This question paper contains 4 printed pages.]

For Visually handicapped Students only

r. No. of Question Paper : 1775 **GC-3** **Your Roll No.....**

Unique Paper Code : 32341102

Name of the Paper : C-2 Computer Systems Architecture

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

Semester : I

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. Attempt **all** questions from **Section A.**
3. Attempt any **four** questions from **Section B.**
4. Attempt **all** parts of a question together.

SECTION – A

1. (a) A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers.

   (i) How many selection inputs are there in each multiplexer ?

   (ii) How many multiplexers are there in the bus ? (5)

   (b) What is a flip flop ? Give the drawback of SR flip flop and how is it removed in JK flip flop ? Give the excitation table of D flip flop. (5)

   (c) Perform the arithmetic operations (+35) + (–17) and (–35) – (–17) in binary using 2's Complement representation for negative numbers. (5)

P.T.O.

(d) Give mapping procedure that provides eight consecutive microinstructions for each machine instruction routine. The operation code has six bits and the control memory has 2048 words. (5)

(e) Why are addressing modes required ? Explain indexed addressing mode and give its advantages. (5)

(f) What is the role of FGI and FGO flip-flop in basic computer ? (5)

(g) Explain the functioning of Direct memory access (DMA) I/O operation. (5)

SECTION – B

2. (a) (i) Why is I/O module required between peripheral device and system bus ?

(ii) Give two instructions required to set E=1 in basic computer. (3+2)

(b) Write the program to evaluate the arithmetic statement

$$X = A - B + C \times (D \times E - F)$$

Using a stack organized computer with zero address instruction. (5)

3. (a) (i) Differentiate between hardwired and micro-programmed control unit. (3+2)

(ii) Explain the operation STA and LDA instruction of basic computer.

(b) Explain property of locality of reference. Also relate it to Hit-ratio. (5)

4. (a) What do you mean by instruction set completeness ? What are the different types of instructions that make the instruction set complete ? (5)

(b) A two-word instruction is stored in memory at an address designated by the symbol W. The address field of the instruction stored at W+1 is designated by the symbol Y. Theoperand used during the execution of the instruction is stored at an address symbolized by Z. An index register contains the value X. State how Z is calculated from the other addresses if the addressing mode of the instruction is

(i) direct

(ii) indirect

(iii) relative

(iv) indexed

(v) immediate (5)

5. (a) Differentiate between combinational circuit and sequential circuit. Give example of each ? (5)

(b) Convert following infix expressions into postfix expressions :

(i) A + B * [C * D + E * (F + G)]

(ii) A * B + A * (B * D + C * E) (5)

6. (a) Discuss the major difficulties of instruction pipeline. (5)

(b) A non-pipeline system takes 50 ns to process a task. The same task can be processed in a six-segment pipeline with a clock cycle of 10 ns. Determine the speed-up ratio of the pipeline for 100 tasks. What is the maximum achievable speed-up ? (5)

7. (a) Write a short note on associative memory. (5)

(b) Show the step-by-step multiplication process using Booth algorithm for the following numbers in binary : $(+11) \times (-13)$. (5)

[This question paper contains 6 printed pages.]

Sr. No. of Question Paper : 2280 **GC-3** **Your Roll No.....**

Unique Paper Code : 32345102

Name of the Paper : Introduction to Programming

Name of the Course : **B.A. (H) / B.Com. (H) / B.Sc. (H) Generic Elective**

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on the receipt of this question paper.
2. Question **1** is compulsory.
3. Attempt any **five** questions out of **Q.2** to **Q.8.**
4. Parts of a question must be answered together.

Note: Please ignore any differences in font used for single and double quotes in the Question paper.

1. (a) What is wrong with the following code/code segments :

i)
```
if (x == 0) cout <<  x << " = 0 " << endl;
else cout <<  x << " != 0 " << endl;
else cout <<  "No error";
```

(1)

ii)
```
void fun ( )
void fun ( ) {
   cout << " Hello ";
}
int main ( ) {
   fun ( ) ;
   return 0;
}
```

(1)

iii)
```
class One{
    int p;
  public:
    void input (int q)  { p = q ; }
    void output ( ) { cout << p ; }
  };
  int main ( ) {
    One b;
    b.p = 10;
    cout << b.p;
  }
```
(1)

(b) Write the outputs of the following code/code fragments :

i)
```
int main() {
   int  j  = -7  / 2;
   int  k =  -7  % 2;
   cout   << j <<"   " << k;
}
```
(3)

ii)
```
int n,  j = 100, k = 30;
n = (j  %  k ?  k + 1 : k - 1);
cout <<  " n = " <<  n <<  "  k =  " <<  k  << endl;
```
(2)

iii)
```
int array[ ] = {0, 2, 4, 6, 7, 5, 3};
int n, result = 0;
for (n = 0; n < 8; n++)
   result += array[n];
cout  <<  result;
```
(2)

iv)
```
int main ( ) {
    int x = 10, y = 20;
    cout <<  x <<  "  " <<  y;
fun (x, x);
    cout  <<  x  <<  "   "  <<  y;
    return 0;
}
void fun (int x,  int y) {
    x = 20;
    y = 10;
    cout <<  x  <<  "   "  <<  y;
}
```
(3)

(c) Write a C++ instruction to define a constant PI with value 3.141. (1)

(d) Write a single C++ statement that prints "too many" if the variable count exceeds 100. (1)

(e) Write logical expressions to represent each of the following conditions :

(i) whether *score* is greater than 80 but less than or equal to 90

(ii) whether *ch* is either lowercase or uppercase letter

(iii) whether n is between 0 and 7 but not even (3)

(f) Give the syntax of using a header file in a C++ program. (1)

(g) Write a function in C++ that takes a number as input and returns the sum of its digits. (6)

2. (a) What would be the output of the following C++ code snippets ?

i)
```
int main( ) {
    int a = 5, b ;
    b  =  -3   -   - (- 3) ;
    cout  <<  "  b = " <<  b ;
    b  =  a++;
    cout << "  a =  " <<  a  << " b = "  << b ;
}
```
(3)

ii)
```
char ch = 'g';
switch (ch) {
   case 'g' :   cout  <<  " Good ";
   case 'b' :   cout  <<  " Bad ";
                break;
   case 'e' :   cout  <<  " Excellent ";
                break;
   default :    cout  <<  " Wrong choice";
}
```
(2)

(b) Write a function *quad* to read the values of variables a, b and c and display the value of x, where $x = \sqrt{(b^2 - 4 * a * c)}$. Give output of the program for a = 3, b = 10, c = 3. (5)

3. Write C++ statements for the following tasks : (2×5)

(a) Write a for loop to display all perfect squares till 100.

(b) Write a prototype of a function *func* that accepts two arguments- an integer and a float; and returns a double.

(c) Create a structure *Employee* having elements *name, age* and *salary.*

(d) Swap two integers and print the new values.

(e) Create a class Day with data members day_of_me_week and month using appropriate data types and access specifiers.

4. (a) Write a function *GCD* that accepts two numbers as arguments and returns their greatest common divisor. (5)

(b) Write a program to read ten integers and search for an integer value given by the user. (5)

5. Create a class *Box* in C++ having three data members : *length, width* and *height.* (2)

   Define a default constructor for this class. (2)

   Define appropriate functions to take input and display the volume of the objects of this class. (4)

   Create an object of this class and display its volume. (2)

6. (a) Define a function *power* that accepts two integers x and y as arguments and returns y^{th} power of x that is x^y. (4)

   Define the function main() that calls the above function and displays results for the following values : x = 2, y = 3. (2)

   (b) Write a program to generate and print first n terms of the Fibonacci Series.

   (1, 1, 2, 3, 5, ...) (4)

7. (a) Which of the following array declarations are invalid ? Give reasons for invalidity.

   (i) float [+10]; (ii) char name[30];

   (iii) double[100]; (iv) int score[15]; (4)

   (b) Write a program to read a 3 × 3 matrix, find its transpose, and display the transpose. (6)

8. (a) Write a C++ Program to display the following pattern on the output screen. The number of rows should be taken as an input from the user.

```
* * * * *
* * * *
* * *
* *
*
```

(6)

(b) Find the error(s) in the following code. Give reasons for the error(s).

```
class A {
   private     :  int x;
   protected   :  int y;
   public      :  int z;
};
class B        :   public A {
   private     :  int i;
   protected   :  int j;
   public      :  int k;
};
int main ( ) {
   A  a ;
   B  b;
   a.x = 1;
   a.y = 2;
   a.z = 3;
   b.x = 5;
   b.y = 6;
   b.z = 7;
   b.i = 10;
   b.j = 20;
   b.k = 30;
}
```

(4)

This question paper contains 3 printed pages. **Your Roll No. .....**

Sl. No. of Ques. Paper : 775 **G**

Unique Paper Code : **234301**

Name of Paper : **Design and Analysis of Algorithms (CSHT : 305)**

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

Semester : **III**

Duration : : **3 hours**

Maximum Marks : **75**

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

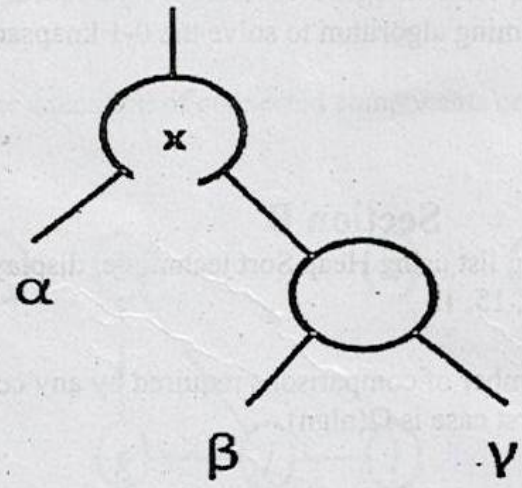
*Q. No. 1 of 35 marks is compulsory. Attempt any **four** questions from Q. No. 2 to Q. No. 7.*

Section A

Q1.

a) Which sorting algorithm is best if the list is already sorted? Why? 2

b) Let a, b and c be arbitrary nodes in subtrees α, β and γ respectively, in the following figure.



How do the depths of a, b and c change when a left rotation is performed on node x in the figure ? 3

c) Prove that the average running time of Quicksort is O(nlgn) where n is the number of elements. 5

d) What are stable algorithms? Is it necessary for Count Sort to be stable? Why? 1+1+3

e) Find the minimum spanning tree for the following graph using Kruskal's algorithm. 5

P. T. O.

This question paper contains 7 printed pages]

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

S. No. of Question Paper : **2047**

Unique Paper Code : **32341302** **GC-3**

Name of the Paper : **C-2 Operating Systems**

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

Semester : **III**

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 questions from

Question No. **2** to Question No. **6**.

Parts of a question must be answered together.

1. (*a*) Give *one* word answers for the following : 6×0.5=3

(*i*) In this address binding scheme the logical and physical addresses are same.

(*ii*) Time taken by the disk arm to reach the appropriate cylinder.

(*iii*) The scheduler responsible for transition of a process state from ready to running.

(*iv*) Fragmentation that occurs when there is enough space in main memory but is not contiguous.

(*v*) The in-memory strucutre that stores the information about all the files which are opened in the system.

(*vi*) Privileged instructions can execute in this mode.

P.T.O.

(*b*) What will be the output of the following code segment ? Justify your answer : 3

```
int i;
cout<<"Hello"<<endl;
for (i=1; i<3; i++)
    fork();
cout<<"Over"<<endl;
```

(*c*) Consider the following memory address references :

0345, 0312, 0347, 0732, 0679, 0732, 0642, 0478, 0425, 0324, 0368, 0841, 0974

What will the reference string corresponding to the addresses given above (assuming page size is 200 bytes) ? How many page faults will occur with this reference string assuming that the process can have only one frame ? 3

(*d*) Differentiate between the following : 3×2=6

(*i*) Tree structured Directories and Acyclic-Graph directories

(*ii*) Asynchronous and Deferred cancellation of threads

(*iii*) Peer-to-peer and client server computing.

(*e*) What is the difference between the following two cases ? 2

Case 1 : copying a file.

Case 2 : sharing a file through linking.

(*f*) Consider the following segment table :

Segment	Base	Lenght
0	219	600
1	1300	95
2	90	400
3	1327	480
4	1052	196

What are the physical addresses for the following logical addresses ?

(*i*) 0, 230

(*ii*) 1, 110. 2

(*g*) If the total number of frames in main memory is 80 and there are 4 processes in the system with the demand as 40, 20, 90 and 50 frames, respectively. What will be the number of frames allocated using the following allocation strategies ?

(*i*) equal allocation 1

(*ii*) Proportional allocation. 2

(*h*) Can use of semaphores lead to deadlocks ? Justify your answer. 2

(*i*) What are the three methods to pass parameters to the operating system ? 3

(*f*) Consider the following segment table :

Segment	Base	Lenght
0	219	600
1	1300	95
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(*i*) equal allocation 1

(*ii*) Proportional allocation. 2

(*h*) Can use of semaphores lead to deadlocks ? Justify your answer. 2

(*i*) What are the three methods to pass parameters to the operating system ? 3

(*j*) Briefly explain the microkernel approach to operating system design. 2

(*k*) What are the advantages of multiprocessor systems ? 3

(*l*) How UNIX maintains the access control list for a file protection ? 3

2. (*a*) Consider the following set of processes, with the length of CPU burst time given in milliseconds :

Process	Arrival Time	Burst Time	Priority
P_1	0	4	2
P_2	2	5	1
P_3	5	7	3
P_4	6	6	4 (Highest)

(*i*) Draw Gantt chart for Shortest Job First algorithm and calculate turnaround time for every process.

(*ii*) Draw Gantt chart for Priority based (preemptive) algorithm and calculate waiting time for every process. 6

(*b*) Suppose there is a system with 128 KB of memory with no memory initially allocated. Given the following sequence of requests by the processes, show the memory layout at intermediate stages for best-fit allocation algorithm. 4

Process Number	Nature of Request	Amount of memory requested (in KB)
P0	Allocation	40
P1	Allocation	15
P2	Allocation	10
P3	Allocation	25
P0	Deallocation	
P2	Deallocation	
P4	Allocation	18
P5	Allocation	15

3. (*a*) Consider the following scenario :

Process P1 is waiting for resource R1 and using (holding) R2

Process P2 is using R1

Process P3 is using R1 and waiting for R2

Process P4 is using R2

(*i*) Draw the resource allocation graph. 3

(*ii*) Is the system in a deadlock ? If the answer is yes, then mention the processes in the deadlock else identify the sequence in which the processes can execute. 2

(*b*) Discuss the linked allocation of files and its variant FAT. 5

4. (*a*) The concurrent processes P1 and P2 execute the following code segments in a uniprocessor environment :

P1 : x=x+1

P2 : x=x–1

where x is a shared variable. What would be the problem of such concurrent execution ? 4

(*b*) Consider the following page reference string :

7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 0, 4, 2, 0, 1, 7.

How many page faults would occur with LRU and optimal page replacement algorithms assuming four frames ? All frames are initially empty. 6

5. (*a*) Consider a logical address space of 64 pages with 1-KB frame size mapped onto a physical memory of 128 KB :

(*i*) How many bits are there in the logical and physical addresses ? 2

(*ii*) How what is the breakup of offset and page number in the logical address ? 2

(*iii*) How is the maximum number of entries in the conventional page table and in the inverted page table ? 2

(*b*) Which of the following components of a program state are shared across different threads in a multithreaded process and why ? 4

(*i*) global variables

(*ii*) stack memory

(*iii*) registers values

(*iv*) files.

6. (*a*) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is :

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms :

(*i*) SSTF

(*ii*) SCAN. 3+2

(*b*) Draw the process state diagram and explain its various states. 5

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 779 **G** **Your Roll No.....**

Unique Paper Code : 234501

Name of the Paper : Theory of Computation (CSHT-511)

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

Semester : V

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. **All** questions from **Part A** is compulsory and attempt any **four** questions from **Part B.**
3. Assume $\Sigma = \{a,b\}$ is the underlying alphabet unless mentioned otherwise. Parts of a question must be answered together.

PART A

1. (a) Prove that for all sets S, $(S^+)^+=S^+$. (2)

   (b) Give regular expression for the language of all words that have at least two a's in them. (2)

   (c) Consider the language PALINDROME over the alphabet {a b}. Prove that if x is in PALINDROME then so is x^n for any n. (3)

   (d) Show that (a*+b)* and (a+b)* defines the same language over alphabet {a b}. (3)

   (e) Build an FA that accepts only those words that have more than four letters. (3)

(f) Build FA for the regular expression (a+b)b(a+b)*. (3)

(g) Find a CFG for the language defined by regular expression (baa + abb)*. (3)

(h) Use the pumping lemma to show that the language $\{a^n b^n a^n \; n= 1\ 2\ 3...\}$ is non regular. (4)

(i) Show that if L1 and L2 are regular languages, then so are $L_1 + L_2$, L_1L_2 and L_1^*. (4)

(j) Construct a PDA for the language $L = \{a^{2n}b^n \; n=0\ 1\ 2\ 3\ ...\}$. (4)

(k) Explain the Church Turing Thesis. (4)

PART B

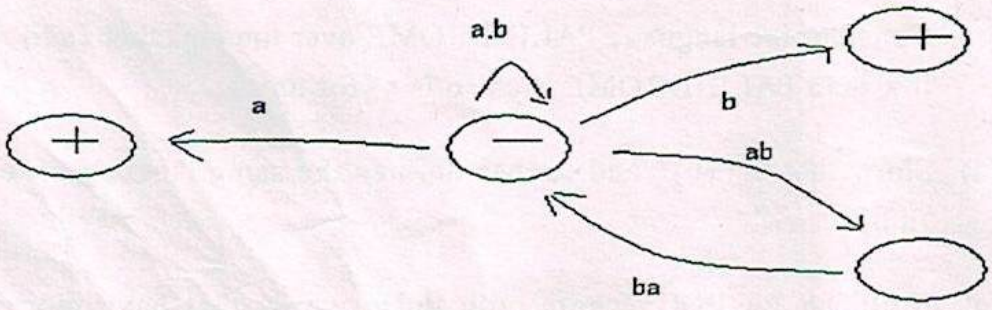
2. (a) Define Finite Automata. (2)

(b) Build a regular expression for all words that have exactly two b's or exactly three b's not more. (3)

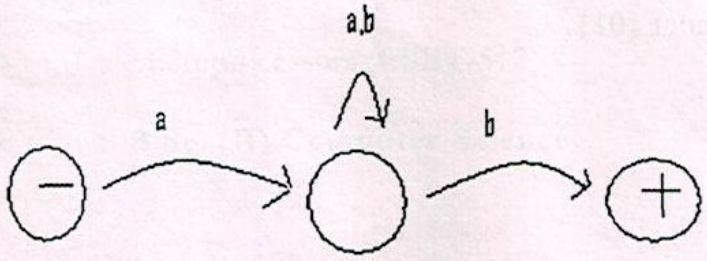
(c) Build an FA that accepts only those words that begin or end with double letter. (5)

3. (a) Define Non Deterministic Finite Automaton. (2)

(b) Convert the following Transition graph into regular expression. (4)



(c) Convert the following NFA into DFA : (4)



4. (a) For the given languages L1 = (a+b)b(a+b)* and L2 = b(a+b)*, find regular expression and finite automata that define $L_1 \cap L_2$. (5)

(b) Use pumping lemma to show that language $\{a^{2n}b^n \; n = 1\ 2\ 3 \ldots\}$ is non regular. (5)

5. (a) Construct a CFG for the language $L = \{a^m b^n \; n>m, \; m, \; n>=1\}$. (5)

(b) Construct a PDA for the language $L = (a^n bb^n \; n=1\ 2\ 3 \ldots\}$. (5)

6. (a) State pumping lemma for context free languages. (2)

(b) Show that the family of context free languages is not closed under intersection. (4)

(c) Show that the language $\{a^n b^n a^n b^n a^n$ for $n = 1\ 2\ 3 \ldots\}$ is non context free. (4)

7. (a) Define Turing Machine. (2)

(b) Prove that If L is a recursive language, then its compliment L' is also recursive. (4)

(c) Design a Turing Machine that provides output as a compliment of the given number which is provided to the machine as input in binary form over the alphabet {01}. (4)

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 780 **G** **Your Roll No.....**

Unique Paper Code : 234502

Name of the Paper : Microprocessors (CSHT-512)

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

Semester : V

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. Attempt **all** questions from **Section A.**
3. Attempt any **four** questions from **Section B.**
4. Attempt all parts of a question together.

Section A

1. (a) The segment register holds the value FA00H. Identify the starting and the end address of the memory area it identifies, in the real mode of memory addressing. (2)

   (b) Differentiate between real and protected mode of memory addressing. (3)

   (c) Explain the difference between the maximum and the minimum modes of the 8086/8088 microprocessors. (3)

   (d) Identify the addressing modes of the following : (3)

   (i) MOV ARY, AL

   (ii) MOV AX, BX

   (iii) MOV DX, [EBP]

P.T.O.

(e) What is the difference between STOS and MOVS instructions ? (3)

(f) What are the special functions associated with register CX ? (3)

(g) Memory devices have data lines 8 bit wide but the 8086 has 16 bit data lines. How is this mismatch overcome ? (3)

(h) Differentiate between isolated and memory mapped I/O. (3)

(i) What are the different modes of I/O in which the 82C55, the peripheral programmable interface, can be programmed ? (3)

(j) Explain the BOUND and INTO interrupt instructions. (3)

(k) What are the signals that are exchanged between the microprocessor and the DMA controller just before the DMA takes over control. Explain this exchange. (3)

(l) What is the purpose of S, C and T FLAG bits ? (3)

Section B

2. (a) Explain the functions of the following pins of 8086: READY, ALE, DEN, RESET and HOLD. (5)

(b) What are program invisible registers ? What is the purpose of GDTR and IDTR ? (5)

3. (a) In each of the given instructions, determine the memory address accessed in the real mode. Given :

CS=2000H; DS=F000H; ES=3000H; SS=0000H; BX=1100H;

BP=0010H; SI=003FH; ARRY = 4444H;

(i) MOV CX, [SI]

(ii) DEC [BX]

(iii) MOV DX, [BP+SI]

(iv) MOV CX, [BX+SI+AAH]

(v) MOV AX, ARRY (5)

(b) How do the CALL and RET instructions affect the stack ? Explain with example. (5)

4. Write the function of the following instructions : (10)

(i) XLAT (ii) LDS

(iii) OUTS (iv) SAHF

(v) XCHG

5. (a) Give three software commands to control the operation DMA 8237. (5)

(b) Sketch the read bus cycle for the 8086/8088 microprocessor. Identify the purpose of each clocking period in this bus cycle. (5)

6. (a) Why are interrupts needed ? Differentiate between INTR and NMI. (5)

(b) Describe the initialization command words ICW1 and ICW2 for 8259A, programmable interrupt controller. (2)

(c) What is the BIST in the Pentium ? (3)

7. (a) Explain the difference between :

(i) Near and far jump

(ii) INS and OUTS (5)

(b) What is wrong with the following instructions :

(i) PUSH AL

(ii) MOV CS, [SI]

(iii) MOV [AX], AH

(iv) POP SS

(v) POP 9000H (5)

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 781 **G** **Your Roll No.....**

Unique Paper Code : 234504

Name of the Paper : Internet Technologies (CSHT-513)

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

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

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

Section A

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

1. (a) Write a Java Script code which will greet user according to the current time. (5)

   (b) (i) How does the use of data types in the context of variables differ in Java Script and Java ? (2)

   (ii) Describe the input tag and write the form elements used in Java script. (3)

   (c) What is the difference between `final`, `finally` and `finalize` ? (5)

(d) What does the following method do ? Give an example of how you can call the method.

```
public class MatchTally
{
   public void  Score(TeamA that, double
points)
   {
      this.score = this.score - points;
      that.score = that.score + points;
   }
. . . // Other related MatchTally methods
```

(5)

(e) What is BeanInfo interface used for ? List the three functions defined by this interface. (2+3)

(f) Describe the various components of JDBC ? (5)

(g) What is the purpose of JSP ? Explain the three types of JSP elements. (5)

Section B

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

2. (a) (i) Explain alert method of window object in Java script with suitable example. (2)

(ii) Write the code to set a HTML documents background color to RED using Java Script. (3)

(b) What is join() method in Java Script ? Explain the use of join() method with the help of an example. (1+4)

3. (a) Write a Java program to merge two sorted list of integers. (5)

(b) What are the differences (and/or) similarities between abstract class and an interface ? (5)

4. (a) Compare and contrast simple and indexed properties using examples. (5)

(b) (i) Why is JAVA known as platform independent language ? (1)

(ii) What is the difference between function overloading and function overriding ? (4)

5. (a) What are the different types of statements in JDBC ? (5)

(b) Describe the following code : (5)

```
Connection
con=DriverManager.getConnection("jdbc:odbc:Myds
n1"," "," ");
String query="Select * from Customers where
CustNumber=?";
PreparedStatement
ps=con.preparedstatement(query);
Ps.setString(1,"123");
Results=ps.executeQuery();
```

6. (a) Illustrate HTTP Request/Response Model with the help of a diagram. (5)

(b) Describe various components in the following statement. (5)

```
<jsp:useBean
id="cartoon"class="com.ora.jsp.beans.motd.Cart
oonBean" />
```

7. (a) How can the standard action element of JSP be used to set the property of a Java Bean ? Illustrate with the help of a suitable example. (5)

(b) What is the purpose of Custom Tag Library ? Give an example. (5)

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

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

S. No. of Question Paper : **33**

Unique Paper Code : **234561** **G**

Name of the Paper : **Networks**

Name of the Course : **B.Sc. Mathematical Science**

Semester : **V**

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

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

Section A is compulsory.

Attempt any *five* questions from Section B.

Section A (Compulsory)

1. (*a*) Differentiate between star and bus topology. List *one* advantage and *one* disadvantage of star topology over bus topology. 2

(*b*) What are the *two* approaches to packet switching ? 2

(*c*) How does forward error correction differ from retransmission ? 2

(*d*) Show how the following data would change when bit stuffing is applied on it : 2

1000111111001111101000111111111111000011111

(*e*) Differentiate between half-duplex and full-duplex mode of data communication. 2

(*f*) What do you mean when we say that a bridge can filter traffic ? Why is filtering important ? 2

P.T.O.

(*g*) How does caching increase the efficiency of name resolution ? 2

(*h*) Identify the layers of OSI model responsible for performing the following operations : 3

(*i*) Logical Addressing

(*ii*) Synchronization of bits

(*iii*) Error Control.

(*i*) Name the layers on which the following networking devices operate : 3

(*i*) Bridge

(*ii*) Router

(*iii*) Gateway.

(*j*) Give full form of the following acronyms : 5

(*i*) TELNET

(*ii*) DNS

(*iii*) NVT

(*iv*) VPN

(*v*) WWW.

Section B (Attempt any *five*)

2. (*a*) What is the purpose of FTP ? Name and explain in brief the different FTP transmission modes. 5

(*b*) List the advantages of optical fiber over twisted-pair and coaxial cable. 3

(*c*) Define guided and unguided media. 2

3. (*a*) Define Virtual Circuit Network. Name and explain the three phases that a virtual circuit needs to go through. What kind of delay is involved in a virtual-circuit network ? 5

(*b*) List various issues to be considered while using bridges to connect different LANs. 5

4. (*a*) A block of IP addresses is granted to a small organization. One of the addresses is 205.16.37.39/28. What is the first and last address in the block ? Also, find the total number of addresses. 5

(*b*) What is the purpose of firewall ? Explain Packet-Filter firewall and Proxy firewall. 5

5. (*a*) Explain Stop-and-Wait Protocol with the help of an example. 5

(*b*) In Carrier Sense Multiple Access (CSMA) which three persistence methods can be adopted when a station finds a channel busy ? 3

(*c*) A network using CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time (including the delays in the devices and ignoring the time needed to send a jamming signal) is 25.6 μs, what is the minimum size of the frame ? 2

6. (*a*) Even though circuit switched network is less efficient than datagram network, delay in these networks are minimal. Explain why ? 5

(*b*) What are *three* domains of the domain name space ? What is the purpose of the inverse domain ? 3

(*c*) How does recursive name-address resolution differ from iterative resolution ? 2

7. Differentiate between the following (any *five*) : 5×2=10

(*i*) Primary Domain Name Server and Secondary Domain Name Server

(*ii*) Static Routing Table and Dynamic Routing Table

(*iii*) Repeater and Amplifier

(*iv*) Passive Hub and Active Hub

(*v*) FQDN and PQDN

(*vi*) Router and Bridge.

8. Write notes on any *two* of the following : 2×5=10

(*i*) Cookies

(*ii*) Radio Waves

(*iii*) SMTP

(*iv*) HTTP.

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

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

S. No. of Question Paper : **1871**

Unique Paper Code : **42341102** **GC-3**

Name of the Paper : **Problem Solving with Computers**

Name of the Course : **B.Sc. (Prog.)/B.Sc. Mathematical Science (CBCS)**

Semester : **I**

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

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

Section A is compulsory.

Attempt any *five* questions from Section B.

Parts of a question must be answered together.

Section A

1. (*a*) Draw the flowchart to find average of three numbers. 2

(*b*) Give the full form of the following : 2

GIGO, EPROM

(*c*) What is the purpose of the following registers : 2

PC, MBR, MAR, IR

(*d*) What is an OMR device ? List *one* of its application. 2

P.T.O.

(*e*) Give the output of the following : 2

(*i*) "62" + "4"

(*ii*) 4 << 2

(*f*) Which of the following is *not* a legal variable name and why ? 2

4hello

helloworld9

and

My_Name

(*g*) Write a function in python that computes the interest (I) on a loan of principal amount (P) at a rate (R) and a for a time period (T) using the formula. Accept P, T, R as arguments and return I using the formula I = (P*T*R)/100. 2

(*h*) Write statements in Python to count the number of occurrences of a character 'e' in the string "welcome". 2

(*i*) Consider the string : 2

Message = "Hello, Welcome to Programming"

Determine the output of the following :

(*i*) Message [7:13]

(*ii*) Message.lower( )

(*j*) What will be the output of executing the following statements : 2

```
>>> cubes = [x**2 for x in range(3, 8)]
>>> print cubes
```

(*k*) Give the output of the following : 2

```
def recur_fun(n) :
  if n <= 1 :
    return n
  else :
    return n * recur_fun(n-2)
print(recur_fun(5))
```

(*l*) Declare a class **Square**. The class should contain **side** of the square as the data member. It should support the following methods : 3

(*i*) **_int_**method for initializing data member side.

(*ii*) **Perimeter** method to find perimeter of the square.

Section B

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

```
lst = ['if', 'pass', 'for', 'break', 'else']
```

Give the output of the following statements :

```
lst.find('for')
lst.insert(2, 'continue')
lst.remove('break')
lst.sort( )
del lst[2:4]
```

(*b*) What are exceptions ? How are they handled in Python ? Explain the errors that can occur on executing the following statements : 5

```
>>> int('hello')

>>> result = 'sum of 2 and 3 is' + 5
```

3. Find the output of the following :

(*i*) 3

```
a = 150
b = 190
while (a != b) :
    if (a > b) :
        a = a - b
    else :
        b = b - a
print a
print b
```

(*ii*) 3

```
total = 0
N = 11
for i in range (1, N + 1) :
    for j in range (1, N + 1) :
        total = i + j
print total
```

3

(*iii*) x = 100

```
def test( ) :
    x = 200
    y = 300
    print 'Inside test : x = ', x
    print 'Inside test : y = ', y
test( )
print 'Outside function test : x = ', x
```

(*iv*) '>' . join (['Welcome', 'to', 'Python']) 1

4. (*a*) Write a function that prints Fibonacci series for first n terms. Fibonacci series takes 0 and 1 as the first two values. Third value in the series is computed as the sum of previous two terms. Similarly other terms of the series can be computed. Example 0 1 1 2 3 5 8 13 21 and so on. 5

(*b*) Write Python statements to accept a four digit number from the user and display its reverse. (For example if user enters 5643, the program should print 3465). 5

6

5. (*a*) What is the output of the following code statements :

(*i*)
```
for i in range (20, 30) :
    if (i%9 != 0) :
        continue
    print i
```

(*ii*)
```
def multiple(a = 0, num = 1) :
    return a*num
multiple(5, 6)
multiple(num = 7)
```

(*iii*)
```
i = x = 0
while i < 10 :
    if (i% 5 == 0) :
        print x
        x += 1
    i += 1
print x
```

(*b*) Write Python code to swap two numbers without using the third variable. 2

(*c*) Consider the following nested list : 2

```
city = [['Tokyo', 23], ['Paris', 34],
['Amsterdam', 45]]
```

What will be the output of the following statements ?

(*i*) print city[1]

(*ii*) print city[1] [0]

6. (*a*) Define a class **Employee** that stores information about employees in the company. The class should contain the following data members : 6

Name—Employee Name

Job—Job Profile of the Employee

Department—Department of the Employee

Basic, DA, HRA—Salary Components

Salary—Gross Salary of the Employee

The Class should support the following methods :

(*i*) **_init_( )** for initializing data members

(*ii*) **findSalary( )** for determining gross salary as sum of Basic + DA + HRA

(*iii*) **empDisplay( )** for displaying information about the employee.

(*b*) Write a python program to print the following pattern using nested loop : 4

```
*
**
***
****
*****
```

7. Consider the following list of items to perform the operations in part (*a*) and (*b*) : 10

37, 12, 89, 11, 41, 94

(*a*) Apply any *one* of the sorting techniques (bubble sort, insertion sort, and selection sort) on the given list.

(*b*) Write a function in python to implement above selected sorting technique.

8. (*a*) What is a Queue ? Consider Q = [5, 12, 4, 18] as a queue. Write python functions to perform insert and remove operations. Show the modified list Q after each of the following operations : 6

(*i*) insert(20) on Q

(*ii*) insert(40) on Q

(*iii*) remove( ) from Q

(*b*) Write a function binSearch in python to perform binary search. The function should accept two parameters : 4

(*i*) a list, lst of values and

(*ii*) a data, value to be searched in the list.

The function should return the index of the first occurrence of input value in the list. It should return -1 if the value searched is not found in the list.

This question paper contains **3** printed pages]

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

S. No. of Question Paper : **1954**

Unique Paper Code : **62341101** **GC-3**

Name of the Paper : **Computer Fundamentals**

Name of the Course : **B.A. (Prog.) Computer Science–CBCS**

Semester : **I**

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 **5** questions from Question **2** to Question **8**.

Parts of a question must be answered together.

1. (*a*) What do you understand by computer program ? 2

(*b*) Briefly explain two uses of the supercomputer. 2

(*c*) What is the flash memory ? What are the features of flash memory ? 4

(*d*) Briefly explain the two primary objectives of an operating system. 4

(*e*) Explain data bus. 2

(*f*) Give full form of the following abbreviations : 3

(*i*) FLOPS

(*ii*) PCB

(*iii*) CAD

P.T.O.

(*g*) Convert the binary number 1001111011 into the following representations : 4

(*i*) 1's complement

(*ii*) 2's complement.

(*h*) What is application software ? Give *two* examples. 2

(*i*) Explain any *one* input pointing device. 2

2. (*a*) Explain the input-process-output cycle. 4

(*b*) Briefly explain the use of computers in Education, Advertising and Government sectors. 6

3. (*a*) What is motherboard ? Explain the booting process when the computer is switched on. 6

(*b*) Explain different ways to access information from the storage device with example. 4

4. Convert the following : 10

(*i*) $(114.325)_{10}$ to $(?)_8$

(*ii*) $(DCE.0C)_{16}$ to $(?)_2$

(*iii*) $(372.602)_8$ to $(?)_{10}$

(*iv*) $(1028.25)_{10}$ to $(?)_8$

(*v*) $(1011001.11)_2$ to $(?)_8$

5. (*a*) Give differences between the following with examples : 6

(*i*) Audio input device and video input device

(*ii*) Hand-held scanners and flat-bed scanners

(*iii*) Hard copy devices and soft copy devices.

(*b*) Explain any *two* different types of I/O ports. 4

6. Perform the following binary operation : 10

(*i*) $(10110000.011)_2 - (100010.101)_2$

(*ii*) $(1110011.101)_2 + (1100011.001)_2$

7. (*a*) What is an operating system and how does operating system perform memory management in a system ? 6

(*b*) Differentiate between Disk partitioning and Disk compression. 4

8. Write short notes on the following terms (any *four)* : 10

(*i*) Big data

(*ii*) System clock

(*iii*) Throughput

(*iv*) Google scholar

(*v*) CMOS chip

This question paper contains **3** printed pages]

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

S. No. of Question Paper : **1955**

Unique Paper Code : **62341101** **GC-3**

Name of the Paper : **Computer Fundamentals**

Name of the Course : **B.A. (Prog.) Computer Science–CBCS**

Semester : **I**

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 **5** questions from Question No. **2** to Question No. **8**.

Parts of a question must be answered together.

1. (*a*) What is the purpose of ROM in the computer system ? 2

(*b*) Convert the binary number 1111011 into the following representations : 2

(*i*) 1's complement

(*ii*) 2's complement

(*c*) Write applications of Touch Screen. 2

(*d*) Define seek time and latency time. 4

(*e*) What do you mean by pixels ? Briefly explain the three factors on which the clarity of image on computer screen depends. 5

P.T.O.

(*f*) What is the purpose of a device driver ? 2

(*g*) How many types of software are there ? Explain each *one* with examples. 4

(*h*) What do you understand by Address Bus ? How much memory (in GB) can be addressed by a 36 bit address bus ? 4

2. (*a*) Define the relationship between hardware and software of a computer system with examples. 6

(*b*) Explain any *four* application areas of the computer with examples. 4

3. (*a*) Briefly explain impact printers and non-impact printers with *two* examples of each. 4

(*b*) Define secondary memory. Explain access types of storage devices. 6

4. (*a*) Give differences between the following with examples : 6

(*i*) SRAM and DRAM

(*ii*) EPROM and EEPROM

(*iii*) OCR and OMR

(*b*) What do you understand by Utility Programs ? Briefly explain any *three* utility programs. 4

5. Convert the following : 10

(*i*) $(2049.625)_{10}$ to $(?)_2$

(*ii*) $(ABC.0C)_{16}$ to $(?)_8$

(*iii*) $(777.002)_8$ to $(?)_{10}$

(*iv*) $(23668.35)_{10}$ to $(?)_{16}$

(*v*) $(11001.101)_2$ to $(?)_8$

6. (*a*) What is an Operating System ? How does operating system provide security to a system ? 6

(*b*) Differentiate between Turnaround time and Response time. 4

7. Perform the following binary operation : 10

(*i*) $(11110011.011)_2 - (1010.111)_2$

(*ii*) $(110011.11)_2 + (100011.001)_2$

8. Write short notes on the following terms (any *four*) : 10

(*i*) e-library

(*ii*) Search engine

(*iii*) SMPS

(*iv*) Cloud computing

(*v*) Anti-virus

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

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

S. No. of Question Paper : **26**

Unique Paper Code : **234361** **G**

Name of the Paper : **CSPT-303 Computer Science—III (Computer System Architecture)**

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

Semester : **III**

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 Question Nos. **2** to **8**.

1. (*a*) Simplify the following Boolean expression using Boolean algebra : 2

$$(AB + A(CD + CD')).$$

(*b*) Give any *two* differences between decoder and encoder. 2

(*c*) Find the 2's complement of the following : 2

(*i*) $(100010)_2$

(*ii*) $(1111110)_2$

(*d*) Give the truth table of $F = x \oplus yz$. 2

(*e*) What are edge-triggered flip-flops ? 2

(*f*) How many address and data lines are there in a memory capacity of 2048x8 ? 2

(*g*) What is Polling ? 2

P.T.O.

(*h*) A bus system multiplexes 32 registers of 8 bits each to produce an 8-line common bus : 2

(*i*) How many multiplexers will be required to implement the bus ?

(*ii*) What is the size of each multiplexer ?

(*i*) Write the control functions and microoperations needed to execute the instruction ADD in the basic computer starting from T_0. Given opcode for ADD is 1. 3

(*j*) Represent $(-14)_{10}$ in signed-magnitude, signed 1's complement and signed 2's complement forms ? 3

(*k*) Represent $(627)_8$ in :

(*i*) Binary

(*ii*) Decimal

(*iii*) Hexadecimal. 3

2. (*a*) Construct a 16-to-1 line multiplexer with two 8-to-1 line multiplexer and one 2-to-1 line multiplexer. Use block diagrams for the three multiplexers. 4

(*b*) Simplify the following function F together with don't care condition *d* in sum-of-products and product-of-sums form. Also draw the logic diagram in each case. 6

$F(A, B, C, D) = \Sigma(0, 6, 8, 13, 14)$

$d(A, B, C, D) = \Sigma(2, 4, 10)$.

3. (*a*) Design an arithmetic circuit with one selection variable S and two *n*-bit data inputs A and B. The circuit generates the following four arithmetic operations in conjunction with

the input carry C_{in}. Draw the logic diagram for the first two stages. 6

S	$C_{in} = 0$	$C_{in} = 1$
0	D = A + B (add)	D = A + 1 (increment)
1	D = A – 1 (decrement)	D = A + B + 1 (subtract)

(*b*) Explain fetch and decode phases of an instruction cycle. 4

4. (*a*) Perform the arithmetic operations (+88) + (+65) and (–88) – (–65) with binary numbers in signed – 2's complement representation. Use eight bits to accommodate each number together with its sign. In which case overflow occurs and why ? 6

(*b*) An instruction is stored at location 123 with its address field at location 124. The address field has the value 500. A processor register R1 contains the number 600. Evaluate the effective address if the addressing mode of the instruction is : 4

(*i*) direct

(*ii*) immediate

(*iii*) relative

(*iv*) indexed with R1 as index register.

5. (*a*) The content of a 4-bit register is initially 1101. The register is shifted six times to the right with the serial input being 101101. What is the content of the register after each shift ? 4

(*b*) Design a 2-bit count-up counter. This is a sequential circuit with two flip-flops and one input x. When $x = 0$, the state of the flip-flops does not change. When $x = 1$, the state sequence is 00, 01, 10, 11, 00 and repeat. 6

P.T.O.

6. (*a*) The content of PC in the basic computer is 3AF (all numbers are in hexadecimal). The content of AC is 7EC3. The content of memory at address 3AF is 932E. The content memory at address 32E is 09AC. The content of memory at address 9AC is 8B9F :

(*i*) What is the instruction that will be fetched and executed next ? 1

(*ii*) Show the binary operation that will be performed in the AC when the instruction is executed. 1

(*iii*) Given the contents of registers PC, DR, AC and IR in hexadecimal at the end of the instruction cycle. 4

(*b*) Draw the logic circuit of a 4-bit adder-subtractor. 4

7. (*a*) Using a general register computer with three address and one address instructions, write programs to evaluate the arithmetic statement : 6

$$X = (A * (B - C))/D.$$

(*b*) Explain the working of a 3 × 8 decoder with the help of logic diagram. 4

8. Write short notes on any *two* of the following : 2×5

(*a*) DMA

(*b*) Interrupt cycle

(*c*) Sequential circuits.

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1438 **F-7** **Your Roll No.....**

Unique Paper Code : 2341301

Name of the Paper : Operating Systems

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

Semester : III

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on the receipt of this question paper.
2. **Section A** is compulsory.
3. Attempt any **4** questions from **Section B.**

Section A

1. (a) Differentiate between a trap and an interrupt. (2)

   (b) Given an example of a system program explaining it's utility in an operating system. (2)

   (c) What is a process? How is it different from a program ? (2)

   (d) Which of the following components of program state are shared across threads in a multithreaded process ?

   (i) Register values

   (ii) Heap memory

   (iii) Global variables

   (iv) Stack memory (2)

P.T.O.

(e) (i) Explain round-robin scheduling algorithm for scheduling processes ? (2)

(ii) Which of the following operating systems use round-robin scheduling ? Justify.

(I) Real-time operating system.

(II) Time-shared operating system. (2)

(f) "Mutual Exclusion is a necessary condition for a deadlock to occur". Explain. (2)

(g) "The method contiguous memory allocation suffers from external fragmentation". Justify. (2)

(h) Define pure demand paging ? (2)

(i) Compare and contrast the sequential and direct access methods for files. (2)

(j) Discuss the single-level directory implementation. (2)

(k) Explain the linear list method for directory implementation. (2)

(l) Starvation cannot occur in the FCFS disk-scheduling algorithm. Explain why this assertion is true. (2)

(m) How can a Trojan horse be used to compromise the security of a system ? (2)

(n) Explain the masquerading method of attack used to breach security. (2)

(o) (i) Define the critical section problem. (2)

(ii) What are Semaphores ? How can they be used to solve the critical section problem ? (3)

SECTION B

2. (a) What are privileged instructions ? Give an example of a privileged instruction. In which mode of the operating system are they executed ? Justify your answer. (1+1+2)

(b) Enumerate the different states of a process and the causes of transition from one state to another ? (4)

(c) Of the following five forms of storage, rank them from fastest to slowest in terms of access time : (1) main memory, (2) magnetic disk, (3) registers, 4) solid state disk, (5) cache. (2)

3. Suppose the following processes arrive for execution at the time indicated :

Process	Burst Time
P0	5
P1	3
P2	2
P3	6
P4	1

(a) Draw Gantt charts illustrating the execution of these processes using FCFS, RR (time quantum = 3). (4)

(b) What is the turnaround time for process P0, P3 in FCFS ? (3)

(c) What is the waiting time for processes P1, P4 in RR ? (3)

4. (a) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would the first-fit algorithm place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order) ? (4)

(b) Given the following reference string with four page frames

1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2

How many page faults occur for

(i) Optimal algorithm

(ii) LRU algorithm (6)

5. (a) Explain the purpose of the open () and close () operations. (2)

(b) What are the advantages of the variant of linked allocation that uses a FAT to chain together the blocks of a file ? (3)

(c) Suppose that a disk drive has 1,000 cylinders, numbered 0 to 999. The drive is currently serving a request at cylinder 150, and the previous request was at cylinder 805. The queue of pending requests, in FIFO order, is :

69, 212, 296, 800, 44, 1,18, 356, 523, 965, 681

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms ?

(i) SCAN

(ii) LOOK

(5)

6. (a) What are deadlocks ? Is it possible to have a deadlock involving only a single process ? Explain. (4)

(b) Draw a resource allocation graph for the following –

P = {P1, P2, P3, P4}

R = {R1, R2, R3}

E = (P1->R1, R1-> P3, P2 -> R1, R2-> P2, R2-> P2, R3-> P2, P3-> R3, R2-> P4}

The number of instances of R1 and R3 is 1 and R2 is 2. Is there a cycle in the graph? Is the system in a deadlocked state? If not, then give reason. (6)

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

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

S. No. of Question Paper : **2307**

Unique Paper Code : **62344328** **GC-3**

Name of the Paper : **Computer Networks and Internet Technologies**

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

Semester : **III**

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 Question Nos. **2** to **8**.

Parts of a question must be answered together.

Marks are indicated against each question.

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

   (*i*) Computer Network

   (*ii*) Protocol

   (*iii*) LAN.

   (*b*) Differentiate between the following : 2+2

   (*i*) Hub and Switch

   (*ii*) Static and Dynamic Web Page.

   (*c*) What is the difference between text area and text box object in a form ? 2

P.T.O.

(*d*) What is star topology ? Give its *two* advantages and two disadvantages. 3

(*e*) What is half duplex data communication ? 2

(*f*) Write HTML statement to make "abc.jpg" as background picture of a web page. 2

(*g*) What is the purpose of "ROWSPAN" option in an HTML table ? 2

(*h*) Write a JavaScript Statement to display a dialog box with the message "The background color will be changed". 2

(*i*) What are unordered lists ? State the different bullet types available with unordered lists in HTML. 2

2. (*a*) What is World Wide Web (www) ? How do you access a document using www ? 5

(*b*) What is TELNET ? What is the difference between local and remote login in TELNET ? 5

3. (*a*) What is the full form of ISO OSI reference model ? Explain the responsibilities of Session Layer and Data Link Layer in OSI reference model. 5

(*b*) What is a twisted pair cable ? Differentiate between Category 3 and Category 5 twisted pair cables. 3+2

4. (*a*) Write a short note on HTTP, explaining its use and properties. 5

(*b*) What are the criteria that affect the network efficiency ? 5

5. (*a*) What are frames and framesets ? Differentiate between them with the help of an example. 5

(*b*) Explain any *three* events in JavaScript ? Which tag helps us identify a JavaScript code in an HTML file ? Can we store JavaScript code as a separate file ? 3+1+1

6. (*a*) What is the difference between break and continue in JavaScript ? Explain with the help of an example. 5

(*b*) Write an html code to generate the following output : 5

Bakery Items :

(*i*) Pizza

(*ii*) Cakes

(*iii*) Cookies

(*iv*) Muffins.

Drinks :

(*i*) Coke

(*ii*) Pepsi

(*iii*) Sprite.

7. (*a*) Give the syntax of FONT command in HTML. 5

(*b*) Describe the functions performed the following HTML tags : 5

(*i*) <HR>

(*ii*) <DIV>

(*iii*)

(*iv*) <P>

(*v*) <I> text </I>

8. Briefly explain the following : 1

(*i*) Search Engine

(*ii*) Web Crawling

(*iii*) WAP

(*iv*) URL

(*v*) Increment and decrement operators in JavaScript.

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

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

S. No. of Question Paper : **2308**

Unique Paper Code : **62344328** **GC-3**

Name of the Paper : **Computer Networks and Internet Technologies**

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

Semester : **III**

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 Question Nos. **2** to **8**.

Parts of a question must be answered together.

Marks are indicated against each question.

1. (*a*) How a picture can be set as a background on web pages ? 2

(*b*) Write the difference between
 and <P> tag. 2

(*c*) Explain with an example the onclick event of Button type element. 2

(*d*) What will be the output of "10" + 20 + 30 in JavaScript ? 2

(*e*) Expand and briefly explain VSAT. 3

(*f*) List any *two* advantages and two disadvantages of Star topology. 2

(*g*) What are the *four* characteristics on which the effectiveness of data communication depends ? Explain. 4

P.T.O.

(*h*) What is the difference between radio button and check box ? Explain with the help of an example. 3

(*i*) What are advantages of using frames in HTML ? 2

(*j*) Write names of all guided media. Explain any *one* of them. 3

2. (*a*) Write an HTML code to generate the following output : 5

Hardware devices :

(*i*) CD-ROM drive

(*ii*) DVD drive

(*iii*) Hard disk

(*iv*) Modem

Web Languages :

(*i*) HTML

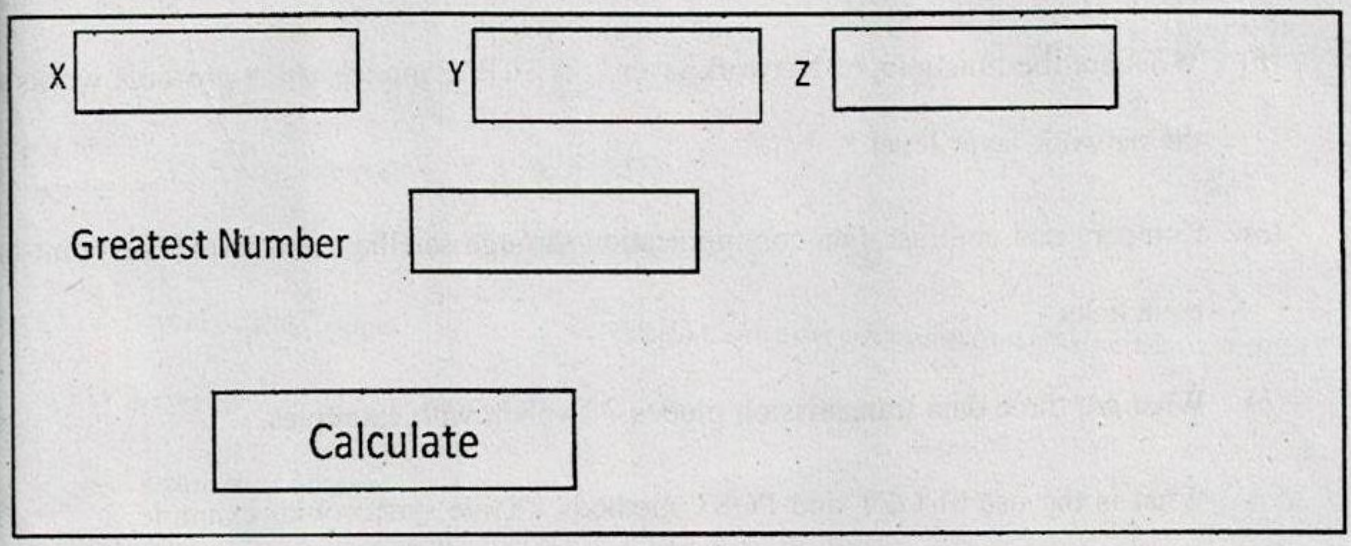
(*ii*) JavaScript

(*iii*) PHP

(*iv*) Java.

(*b*) Write the syntax to insert an image in the document. Also explain the attributes to align image in a HTML document. 5

3. (*a*) Write JavaScript code to generate the following form with the required functionality. 5



Required functionality : user should enter three numbers x, y, z. On pressing calculate button, the number which is greatest among them should be displayed in the box designated. Code must give the proper message if any one of the numbers is not entered.

(*b*) What are data types in JavaScript ? Explain any *four* data types. 5

4. Differentiate between : 10

(*a*) Multipoint and point-to-point connections

(*b*) Frame and packet

(*c*) Routers and gateways

(*d*) Connection Oriented *Vs*. Connectionless data transmission.

5. (*a*) What are the difficulties in web browsing using mobiles as compared to using desktop computers ? List any *five*. 5

(*b*) What are the functions of Network layer ? In TCP/IP model which protocol works at the network layer level ? 3+2

6. (*a*) Compare and contrast data communication through satellites and terrestrial point-to-point links. 5

(*b*) What are three data transmission modes ? Explain with examples. 5

7. (*a*) What is the use of GET and POST methods ? Give syntax with example. 5

(*b*) Create the following output in HTML. 5

*

* *

* * *

8. Write short notes on : 10

(*a*) Data link layer

(*b*) Remote logging

(*c*) Web streaming

(*d*) Real Time Conferencing.

Recond (10)

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

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

S. No. of Question Paper : **2335**

Unique Paper Code : **62343318** **GC-3**

Name of the Paper : **Office Automation Tools**

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

Semester : **III**

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

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

Question No. **1** is compulsory.

Attempt any *three* questions from rest of the five.

1. (*i*) The cell reference for a range of cells that starts from column C and row 1 and goes over to column H and down to row 10 is : $10\times1=10$

   (*a*) 1C:10H

   (*b*) C1:H10

   (*c*) C-1:H-10

   (*d*) C:1..H:10

   (*ii*) What does the VLOOKUP( ) function do ?

   (*a*) Looks up text that contain 'v'

   (*b*) To replace a text

   (*c*) Find related records

   (*d*) All of the above

P.T.O.

(*iii*) Which of the functions shows the word "TRUE" or "FALSE" as a result ?

(*a*) SUM

(*b*) COUNT

(*c*) IF

(*d*) MIN

(*iv*) How can we set Page Border in Excel ?

(*a*) From Edit Menu

(*b*) From Home

(*c*) You cannot set page border in Excel

(*d*) From Tools menu

(*v*) Which of the following should be used to make the same "look" for all the slides in a presentation ?

(*a*) The slide layout option

(*b*) Add a slide option

(*c*) Outline view

(*d*) A presentation design template

(*vi*) Special effects used on objects of the slides in a presentation are called :

(*a*) Effects

(*b*) Animations

(*c*) Transitions

(*d*) None of the above

(*vii*) What is the term used when you press and hold the left mouse key and move the mouse around the slide ?

(*a*) Deleting

(*b*) Dragging

(*c*) Selecting

(*d*) Moving

(*viii*) A screen element of MS Word that is usually located below the title bar that provides categorized options is :

(*a*) Menu Bar

(*b*) Tool Bar

(*c*) Status Bar

(*d*) All of the above

(*ix*) Which of the following is *not* a PowerPoint view ?

(*a*) Slide show view

(*b*) Slide view

(*c*) Presentation view

(*d*) Outline view

(*x*) Portrait and Landscape are :

(*a*) Page Orientation

(*b*) Paper Size

(*c*) Page Layout

(*d*) All of the above

2. Write functions for the operations (*a*)–(*e*) based on the spreadsheet given below along with the relevant cell addresses : 5

	A	B	C	D	E	F	G
1	SNO	Name	Science	Maths	Computers	Total	Average
2	1	Swati	70	80	87	--	--
3	2	Shruti	90	98	89	--	--
4	3	Neelu	90	90	98	--	--
5	4	Rosy	60	76	79	--	--
6	5	Shreya	50	45	67	--	--
7	Max			--	--		
8	Total		--				

(*a*) To calculate the Total Marks as sum of Science, Maths and Computers for each student and display them in column F.

(*b*) To calculate the average marks for each student and display them in column G.

(*c*) To calculate the highest marks in Computers and display it in cell E7.

(*d*) To calculate the lowest marks in Maths and display it in cell D7.

(*e*) To calculate the total number of students appearing for the Science test and display it in cell C8.

3. (*a*) How are charts useful in Excel ? Name any *two* types of chart available in Excel. 2

(*b*) Explain different types of Cell References supported by Excel with a suitable example. 3

4. (*a*) What is the difference between Animation and Transition ? Explain with example. 2

(*b*) What is Rehearse Timings in PowerPoint and why is it used ? 3

5. (*a*) Differentiate between Outline view and Slide Sorter view in PowerPoint. 3

(*b*) Write steps to insert a picture in PowerPoint slide. 2

6. What is Mail Merge ? Explain the process of Mail Merge in MS-Word. 5

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

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

S. No. of Question Paper : **2547**

Unique Paper Code : **32345301** **GC-3**

Name of the Paper : **G-3 Computer Networks and Internet Technologies**

Name of the Course : **Generic Elective for Hons. Courses**

Semester : **III**

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

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

Part A is of **25** marks and is compulsory.

Attempt any *Five* questions from Part B.

Part A

1. (*i*) Which of the OSI layers handles each of the following ? 3

(*a*) Dividing the transmitted bit stream into frames.

(*b*) Determining which route through the subnet to use.

(*c*) Keeping track of whose turn it is to transmit.

(*ii*) Which two layers of layers of ISO-OSI reference model are absent in the TCP/IP model ? 2

P.T.O.

(*iii*) What are the advantages of using optical fiber over twisted pair and co-axial cable ? 4

(*iv*) What is full form of VSAT ? 1

(*v*) Differentiate between RING topology and STAR topology. 3

(*vi*) Explain any *three* attributes of Frame tag in HTML. 3

(*vii*) Differentiate between internal and external linking with examples. 3

(*viii*) Write HTML statement to make an image as marquee. 2

(*ix*) Write the command to align the first table to left and second to right. 2

(*x*) Write the HTML statement for the given code : 2

```
*
***
*****
*******
*****
***
*
```

Part B

2. (*a*) Differentiate between LAN, MAN and WAN. 6

(*b*) Explain any *two* internet applications. 4

3. Create an admission form in HTML using the following objects : 10

Text Box, Radio buttons, Check boxes, Text Area, Select, Submit button and Reset button.

4. (*a*) Differentiate between upload and download in terms of internet.

(*b*) Explain the working of :

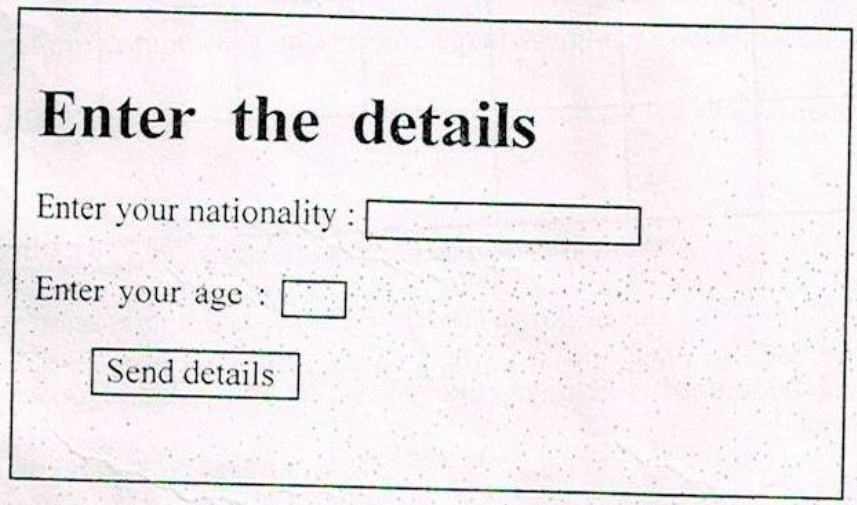
Routers, Hubs and Bridges.

5. (*a*) Using JavaScript write down a program to find the largest of three numbers giv by user.

(*b*) Describe "for" and "for ..... in" commands in JavaScript.

6. (*a*) Explain the logical operators with their syntaxes in JavaScript.

(*b*) Prepare the following web page layout that contains two textboxes "txtNation" to acce nationality and "txtAge" to accept age.



Write the JavaScript code to display the alert message "Eligible for Voting" when bot the given *two* validations are true :

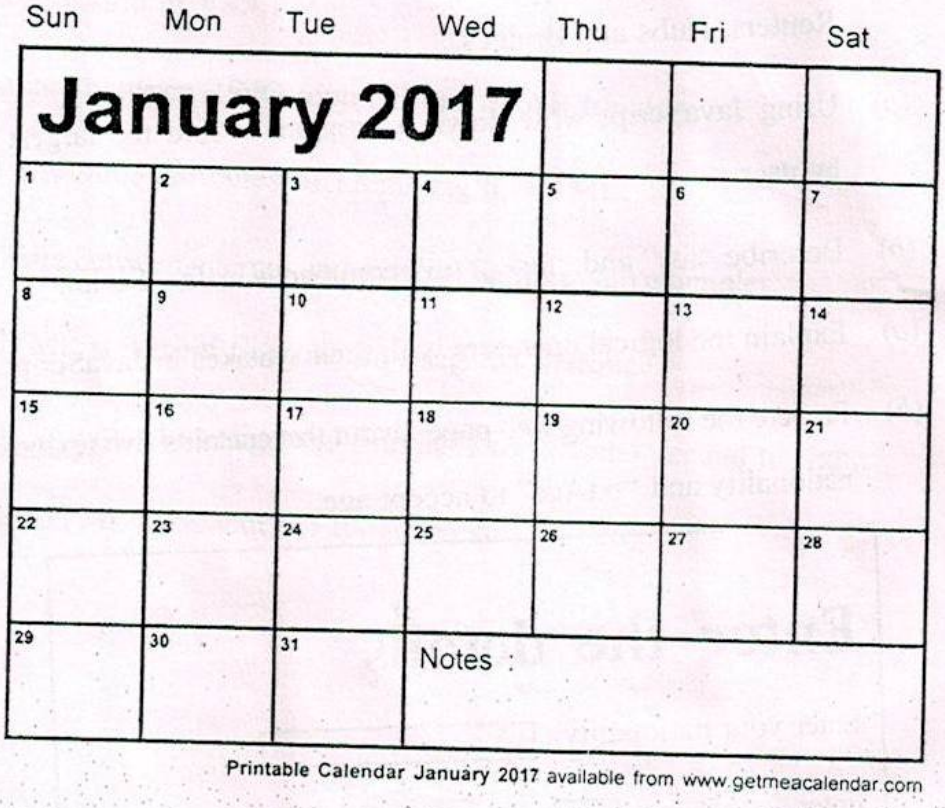
(*i*) The age should be numeric and should be > 18

(*ii*) The nationality should be "Indian"

The alert message "Not eligible to vote" should be displayed if any of the above mentioned validations are false for the click event "Send details".

7. (*a*) Differentiate between Cell Spacing and Cell Padding with syntax in Table tag. 4

(*b*) Create the given webpage in HTML. 6



Sun	Mon	Tue	Wed	Thu	Fri	Sat
January 2017						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	Notes :			

Printable Calendar January 2017 available from www.getmeacalendar.com

8. (*a*) Write the code to create the following structure in HTML : 2

$$x^2 + y + z^3 = 2.$$

(*b*) What is "event" in JavaScript ? Explain "blur" and "focus" events. 4

(*c*) Write short notes on the following : 4

(*i*) Micro Waves

(*ii*) Satellites.

This question paper contains **2** printed pages]

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

S. No. of Question Paper : **227**

Unique Paper Code : **234551** **G**

Name of the Paper : **Software Testing—CA-3A**

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

Semester : **V**

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

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

Section A is compulsory.

Attempt any *three* questions from Section B.

Each question carries **10** marks.

Section A

1. *All* questions are compulsory and carries equal weightage of **3** marks.

   (*a*) For the scientific software systems which software process model may be used ? 3

   (*b*) What do you mean by Bug and Debugging ? 3

   (*c*) Under what circumstances White Box Testing in used ? 3

   (*d*) What should be the value of Cyclomatic Complexity for a good designed software ? 3

   (*e*) Explain Gray Box Testing. 3

Section B

Attempt any three of the following. Each question carries equal marks.

2. (*a*) Explain Waterfall Software Process Model. State the advantages and disadvantages of the same. 5

P.T.O.

(*b*) Explain Spiral Software Process Model. State the advantages and disadvantages of the same.

3. (*a*) Explain Testing as a process.

(*b*) Explain the various phases of software development life cycle.

4. (*a*) Differentiate between Unit Testing, System Testing, Integration Testing.

(*b*) Differentiate between Dynamic and Static Testing.

5. (*a*) Explain the various test metrics and measurements.

(*b*) What are the uses of software testing tools ?

6. Write short notes on any *two* of the following : 2×5=10

(*a*) Throw Away Prototyping Model

(*b*) Types of Software Maintenance

(*c*) Feasibility Study.

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 229 **G** **Your Roll No.....**

Unique Paper Code : 234553

Name of the Paper : CA-2A : Internet Technologies – I

Name of the Course : **B.A. Programme**

Semester : V

Duration : 3 Hours Maximum Marks : 45

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. Attempt any **5** questions from **Section B.**

Section – A

1. (a) Explain the use of <P> tag in HTML. (2)

   (b) Write the code to create the following structure in HTML :

   $2H_2 + O_2 = 2H_2O$ (2)

   (c) What is <MARQUEE> tag in HTML ? Give an example. (2)

   (d) Write the code to change the color of a hyperlink to Green. (2)

   (e) Name the tag to insert a horizontal line on a page. (1)

   (f) What is the difference between Checkbox and radio button objects in a form ? (2)

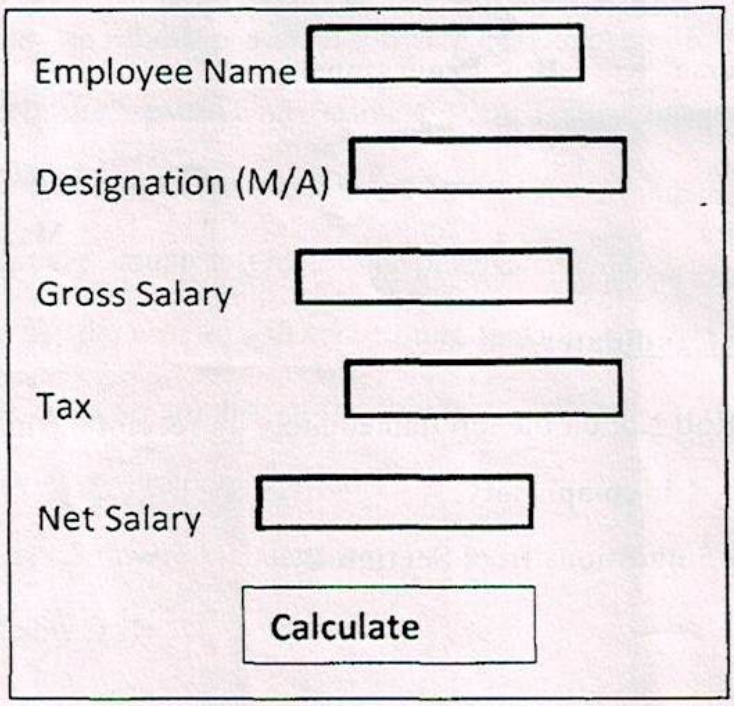
   (g) Explain the syntax and purpose of "alert" method. (2)

   (h) What is the difference between Cell Spacing and Cell Padding ? (2)

P.T.O.

Section – B

2. Give an HTML code for the given form (6)

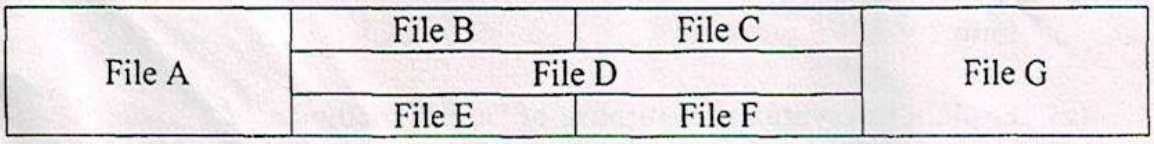


If Designation is M (Manager) then Tax = 20% of Gross otherwise it is 10% of Gross. Calculate the Net Salary" (Gross – Tax) on "onClick()" event handler of the button.

3. (a) Write a JavaScript code to check whether a given number is a multiple of 5 or not. (4)

(b) What do you mean by DOCTYPE in HTML ? (2)

4. Write the HTML code to create the following page using frames : (6)



5. Write HTML code for the following : (6)

Components of a Computer System

A. Hardware

1. Memory
2. Processor
3. Peripheral Devices

B. Software

- System Software
  - i. OS
  - ii. Drivers
  - iii. Utility Programs
- Application Software
  - i. Document Processing
  - ii. Payroll
  - iii. Banking etc.

6. Write HTML code for the following : (6)

ROW 1 COL 1	
ROW 2 COL1	ROW 2 COL 2 (i) ROW 2 COL2 (ii)

7. (a) Explain any two ways of representing colors in HTML. (4)

(b) Write the HTML syntax for changing the Font type of a text to Arial. (2)

8. Write HTML code to create the following form : (6)

NATIONAL SCHOLARSHIP PORTAL

Registration Form

Name of the College : [ ]

Name of the Affiliating University : [University of Delhi ▼]

Nature of College ● Private ● Government

Courses Offered : Certificate ☐ Under Graduate ☐ Post Graduate ☐

[Submit Data] [Refresh Data]

This question paper contains **2** printed pages]

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

S. No. of Question Paper : **250**

Unique Paper Code : **290563** **G**

Name of the Paper : **Computer Applications-I**

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

Semester : **V**

Duration : **3 Hours** Maximum Marks

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

Section A is compulsory.

Attempt any *three* questions from Section B.

Section A

1. (*a*) Write short notes on :

   (*i*) Cache memory

   (*ii*) Optical fibre.

   (*b*) Differentiate between : Printers and Plotters.

   (*c*) Define the term "Operating System". Give any *two* examples of operating system

   (*d*) What is a web browser ? Explain the different types of web browsers examples.

   (*e*) What is the smallest unit of data that a computer can deal with ? How may byt there in 1 MB ?

   (*f*) Differentiate between "Field" and "Record" in the context of DBMS.

Section B

(*a*) Explain the components of a computer system with a block diagram. 5

(*b*) What is a System Bus ? Name and explain the different components of a system Bus. 4

(*c*) What are registers ? 1

(*a*) What is ROM ? Explain any *four* types of ROM available. 5

(*b*) Describe briefly any *two* pointing devices. 5

(*a*) Describe any *three* types of operating system. 6

(*b*) What do you understand by data transmission mode ? Explain briefly the various transmission modes possible. 4

(*a*) How is a client-server network different from peer-to-peer network ? 4

(*b*) What is URL ? Describe the structure of URL with suitable examples. 6

(*a*) Define DBMS. Explain the various components of DBMS. 5

(*b*) Explain any *two* advantages of DBMS. 5

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[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 491 **G** **Your Roll No.....**

Unique Paper Code : 234581

Name of the Paper : Computers Applications in Business (C.P 5.2)

Name of the Course : **B.Com. (Prog.)**

Semester : V

Duration : 2 Hours Maximum Marks : 45

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions are compulsory.
3. Answers should be brief and all parts of a question be answered together.
4. Answers may be written either in English or Hindi; but the same medium should be used throughout the paper.

छात्रों के लिए निर्देश

1. इस प्रश्न-पत्र के मिलते ही ऊपर दिए गए निर्धारित स्थान पर अपना अनुक्रमांक लिखिए।
2. सभी प्रश्न अनिवार्य हैं।
3. उत्तर संक्षिप्त हों तथा प्रश्न के सभी उपभाग क्रमवार लिखिए।
4. इस प्रश्न-पत्र का उत्तर अंग्रेजी या हिंदी किसी एक भाषा में दीजिए, लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

1. Fill up the blank : (5)

   (i) _____ cell reference is used to copy a formula from one cell to another.

   (ii) _____ is text that is printed at the bottom of every page.

(iii) _____ command is used to change the existing text with new text in MS-Word.

(iv) ASCII stands for _____ .

(v) _____ is protocol for mail services.

रिक्त स्थानों की पूर्ति कीजिए :

(i) _____ सेल रेफरेन्स का प्रयोग एक सेल से दूसरे सेल में सूत्र (formula) कॉपी करने के लिए किया जाता है।

(ii) _____ एसी टेक्स्ट है जिसे हर पृष्ठ पर सबसे नीचे प्रिंट किया जाता है।

(iii) _____ कमाण्ड का प्रयोग, वर्तमान पाठांश को नए पाठांश से परिवर्तित करने के लिए (एम एस वर्ड में) किया जाता है।

(iv) ASCII का अभिप्राय है _____

(v) _____ मेल सेवाओं के लिए प्रोटोकॉल है।

2. (a) What are the main components of CPU in a computer ? Briefly explain their functions. (5)

(b) What is paragraph alignment ? What are the different types of alignments ? (5)

OR

(a) Define the terms : Hardware, Software and Firmware. (5)

(b) (i) Calculate Decimal Equivalent of the Binary number $(1100101)_2$.

(ii) Calculate Binary Equivalent of the Decimal number $(42)_{10}$. (5)

(क) एक कम्प्यूटर में सेन्ट्रल प्रोसेसिंग यूनिट के मुख्य घटक कौन से हैं ? संक्षेप में उनके कार्य बताइये।

(ख) पैराग्राफ सरेखण किसे कहते हैं ? सरेखण के विभिन्न प्रकार कौन से हैं ?

अथवा

(क) इन शब्दों को परिभाषित कीजिए- हार्डवेयर, सॉफ्टवेयर तथा फ़र्मवयेर।

(ख) (i) द्वि-आधारी संख्या $(1100101)_2$ की तुल्य दशमलव संख्या की गणना कीजिए।

(ii) दशमलव संख्या $(42)_{10}$ की तुल्य द्वि-आधारी संख्या ज्ञात कीजिए।

3. (a) What do you understand by a search engine and a Browser ? How are they useful in the context of the internet ? (5)

(b) What is Page Formatting in MS-Word ? What options are available in page formatting ? (5)

OR

(a) How do you create a table in MS-Word ? Explain the purpose of split cell and merge cell in a table with examples. (5)

(b) Write down the steps to create bullets in a document. (5)

(क) सर्च इन्जन तथा ब्राउज़र से आप क्या समझते हैं ? इन्टरनेट के सन्दर्भ में ये किस प्रकार महत्वपूर्ण हैं ?

(ख) एम एस वर्ड में पृष्ठ स्वरूपण क्या होता है ? पृष्ठ स्वरूपण के लिए कौन से विकल्प उपलब्ध होते हैं ?

अथवा

(क) एम एस वर्ड में आप तालिका किस प्रकार बनाते हैं ? किसी भी तालिका में सेल विभाजन तथा सेल विलय के उद्देश्यों की व्याख्या कीजिए।

(ख) किसी भी दस्तावेज़ में बुलेट बनाने की पद्धति लिखिए।

4. (a) What do you understand by a slide show ? Explain the procedure to copy the slide from one presentation to another. (5)

(b) What is the difference between Line Chart and Pie-Chart ? (5)

OR

(a) What are headers and footers ? What are the advantages of using them ? Explain with examples. (5)

(b) What do you mean by slide animations and slide transitions ? (5)

(क) स्लाइड शो से आप क्या समझते हैं ? एक प्रस्तुति से दूसरी प्रस्तुति में स्लाइड कॉपी करने की प्रक्रिया समझाइये ।

(ख) रेखीय चार्ट तथा पाई चार्ट में क्या अन्तर है ?

अथवा

(क) शीर्ष लेख तथा पद लेख किसे कहते हैं ? इनके प्रयोग के क्या लाभ हैं, उदाहरण सहित समझाइये ।

(ख) स्लाइड एनीमेशन तथा स्लाइड संक्रमण से क्या अभिप्राय है ?

5. (a) Differentiate between worksheet and workbook in MS-Excel. (5)

(b) Write the difference between internet and intranet. (5)

OR

(a) Explain the functions: PMT and IPMT. (5)

(b) What do you mean by cell reference in MS-Excel ? What are the different types of cell references ? (5)

(क) एम एस एक्सेल में, वर्कशीट तथा कार्यपुस्तिका में अन्तर्भेद कीजिए ।

(ख) इन्टरनेट तथा अंतथजाल (intranet) में अन्तर स्पष्ट कीजिए ।

अथवा

(क) PMT तथा IPMT फलनों की व्याख्या कीजिए ।

(ख) एम एस एक्सेल में, सेल संदर्भ से आप क्या समझते हैं ? विभिन्न प्रकार के सेल सन्दर्भ कौन से हैं ?

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

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

S. No. of Question Paper : **1491**

Unique Paper Code : **2341701** **F-7**

Name of the Paper : **Artificial Intelligence**

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

Semester : **VII**

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* from Question Nos. **2** to **7**.

Parts of a question must be answered together.

1. (*a*) Define an Agent, Agent Function and an Agent Program. 3

(*b*) Differentiate between knowledge-based systems and expert systems. 4

(*c*) Why is state space representation important ? 2

(*d*) Is minimax procedure Depth-first or Breadth-first ? Justify your answer. 2

(*e*) Is the following set unifiable ? If yes, obtain a most general unifier for it : 3

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

(*f*) Obtain Skolem standard form for the following : 3

$$E = \exists X\left(P\left(f\left(x\right)\right) \wedge Q\left(x, f\left(a\right)\right)\right)$$

P.T.O.

(*g*) Explain utility function measure for an agent. 2

(*h*) Discuss special cases of hill climbing : Local Maximum, Plateau and Ridge. 3

(*i*) Express the following sentences as conceptual dependency structures : 6

(*i*) Bill is a programmer

(*ii*) Joe gave Sue a flower.

(*j*) What are the main differences between scripts and frame structure ? 3

(*k*) A 3-feet tall monkey is in a room, where some bananas are suspended from 8-feet high ceiling. The room contains two stackable, movable and climbable 3-feet high crates. Give the initial state, goal state, successor function and cost function for getting the bananas. 4

2. (*a*) Let h′ denote the estimate of h (the actual cost of traversing 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 : 6

(*i*) h′ always underestimates h.

(*ii*) h′ always overestimates h.

(*b*) Consider a state space where the start space is number 1, and the successor function for a state n returns two states numbered $2n$ and $2n + 1$: 4

(*i*) Draw the portion of state space for states 1 to 15.

(*ii*) Suppose the goal state is 11. List the order in which nodes will be visited for breadth — first search.

3. (*a*) Explain Cut, Fail and Cut-fail statements in PROLOG. 6

(*b*) Write a PROLOG program to find GCD of two numbers. 4

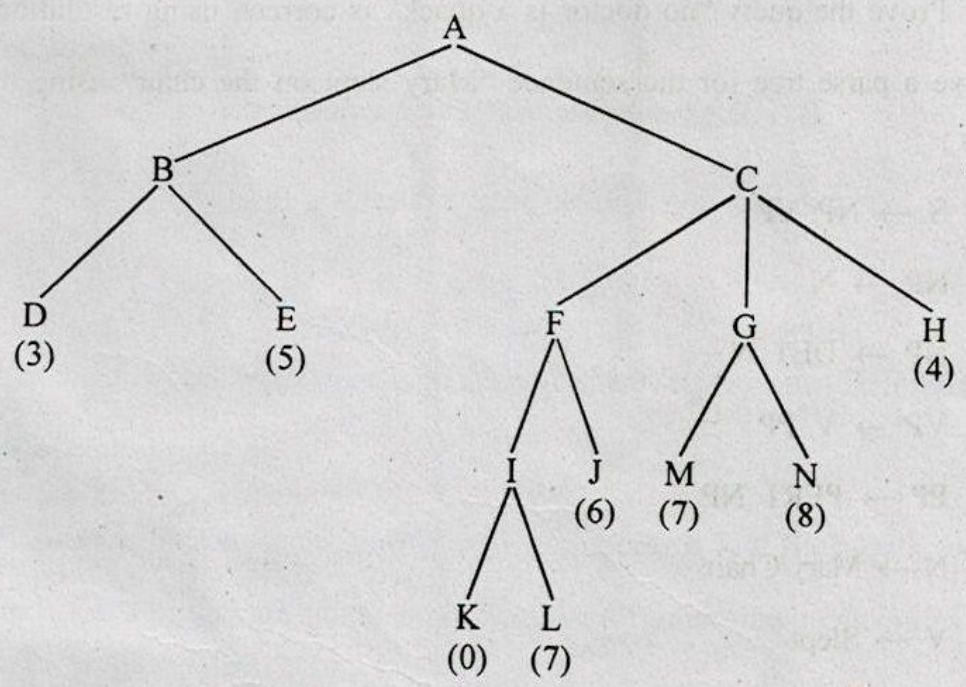
4. (*a*) Explain Turing Test approach to AI. How is Turing Test approach different from Rational Agent approach ? 6

(*b*) Develop PEAS description of the task environment for — Internet book-shopping agent. 4

5. (*a*) Using constraint satisfaction algorithm, solve the following crypt arithmetic problem : 6

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

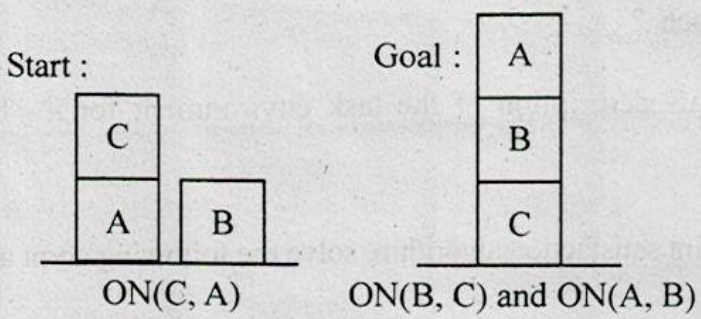
(*b*) A game tree is as follows : 4



Which nodes would not be examined using alpha-beta pruning procedure ? Write a stepwise explanation.

6. (*a*) Discuss the differences and similarities between problem solving and planning. 5

(*b*) Consider the following block world problem and solve it using goal stack planning : 5



7. (*a*) Consider the following piece of knowledge : 6

Some patients like all doctors.

No patient like any quack.

(*i*) Represent this knowledge as predicate statements.

(*ii*) Prove the query "no doctor is a quack" is correct, using resolution method.

(*b*) Derive a parse tree for the sentence "Mary slept on the chair" using the following rules : 4

$S \rightarrow NP\ VP$

$NP \rightarrow N$

$NP \rightarrow DET\ N$

$VP \rightarrow V\ PP$

$PP \rightarrow PERT\ NP$

$N \rightarrow$ Mary/Chair

$V \rightarrow$ Slept

$DET \rightarrow$ the

$PERP \rightarrow$ on

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

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

S. No. of Question Paper : **1492**

Unique Paper Code : **2341702** **F-7**

Name of the Paper : **CS-702 Information Security**

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

Semester : **VII**

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.

Parts of a question must be answered together.

Section A

1. (*a*) List the different layers of an organization where security must be implemented to protect its operations. 3

(*b*) Assume a hacker hacks into a network, copies a few files, defaces the Web page, and steals credit card numbers, how many different threat categories does this attack fall into ? 2

(*c*) What measures can individuals take to protect against shoulder surfing ? 1

(*d*) Differentiate between Honeynet, Honeypot and Padded cell systems. 3

P.T.O.

(*e*) (*i*) Define Generator and Parity Check Matrix.

(*ii*) How can parity check matrix be used to generate codeword ?

(*iii*) Define minimum weight of the code. 2+2+1

(*f*) Describe linear block code. Explain the difference between hamming distance and hamming weight. 3

(*g*) Define congruence and compare with equality. 2

(*h*) Explain modulo operator along with its application. Also define residue classes with an example. 2

(*i*) Explain whether the following cipher is monoalphabetic or not. Given reason also.

Plain text : Frittata

Ciphertext : LTOHHQJQ 2

(*j*) Use the Additive cipher to encrypt the message "HelloAbraham" with key = 10. 3

(*k*) Explain transposition cipher with a suitable example. 3

(*l*) How many permutation tables are used in Data Encryption Standard cipher ? 2

(*m*) Differentiate between the following : 2+2

(*i*) Digital Signature and conventional signature

(*ii*) Public key and Private key.

Section B

2. (*a*) Explain the steps of Diffie-Hellman Key exchange protocol. What is the most common attack on this protocol ? 5

(*b*) Assume a language with 8 letters : A, B, C, K, L, O, T, Y, where A is 0, B is 1, C is 2, K is 3, L is 4, O is 5, T is 6, Y is 7. In order to encrypt a word in this language, we convert the letters into binary form, apply the scheme shown in the diagram given below and convert them back to corresponding letters. Using the above algorithm, encrypt the word : KAL. 5

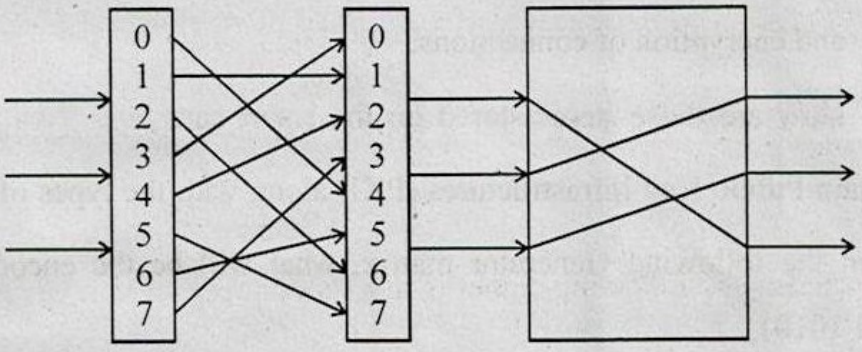


Fig. for question 2(*b*)

3. (*a*) (*i*) Describe Playfair Cipher encryption.

(*ii*) Encrypt the plaintext "This is Good" using playfair cipher and the following key :

secret key =

L	G	D	B	A
Q	M	H	E	C
U	R	N	I/J	F
X	V	S	O	K
Z	Y	W	T	P

3+2

P.T.O.

(*b*) (*i*) Show the P-Box for the following table :

8	1	2

(*ii*) A message has 2000 bits. It is supposed to be encrypted using a block cipher of 64 bits, find the size of padding and the number of blocks. 3+2

4. (*a*) Explain Data Encryption standard with the help of a diagram. 7

(*b*) (*i*) Give a list of possible items, which could be stored on a smart card, for authentication and encryption of connections.

(*ii*) How are those items stored on the smart card ? 2+1

5. (*a*) Explain Public Key Infrastructures (PKI) along with the types of models. 5

(*b*) Given the following Generator matrix, what will be the encoded message for the word (0101) ? 3

$$G = \begin{bmatrix} g_0 \\ g_1 \\ g_3 \\ g_4 \end{bmatrix} = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}.$$

(*c*) Explain Syndrome Decoding. 2

6. (*a*) What do you mean by Intrusion Detection and Prevention System ? Explain any *two* types of IDPS. 5

(*b*) Explain vulnerability scanner. How is it used to improve security ? 2

(*c*) Define network footprinting and network fingerprinting ? How are these two related ? 3

7. (*a*) Explain the different phases of security systems development Life Cycle. 6

(*b*) List and explain any *four* types of deliberate software attacks. 4

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

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

S. No. of Question Paper : **1532-A**

Unique Paper Code : **2343703** **F-7**

Name of the Paper : **CS703 Principles of Communication Engineering**

Name of the Course : **B.Tech. in Computer Science — Allied Course**

Semester : **VII**

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

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

There are *two* parts of the question paper Part I and Part II.

Part I has one question which is compulsory.

From Part II attempt any *four* out of six questions.

Part I

Question No. **1** is compulsory.

1. (*a*) Fill in the blanks : 15×1

(*i*) Elements of communication system are ..... .

(*ii*) Mathematically in the time domain and frequency domain Sin wave signal are represented as ..... .

P.T.O.

(*iii*) Steps involves in conversion of analog signal to digital signal are ..... .

(*iv*) Carrier recovery circuit is needed at the recovery produce a coherent local carrier called ..... effect.

(*v*) Delay distortion is not important in ..... but important in ..... .

(*vi*) For communication most important signals is/are (Analog or Digital or Both) ..... .

(*vii*) Input function $x(t)$ is said to be transmitted without distortion if the output signal $y(t)$ is defined as ..... .

(*viii*) Let the bandwidth of signal is B, sampling rate needed for the same is ..... .

(*ix*) We need to compute noise is db; what will be the formula ..... .

(*x*) Envelope is the original signal; show it graphically in pictorial form ..... .

(*xi*) In communication system the noise analysis is based on an idealized form of noise is called ..... noise.

(*xii*) In Amplitude Modulation (AM), let the carrier voltage and modulating voltage are V_c and V_m, respectively, be represented by ..... and ..... .

(*xiii*) In the standard method of evaluating the modulation index when calculating from a waveform such as my be seen on an oscilloscope, i.e. when both carrier and the modulating voltages are known, equation for the same is ..... .

(*xiv*) Mathematical representation (PM) of unmodulated carrier signal is expressed as ..... .

(*xv*) A transmission of line is said to be lossless if R = G = ...

(*b*) (*i*) Explain the need of modulation in communication system. 2

(*ii*) Discuss the type, causes and effects of the various form of noise which may be created within a receiver or an amplifier. 3

(*c*) (*i*) Draw block diagram of Amplitude Shift Keying and explain in brief. 2

(*ii*) Explain Balanced Modulator, explain it's working. 3

(*d*) (*i*) Explain Doubling Stub Matching in brief. 2

(*ii*) The characteristic for Impedance $Z_o = R_o + jX_o$, write expression for General, Lossless and Distortionless cases. 3

(*e*) (*i*) Power spectrum density of signal voltage is 100 volts and of noise is 10 volts, compute the noise figure for receiver in terms of dB. 3

(*ii*) Explain any *two* high frequency transmission lines. 2

P.T.O.

Part II

Attempt any *four* questions from this part. *All* questions carry equal marks.

2. (*a*) Draw block diagram of a communication system. mention the elements of a communication system and describe their functionality. 5

(*b*) What do you understand by non-linear distortions ? Explain it mathematically as well as with the diagram which shows the non-linearity. 5

3. (*a*) Explain amplitude modulation, theoretically as well as mathematically and define modulation index of AM wave. 5

(*b*) Explain transmission line parameters, equation, with equivalent circuit model of a differential length Delta (z) of two-conductor transmission line. 5

4. (*a*) An audio signal given as "15 sin $2\pi(1500t)$" amplitude modulates a carrier given as "60 sin $2\pi(100000t)$" determine the following : 5

Note : You My assume signals for (i, ii & iii); use above signals for (iv and v).

(*i*) Sketch the audio signal.

(*ii*) Sketch the carrier signal.

(*iii*) Construct the modulated signal.

(*iv*) Determine the modulation index and percent modulation.

(*v*) What is the frequency of the audio signal and the carrier ?

(*b*) A bandwidth of 20 MHz is to be considered for the transmission of AM signals. If the highest audio frequencies used to modulate the carriers and not to exceed 3 kHz, how may stations could broadcast within this band simultaneously without interfering with one another ? 5

(*a*) Explain Frequency Modulation mathematically and define the advantages and disadvantages of Frequency Modulation over Amplitude Modulation. 5

(*b*) Explain the concept of Angular Modulation mathematically with instantaneous angular velocity, define the relationship between Phase Modulation (PM) and Frequency Modulation. 5

(*a*) Consider a transmission line of length L, explain mathematical expression to compute impedance, standing wave ratio (SWR) and Power ? 5

(*b*) What are the different transmission line chats ? Explain smith chart in detail. 5

(*a*) Explain mathematically the noise in AM and Angle Modulation system. What are the effects in small noise and large noise ? 5

(*b*) What are the circuit elements ? Use of transmission line as circuit elements, why ? Conventional circuit element do not behave as expected at high frequency. 5