Q.1 a. Consider the C program shown below:
```c
#include<stdio.h>
main()
{
    int x=5, m, k=1,n;
    float y= 2.5;
    m= x * 1000 + y * 10;
    k= m/1000 + x;
    n= (x = =y)? k : m;
    printf("%d /n %d /n %d", m, k, n);
}
```
Write the output of the above program.

b. What is the difference between a linker and a loader? Explain.

c. Briefly describe: malloc, calloc, realloc, free.

d. What is Identifier? Explain. List the rules required to form variable names in C.

e. What is importance of C standard library?

f. Can you have pointers to a function? If yes, illustrate using a C code.

g. What does following functions do?
   ftell(), ferror(), feof(), fseek()  (7×4)

Q.2 a. Write a program to read a positive integer and print its binary equivalent.  (6)

b. An electric power distribution company charges its domestic consumers as follows:

<table>
<thead>
<tr>
<th>Units Consumed</th>
<th>Rate of Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 200</td>
<td>Rs. 0.50 per unit</td>
</tr>
<tr>
<td>201 – 400</td>
<td>Rs 100 plus Rs 0.65 per unit excess of 200</td>
</tr>
<tr>
<td>401 – 600</td>
<td>Rs 230 plus Rs 0.80 per unit excess of 400</td>
</tr>
<tr>
<td>601 &amp; above</td>
<td>Rs. 390 plus Rs 1.00 per unit excess of 600</td>
</tr>
</tbody>
</table>
Write a C program using nested if statements to read in customer number and power consumed and print out the amount to be paid by customer.  

(7)

c. What are the restrictions to ternary operators?  

(5)

Q.3 a. Write a program to check whether an array is ordered. If ordered print a suitable message as “Ascending” or “Descending”. Otherwise “not ordered”.  

(9)

b. Discuss features of a static variable. Write a C program to illustrate the properties of static variable.  

(9)

Q.4 a. Write a C program to delete a node from a singly linked list. Accommodate all the cases of deletion in your program.  

(9)

b. Write a program which will read a string and rewrite it in the alphabetical order. For example, the word STRING should be written as GINRST.  

(9)

Q.5 a. Write a C program to find transpose of a matrix.  

(10)

b. What do you mean by recursion? What conditions should be mandatory for writing a recursive function? Explain using a suitable C program.  

(8)

Q.6 a. What is Insertion Sort? Write a program in C to sort the list of integers using insertion sort. Discuss efficiency of this sort.  

(10)

b. Write a program that reads a file containing integers and appends at its end the sum of all the integers.  

(8)

Q.7 a. Discuss Basic path testing giving suitable example.  

(5)

b. What precautions should be taken while constructing statements in C language?  

(4)

c. Explain different types of pre-processor directives with examples.  

(9)