Total No. of Questions—**8**] [Total No. of Printed Pages—**6**

Seat No.	

[5057]-263

S.E. (I.T.) (I Sem.) EXAMINATION, 2016
FUNDAMENTALS OF DATA STRUCTURES
(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer *four* questions.
(*ii*) Neat diagrams must be drawn wherever necessary.
(*iii*) Figures to the right indicate full marks.
(*iv*) Assume suitable data, if necessary.

1. (*a*) What is call by value and call by reference ? Give example. [6]

(*b*) Select proper output for the following codes : [6]

(1)
```
main()
{
   int b[] = {10, 20, 30, 40, 50};
   int i, *k;
   k=&b[4] – 4;
   for (i=0; i<=4; i++)
   {
      printf("%d", *k);
      k++;
   }
}
```

(1) 10, 20, 30, 40, 50
(2) 10 10 10 10 10
(3) 10 20 30 40 50
(4) 50 50 50 50 50

P.T.O.

(2) main()

{

//assume array begins at address 1200 and integer requires 2 bytes of memory

int arr[] = {1, 2, 3, 4, 5};

printf("%u %d", arr, sizeof(arr));

}

(1) 1200 10

(2) 10 10

(3) 1200 1200

(4) 1200 1208

(3) main()

{

int i = –5, j = –2;

junk(i, &j);

printf("i = %d j = %d", i, j);

}

junk(int i, int *j)

{

i=i*i;

*j = *j * *j;

}

(1) –5 –2

(2) 25 4

(3) –5 4

(4) 25 –2

Or

2. (*a*) What is the output of the following codes : [6]

(1)
```
#include <stdio.h>
void main()
{
   int x = 0;
   if (x == 0)
      printf("hi");
   else
      printf("how are u");
      printf("hello");
}
```
(*a*) hi
(*b*) how are you
(*c*) hello
(*d*) hihello

(2)
```
#include <stdio.h>
void main()
{
   int ch;
   ch = 2;
   switch (ch)
   {
   case 1:
      printf("1\n");
   default:
      printf("2\n");
   }
}
```
(*a*) 1
(*b*) 2
(*c*) 1 2
(*d*) Run time error

(3)
```
#include <stdio.h>
void main()
{
    int a[2][3] = {1, 2, 3, 4, 5};
    int i = 0, j = 0;
    for (i = 0; i < 2; i++)
    for (j = 0; j < 3; j++)
        printf("%d", a[i][j]);
}
```

(*a*) 1 2 3 4 5 0

(*b*) 1 2 3 4 5 junk

(*c*) 1 2 3 4 5 5

(*d*) Run time error

(*b*) Describe control instruction in C with an example. [6]

3. (*a*) Define the following : [6]

(1) Data and Data object

(2) Data structure

(3) Abstract Data Type.

(*b*) Sort the following elements in ascending order using Insertion sort. Show all iterations and write worst case time complexity. Numbers are : 16, 36, 4, 22, 100, 1 and 54. [6]

Or

4. (*a*) Apply merge sort for sorting the following elements in ascending order. Show all iterations and write worst case time complexity. Numbers are 310, 285, 179, 652, 351, 423, 861, 254, 450 and 520. [6]

(*b*) Distinguish between : [6]

(1) linear and non-linear data structure

(2) primitive and non-primitive data structure.

5. (*a*) Convert the following sparse matrix into triplet form and write its transpose. Write fast transpose algorithm : [8]

15	0	0	22	0	–15
0	11	3	0	0	0
0	0	0	–6	0	0
0	0	0	0	0	0
91	0	0	0	0	0
0	0	28	0	0	0

(*b*) List the advantages and disadvantages of sequential organization. [6]

Or

6. (*a*) Explain row and column major representation of a matrix. [6]

(*b*) Represent the following polynomial using array : [8]

(1) $x^2 + 3xy^2 + 2x^4y^4 + 10$

(2) $3x^3 + 2y^2x + 5y^3x^3$.

7. (*a*) What is generalized linked list ? Represent the following lists : [8]

(1) $(p, q, r (s, t(u, (v, w))), x, (y))$

(2) $(((a, b), c, d, (e, f), g))$.

(*b*) Write *c* function to delete an element from DLL. [4]

Or

8. (*a*) Represent the following polynomial using GLL : [8]

(1) $8x^3y^2z - 5x^2y^3z^2 + 7xyz + 10y^3z + 11$

(2) $6xy + 6x^3y^5z^5 + 8x^4z^5 + 10xy^2z + 11z$.

(*b*) Compare the following : [4]

(1) SLL and CLL

(2) Array and Linked list.