (*a*) How is due diligence different from due care ? 2

(*b*) What can be done to deter someone from committing an unethical and illegal behaviour ? 3

(*c*) Describe risk management and its various components. 5

5. (*a*) What is access control ? Describe *four* mechanisms on which all access control approahces rely. 6

(*b*) What is symmetric encryption ? Why is it important to exchange keys out of band in it ? 4

6. Write short notes on (any *five*) : 10

(*a*) Spoofing

(*b*) Dictionary attack

(*c*) Digital Signatures

(*d*) Asymmetric encryption

(*e*) Man-in-the-middle

(*f*) Proxy server.