S. No. of Paper   : 6510

HC

Unique Paper Code   : 32341201

Name of the Paper   : **Programming in Java**

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

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 four questions from Section B.

Section A

1   (a) Give one word answer for the following: (1 x 5)

    (i)   A feature to handle runtime errors

    (ii)   Superclass of all the classes defined in Java

    (iii)   Multiple inheritance can be implemented using them

    (iv)   The toolkit to provide graphical user interface

    (v)   Which feature of Java makes it secure and platform independent?

(b)   On compiling the file having the following two classes, how many files will be created and what will be the name(s) of those file(s)?   (2)

```
class A {
      int x = 10;
}
class B {
      public static void main(String args[])
   {
```

P. T. O.

```
A        a = new A();
        System. out. println(a. x);
    }

}
```

(c)   Differentiate between the following: (3 x 2)

    (i)   init() and start() methods of the Applet class
    (ii)   checked and unchecked exceptions
    (iii) java application and applet

(d)   Out of the following two if statements, which one will
throw an exception if value of n is 10 and of d is 0; and
why?   (2)

```
if (d != 0 && n / d <= 1)
    System. out. println("n/d <= 1");
if (d != 0 & n / d <= 1)
    System. out. println("n/d <= 1");
```

(e)   Write the mathematical expression in Java for:

$$X = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$ (2)

(f)   What will be the output of the following statements?
                                   (1 x 5)

    (i)   System. out. println("Try this " + 1 + 4);
    (ii)   System. out. println(3 & 8 - 2);
    (iii) System. out. println(0B11010);
    (iv) System. out. println(-1>>6);
    (v)   System. out. println("Hello World!!!". sub
                                    string(3, 7));

(g)   What is the KeyEvent class and what are the three events
associated with it? Give one example of a key when
pressed results in:
    (i)   all the three events
    (ii)   two events only.   (2 + 1)

(h) Consider the following code segment:

```
class A{
        void fn(int ... v) {
                for (int x:v)
                        System.out.println(x);
        }

        void fn(boolean ... v) {
                for (boolean x:v)
                        System.out.println(x);
        }
        void test() {
                A         a = new A();
                a.fn(1, 2, 3);              // line 1
                a.fn(true, false);         // line 2
                a.fn();                    // line 3
        }
}
```

Out of line1, line2 and line3, which one(s) will give an error and why?   (2)

(i) For the following code segment, how many times does autoboxing and autounboxing take place in line1 and line2? Explain.   (2)

```
int       i;
Integer   I = 12;        // line 1
i = I / 3;               // line 2
```

(j) What is the function of run() method of the Thread class?   (2)

(k) Write the statement(s) in Java to create a two dimensional array that has 3 rows. Row 1 has 3 columns, row 2 has 1 column and row 3 has 2 columns. Also write for-each statements to print this array.   (2 + 2)

Section B

2.

(a) Define a class Person having name as its private data member. Create a subclass Student from Person that has a data member marks. Create another subclass Employee from Person that has additional data member salary. Add the relevant methods in the classes to read into the values of the data members. Use dynamic method dispatch concept to display the contents of the subclasses.

(5)

(b) Identify the errors in the code segments given below:

(1 x 5)

(i) `++(i + j);`

(ii)
```
interface I {
    char c;
    void display();
}
```

(iii)
```
final class A {
    float   f;
}
class B extends A {
    char    c;
}
```

(iv)
```
String s = "ace";
s[0] = 'i';
```

(v)
```
class try {
    void fn(int x) {
        System.out.println(x);
    }
    void fn(int x, int y) {
        System.out.println(x + " " + z);
    }
}
```

3.

(a) Design a class named *Book* having title, authorName and yearOfPublication as its private members. Here, authorName is an object of the class Name that has firstName, middleInitial and lastName as its private members. Assume appropriate data types for the instance members of the classes. Define methods to read the data for objects of *Book* class and override *toString()* method to print the details of a book. (*main()* method not required) (5)

(b) Consider the following three files:

File: A.java
```
package X;
public class A {
   int i;
}
```

File: A.java
```
package Y;
public class A {
      float f;
}
```

File: B.java
```
package Z;
import X.*;
import Y.*;
class B {
   public static void main(String
                        args[]) {
      A a = new A();
   }
}
```

(i) What problem will come on compiling file B.java? How can that problem be solved?

(ii) What should be the names of the folders/directories to store these three files? Assume that the name of the parent folder is home.

(iii) What command will be used to run the program assuming that the error has been removed and file has been successfully compiled? (2 + 2 + 1)

4.

(a) Write a method int myIndexOf (String str, char ch, int startIndex) that returns the position of the first occurrence of char ch in the string str and startIndex is the index from where the search begins. The function should return -1 if not found or if the startIndex is greater than the size of the string. Don't use the library routine IndexOf(). (4)

(b) Explain the Delegation Event Model for event handling. (3)

(c) What are the two ways a thread can be created? Which one should be preferred and why? (3)

5.

(a) Create an applet named mouseDemo to show "Mouse Pressed" in the status bar of the applet window when the mouse is pressed. Also write the applet tag required to run this applet. (4)

(b) Write a program to display the contents of the file whose name is passed as a command line argument to the program. (4)

(c) What is the output of the following code segment? Justify your answer. (2)

```
class X {
        int x = 20;
        X(int x) {
```

7.

```
                x = x;
                System.out.print(x + " ");
        }
        public static void main(String
                                        args[]) {
                X a = new X(10);
                System.out.print(a.x + " ");
        }
}
```

6.

(a) Write a program to create a child thread. The parent thread should read an integer n from the user and the child thread should then print all the odd numbers till n. The parent thread should wait for the child to complete the work. (4)

(b) Consider the following code segment:

```
interface I {
    int x = 10;
    void display();
}
class A implements I {
    float f;
    void set(float F) { f = F; }
    public void display() {
        System.out.println(x + " " + f);
    }
}

class Demo {
    public static void main(String args[]) {
        A a = new A();
        I i;
    }
}
```

For each of the following statements mention whether it is correct or not. Justify your answers. (6)

    (i)   i = a;

    (ii)   a = i;

    (iii)   i. set (1. 23f);

    (iv)   i. display ();

    (v)   a. set (1. 23f);

    (vi)   a. display ();

7.   What will be the output of the following code segments?

(a)
```java
enum Mango {
    Alphonso (100), Langra (80), Dasehri (90);
    private int price;
    Mango (int x) { price = x; }
    int getPrice () { return price; }
}


class enumDemo {
    public static void main (String args[]) {
        for (Mango x : Mango. values ()) {
            System. out. print (x. getPrice ());
            System. out. println
                                (" " + x. ordinal ())
        }
    }
}
```
    (2)

(b)
```java
String a = "abc", b = new String (a);
System. out. println ("a == b: " + (a == b));
System. out. println ("a. equals (b) :
                        "+ a. equals (b));
```
    (2)

(c)
```
class A {
    int x = 12;
    A(int y) {
        System.out.println("In A with s
                                    = " + s);
        s = 200;
        x = y;
    }
    static int s = 10;
    static {
        System.out.println("In static");
        s = 100;
    }
    public static void main(String args[]) {
        A a = new A(34);
        A b = new A(45);
        System.out.println(a.s + " " + a.x);
        System.out.println(b.s + " " + b.x);
    }
}
```
(3)

(d)
```
class Demo {
    static void test(int a) {
        try {
            if (a > 10)
                throw new ArithmeticException
                                    ("Demo");
            System.out.println("Normal exit");
        }
        catch (ArithmeticException e) {
            System.out.println(e);
            throw e;
        }
        finally {
            System.out.println("In test method
                                for a = " + a);
```

```
        }
      }


   public static void main(String args[]) {
      try   {
         test(10);
         test(20);
      }
      catch (Exception e) {
         System.out.println("Caught");
      }
   }
}
```
(3)

Sl. No. of Ques. Paper : **6511**   **HC**

Unique Paper Code   : **32341202**

Name of Paper   : **Discrete Structures**

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

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 in Section A.
Attempt any four questions from Section B.
Parts of a question should be attempted together.

SECTION A

1. (a) Of a group of 20 students, 10 are interested in music, 7 are interested in photography, and 4 like swimming. Furthermore 4 are interested in both music and photography, 3 are interested in both music and swimming, 2 are interested in both photography and swimming and 1 is interested in music, photography and swimming. How many students are interested in photography but not in music and swimming?   3

   (b) Prove that the given Boolean expression is a tautology using equivalence rules:

   $$(\neg p \wedge q) \rightarrow (\neg (q \rightarrow p))$$ 5

2

(c) Given $f(x)=x^2+1$ and $g(x)=x+2$. Find $f \circ g$ and $g \circ f$ where f and g are functions from R to R.   3

(d) Consider the following advertisement of a game:

     (i)   There are three statements in this advertisement.

     (ii)   Two of them are not true.

     (iii)   The average increase in IQ scores of people who learned this game is more than 20 points.

     Prove that the statement (iii) is true using truth table.   4

(e) A dance pair means a woman and man dancing together. How many such dance pairs can be formed from a group of 6 women and 10 men?   3

(f) Determine whether the given graphs G1 and G2 are isomorphic or not.   4
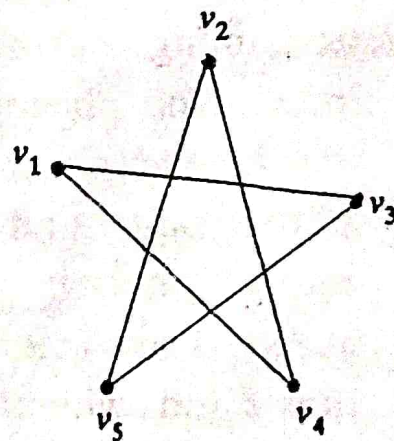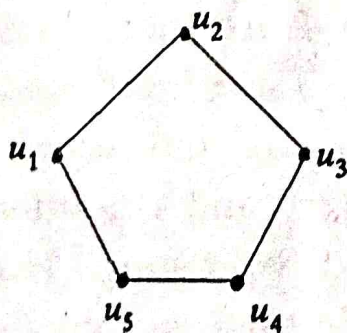
(g) Does there exist a simple graph with seven vertices having following given degree sequence:

$$(1, 3, 3, 4, 5, 6, 6)$$ 3

(h) Use Master method to find asymptotic bounds for the following recurrence relation:

$$T(n) = T(9n/10) + n$$ 5

(i) Solve the following recurrence relation using generating function method:

$$a_r = 3\,a_{r-1} + 2,$$

where $r \geq 1$ with the boundary condition $a_0 = 1$.   5

SECTION B

2. (a) A jigsaw puzzle consists of a number of pieces. Two or more pieces with matched boundaries can be put together to form a "big" piece. Finally, when all pieces are put together as one single block, the jigsaw puzzle is set to be solved. Putting two blocks with matched boundaries together is counted as one move. Use principle of Mathematical Induction to prove that for a jigsaw puzzle with n pieces it will taken $n-1$ moves to solve the puzzle.   5

(b) What is a Poset? Draw a Hasse Diagram for the given Poset:

$$(\{2, 4, 5, 10, 12, 20, 25\}\,;\,|).$$ 5

3. (a) Consider two sets A and B, A = {1, 2, 3, 4} and B = {3, 4, 5, 6}. Find the elements of each relation R stated below. Also, find the domain and range of R.

(i) $a \in A$ is related to $b \in B$, i.e., aRb if and only if $a < b$

P. T. O.

(ii) $a \in A$ is related to $b \in B$, i.e., aRb, if and only if a and b are both odd numbers. 5

(b) Translate "Everybody has somebody who is his or her mother" into predicate calculus. 2

(c) Give Big-O notation for factorial function. 3

4. (a) Show all the steps of Bubble Sort to put the following list of items in increasing order:

| 4 | 9 | 3 | 6 | 2 | 5 | 1 |

5

(b) A factory makes custom sports cars at an increasing rate. In the first month only one car is made, in the second month two cars are made, and so on, with n cars made in the nth month.

(i) Set up a recurrence relation for the number of cars produced in the first n months by this factory.

(ii) Use recurrence equation to solve how many cars are produced in the first year.

(iii) Find an explicit formula for the number of cars produced in the first n months by this factory. 5

5. (a) Show that the following argument is valid:

"If Mohan is a lawyer then he is ambitious. If Mohan is an early riser, then he does not like rice. If Mohan is ambitious then he is early riser. Then if Mohan is a lawyer, then he does not like rice." 4

(b) State the condition for Eulerian path and Eulerian circuit. Determine whether the given graphs G1 and G2 have Eulerian circuit or Eulerian path.   4
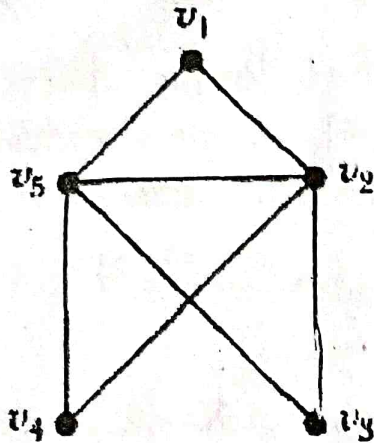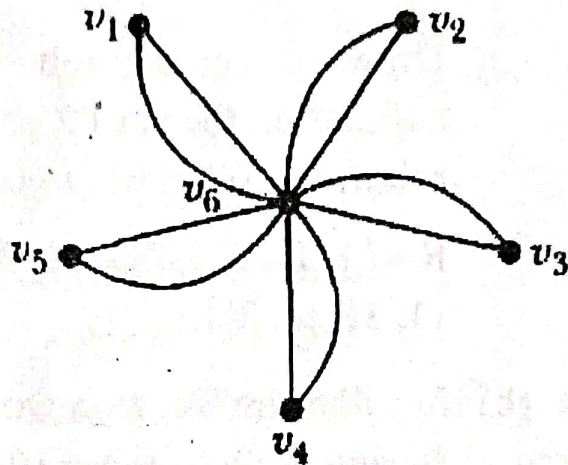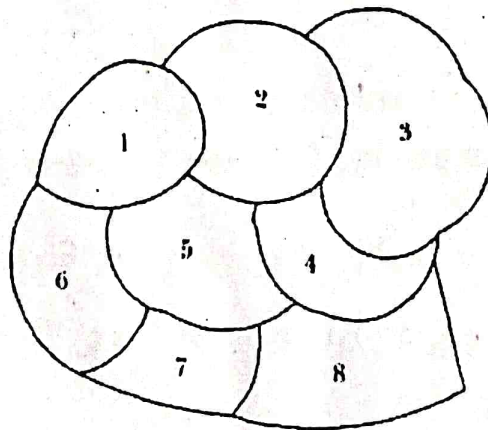

G1   G2

(c) Define chromatic number for a graph. Determine χ (chi) for the given graph G.   2

G.

5. (a) Find $S^6 a$ and $S^{-3} a$ for the following numeric function where r is 0 for $r = 0, 1, 2, i-1$ and is a_{r-i} for $r \geq i$:

$$a_r = \begin{cases} 1 & 0 \le r \le 9 \\ 2 & r \le 10 \end{cases}$$

5

(b) Consider $H_0=0$, $H_1=1$ and $H_n=H_{n-1}+2H_{n-2}$. Give an explicit solution for H_n.

5

7. (a) Draw a directed graph of the following relations R defined on the set $\{1, 2, 3, 4\}$. Decide whether the relation is reflexive, symmetric, or transitive.

$R=\{1, 1\}, \{2, 2\}, \{3, 3\}, \{4, 4\}, \{1, 2\}, \{2, 3\}, \{1, 3\}, (3, 2)\}$

5

(b) Let f be the function from the set $X=\{2, 3, 4, 5, 6, 7\}$ into the set $Y=\{0, 1, 2, 3, 4\}$ defined by $f(x)=2x \pmod 5$. Write f as a set of ordered pairs. Is f one-one or onto Y?

5

Sl. No. of Ques. Paper: 8750   **GC-4**

Unique Paper Code   : 12295201

Name of Paper   : **Spatial Information Technology**

Name of Course   : **B.A. (Hons.) CBCS**

Semester   : II/IV

Duration   : 3 hours

Maximum Marks   : 75

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

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

टिप्पणी:— इस प्रश्नपत्र का उत्तर अंग्रेज़ी या हिन्दी किसी एक भाषा में दीजिए, लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

Answer all questions.
All questions carry equal marks.

सभी प्रश्नों के उत्तर दीजिए।
सभी प्रश्नों के अंक समान हैं।

1. Discuss different elements of GIS.

   जी०आई०एस० के विभिन्न तत्वों का वर्णन कीजिए।

   Or (अथवा)

   Trace the historical development of GIS.

P.T.O

जी०आई०एस० के ऐतिहासिक विकास की रूपरेखा प्रस्तुत
कीजिए ।

2. Differentiate between raster and vector data
structures.

रास्टर एवं वेक्टर आकंड़ा संरचनाओं में अन्तर स्पष्ट कीजिए ।

Or (अथवा)

Define projection and discuss its significance in the
process of registration.

प्रक्षेपण को परिभाषित कीजिये और रजिस्ट्रेशन प्रक्रिया में इसके
महत्व की विवेचना कीजिए ।

3. Describe the different techniques of digitization, data
attachment and data transformation.

डिजिटाइजेशन, आँकड़ा संलग्न एवं आँकड़ा रूपान्तरण की
विभिन्न तकनीकों का वर्णन कीजिए ।

Or (अथवा)

Discuss the techniques of data analysis and map
layout.

आँकड़ा विश्लेषण एवं मानचित्र प्रदर्शन तकनीकों का वर्णन
कीजिए ।

4. Discuss in detail the network analysis.

तंत्र विश्लेषण की विस्तृत व्याख्या कीजिए ।

Or (अथवा)

Discuss and differentiate between raster and vector
overlays.

रास्टर एवं वेक्टर ओवरले का वर्णन करते हुए अन्तर सपष्ट कीजिए ।

5. Evaluate the significance of Spatial Information Technology.

स्थानिक सूचना तकनीक के महत्व का मूल्यांकन कीजिए ।

Or (अथवा)

Discuss the application of Spatial Information Technology in urban studies.

नगरीय अध्ययनों में स्थानिक सूचना तकनीक की प्रायोगिकता का वर्णन कीजिए ।

Roll No. ☐☐☐☐☐☐☐☐☐☐

S. No. of Question Paper : 6512

Unique Paper Code : 32341401   HC

Name of the Paper : Design and Analysis of Algorithms

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

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 of 35 marks is compulsory.

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

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

     2

     (*b*) Consider a variation of the merge sort algorithm that solves a problem of size n by dividing it into two subproblems of sizes $2n/3$ and $n/3$, and then merging the solutions. Find the recurrence for the running time of the above algorithm and solve it.

     4

               P.T.O.

(c)   A thief wants to steal all the gold dust from a st

having W kg of it. The thief has n sacks hav

different capacities. Give an efficient algorithm for

thief to fill his sacks with dust so that the number

sacks used is minimized.

(d)   Consider an instance of the weighted interval schedul

problem with 6 intervals as specified below :

Interval number	Start time (s_i)	Finish time (f_i)	Weight (
1	0	2	2
2	1	3	4
3	2	4	4
4	1	5	7
5	4	5	2
6	4	6	1

With the help of the above example argue

the memorized recursive algorithm solves lesser num

of subproblems than the corresponding itera

algorithm.

(e) Can a red-black tree have

   (i) a black node without any sibling ? Justify.

   (ii) a red node without any sibling ? Justify.   4

(f) Consider an algorithm A with run time $O(n)$. What is the condition on A for it to be usable as the intermediate sort in Radix sort ? Explain.   3

(g) Let $G = (V,E)$ be an undirected path graph with n nodes. We call a graph a 'path' if its nodes can be written as $v_1, v_2, \ldots\ldots, v_n$ with an edge between v_i and v_j if and only if the numbers i and j differ by exactly 1. With each node v_i, we associate a positive integer weight denoted by w_i. A subset of the nodes is called an independent set if no two of them are joined by an edge. Consider the following greedy algorithm for finding an independent set of maximum total weight in a path graph :

Start with S = empty set

While some node remains in G

Pick a node v_i of maximum weight

Add v_i to S

Delete v_i and its neighbors from G ,

Endwhile

Return S

Give an example to show that the above algorithm does not always find an optimal solution.　　　　4

(h) Discuss the run time complexity of the naïve string matching algorithm.　　　　2

(i) Consider a directed graph G = (V, E). Given two vertices s and t in V, mention the name of an algorithm that can be used to determine if there exists at least one s-t path in G. What is the running time of the algorithm ?　　　　3

(j) Give an efficient algorithm to find the maximum element in a min-heap. Give the exact running time of the algorithm.　　　　3

(k) Would you use DFS to find the shortest-path distance between two nodes in a graph ? Justify your answer.   3

(a) Consider an adjacency list representation of a directed graph wherein an array of the outgoing edges (and not the incoming edges) for each vertex is maintained. Give an algorithm to compute the indegree for each vertex and discuss the time complexity of the algorithm.   5

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

(i) Insertion

(ii) Preorder traversal.   5

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

P.T.O.

FindPair (Arr, n, S)

Quicksort (Arr, 1, n)

for i = 1 to n

flag = BinarySearch(Arr, i+1, n, | S-Arr[i] |)

if (flag)

return 1

endif

endFor

return 0

FindPair uses the following algorithms :

Quicksort (Array, First, Last).

BinarySearch (Array, First, last, element)

Analyze the worst case running time of FindPair. 4

(b) Can a graph G in which edge weights are not necessarily distinct, have more than one minimum spanning trees (MST). If yes, give an example; if no, justify.

4

(c) Is Merge sort (i) in place (ii) stable ? Explain. 2

4.   (a)   Consider a stack S that supports the following operations :

Push(S, x) : push element x onto stack S

Pop(S) : pop the top element from stack S and return it

Multipop(S, k) : remove top-k elements of stack S

Using the aggregate method of analysis, determine the amortised cost per operation when a sequence of n operations is performed on an empty stack.   3

(b)   For each of the following sorting algorithms give an input of size five for which it shows worst case behaviour :

(i)   Merge sort

(ii)   Quick sort.   4

(c)   For the variant of interval scheduling problem that minimizes lateness, give an instance with two different optimal solutions, neither of which has any inversions or idle time.   3

5. (a) Give an example graph having five nodes that has two different topological orderings. Also, show the topological orderings.   4

   (b) Observe that selection sort and heap sort function in a similar fashion in the following sense - in any iteration both the sorting techniques find the maximum amongst the elements yet to be processed and place it appropriately. However, they have different running times. Give the asymptotic time complexity of both and comment on what makes their running times different.   4

   (c) Create a Red-black tree with successive insertions for the following sequence of numbers: 10,8,14,12,13.   2

6. (a) Suppose we are given an instance of the Shortest s-t path problem on a directed graph G. We assume all the edge costs are positive and distinct. Let P be a minimum cost s-t path for this instance. Now suppose

we replace each edge cost c_e by its square, c_e^2, thereby creating a new instance of the problem with the same graph but different costs. Is it necessary for P to still be a minimum cost s-t path for this new instance ? Explain.   4

(b)   Why is Bucket sort considered to be a non-comparison based sorting algorithm (where no comparison of keys is performed for sorting the list) despite the fact that insertion sort, which is used to sort individual buckets, is comparison based ?   2

(c)   What kind of inputs will lead to (i) best case (ii) worst case performance for insertion sort algorithm ? Give the running time for both the cases.   4

7.   (a)   Show that at most 3*floor(n/2) comparisons are sufficient to find both the minimum and maximum in a given array of size n.   3

(b) Consider the following recursive algorithm to find an optimal solution to the subset sum problem :

Compute_opt(i,w)

If i = 0 or w = 0 then

Return 0

Else

If w < w_i then:

Return Compute_opt(i-1, w)

else

Return max(w_i + Compute_opt(i-1, w - w_i),

Compute_opt(i-1,w))

(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.

(iii) Consider an optimal solution to the above problem. Is it possible for this solution to contain a sub-optimal solution to a subproblem ? Explain.   2+2+3

Sl. No. of Ques. Paper : 6513   HC

Unique Paper Code   : 32341402

Name of Paper   : Software Engineering

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

Semester   : IV

Duration   : 3 hours

Maximum Marks   : 75

(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 four questions from Section B.
Parts of a question must be answered together.

Section A

1. (a) Why is the Spiral Model more realistic for the development of large scale systems?   2

   (b) State six characteristics of a good SRS.   3

   (c) How do we assess the consequences of risk? How is overall risk exposure determined?   3

   (d) State the advantages and disadvantages (three each) of Waterfall model.   3

   (e) What are the advantages of Technical Reviews?   2

   (f) When do umbrella activities occur? List any *three* of them.   3

P. T. O.

(g) What is the difference between an Alpha Test and a Beta Test? 3

(h) How does interface complexity affect coupling? 3

(i) Differentiate between top-down and bottom-up approaches in the case of software design. 2

(j) A system has 5 external inputs, 8 external outputs, 3 external queries, manages 5 internal logical files, and interfaces with 3 different legacy systems (3 EIFs). All of these data are of high complexity (6, 7, 6, 15, 10) and the overall system is relatively simple. Compute Function Point for the system. 3

(k) State the significance of a Gantt Chart for scheduling and monitoring a software project. 3

(l) Explain with the help of a diagram failure curves for software. 3

(m) What is Smoke testing? 2

SECTION B

2. (a) Explain testing strategy with the help of neat diagram. 5

   (b) What is Capability Maturity Model Integration (CMMI)? Explain the various layers of CMMI in detail. 5

3. (a) Explain the Incremental Model of software development process with the help of a diagram. Also state its two advantages. 5

(b) What is Boundary Value Testing? State the guidelines to create Boundary Value Testing for test cases with two examples.   5

4. (a) Draw a Context level and level 1 Data Flow Diagram for Retail Clothing Store in a mall.   6

(b) Explain four different measures of Software Quality.   4

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

```c
int main()
{
int year;
printf("Enter a year:");
scanf("%d",&year);
if(year%4==0)
{
   if(year%100==0)
   {
      if(year%400==0)
         printf("%d is a leap year.", year);
      else
         printf("%d is not a leap year.", year);
   }
   else
      printf("%d is a leap year.", year);
}
else
```

```
        printf("%d is not a leap year.", year);
        return0;
    }
```
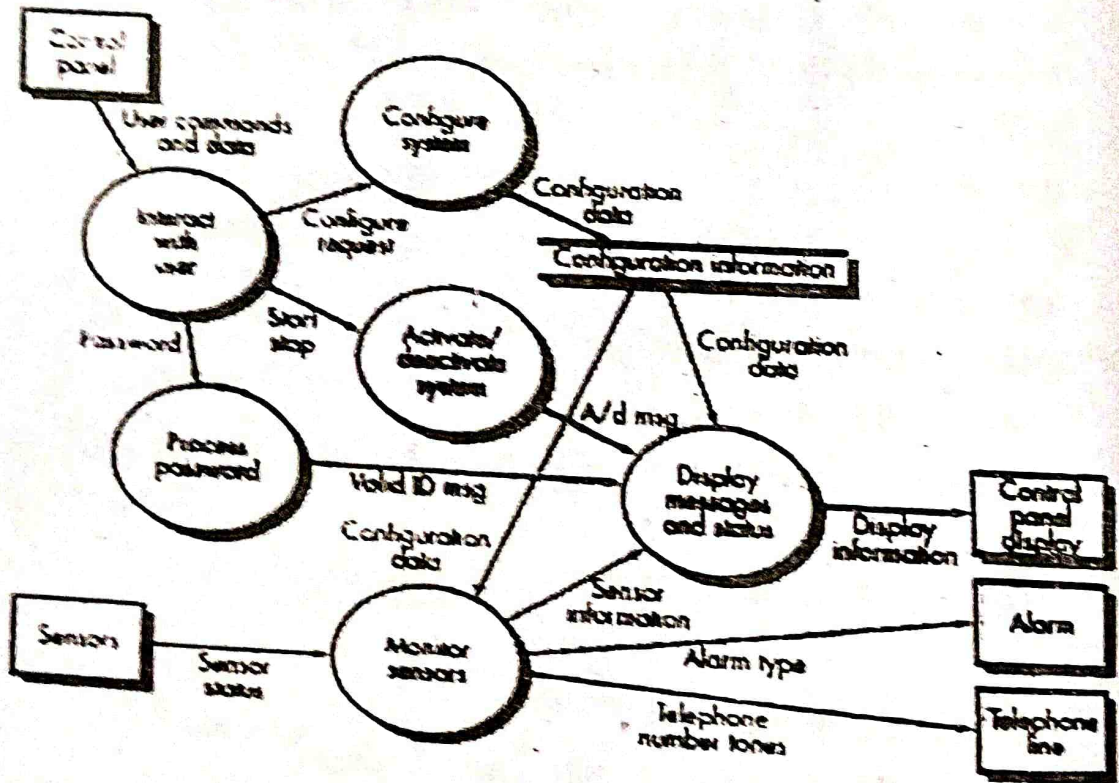   6

(b) What are the components of a risk table? How is
    it constructed?
                                                      4

6. (a) What is Transform Mapping? Perform first level
       factoring for the DFD given below.   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 average complexity (Screen-2, Reports-5, 3CGL components-10) and average/developer/ environment maturity as 13. Use the application composition model with object points. 5

7. Write short notes on any *two*:

(a) Five levels of cohesion

(b) Five elements of software quality assurance

(c) Defect amplification model. 10

Roll No. ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

S. No. of Question Paper : 6514

Unique Paper Code : 32341403   IC

Name of the Paper : Database Management Systems

Name of the 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 No. 1 is compulsory.

Attempt any *four* questions out of the remaining Q. No. 2–Q. No. 7.

Parts of a question must be answered together.

1.   (a)   Two sets of FDs for a relation R (A,B,C,D,E) are given as follows :

$$F = \{A \to B$$

$$AB \to C$$

$$D \to AC$$

$$D \to E\}$$

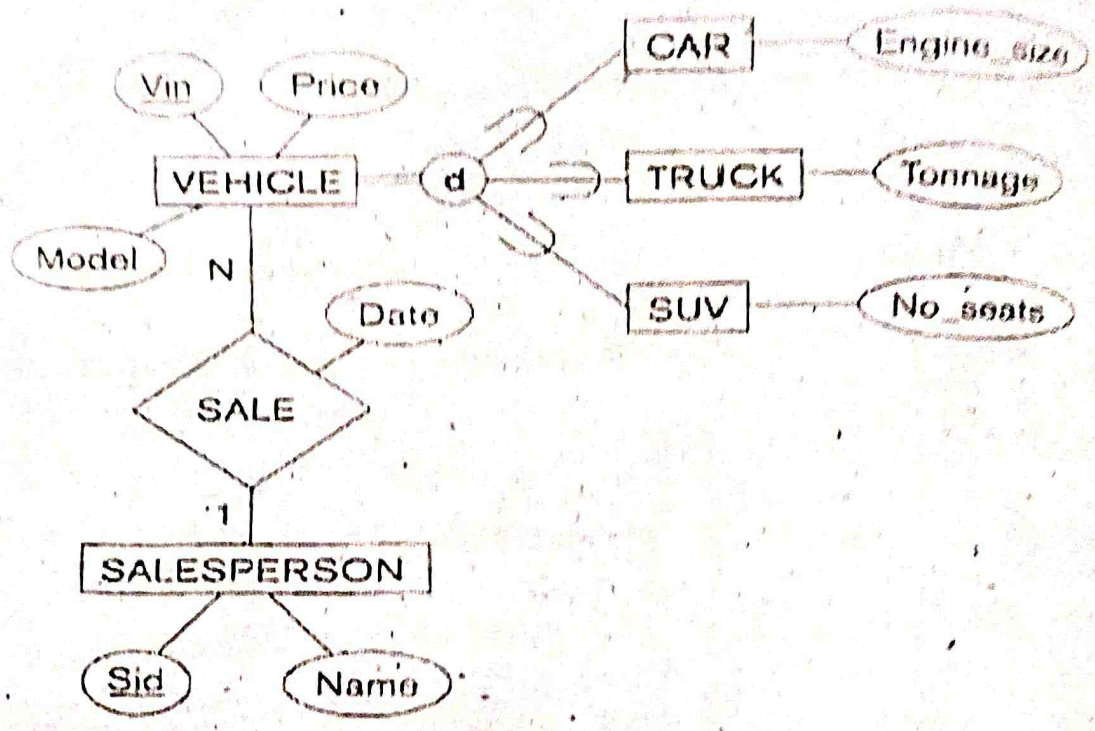$$G = \{A \to BC$$

$$D \to AE\}$$

Are F and G equivalent ? Justify your answer.   5

P.T.O.

(b)   Consider the following EER diagram for a vehicle dealer database. Vin (Vehicle Identification) is primary key for the entity VEHICLE and Sid (Salesperson Id) is the primary key for the entity SALESPERSON :

Convert the following components of the above EER diagram to relational tables :

(i)   1 : N relationship

(ii)   Specialization.   2+3

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

- A table T with the attributes T1(int), T2(char(20)), T3(int), T4(char(6)), T5(int)

- (T1, T2) form the primary key

- Default value of T3 is 6

- Value of T4 should be taken from the values (Male, Female)

- T5 is a foreign key coming from another table S of the database   5

(d) Consider the following tables A and B :

A

X	Y	Z
15	a	7
25	b	8
35	d	6

B

U	V	W
25	a	9
35	d	6
25	c	7

The attributes X, Y, Z are domain compatible with the attributes U, V, W respectively. Show the results of the following operations :

(i)   A U B

(ii) $A \bowtie_{A.X=B.U} B$

(iii) $\Pi_{A.Z,\ B.W}\ (\sigma_{A.Y=B.V}\ (A \times B))$ 1+2+2

(e) What is *data independence* ? Illustrate the concepts of *logical data independence* and *physical data independence* with examples.   1+2+2

P.T.O.

(f) Consider a data file EMPLOYEE (EmpId, Ename Salary, DeptNo, Dob, Designation). Create the primary index (on EmpId) and the secondary index (on DeptNo) on the above file diagrammatically. Which index will take more space and why ?

3+2

(g) State the ACID properties of transactions. What is the use of system log ?

4+1

2. Consider a movie database in which data is recorded about the movie industry.

The data requirements are summarized as follows :

- Each movie is identified by title and year of release. Each movie has a length in minutes. Each movie has a production company and is classified into one or more genres (such as horror, action, drama, and so forth). Each movie has one or more directors and one or more actors that appear in it. Each movie also has a plot outline. Finally, each movie has zero or more quotable quotes, each of which is spoken by a particular actor appearing in the movie.

- Actors are identified by name and date of birth and appear in one or more movies. Each actor in the movie has a role in it.

• Directors are identified by name and date of birth and direct one or more movies. It is possible for a director to act in a movie that he directed.

• Production companies are identified by name and each has an address. A production company produces one or more movies.

Identify :

(i) Entities of interest.

(ii) Attributes of interest for each entity.

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

3. Consider the following database giving information of various branches of a company and staff at each branch :

Branch (branchNo, street, city, postcode)

Staff (staffNo, fname, lname, position, sex, DOB, salary, branchNo)

(a) Give SQL Create Table commands to create the above tables.   2+2

(b) Answer the following queries in SQL : 1½+1½+1½+1½

    (i) List the address of all branch offices in London or Bristol.

    (ii) Find the minimum, maximum and average staff salary.

    (iii) For each branch office with more than one staff member, find the number of staff working and the sum of their salaries.

    (iv) Find all staff whose salary is larger than the salary of every staff member at the branch with branchNo 'B003'.

4. (a) Consider a file with the following key values : 9, 5, 2, 7, 4, 15. 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. Find the blocking factor for the file, the number of blocks needed for the file and number of block accesses needed by a binary search on this data file. 1+1+

(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} → {C}, {A} → {D, E}, {B} → {F}, {F → {G, H}, {D} → {I, J}}. Find the key of R? Decompose R into 2NF and then 3NF relations.   2+2+2

(b)   Differentiate between functional dependency and full functional dependency. Give an example of a relation that is in 3NF but not in BCNF giving reasons.   2+2

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

item(ItemCode, ItemName, ItemPrice, ItemQty)

customer(CustCode, CustName, CustAddress, CustPhone)

issue(IssueCode, ItemCode, IssueDate, IssueQty, CustCode)

(i)   Find the names of distinct customers who have got issued any item with price above 1000/-.

(ii)   Give the details of the costliest item.

(iii) Give the details of all those customers who bought an item with item code 'I005'.   2+2+2

(b)   Give four advantages of the DBMS approach over the conventional file system approach.   4

7. (a) Illustrate the use of each of the following constraints that can be applied to specializations/generalizations with the help of an example :

(i) Disjoint Total

(ii) Disjoint Partial

(iii) Overlapping Partial.   2+2+2

(b) Consider the following relations :

Student

SId	Sname	CNum
1	Anu	6
2	Shyam	8
3	Rakesh	6

Course

CNo	Cname	Dept
6	XX	Maths
7	YY	CompSc
8	ZZ	English

Here, SId is a Primary Key and CNum is a Foreign Key in Student relation. CNo is primary in Course relation.

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

(i) Insert < 4, 'Preeti', 10 > in Student

(ii) Insert < 5, 'Reena', 7 > in Student

(iii) Delete < 6, 'XX', 'Maths' > from Dept

(iv) Insert < 10, 'AA', 'Electronics' > in Course   4

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

S. No. of Question Paper : 7178

Unique Paper Code : 32343406   HC

Name of the Paper : PHP Programming

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

Semester : IV

Duration : 2 Hours   Maximum Marks : 25

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

Section A is compulsory.

Parts of a question must be answered together.

Attempt any *three* questions from Section B.

All questions in Section B carry equal marks.

Section A

1. (*a*) Differentiate between the require_once() and include_once() functions with suitable examples.   2

    (*b*) Are the operators "&&" and "*and*" interchangeable ? Give examples to support the answer.   1

P.T.O.

(c) Diagrammatically explain the request/response sequence in the client/server environment.   2

(d) What will be the output of the following code .   1

```php
<?php

    $x = True and False;

    var_export($x);

?>
```

(e) What is the difference between the echo and print commands ?   1

(f) What is a binary safe function in PHP ? Explain with an example.   2

(g) What are superglobal variables ? Where are they used ?   1

Section B

2. (a) Describe the HTTP Request Methods : GET and POST highlighting the difference between the two.   2+3

(b) Write a PHP script to create and retrieve a cookie.

3. (a) Define an associative array with the help of an example.

    2+1+2

(b) Give the syntax to set PHP's internal pointer back to the first element of the array.

(c) Give the output of the following :

```
<html>

<head>

<title> Question 3 c</title>

</head>

<body>

<?php>

    $classes = array ("BSc", "MSc", "PhD");

    echo (next($classes));

    echo (next($classes));

?>

</body>

</html>
```

(a) Write a command to validate whether a string is alphanumeric or not, using either preg_match() or regex.

2+3

(b)   Given $a=10 $b='10' $c ='a'

Evaluate the following, justifying your answers :

(i) $a= =$b and $a= = =$b

(ii) $a != $b and $a !== $b

(iii) $c and $$c

5.   Write a PHP function createtable() that does the following :   5

(a)   Take the size of the table from the user, say n

(b)   Dynamically generate an $n \times n$ HTML table where each cell displays the product of the indices of the cell (i.e., the (i, j) cells shows $i*j$).

6.   (a)   Write a PHP function to take user input for an array with 10 numeric items and sort it using bubble sort.   3+2

(b)   Describe the working of the following functions with examples :

(i)   nl2br()

(ii)   strrchr()

[This question paper contains 8 printed pages]

Your Roll No. : ....

Sl. No. of Q. Paper : **6515**   HC

Unique Paper Code : 32341601

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

Name of the Paper : Artificial Intelligence

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) Section **A** is compulsory.

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

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

P.T.O.

SECTION A

1. (a) Describe the following : 4

    i. Agent Function

    ii. Closed World Assumption

  (b) In what type of reasoning existing rules can be retracted ? Explain, whether a rule can be retracted in FOPL. 2

  (c) Let h' denote the estimate of h (the actual cost of getting from the current node to a final state node). Explain in what way the efficiency of A* algorithm and reaching of a goal state is affected if h' always overestimates h. 2

  (d) Differentiate between breadth first search and best first search. 3

  (e) Explain uses of Cut and Fail predicates in PROLOG. 3
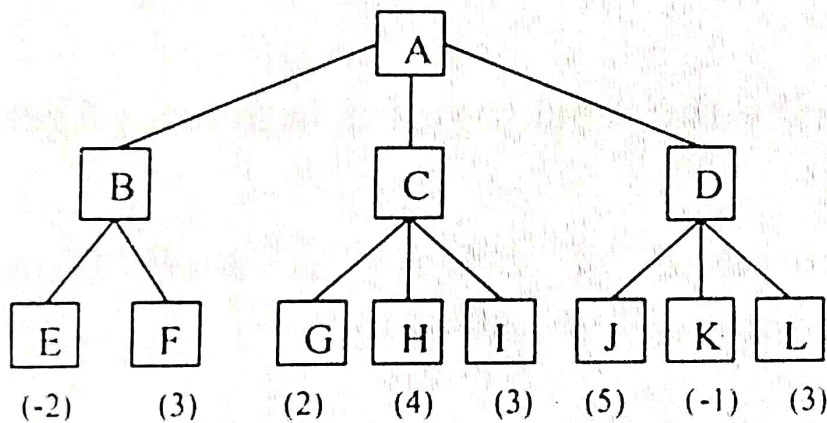
  (f) Find the meaning of the statement

$$(\lnot P \lor Q) \mathbin{\&} R \to S \lor (\lnot R \lor Q)$$ 2

    for the following interpretation : P is true, Q is true, R is false, S is true.

(g) Transform the following sentence into disjunctive normal form : 2

¯(P V ¯Q) & (R → S)

(h) Consider the following game tree with ply. depth 2, in which the indicated scores are from the MIN player's point of view. What move should MIN choose, and why ? 3

MIN Ply.

MAX Ply.

(i) Express the following sentences as conceptual dependency structures : 4

  (i) Bill is a programmer

  (ii) Joe gave Sue a flower.

(j) Determine whether set is unifiable ? If yes, obtain a most general unifier. 2

W= {P(A,B,B), P(x,y,z)}

(k) Differentiate between a fully observable and partially observable environment.

4

(l) Give an example of each of the four types 0, 1, 2 and 3 for Chomsky's hierarchy of grammers.

4

SECTION B

2. (a) Write a PROLOG program to reverse a list.

4

(b) Describe the working of a Learning Agent.

3

(c) Prove that if events A and B are independent, P (B|A) = P(B).

3

3. (a) Using constraint satisfaction algorithm, solve the following crypt arithmetic problem.

5

$$
\begin{array}{r}
O\,D\,D \\
O\,D\,D \\
\hline
E\,V\,E\,N \\
\hline
\end{array}
$$

(b) Discuss, based on the alpha value of a MAX player and beta value of a MIN player, when the search is discontinued in the MINIMAX procedure using alpha-beta pruning. Explain, using an example.

5

4. (a) Derive a parse tree for the sentence

3

"Mary slept on the chair"

Using the following rules :

$S \rightarrow NP\ VP$

$NP \rightarrow N$

$NP \rightarrow DET\ N$

$VP \rightarrow V\ PP$

$PP \rightarrow PREP\ NP$

$N \rightarrow Mary\ /\ Chair$

$V \rightarrow Slept$

$DET \rightarrow the$

$PREP \rightarrow on$

(b) Joint probability $P(x_1, x_2, \ldots, x_8)$ by inspection as a product of chain conditional probabilities is:

$$P(x_1, x_2, \ldots, x_7) = (\ P(x_7\ |\ x_5, x_6)\ P(x_6\ |\ x_3, x_4) \\ P(x_5\ |\ x_4)\ P(x_4\ |\ x_2)\ P(x_3\ |\ x_2)\ P(x_2\ |\ x_1)\ P(x_1)\ )$$

Draw the causal network for the same.

4

P.T.O.

(c) What should be the features of a good performance for a rational agent ?

3

5. (a) Based on the following statements :

7

i. Whoever can read is literate

ii. Dolphins are not literate

iii. Some dolphins are intelligent also.

iv. Donald is a dolphin.

Using resolution to prove that "some intelligent beings cannot read".

(b) Evaluate truth value of expression   3
$$E = \exists X(P(f(x)) \land Q(x, f(a)))$$

With given domain D = (1,2); assignment for a=1; assignment for f are : f (1) =2, f (2) = 1.

6. (a) Write the conceptual graph and FOPL representation for the following sentence :   4

"Every cycle has pedals".

6

(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

7 . (a) What are the similarities and differences between Conceptual Graph (CG) and Conceptual Dependency (CD) representation structures ? 4

(b) Explain the difference between a Recursive Transition Network and Augmented Transition Network. 3

(c) You are given two jugs of capacity 4-gallon and 3-gallon respectively. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug ? Write down solution by showing all intermediate states.

3

S. No. of Paper : 6516   HC

Unique Paper Code : 32341602

Name of the Paper : Computer Graphics

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

Semester : VI

Duration : 3 hours

Maximum Marks : 75

(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 four questions from Section B.

Parts of a question must be answered together.

Section A

(a) What is the condition for trivial acceptance of a line segment PQ with P(0, 2) and Q(4, 2) in Cohen Sutherland Line Clipping Algorithm using rectangular window defined by vertices A(0, 0), B(4, 0), C(4, 4), and D(0, 4)?   3

(b) What is the advantage of convex hull property in Bezier curve?   3

(c) Define aspect ratio. If an image has a height of 2 inches and an aspect ratio of 1.5, what is its width?   3

(d) How do we specify animation sequence using kinematic and inverse kinematic description?   3

(e) Explain why a RGB color model is an additive color model. How can YIQ be obtained from   3

RGB?

(f) Give two reasons why Z buffer algorithm for visible surface determination is a fast algorithm.

(g) Consider the triangle ABC with A(0, 0), B(5, 0), and C(0, 5). Give transformation matrix after shearing triangle ABC by 3 units along Y-axis and 4 units along X-axis, using homogeneous coordinates.

(h) What is the difference between Phong shading and Gouraud shading?

(i) List any three logical input-device classifications used by the graphics systems, giving one example of each.

(j) Consider a polygon with vertices ABCD with co-ordinates A(1, 2), B(5, 5), C(8, 3) and D(5, 10). Trace the contents of Active Edge Table according to scan line fill algorithm.

(k) What are the advantages of using homogeneous coordinates?

(l) Give the transformation matrix for perspective projection onto the $z=0$ plane from center of projection at $z = -5$.

Section B

2. (a) Mention all possible vanishing points and draw a diagram of three points perspective projection .

(b) Given an ellipse with major axis = 16 units and minor axis = 12 units. Determine first 6 raster positions along the ellipse path, considering the initial raster position at (0, 6).

3. (a) Explain Gouraud shading method for polygon rendering with its drawbacks.

(b) Draw the four stages of the Sutherland-Hodgeman 6
clipping algorithm as the polygon shown below is
clipped by the right, top, left, and bottom clip
rectangle edges.
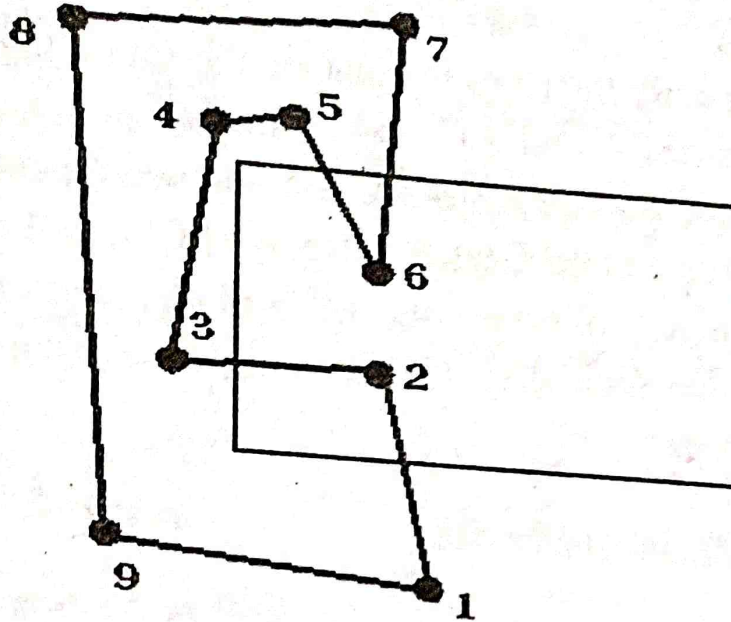
4. (a) Consider a rectangle A(-1, 0), B(1, 0), C(1, 2) and 6
D(-1, 2). Rotate the rectangle about the line $y=0$ by
an angle $\alpha=45^0$ using homogeneous co-ordinates.
Give the new co-ordinates of the rectangle after
transformation.

(b) Prove that parallel lines remain parallel after 4
generalized 2D transformation.

5. (a) Define hue, intensity, saturation and purity of light 4
with respect to color models.

(b) Develop cavalier and cabinet oblique projection on 6
a unit cube, assuming one of the parameters $\alpha=$
30^0.

6. (a) Derive the Basis Matrix for parametric cubic Bezier Curves. Also, obtain its blending functions. 5

(b) List the five ambiguities that may arise ·in the depth sort algorithm of hidden surface removal when the polygon's Z extents overlap. 5

7. (a) Specify the rules to equalize the set of edges in key frames k and $k+1$ in an animation scene. Using these rules, transform a triangle into a pentagon. 5

(b) Does Liquid Crystal Display (LCD) fall under the category of non-emissive displays? Does it support raster scan display? Explain its working. with a diagram. 5

Your Roll No. : ....

Sl. No. of Q. Paper : **8764** **HC**

Unique Paper Code : 42347903

Name of the Course : **B.Sc.(Programme) : DSE-1B**

Name of the Paper : Internet Technologies

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) Section **A** compulsory.

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

Section - A

1. (a) Name the attributes of Table tag in HTML to control : 2

   (i) the distance between the data in a cell and the boundaries of the cell.

   (ii) the spacing between adjacent cells in the table.

P.T.O.

(b) Which Property in CSS is used for :

(i) changing the background color of an element.

2

(ii) inserting an image in the background of an element.

(c) "JavaScript variables are loosely cast". Explain.

2

(d) What is the difference between alert() and prompt() functions in JavaScript ?

2

(e) **var tot = eval("15*6/2");**

2

What value will be stored in the variable "tot" ?

2

(f) What is the use of "Arithmetic Exception" in Java ?

2

(g) Write a java code to print the following pattern using loops :

3

1

12

123

(h) Name the three JSP lifecycle methods and mention its purpose.

3

(i) What are the five basic steps to connect a database in Java ?

3

(j) Explain the following JSP elements with example :   4
  (i) Scriptlet
  (ii) Declaration

Section - B

2. (a) Write a code in HTML to create an image **'xyz.jpg'** as a hyperlink to a URL **'abcd.htm'**. Name four shapes in which image map regions can be created.   4

   (b) What is CSS ? What is its advantage in designing a web page ? Explain with example.   4

   (c) Give any two text attributes used in CSS.   2

3. (a) When is the JavaScript Event Handler **'onBlur()'** executed ? Give its one use with example.   4

   (b) Give the output for the following JavaScript code :   4

```
<script language='JavaScript'>
x=50
y=30
z=(x>y) ? 'Happy' : 'Sad'
document.write(z)
</script>
```

Rewrite the above code in JavaScript using 'if' statement.

(c) Write a code in Javascript to set the HTML document's background color to red, using hexadecimal code.

2

4. (a) Give the output for the following Java code :

4

```
class show  {
public static void main(String args[ ])  {
int p[ ][ ] = new int [4][ ];
p[0] = new int[1];
p[1] = new int[2];
p[2] = new int[3];
p[3] = new int[4];
int i, j, k = 0;
for(i=0; i<4; i++)
for(j=0; j<i+1 ; j++)
{
p[i][j] = k;
k++;
}
```

```
for(i=0; i<4; i++) {
    for(j=0; j<i+1 ; j++)
        System.out.println(p[i][j] + " ");
        System.out.println();
    }
  }
}
```

(b) Write a java program to copy the contents of file **A.txt** to file **B.txt**.   4

(c) What is the use of keyword 'finally' in exception handling in Java.   2

5. (a) What is the advantage of JDBC in java ? In JDBC, What is the purpose of the following :

4

   (i) SQL statement

   (ii) Callable statement

   (iii) Prepared statement

(b) Give the direction of the cursor movement in the following resultset type in JDBC :

4

   (i)   ResultSet.TYPE_FORWARD_ONLY

   (ii) ResultSet.TYPE_SCROLL_ INSENSITIVE

(c) What is the purpose of the following code line in JDBC ?

Class.forName("com.mysql.jdbc.Driver");

2

6. (a) What is JSP ? Mention its three advantages over Servlets. 4

(b) Explain any four JSP implicit objects. 4

(c) Give the use of the following Directives of JSP : 2

(i) page

(ii) include

7. (a) How can the data present in the textbox of an HTML form be used by a JSP page ? Illustrate with an example. 4

(b) What will be the output of the following JSP code : 4

```
<%! int font Size; %>

<html>

        <body>
```

```
<%for(font Size=1;font Size<=3; font Size++)
<font color="green" size= "<%=font Size %>">
        JSP
    </font> <br/>
    <% } %>
</body>
</html>
```

(c) Find the error and make correction in the following JSP code line :   2

```
<%! 5+6*2 %>
```

8. (a) Write a code to create a HTML form with the following elements -   4

	Lable	Name	Type
(i)	Employee Name	txtName	Textbox
(ii)	Salary	txtAge	Textbox
(iii)	OK	btnOK	Button
(iv)	Clear	btnClear	Reset Button

(b) Add JavaScript code block to validate the above HTML form at the click of 'OK' Button-

    (i) Employee Name should not be blank.
    (ii) Salary should be a numeric value.
    (iii) If the data entered is valid, display **'Welcome <Employee Name>'** Otherwise, display **'Please enter valid values'**.   4

(c) What is the difference between colspan and rowspan attributes of a frame in HTML ?   2

Instructions for Candidates

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

. Section **A** is compulsory. Attempt any 4 questions from Section **B**.

. Use of scientific calculator is allowed.

Section – A (Compulsory)

. (a) What is the difference between Supervised and Unsupervised machine learning techniques? (3)

(b) Draw a diagram for a multi-layer perceptron? (3)

(c) What is the difference between Linear Regression and Logistic Regression?   (3)

(d) Explain the Cost function for Linear regression.   (3)

(e) Normalize the given data using mean normalization method.

12, 34, 45, 15, 40, 34   (3)

(f) How does the posterior probability of a class is computed by Naïve Byes classifier?   (3)

(g) How can neural network be used to tackle three class problems?   (3)

(h) Show that single layer perceptron can't solve XOR problem.   (3)

(i) Give an expression of bipolar sigmoidal activation function. Also obtain first derivative of the function.

(3)

(j) For a classification problem to classify 220 training instances into two classes **TRUE** and **FALSE**, the prediction pattern of a classifier is shown below :

1) 110 **TRUE** class instances classified as **TRUE**

2) 75 **TRUE** class instances classified as **FALSE**

3) 25 **FALSE** class instances classified as **TRUE**

4) 10 **FALSE** class instances classified as **FALSE**

Find the accuracy of this classifier. (4)

(k) List and explain applications of machine learning.

(4)

Section – B

(a) Consider the following 10 training instances (4)

No.	Color	Type	Mileage	Tested
1	Blue	Sports	Average	Yes
2	Blue	SUV	Average	No
3	Blue	Sports	High	Yes
4	Pink	Sports	High	No
5	Pink	Sports	Average	Yes
6	Pink	SUV	Average	No
7	Blue	SUV	High	Yes
8	Red	SUV	High	No
9	Red	SUV	Average	Yes
10	Red	Sports	Average	Yes

Compute the following probabilities

1. P(Blue/Yes)

P.T.O.

2. P(Sports/No)

3. P(Red/Yes)

4. P(Pink/Yes)

(b) Explain Gradient Descent algorithm for predicting parameters of multivariate Linear regression. (6)

3. (a) Calculate intercept and slope the following pairs of (x, y) training values : $(2,6),(5,12),(8,15),(12, 23),(17,29)$. Predict the value of y for test data $x=10$. (5)

(b) Write Best Subset Selection algorithm. Comment on the complexity of this algorithm. (5)

4. (a) Why Linear regression cannot be applied for categorical data? Explain with a suitable example. (5)

(b) For the values of β_0 and β_1 as -2.16 and 0.425 for categorical predictor variable X and a categorical response variable Y respectively, apply logistic regression to find $\widehat{Pr}(Y = yes \mid x = yes)$ and $\widehat{Pr}(Y = yes \mid x = no)$ (5)

(a) What do you understand by over-fitting of a classifier? How regularization can be used to tackle the problem of over-fitting? (6)

(b) Write the expression of the cost function for logistic regression and explain it. (4)

(a) Find the linear regression coefficients using gradient descent method for the following dataset when learning rate = 0.2. Carry out the process for 2 iterations.

X	0	1	2	3	4
Y	3	4	5	4	6

(5)

(b) Explain polynomial regression using formal notation.

(3)

(c) How does an Artificial Neural Network resemble functioning of brain? (2)

(a) Explain Backpropagation algorithm for multilayer perceptron. (6)

(b) Train a neural network for the following data with X1 and X2 as inputs and Y as output.

X1	X2	Y (output)
0	0	1
0	1	0
1	0	0
1	1	0

Roll No.

S. No. of Question Paper : 9426A

Unique Paper Code : 32347611   HC

Name of the Paper : Data Mining

Name of the Course : B.Sc. (H) Computer Science : DSE-4

(4) Semester : VI

Duration : 3 Hours   Maximum Marks : 75

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

All questions are compulsory from Section A.

Attempt any *four* questions from Section B.

Section A

1.   (a)   What is the difference between Data mining and KDD ?   2

     (b)   Identify attribute types for the following :   2

         (i)   eye color

         (ii)   grades

         (iii)   dates in a calendar

         (iv)   age.

(c) What are the maximum and minimum values of Gini Index ? Find Gini index for the following node : 2

Node N	Count
Class = 0	1
Class : 1	5

(d) Give *two* applications where graph data structure is used to model data. 2

(e) Given four points $p_1(0,2)$, $p_2(2,0)$, $p_3(3,1)$ and $p_4(5,1)$. Calculate Euclidian distance between the points p_1 and p_2, and p_3 and p_4. 2

(f) Let X denote the categorical attribute having possible values {poor, good, better, best}. What is the representation of each value when X is converted to binary form ? 2

(g) How are interval scaled attributes different from ratio scaled attributes ? Give an example of each.

(c) What are the maximum and minimum values of Gini Index ? Find Gini index for the following node : 2

Node N	Count
Class = 0	1
Class : 1	5

(d) Give *two* applications where graph data structure is used to model data.

2

(e) Given four points $p_1(0,2)$, $p_2(2,0)$, $p_3(3,1)$ and $p_4(5,1)$. Calculate Euclidian distance between the points p_1 and p_2, and p_3 and p_4.

2

(f) Let X denote the categorical attribute having possible values {poor, good, better, best}. What is the representation of each value when X is converted to binary form ?

2

(g) How are interval scaled attributes different from ratio scaled attributes ? Give an example of each.

3

(h) How is a eager learner different from lazy learner ? Support your answer with an example from both categories of classifiers. 3

(i) State the *Apriori principle*. Comment on the following statement :

"If an item set {x, y, z} is frequent, then its subset {y, z} will be frequent." 4

(j) Given the age of four students, normalize the values {18, 21, 22, 25}. 4

(k) Explain the following terms with reference to the DBSCAN algorithm : 2+2

(i) Core point

(ii) Noise point

(l) What are *mutually exclusive* rules in a rule based classifier ? What problem may arise if rules are not mutually exclusive ? How can such problem be resolved ? 5

Section B

2. (a) Consider the following transaction dataset :

6

Customer ID	Transaction ID	Items Bought
1	0001	{a, d, e}
1	0024	{a, b, c, e}
2	0012	{a, b, d, e}
2	0031	{a, c, d, e}
3	0015	{b, c, e}
3	0022	{b, d, e}
4	0029	{c, d}
4	0040	{a, b, c}
5	0033	{a, d, e}
5	0038	{a, b, e}

(i) Compute the support of itemsets {e}, {b, d},

{b, d, e}, {a, b, d, e}

(ii) Compute the confidence of rules {b, d} → {e}

and {e} → {b, d}.

(iii) Is confidence a symmetric measure ?

Section B

2. (a) Consider the following transaction dataset : 6

Customer ID	Transaction ID	Items Bought
1	0001	{a, d, e}
1	0024	{a, b, c, e}
2	0012	{a, b, d, e}
2	0031	{a, c, d, e}
3	0015	{b, c, e}
3	0022	{b, d, e}
4	0029	{c, d}
4	0040	{a, b, c}
5	0033	{a, d, e}
5	0038	{a, b, e}

(i) Compute the support of itemsets {e}, {b, d},

{b, d, e}, {a, b, d, e}

(ii) Compute the confidence of rules {b, d} → {e}

and {e} → {b, d}.

(iii) Is confidence a symmetric measure ?

(b) Let A and B be two sets of integers. A distance measure 'd' is defined as $d(A - B) = $ size$(A - B)$, where '$-$' denotes the set difference. Prove that 'd' is not a metric.

4

(a) Explain the concept of aggregation with the help of an example. List three uses of aggregation. 2+3

(b) What is the difference between noise and outliers ? Answer the following questions : 5

(i) Is noise ever interesting or desirable ?

(ii) Are outliers ever interesting or desirable ?

(iii) Are noise obejcts always outliers ?

(iv) Are outliers always noise objects ?

(a) For the following two-class problem, draw a *Confusion Matrix* and compute the *Accuracy* and *Error* from it : 6

Instance id	A	B	Predicted Class	Actual Class
1	T	F	+	+
2	T	T	+	+
3	T	T	+	−
4	T	F	−	−
5	T	T	+	+
6	F	F	−	+
7	F	F	−	−
8	F	F	−	−
9	T	T	−	+
10	T	F	−	+

(b) What is k - fold cross validation ? How is it different from the hold-out method ? 4

5. (a) What is the difference between hierarchical and partition based clustering ? Enumerate *two* advantages and disadvantages of hierarchical clustering. 4

(b) What is simple random sampling ? 2

(c) Consider the following rule set : 4

R_1 : (Give Birth = no) ^ (Can Fly = yes) → Birds

R_2 : (Give Birth = no) ^ (Live in Water = yes) → Fishes

R_3 : (Give Birth = yes) ^ (Blood Type = warm)

→ Mammals

R_4 : (Give Birth = no) ^ (Can Fly = no) → Reptiles

R_5 : (Live in Water = sometimes) → Amphibians.

Which rules cover the following tuples :

Name	Blood Type	Give Birth	Can Fly	Live in Water	Class
hawk	Warm	No	Yes	No	?
bear	Warm	Yes	No	No	?

5. (a) List the rules that can be generated from tlre 3- itemset ABE using the following transactional data set. Compute the confidence. 8

T_id	Itemset
t1	ACD
t2	BCE
t3	ABCE
t4	BDE
t5	ABCE
t6	ABCD

(b) Enumerate strong association rules if minConf = 0.5

2

Which rules cover the following tuples :

Name	Blood Type	Give Birth	Can Fly	Live in Water	Class
hawk	Warm	No	Yes	No	?
bear	Warm	Yes	No	No	?

6. (a) List the rules that can be generated from the 3- itemset

ABE using the following transactional data set. Compute

the confidence. 8

T_id	Itemset
t1	ACD
t2	BCE
t3	ABCE
t4	BDE
t5	ABCE
t6	ABCD

(b) Enumerate strong association rules if $minConf = 0.5$

2

7.   (a)   Given the following points : 2, 4, 10, 12, 3, 20, 30, 11, 25. Given $k = 3$, and the initial means, $\mu_1 = 2$, $\mu_2 = 4$ and $\mu_3 = 6$. Show the clusters obtained and the new means after each iteration using the K-means algorithm.   8

     (b)   What is the differences between Partial and Complete clustering scheme ?   2

Sl. No. of Ques. Paper : 8176

HC

Unique Paper Code : 62341201

Name of Paper : Database Management Systems

Name of Course : B.A. (Prog.)

Computer Applications

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 five questions from Q. Nos. 2 to 8.

(a) Describe different types of relationships in the context of a relational data model with the help of a suitable example. 3

(b) Differentiate DELETE and DROP SQL commands with the help of an example. 3

(c) A database consists of following relations:

EMPLOYEE(EMP_CODE,EMP_NAME,JOB_CODE)
JOB (JOB_CODE, JOB_DES)

Identify and describe primary key and foreign key(s) in the above relations. 4

(d) Write the SQL command that will not abort the changes being made to a relational table Employee. 2

(e) Illustrate insertion anomaly with a suitable example. 3

P.T.O.

8176

(f) What do you understand by referential integrity rule? Illustrate with the help of suitable example.

    2

(g) Give an SQL command to add a new attribute Email with data type varchar (20) in the relational table Employee.

    2

(h) A database consists of the relation Customer:

Customer (Cust_Code, Cust_Name, Region_Code, DOB, Age)

where cust_code is the primary key and age is the derived attribute. Describe the derived attribute and also draw an ER diagram for the same.

    4

(i) Refer the following table to give the output of the given SQL command on the table CUSTOMER:

SELECT *

FROM CUSTOMER

WHERE Cust_Age>25 and Cust_Age<30:

CUSTOMER		
Cust_id	Cust_Name	Cust_Age
1	Ram	32
5	Hari	27
2	Kamna	25
7	Suresh	24
3	Rajesh	23
6	Komal	22
4	Chatana	25

2. (a) Describe the different components of a database system.

(b) Give the output of the given SQL command on the tabel STUDENT:

(i) SELECT MAX (AGE), MIN (FEES)

FROM STUDENT;

(ii) SELECT NAME

FROM STUDENT

WHERE NAME LIKE "R%";

STUDENT

ID	NAME	AGE	ADDRESS	FEES
1	Ramesh	32	Ahmedabad	2000-00
2	Rakesh	27	Bhopal	8500-00
3	Kamal	25	Delhi	1500-00
4	Chatan	25	Mumbai	6500-00
5	Mukesh	24	Indore	10000-00
6	Raju	23	Kota	2000-00
7	Komal	22	Pune	4500-00

Suppose you are given the following requirements for a database for the India Cricket League (ICL):

(a) The ICL has many TEAMS.

(b) Each team has a team_id (unique), team_name, city, coach_name and captain_name.

(c) Each PLAYER belongs to only one team

(d) Each player has a player_id (unique), player_name, position (such as batsman, bowler, and all-rounder) and team_id.

(e) A Match is played between teams.

P.T.O

(f) Each match has match_id (unique), team_id date and score.

Construct an ER diagram for the ICL database.

10

4. (a) What is Network data model? Give any two disadvantages of the network model.

4

(b) Describe DBMS functions:
   (i)   Data integrity management
   (ii) Backup and recovery management.

6

5. Consider the database SALES with the tables salesperson. Write SQL queries for the following:

saleperson   (Saleperson_id,   saleperson_
name, Region_id, city, sales, sex,)

Region (Region_id, Region_name)

10

(a) Find the name of the salesperson_name who works for north region.

(b) Find all salesperson_name in the database according to their city.

(c) Find the salesperson_name and Region_id that gets the maximum sales.

(d) Find the Regions_name and cities where average sales per salesperson are greater than 550.

(e) Find the total number of salespersons in north region, in which the salesperson operates.

10

6. Using the relations course and Marks, given below, find the result of the following operations:

4

(f) Each match has match_id (unique), team_id date and score.

Construct an ER diagram for the ICL database.

10

4. (a) What is Network data model? Give any two disadvantages of the network model.

4

(b) Describe DBMS functions:
   (i) Data integrity management
   (ii) Backup and recovery management.

6

5. Consider the database SALES with the tables Salesperson. Write SQL queries for the following:

Saleperson (Saleperson_id, Saleperson_name, Region_id, City, Sales, Sex,)

Region (Region_id, Region_name)

10

(a) Find the name of the salesperson_name who works for north region.

(b) Find all salesperson_name in the database according to their city.

(c) Find the salesperson_name and Region_id that gets the maximum sales.

(d) Find the Regions_name and cities where average sales per salesperson are greater than 550.

(e) Find the total number of salespersons in north region, in which the salesperson operates.

10

6. Using the relations course and Marks, given below, find the result of the following operations:

(a) PRODUCT of COURSE and MARKS

(b) DIFFERENCE OF COURSE AND MARKS

(c) UNION of COURSE and MARKS

(d) JOIN OF COURSE AND MARKS on equal course code

(e) SELECT C_code= 'C98'

(Note : use the relation MARKS)

Relation course

c_Code	C_Name
C21	English
C32	Maths
C33	Economics
C50	Accounting
C56	History
C81	M.I.S

Relation Marks

c_Code	C_Name
C21	English
C25	E.V.S.
C33	Economics
C34	Pol. Sc.
C50	Accounting
C81	M.I.S
C86	Hindi
C98	German

(a) Consider the relation EMPLOYEE (emp_id,

firstname, middlename, lastname, email).
List and describe the *required* and *optional*
attributes.

4

(b) Give any *three* advantages of the DBMS over file
systems.

6

8. (a) Describe 3NF. When is a table said to be in 3NF?
Illustrate with the help of an example.

4

(b) Differentiate between centralized and distributed
databases.

4

(c) Consider the following relational table:

2

STUDENT

STD_ID	STD_NAME	Contact	Address	city
1	Anil	9933445566	A4	Delhi
2	Deepika	9988776655	B12	Mumbai
3	Sapna	8899776655	C12	Lucknow
4	Gaytri	9911223344	I12/14	Delhi
5	Umesh	9977665544	I133/89	Pune
6	Shyam	9922334455	B3	Jaipur
7	Anita	9933445566	C9	Mumbai

Give the output on execution of each of the
following SQL commands on the table customer:

SELECT COUNT (DISTINCT city) FROM
STUDENT;

firstname, middlename, lastname, email). List and describe the *required* and *optional* attributes.

4

(b) Give any *three* advantages of the DBMS over file systems.

6

8. (a) Describe 3NF. When is a table said to be in 3NF? Illustrate with the help of an example.

4

(b) Differentiate between centralized and distributed databases.

4

(c) Consider the following relational table:

2

STUDENT

STD_ID	STD_NAME	Contact	Address	City
1	Anil	9933445566	A4	Delhi
2	Deepika	9988776655	B12	Mumbai
3	Sapna	8899776655	C12	Lucknow
4	Gaytri	9911223344	I12/14	Delhi
5	Umesh	9977665544	I133/89	Pune
6	Shyam	9922334455	B3	Jaipur
7	Anita	9933445566	C9	Mumbai

Give the output on execution of each of the following SQL commands on the table customer:

SELECT COUNT (DISTINCT city) FROM STUDENT;

S. No. of Paper   : 8177   HC

Unique paper code : 62341201

Name of the paper : Database Management Systems

Name of course   : B.A. (Prog.)

                      Computer Applications

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 do you mean by the term data dictionary? 2

(b) Consider the following relational table: 3

Customer

Cust_ID	Cust_Name	Contact	Address	City
1	Aarti	9933445566	A4	Janak Puri
2	Deepak	9988776655	B12	Pitam Pura
3	Sapna	8899776655	C12	Ashok Vihar
4	Gaytri	9911223344	112/14	Janak Puri
5	Uma	9977665544	1133/89	Ashok Vihar
6	Shyam	9922334455	B3	Ashok Vihar
7	Anita	9933445566	C9	Janak Puri

Give the output on execution of each of the following SQL commands on the table Customer:

P. T. O.

    i.   `SELECT COUNT(City) FROM Customer;`

   ii.   `SELECT COUNT(DISTINCT City) FROM Customer;`

(c) What is a business rule? How does identifying and documenting business rules help in database design?

(d) Give an SQL command to create a relational table *Student* having the following attributes:

Attribute	Data Type
Roll_No	Integer (3) *primary key*
Name	VARCHAR (max 25 characters)
Age	Number (2)
DOB	Date

(e) Consider an entity **Car** with attributes **Car_Reg, Car_Year, Model, Car_Color**.

(Note: **Car_Reg** is the primary key and **Car_Color** is a multivalued attribute)

Draw an E-R diagram for the entity **Car**.

(f) Illustrate the use of referential integrity rule with the help of an example.

(g) Given a relation:

PRODUCT (PCode, P_Desc, P_Pdate, P_Price)

Write an SQL command to display all the products in ascending order of **P_Price**.

(h) What do you mean by insertion anomaly? Illustrate with the help of an example.   2

(i) What is a *PROJECT* operator?   3

Give the output when the **PROJECT** operator is applied on both the attributes **F_Name** and **L_Name** for the following table:

Salesman

ID	F_Name	L_Name	Age	Total_Sal
101	Shobha	Gupta	28	200000
102	Ankit	Saxena	30	50000
103	Sudhir	Vij	35	250000
104	Madhur	Sharma	27	150000

(j) Consider the table **Employee**   3

Employee

Emp_ID	Emp_Name	D_Code	Salary
1010	Akshay	45	25000
1020	Ankita	32	40000
1030	Geeta	37	23000
1040	Sakshi	27	35000

Differentiate between the following SQL Commands
  i.   **Delete** From *Employee*;
  ii. **Drop** Table *Employee*;

(a) Describe any three advantages of DBMS.   6

(b) What are derived attributes? Illustrate with the help of an example.   4

P. T. O.

3. Consider the database for a hospital with a set of patients and a set of medical doctors. The database maintains a record of various tests conducted on each patient:

Patient (PP#, PName, Insurance, DD#)

Doctor (DD#, DName, Specialization)

Test (PP#, TestName, Date, Time)

Construct an E-R diagram for a hospital with the following constraints:

   i.   A **doctor** may treat many **patients** but a **patient** is under the supervision of only one **doctor**.

   ii.   Many **patients** may go for the same **test** and many **tests** may be prescribed to a **patient**.

4. (a) Give an overview of the network data model. Give two disadvantages of the network model.

(b) A database contains the entities **Painter** and **Paintings**. Is the relationship between the **Painter** and **Painting** (1:M) or (1:1)? Justify your answer. Draw an ER diagram for this scenario.

5. Consider the following tables: 10

Order (OrderID, CustID, Order_Date, Qty, Delivery_Date)

Customer (CustID, CustName, City)

Write SQL commands to:

i. Display all the details of the *order* with *customer name* and *city* where the order quantity is greater than 50.

ii. Display all the details of the *customer* whose *name* starts with 'R'.

iii. Increase the *quantity* of all the orders by 5.

iv. Insert a row in *Customer* table corresponding to the attribute values *10, `Akash'* and *'New Delhi'* respectively.

v. Add a new attribute (*i.e.* column) *Remarks* with data type varchar(25) in the table *Order*.

· Consider the following relation instances R1 and R2 having the same schema   10

Relation R1

Emp_Id	Emp_Name
118	Anuj
112	Sumati
200	Arun
202	Ram

Relation R2

Emp_Id	Emp_Name
115	Anita
205	Varuna
202	Ram
118	Anuj

P. T. O.

Find the result of the following operations:
  i.   R2 UNION R1
  ii. R2 DIFFERENCE R1
  iii. R1 INTERSECT R2
  iv. R1 PRODUCT R2
  v.   SELECT   Id < 150
       (Note: use the relation R2)

7. (a) Given a database with following relations:

   Product (P_Code, P_Desc, P_Price,
   V_Code)

   Vendor (V_Code, V_Name,
   V_Address, V_Contact)

   Identify primary and foreign key for each
   relation. Make suitable assumptions and state
   them.

  (b) Differentiate between the following:
     i.   DDL and DML.
     ii. Data and Information

  (c) What do you understand by cardinality?

8. (a) Describe second normal form with a suitable example

  (b) Describe the following DBMS functions:
     i.   Security management
     ii. Data transformation and presentation.

This question paper contains 4 printed pages.]

Your Roll No................

No. of Question Paper : 8254   HC

Unique Paper Code   : 62343414

Name of the Paper   : Search Engine Optimization

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

Semester   : IV

Duration : 2 Hours   Maximum Marks : 25

Instructions for Candidates

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

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

SECTION A

(i) In a URL "http://www.facebook.com", www is known as   (1)

     (a) Sub Domain

     (b) Domain

     (c) Domain Name

     (d) Domain Name System

P.T.O.

(ii) Phrases containing over 4+ words that make search results highly specific is known as :   (1)

    (a) Short tail Keyword

    (b) Long tail Keyword

    (c) Bigtail Keyword

    (d) Small tail Keyword

(iii) Which of the following URL has proper length and file structure :   (1)

    (a) SWOT friendly URL

    (b) SEO friendly URL

    (c) Backlinks

    (d) Both (a) & (b)

(iv) Which tool is used to improve the ranking of local listing in a search :   (1)

    (a) Google pigeon update

    (b) Bing update

    (c) HTML update

    (d) Netscape update

(v) Spider is used for :   (1)

    (a) Crawling

    (b) Indexing

    (c) Retrieval

    (d) Updating

3

(vi) A score developed by Moz that predicts how well a website will rank on SEO is : (1)

    (a) Software Authority

    (b) Domain Authority

    (c) Web page Authority

    (d) Hyper link Authority

(vii) What is BING? (1)

    (a) Virus

    (b) Website

    (c) Search Engine

    (d) Directory

(viii) _____ and _____ are two SEO practices? (1)

    (a) White Hat and Black Hat

    (b) On and Off

    (c) Visible and Invisible

    (d) Domain and Subdomain

(ix) URL stands for : (1)

    (a) Unsolved Resource Locator

    (b) Uniform Resource Locator

    (c) United Resource Locator

    (d) Unidentified Resource Locator

(x) Retrieval is used for :

(a) SEO

(b) Website Updating

(c) Clearing the History

(d) Indexing

SECTION B

2. What is the significance of SWOT analysis in SEO?

3. Discuss the importance of sitemap in SEO in detail.

4. What are the various Online Optimization Techniques. Discuss in detail.

5. Explain any **two** of the following :

(a) Crawling

(b) Indexing

(c) Retrieval

6. Write the steps to submit a directory to Google Search Engine.

[This question paper contains 8 printed pages]

Your Roll No. : ....

Sl. No. of Q. Paper : **8814**   **HC**

Unique Paper Code : 42347903

Name of the Course : **B.Sc. (Programme) : DSE-2B**

Name of the Paper : **Internet Technologies**

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) **Section-A** is compulsory.

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

Section A

1. (a) Name the attributes of Table tag that controls the horizontal and vertical alignment of the table on the web page.   2

P.T.O.

(b) Which Property in CSS is used to : 2

    (i)   Set shadow around a text.

    (ii) Set the width of the image border.

(c) Give **two** advantages of using Java script along with HTML. 2

(d) What is the use of **parseInt()** function ? Explain with an example. 2

(e) Write a note of DOM (Document Object Model). 2

(f) What is the use of **"Number Format Exception"** in Java ?

2

(g) What is a java stream and what are its types ?

3

(h) Differentiate between SQL statement and Callable statement of JDBC. Give examples.

3

(i) Give any **three** attributes of **'page'** directive of JSP. 3

(j) Explain the following JSP elements with example : 4

    (i)   expression

    (ii) declaration

Section B

2. (a) Write a code in HTML to create a hyperlink to :

    (i) A particular section of the same page.

    (ii) Beginning of another document 'abc.html'

                                                   4

   (b) What is CSS ? Mention the three ways in which CSS can be used with HTML ?

                                                   4

   (c) Give any **two** font attributes used in CSS.

                                                   2

3. (a) When is the JavaScript Event Handler 'onFocus()' executed ? Give its one use with example.

                                                   4

   (b) Differentiate between **setTimeout** and **setInterval** methods. Give examples.

                                                   4

   (c) Give the output for the following JavaScript code: 2

```
<script language=javascript>
for(i=0; i<=10; i++)
{
        if(i= =5)
        {
```

```
                continue
            }
        document.write(i)
        document.write("<BR>")
        }
    }
    </script>
```

4. (a) Give the output for the following Java code : 4

```
    Class A
    {
        protected int s;
        A( )
        { s = 10;}
    }

    Class B extends A
    {
        B( )
        { s = 11;}
        void display()
        { System.out.println(s);}
    }
    Class C
    {
```

```
public static void main (String args[])
{
    B obj = new B();
    Obj.display();
}
}
```

(b) What will be the output of the following, when the program is called without argument ?

4

```
Class MultiCatch
{
    public static void main(String args[])
    {
        try
        {
            int a = args.length;
            System.out.println("a = " + a);
            int b = 42 / a ;
        }
        catch(ArithmeticException e) {
```

```
System.out.println ("Divide by 0: " +e);  }
catch(ArrayIndexOutofBoundsException e)  {
    System.out.println(" Array index : " +e);  }
System.out.println("After try/catch blocks.");
    }
}
```

(c) When is a class declared to be **'static'** ?

2

5. (a) What are the **four** types of drivers that were used for database connectivity with Java?

4

(b) Differentiate between the following resultset types in JDBC :   4

   (i) ResultSet.TYPE_SCROLL_SENSITIVE

   (ii) ResultSet.TYPE_SCROLL_INSENSITIVE

(c) Consider the following code line in JDBC :

   DriverManager.getConnection(jdbc:mysql: EMP, 'admin', 'sql')   2

   (i) What is 'admin' in the above code ?

   (ii) What is 'sql' in the above code ?

6. (a) What is JSP ? Mention three disadvantages of Servlets. 4

(b) What is MVC ? How does it relate to JSP ?

4

(c) How do we provide comments in the following : 2

    (i) Java

    (ii) JSP

7. (a) How can the data present in the textbox of an HTML form be used by a JSP page ? Illustrate with an example. 4

(b) Give one use of the following JSP implicit object : 4

    (i) response

    (ii) request

    (iii) out

    (iv) session

(c) Find the error and make correction in the following JSP code line : 2

    `<%= int a=4 %>`

8814

8. (a) Write a code to create a HTML form with the following elements : 4

	Label	Name	Type
(i)	Name	txtName	Textbox
(ii)	Age	txtAge	Textbox
(iii)	OK	btnOK	Button
(iv)	Clear	btnClear	Reset Button

(b) Add JavaScript code block to validate the above HTML form at the click of 'OK' Button- 4

(i) Name should not be blank.

(ii) Age should be a numeric value.

(iii) If the data entered is valid, display 'Welcome <Name>' Otherwise, display 'Please enter valid values'.

(c) What is the difference between **cellpadding** and **cellspacing** attribute of the table in HTML ? 2

1200

Your Roll No...............

Sr. No. of Question Paper : 8863   HC

Unique Paper Code   : 42347903

Name of the Paper   : Internet Technologies

Name of the Course   : **B.Sc. (P) DSE – 3B**

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. Section **A** is compulsory.

3. Attempt any **five** questions from Section **B**.

Section – A

(a) Write the HTML code to create a link to Delhi University web site. The link text that appears should read 'The Number One University'.   (2)

(b) Write the CSS code to :

(i) set the size of the text in element **H1**.

(ii) set the **color of the text** in element P to green.

(2)

(c) Write a function in JavaScript to accept a number as argument and return its factorial.

(2)

(d) What is the difference between **alert()** and **confirm()** functions in JavaScript?

(2)

(e) How are global variables created in JavaScript? Give an example illustrating the use of local and global variables.

(2)

(f) What is the use of **final** class in Java?

(2)

(g) Write a java code to print the following pattern using loops :

4321

321

21

1

(3)

(h) Give three advantages of using JSP over other technologies.

(3)

(i) Write a note on any two JDBC drivers. If a Java application is accessing multiple types of databases at the same time, which is the preferred driver?

(3)

(j) Give the syntax for the following JSP elements with example :

    (i) Expression

    (ii) Declaration   (4)

Section – B

(a) Write a code in HTML to create a table with two rows and two columns. All four cells should contain images.   (4)

(b) Give one advantage of external CSS over inline CSS. How do you create external CSS file? Give example.   (4)

(c) In the following code line, what is the use of **target** attribute?

< a href = "abc.html" **target** = "xyz" >   (2)

(a) What is the difference between **break** and **continue** in JavaScript? Give examples.   (4)

(b) Give the output for the following JavaScript code. What is 1000 on line 7 ?

```
1. <html>

2. <head>

3. <script type="text/javascript">
```

```
4.  var sec=0;
5.  function start( )
6.  {
7.  window.setInterval ("upTime()", 1000);
8.  }
9.  function upTime( )
10. {
11. sec++;
12. x.innerText=sec;
13. }
14. </script>
15. </head>
16. <body onload="start( )">
17. <H1 id="x">  0  </h1> seconds
18. </body>
19. </html>
```

(4)

(c) What is the difference between **div** and **span** tag? Give examples.

(2)

4. Give the output for the following Java code :

(a) class show {
     public static void main(String args[ ])
     { int a, b;

```
        for( a = 1, b = 4; a < b ; a + +, b - -)
        {
          System.out.println("a= " + a);
          System.out.println("b= " + b);
        }
      }
    }
```
(2)

```
(b) class A {
      public static void main( String args[ ] )
      {
        for( int k = 1 ; k < 100 ; k + +)
        {
          if (k = = 10) break;
          System.out.println("k= " +k);
        }
      }
    }
```
(2)

```
(c) class B {
      public static void main( String args[ ] )
      { int d, a;
        try{
        d=0;
        a=42/d;
        System.out.println("This is in try block");
        } catch(ArithmeticException e)
          { System.out.println("This is in Catch block"); }
```

```
        System.out.println("This is after catch block");
    }
}
```
(2)

(d) What is a constructor? Give three characteristics of a constructor in Java. (4)

5. (a) What do you mean by the term Directive? Explain different types of directives available in JSP? (4)

(b) Explain the following code :

```
Connection con = DriverManager.getConnection(
"jdbc:odbc:Myds" , "aaa" , "bbb");

String query = "Select * from Customers where
CustNumber = ?";

PreparedStatement ps = con.preparedStatement(query);

Ps.setString(1 , "101");

Results = ps.executeQuery();
```
(4)

(c) What is the use of Resultset object in JDBC? What is its initial cursor position? (2)

6. (a) Write a note on Exception Handling in JSP. (4)

(b) Illustrates HTTP Request/Response Model in JSP with the help of a diagram. (4)

(c) What is the use of **isErrorPage** attribute of page? What is its default value?

```
<%@ page isErrorPage = "true" %>
```
(2)

(a) Write a code in JSP that checks for the current time of the day and prints **"Good Morning"** if the time is between six in the morning and twelve noon otherwise prints **"Good Day"**.
(4)

(b) What will be the output of the following JSP :

```
<%! int pageCount=0;

    void addCount()

    { pageCount + + ; }

%>

<% addCount ( ); %>

<html>

        <body>

                <h1> <%= pageCount %> </h1>

        </body>

</html>
```
(4)

(c) Find the error and make correction in the following JSP code :

```
<%=  int a = 5;   %>
```
(2)

8. (a) Write a code to create a HTML form with the following elements –

Label	Name	Type
(i) Student Name	txtName	Textbox
(ii) Country Name	setCtry	dropdown box
(iii) OK	btnOK	Button
(iv) Clear	btnClear	Reset Button

(4)

(b) Add a JavaScript code block to the above HTML form at the click of 'OK' button :

(i) Student Name should displayed in capital letters

(ii) "You live in <Selected Country Name>" should be displayed.

(iii) If the data entered is valid, display 'Welcome <Employee Name>'

(iv) Otherwise, display 'Please enter valid values'.

(4)

(c) What is the difference between **ordered lists** and **unordered lists** HTML? Give their tags. (2)

Roll No. ☐☐☐☐☐☐☐☐☐☐

No. of Question Paper : **9545**

que Paper Code : **62343603** **HC**

ie of the Paper : **Web Designing using HTML**

ie of the Course : **B.A. (Programme) Computer Application : SEC**

ester : **VI**

ation : **2 Hours** Maximum Marks : **25**

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

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

Attempt any *three* questions from Section B

Parts of a question should be answered together.

Sections A

(*a*) Which is the correct CSS syntax ? 10×1=10

  (*i*) {body {color: black}

  (*ii*) {body;color:black}

  (*iii*) {body:color=black(body}

  (*iv*) body:color=black.

(b) For selecting only one option from multiple options, what is the value of *type* attribute in *input* ?

    (*i*) radio

    (*ii*) text

    (*iii*) submit

    (*iv*) checkbox.

(c) The *src* attribute of the <IMG> tag stands for :

    (*i*) location of the image file

    (*ii*) sequential arrangement of pages

    (*iii*) creation of similar image

    (*iv*) none of the above.

(d) Which HTML tag is used to define a local style sheet ?

    (*i*) <style>

    (*ii*) <css>

    (*iii*) <script>

    (*iv*) none of the above

(e) Which of the following is true about *audio* tag in HTML5?

    (*i*) HTML5 supports <audio> tag which is used to embed sound content in an HTML or XHTML document.

(ii) The current HTML5 draft specification does not specify which audio formats browsers should support in the audio tag

(iii) Both of the above

(iv) None of the above.

(f) What is the HTML5 attribute used, to *left align* the content in CSS ?

(i) <td left>

(ii) <td="align left">

(iii) float: left

(iv) border: 2px black solid.

(g) Which among the following browsers support HTML5 ?

(i) Safari

(ii) Firefox

(iii) Internet Explorer

(iv) All of the above.

(h) Which of the following is an attribute of the *Form* tag ?

(i) meta charset

(ii) header

(iii) action

(iv) <p>.

P.T.O.

example.   2

P. T. O.

(i) Which of the following is true about <!doctype> declaration in HTML5 ?

    (i)   <!doctype> declaration is optional

    (ii)   There must be only one <!doctype> declaration

    (iii) There must be only two <!doctype> declaration

    (iv) There can be any number of <!doctype> declaration.

(j) How to add alternate text for an image ?

    (i)

    (ii)

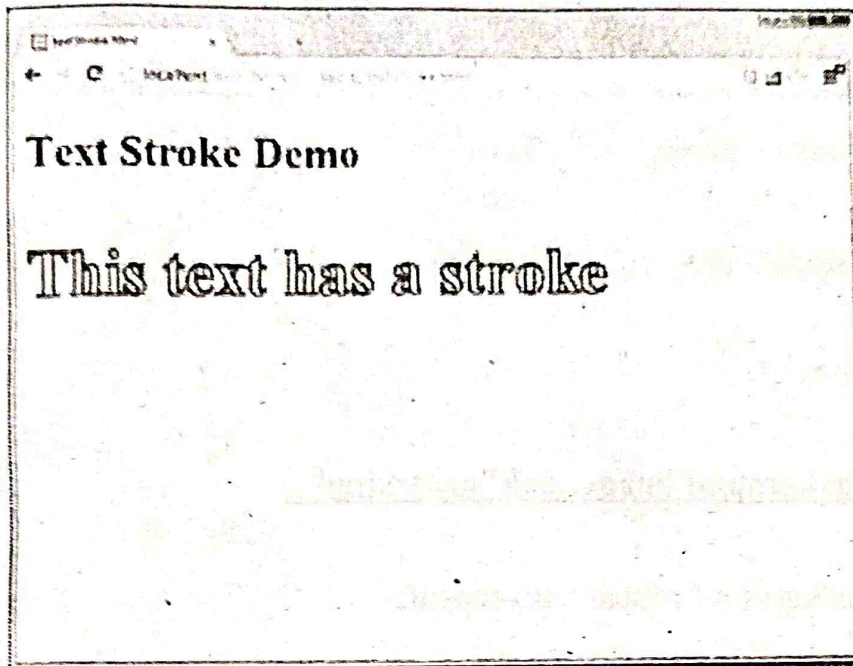   (iii)

    (iv) .

Section-B

2. (a) Differentiate between RGB and HSL coloring schemes. 2

   (b) Explain the meaning of each line of the following code segment :   3

```
@font-face {
font-family: "Miama";
src: url("Miama.otf");
}
```

3. (a) What is the use of charset attribute of meta tag ? 2

    (b) Write a program in HTML5 to print the following : 3

4. Explain the three levels of CSS styles that can be applied

    on a web page. Also give their syntax.   5

5. (a) What are the limitations of using flash animation tool

        with HTML5 ? How can it be overcome in CSS ?3

    (b) Give the syntax of reflection of an image in CSS. 2

5. Explain the working of underlined code in the following

    program :   5

    <!DOCTYPE HTML>

    example.   2

```
<html  lang = "en">

<head>

<title>opacity.html</title>

<meta  charset = "UTF-8"/>

<style  type = "text/css">

body {

background-image: url("apoyo.jpg");

background-repeat: no-repeat;

}

h1 {

color: rgba(0, 0, 0, .3);

}

#box {

position: absolute;

top: 350px;

left: 100px;

height: 100px;
```

```html
<html lang = "en">

<head>

<title>opacity.html</title>

<meta charset = "UTF-8"/>

<style type = "text/css">

body {

background-image: url("apoyo.jpg");

background-repeat: no-repeat;

}

h1 {

color: rgba(0, 0, 0, .3);

}

#box {

position: absolute;

top: 350px;

left: 100px;

height: 100px;
```

```
width: 100px;

border: 1px solid red;

background-color: white;

opacity: .3;

}

</style>

</head>

<body>

<h1>Opacity Demo</h1>

<div id = "box"></div>

</body>

</html>
```

example.   2

P. T. O.

```
    width: 100px;

    border: 1px solid red;

    background-color: white;

    opacity: .3;

    }

    </style>

    </head>

    <body>

    <h1>Opacity Demo</h1>

    <div id = "box"></div>

    </body>

    </html>
```

example.

P. T. O.

Sl. No. of Ques. Paper : **9583**   **HC**

Unique Paper Code   : **62345625**

Name of Paper   : **Multimedia and Web Designing**

Name of Course   : **B.A. (Prog) : Computer Applications : GE**

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 five questions from the Question Nos. 2 to 8.

(a) What do you understand by multimedia?   2

(b) What is the difference between <BR> and <P> in HTML?   2

(c) Why is CSS preferred over the deprecated HTML?   2

(d) Define the term dithering.   3

(e) Explain sampling rate with an example.   3

(f) What are kinematics and inverse kinematics?   3

(g) Differentiate between <Frame> and <Frameset> in HTML with an example.   3

(h) Explain Safe Title Area in terms of video with example.   2

P. T. O.

(i) Explain the structure of an HTML program. 3

(j) Write any two jobs of HTTP protocol. 2

2. (a) Differentiate between CELLPADDING and CELLSPACING with syntax in HTML. 4

(b) Create an HTML form for an employment agency using the following:

Text box, Radio buttons, Check boxes, Text area, Submit button and Reset button. 6

3. (a) Describe letter-spacing, line-height and text-align properties in terms of CSS. 6

(b) What are the circumstances in which digital audio is used? 4

4. (a) Briefly describe the Cel animation. 5

(b) Compare XML with HTML with an example. 5

5. (a) Write the HTML program to generate the following output:

Hardware devices:

- CD-ROM

- DVD drive

- Hard disk

- Modem

Web languages:

- HTML
- JavaScript
- PHP
- Java   6

(b) Briefly describe any three storage devices used in a multimedia project.   4

6. (a) What is style sheet? Explain its basic syntax with an example.   4

(b) Write the HTML code for the following:

FRAME1	
FRAME2	FRAME3
FRAME4	

7. (a) What are Time based authoring tools? Explain with an example.   5

(b) Define color palette. What are the uses of colour palettes in multimedia?   5

8. Write HTML code to create the following table: 4

STUDENT

Roll No.	Name	Marks
101	A	55
102	B	50
103	C	60
104	D	70

(a) What is Degaussing? 2

(b) Explain any two applications of Multimedia. 4

This question paper contains 4 printed pages]

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

S. No. of Question Paper : **9609**

Unique Paper Code   : **62347626**   **HC**

Name of the Paper   : **Software Engineering**

Name of the Course   : **B.A. (Programme) Computer Application**

DSE-3

Semester   : **VI**

Duration : 3 Hours   Maximum Marks : 75

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

The paper has two sections. Section A is compulsory.

Attempt any *five* questions from section B.

Parts of a question must be answered together.

Section A

1. (*i*)   There are *two* types of metrics used for software

development, give their names. Define each.   3

This question paper contains 4 printed pages]

Roll No.

S. No. of Question Paper : 9609

Unique Paper Code : 62347626   **HC**

Name of the Paper : Software Engineering

Name of the Course : B.A. (Programme) Computer Application

DSE-3

Semester : VI

Duration : 3 Hours   Maximum Marks : 75

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

The paper has two sections. Section A is compulsory.

Attempt any *five* questions from section B.

Parts of a question must be answered together.

Section A

1. (*i*)   There are *two* types of metrics used for software

development, give their names. Define each.   3

P.T.O.

(ii) How does a phased process help in achieving high Quality and Productivty, when it seems that we are doing more tasks in a phased process as compared to an ad-hoc approach ? 3

(iii) What are functional and non functional requirements in context of software requirement analysis ? 3

(iv) List any *four* essential attributes of a good software product. 4

(v) What are the drawbacks of Waterfall model ? 3

(vi) Briefly describe the block box testing. 3

(vii) What do you mean by psychology of testing ? 3

(viii) "Problem analysis should be the integral part of software engineering process". Justify this statement. 3

Section B

2. (a) What are major software engineering challenges, explain any two in detail. 5

(b) Briefly describe the software management process. 5

3 (a) What is time-boxing process model ? Under what

circumstances, it is recommended ?   5

(b) What is an iterative model in software development

process ? Explain its advantages.   5

4 (a) Explain software configuration management process in

detail.   5

(b) Describe any *two* characteristics of Software Requirement

Specification document.   5

5 (a) What is the use of Data Flow Diagram (DFD) in problem

analysis ? Explain DFD with a suitable example.   5

(b) What are various phases of software development

process ? Explain any *two* in detail.   5

6 (a) Describe any two components of Software Requirement

Specification document.   5

(b) What does the capability Maturity Model (CMM)

determine ? Explain.   5

7   (a)   What is the significance of boundary analysis

testing ?   5

(b)   Show and briefly describe the levels of software testing

with the help of a diagram.   5

8   (a)   Write the general structure of a requirement

document.   5

(b)   How prototyping is used in requirement analysis ? 5

Roll No. ☐☐☐☐☐☐☐☐

S. No. of Question Paper : 9636

Unique Paper Code : 62347626   HC

Name of the Paper : Software Engineering

Name of the Course : B.A. (Programme) : Computer

                     Application-DSE-4

Semester : VI

Duration : 3 Hours   Maximum Marks : 75

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

The paper has *two* sections. Section A is compulsory.

Attempt any *five* questions from section B.

Parts of a question must be answered together.

Section A

1.   (*i*)   What are the differences between the student software and the industrial strength software ?   3

    (*ii*)   "An SRS provides a reference for validation of the final product". Justify the statement.   3

(iii) List any *three* essential attributes of a good software product.　　3

(iv) What does ETVX stand for ?　　2

(v) Define the terms: Reliability and Maintainability.　　2

(vi) What is the purpose of a data flow diagram ? Explain with a suitable example.　　4

(vii) What is a prototyping Process Model ? Under what circumstances, it is recommended ?　　4

(viii) Explain black box testing method.　　4

Section B

2　(a) Describe an early defect removal in the context of the software process.　　5

(b) Discuss the components Software Processes.　　5

3　(a) Describe predictability in the context of the software process.　　5

(b) What is Software Requirement Specification document (SRS) ? List and describe any *two* characteristics of SRS.　　5

4　(a) Explain phases of Software development process.　　5

(b) What is the main goal of the inspection process ? Explain.　　5

5   (a)   What is an Iterative process model ? Under what

        circumstances, it is recommended.   5

    (b)   List advantages, disadvantages of Waterfall model and

        when to use it ?   5

6   What does the capability maturity model (CMM)

    determine ?   Explain its *five* capability Levels.   10

7   (a)   What are different levels of testing and their

        goals.   5

    (b)   Why is the configuration management process needed

        in addition to the development process ?   5

8   Differentiate between the following :

    (a)   Error, fault and failure   6

    (b)   Quality and Productivity   4

[This question paper contains 8 printed pages]

Your Roll No. : ....

Sl. No. of Q. Paper : **7543** HC

Unique Paper Code : 32345201

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

Name of the Paper : Introduction to Database Systems

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) Question NO.1 is compulsory in **Section- A.**

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

(d) Parts of question should be attempted together.

P.T.O.

Section- A

1. (a) What are the functions of a DBA ?

    2

    (b) Identify the primary and foreign keys in the following relations :   5

    Part (Part_no, Part_name, color)

    Supplier (Supplier_no,Supplier_name,City)

    Shipment (Part_no,Supplier_no, Quantity)

    (c) Define the following terms :   4

    (i) Attribute

    (ii) Degree of a relation

    (d) Give short answer for the following :   3

    (i) What is the SQL clause for displaying the output of the query in ascending order ?

    (ii) What is the column or group of columns that uniquely identify a tuple called ?

    (iii)What   is   the   diagrammatic representation of the entities and the relationships amongst them called ?

2

(e) Consider the following table EMP_DETAIL :

I D	Name	Age	Address	Salary(₹)
1	Ram	32	Mumbai	5000.00
2	Mohan	25	Delhi	3500.00
3	Roy	23	Agra	4000.00

Formulate the SQL queries for the following :

(i) Insert a tuple <4,Sita, 28, Shimla, 7000>.

2

(ii) Delete the tuple where the address is 'Delhi'. 2

(iii) Modify the salary of an employee having ID = 1, to 6000. 2

(iv) Display the names and address of employees having salary greater than 4000.

2

(f) Suggest appropriate data types for the following attributes : 3

(i) Commission of a salesperson

(ii) The date of joining of an employee

(iii) Name of the author of a book

Section-B

2. (a) Can a binary relation have both the attributes defined over the same entity set ? Illustrate using an example. 4

P.T.O.

(b) Draw the ER diagrams for the following entities and relationships, depicting the cardinality ratios : 6

Entity 1	Relationship	Entity 2
(i) Employee	HAS	Dependent
(ii) Supplier	SUPPLIES	Part
(iii) Waiter	SERVES	table

3. (a) Consider the following relational database schema that keeps track of auto sales in a car dealership.

CAR (Serial_no, Model, Manufacturer, Price)

Sales (Salesperson _id, Serial _no, Date, Sale_price)

SALESPERSON (Salesperson _id, Name, phone)

Write the SQL queries for the following :

(i) For the salesperson named 'Raman Lamba', list the Serial _no, Manufacturer, Sale_price for the cars she sold. 3

(ii) List the serial_no and model of cars sold in between the months of March 2016 and Dec 2016. 2

4

(iii) Display all car models and their manufacturers in the decreasing order of their price. 2
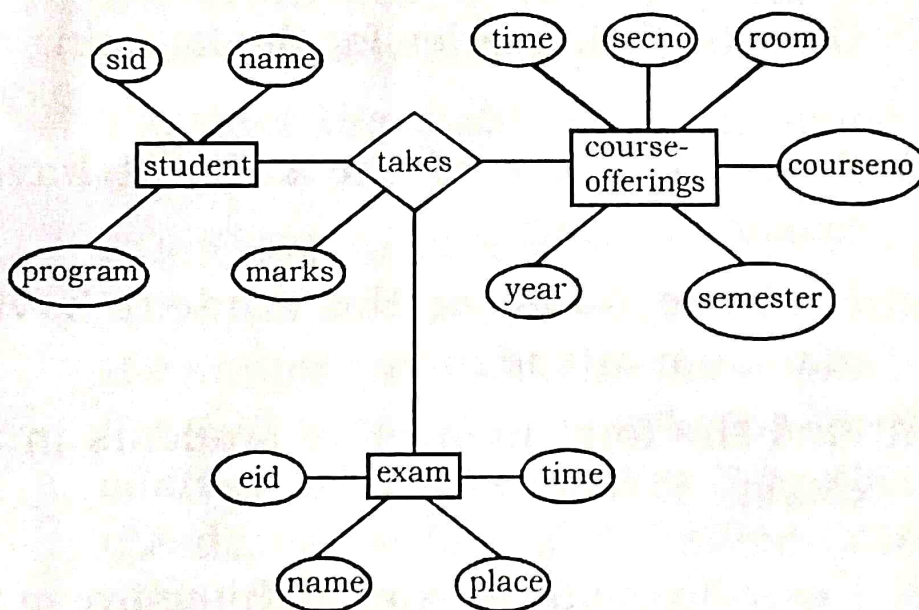
(b) Give one word answer for the following : 3

(i) An entity which has primary key of its own

(ii) Attributes that combine to form primary key

(iii) Data about data

4. Consider the following ER diagram :

(i) Identify the relations and relationship from the diagram. 2

P.T.O.

(ii) Give the schema for each of them.

4

(iii) Give the primary and foreign keys of each relation.

4

5. (a) What is normalization ? Why do we need it ? 2+2=4

(b) Consider the following relation STUDENT :

Roll No	Name	Marks	Attendance
1	Smith	44	78
2	Paul	52	68
3	James	69	87
4	John	54	74

Give the SQL queries for the following :

2×3=6

(i) Find the Name of the student having maximum marks.

(ii) Find the Name of the student having minimum attendance.

(iii) Find the total number of students in the class.

6. (a) Describe the three -tier architecture of the DBMS with the help of a diagram.

4

(b) Consider the following table PLAYER_INFO :

Player ID	Name	Sport Played
1	Joey	44
2	Virat	52
3	Manoj	69
4	Xavier	54

(i) Write SQL command to create the table.

2

(ii) Write SQL command to add one more column AGE to above table. 2

(iii) Write SQL command to remove the above table from the database. 2

7. (a) Differentiate between primary key, candidate key and super key. 3

(b) Consider the database of an online book store.

Every book has a title, ISBN, Year and price. The store also keeps the information about the author and publisher for all the books. For author the database keeps the name, address, and phone number. For publishers, the database keeps the name, address, phone number. Many author may write many book and a book is published by one publisher only.

P.T.O.

(a) Identify the entities of interest and their attributes. 2

(b) Identify the relationships among these entities. 2

(c) Design an E-R diagram for such a bookstore and state necessary assumptions. 3

8. (a) What are referential integrity constraints ? Give one example. 4

(b) Differentiate between : 2×3=6

   (i) Logical and physical data independence

   (ii) DDL and DML

   (iii) Strong and weak entity

This question paper contains 4 printed pages]

Roll No.

S. No. of Question Paper : 7673

Unique Paper Code : 32345401   HC

Name of the Paper : Information Security and Cyber Laws

Name of the Course : Generic Elective : Computer Science

Semester : IV

Duration : 3 Hours   Maximum Marks : 75

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

Question number 1 is compulsory from Section A.

Attempt any *four* questions from Section B.

Section A

(a) What is Spoofing ?   2

(b) What is TCP Session Hijacking ?   3

(c) What are the *three* goals of data security ?   3

(d) Give any *four* malicious codes and explain each

briefly.   4

P.T.O.

(e) List any *three* password cracker tools.

(f) Explain briefly cyber forensic.

(g) What is the punishment for dishonestly receiving stolen computer resource or communication device under ITAA 2008 ?

(h) What is Identity Theft ? What is the punishment for same under the ITAA 2008 ?

(i) Explain briefly Caesar Cipher with a suitable example using key = 3.

(j) Differentiate between the following (any *three*) :   3×3

(i) Active and Passive Attack

(ii) Secret Key and Public Key

(iii) Fault and Failure

(iv) Law and Ethics

(v) Virus and Trojan Horse.

Section B

2. (a) Define threat with respect to computing system. Explain different kinds of threats.

(b) Explain CIA triad and its relevance to computer security.   5

3. (a) What is cryptanalysis ? Explain any *three* different things that a cryptanalyst can attempt to attack the system.   4

(b) Explain transposition cipher with suitable example.   3

(c) What is Hacking ? What is the punishment for same under the ITAA 2008 ?   3

4. (a) What is risk analysis ? List the basic steps of risk analysis.   5

(b) What is a security policy ? Explain any *three* characteristics of a good security policy.   5

5. (a) What are firewalls ? Explain any *four* features of a firewall.   5

(b) What do you understand by authentication ? Mention any *two* ways in by which human user can be identified and computer can be authenticated.   3

(c) Write a short note on password security in Windows 2000.   2

6. (a) What is Cyber Crime ? Explain any *four* techniques to commit cyber crimes.   5

(b) Explain the punishment for Cyber Terrorism under the ITAA 2008.   3

(c) Write a short note on Digital Signature.   2

7. (a) What do you understand by the term malicious hackers ? Explain any *three* broadly classified Hackers.   5

(b) List any *five* guidelines of password selection.   5