૧. દરેક પ્રશ્નનો [a] અથવા [a(i)] અને [a(ii)] જ લખવાના રહેશે.

૨. પ્રશ્ન : ૧[a] અથવા ૧[a(i)] અને ૧[a(ii)] તથા ૨[a] અથવા ૨[a(i)] અને ૨[a(ii)] ના 14 માર્ક્સ ના બદલે ૧૮ માર્ક્સ રહેશે.

૩. પ્રશ્ન : 3[a] અથવા 3[a(i)] અને 3[a(ii)] તથા ૪[a] અથવા ૪[a(i)] અને ૪[a(ii)] ના 14 માર્ક્સ ના બદલે ૧૭ માર્ક્સ રહેશે.

૪. દરેક પ્રશ્નનો પ્રશ્ન નં ૧(b), પ્રશ્ન નં ૨(b), પ્રશ્ન નં 3(b) તથા પ્રશ્ન નં ૪(b) (ટૂંકા પ્રશ્નો) વિદ્યાર્થીએ લખવાના નથી.

Q.1 a) i) Explain Bitwise operator and special operator in detail. [7]

ii) Describe the order of precedence with regards to operators in "C". [7]

OR

a) i) Discuss importance of goto statement in "C". Write a program that explains use [6] of goto statement.

ii) Write a program to compute adjoint of given matrix. [8]

Attempt any four questions:

b) i) What are the different types of real data type in"C"? [1]
(a) float, double   (b) float, double
(c) short int, double, long int   (d) short int, double, long int

ii) Describe usage of header files in"C"programming? Give an example. [1]

iii) What is the difference between abs() and fabs() functions? [1]

iv) What is the explanation for modular programming? [1]

v) What is syntax error? [1]

vi) Find out the errors from following programs(if any). [1]
```
#include<stdio.h>
main()
  {  int i;
     for(i=1: i<10 ; i+)
     {
       printf("i=%d",i);
       if(i>j)
       goto abc;
  }
```

Q.2 a) i) Write general format of structure in C. what are the rules for initializing [7] structure.

ii) Write a program to print thr alphabet set a to z and A to Z in decimal and [7] characterfrom.

OR

a) i) How a function is designed? Discuss elements of user defined function in detail. [6]

ii) How do you declare a variable that will hold string values? Explain with an [4] example.

iii) Explain how can we copy and compare structure variables with an example. [4]

Attempt any four questions:

b) i) How many bytes in memory taken by the following"C"structure? **[1]**

```
#include <stdio.h>
struct test
{
    int k;
    char c;
};
```

(a) Multiple of integer size   (b) integer size+character size

(c) Depends on the platform   (d) Multiple of word size

ii) Which of the following are themselves a collection of different data types? **[1]**

(a) string   (b) structures   (c) char   (d) all of the mentioned

iii) What is the difference between actual and formal parameters? **[1]**

iv) Which operator connects the structure name to its member name? **[1]**

(a) –   (b) <-   (c) . (dot)   (d) Both <- and .(dot)

v) What is recursion? **[1]**

vi) What is the use of a '\0' character? **[1]**

Q.3 a) i) Use Lagrange interpolation method to find value of given function at x=10 using given set of data. **[6]**

x	5	6	9	11	12
f(x)	2	5	10	15	18

ii) Write a program to solve algebric equations using Gauss-elimination method. **[8]**

OR

a) i) Write an algorithm to interpolate data using Lagrange interpolation method. **[7]**

ii) Derive expressions for regression coefficients for the functions $y=ae^{-bx}$ and $y=mx+c$. **[7]**

Attempt any three questions:

b) i) The Newton Raphson method is also called as........... **[1]**

a)Tangent method   b)Secant method   c)Chord method   d)Diameter method

ii) Given ln 1 = 0, ln 6 = 1.791759, use linear interpolation to find ln 2. **[1]**

iii) If the equation $y = ae^{bx}$ can be written in linear form $Y=A + BX$, what are Y, X, A, B? **[1]**

(a) Y = logy, A = loga, B=b and X=x   (b) Y = y, A = a, B=b and X=x

(c) Y = y, A = a, B=logb and X=logx   (d) Y = logy, A = a, B=logb and X=x

iv) Interpolation is done by **[1]**

(a) Curve fitting   (b) Regression analysis

(c) Curve fitting & Regression analysis   (d) None of the mentioned

v) The following function(s) can be used for interpolation: **[1]**

(a) polynomial   (b) exponential

(c) trigonometric (d) all of the above

Q.4 a) i) Integrate following function using simpson method. **[7]**
f(x) = 3x²+5x+7, with upper and lower limit 0 to 7 and with step size of 0.5.

ii) Write a program to solve differenctial equation using second order Runge-Kutta **[7]** method.

OR

a) i) Derive formula for trepazoidal rule. **[7]**

ii) Write a program to solve differential equation using Euler's method. **[7]**

Attempt any three questions:

b) i) The value of y'/x' in terms of the angle θ is given by _____ **[1]**
(a) tanθ (b) secθ (c) cotθ (d) cosecθ

ii) State the special advantage of Runge-Kutta method over taylor series method. **[1]**

iii) What is the order of error term in simpson 3/8 rule? **[1]**

iv) The number of different polynomials that can go through two fixed data points **[1]**
(x1 , y1) and (x2 , y2) is
(a) 0 (b) 1 (c) 2 (d) infinite

v) What are the advantages of numerical method over analyatical method? **[1]**