Assignment

Q1. Write a C program for calculating the price of a product after adding the sales tax to its original price. Where rate of tax and price is inputted by user.

Sol.
```
#include <stdio.h>

int main()
{
   float original_price,tax_rate,total_price;
   printf("enter original_price");
   scanf("%f",&original_price);
   printf("enter tax_rate");
   scanf("%f",&tax_rate);
   total_price=original_price+((original_price*tax_rate)/100);
   printf("total price after tax = %.2f\n",total_price);
    return 0;
}
```

Q2. Write a C program to calculate the weekly wages of an employee. The pay depends on wages per hour and number of hours worked. Moreover, if the employee has worked for more than 30 hours, then he or she gets twice the wages per hour, for every extra hour that he or she has worked.

Sol.
```
#include <stdio.h>

int main()
{
   float wages_per_hour,hours_worked,weekly_wages;
   printf("enter wages_per_hour");
   scanf("%f",&wages_per_hour);
   printf("enter hours_worked");
   scanf("%f",&hours_worked);
   if(hours_worked<=30)
{
  weekly_wages=(wages_per_hour*hours_worked);
}
else
{
   weekly_wages=(30*wages_per_hour)+((hours_worked-30)*(2*wages_per_hour));
}
   printf("weekly_wages = %.2f\n",weekly_wages);
    return 0;
}
```

Q.3 Mr. X goes to market for buying some fruits and vegetables. He is having a currency of Rs 500 with him for marketing. From a shop, he purchases 2.0 kg Apple priced Rs. 50.0 per kg, 1.5 kg Mango priced Rs.35.0 per kg, 2.5 kg Potato priced Rs.10.0 per kg, and 1.0 kg Tomato priced Rs.15 per kg. He gives the currency of Rs.

500 to the shopkeeper. Find out the amount shopkeeper will return to X by writing a C program.

Sol. #include <stdio.h>

```
int main()
{
   float wallet=500;
   float apple_price_per_kg=50.0;
   float mango_price_per_kg=35.0;
   float potato_price_per_kg=10.0;
   float tomato_price_per_kg=15.0;
   float apple_weight=2.0;
   float mango_weight=1.5;
   float potato_weight=2.5;
   float tomato_weight=1.0;
   float
total_cost=(apple_weight*apple_price_per_kg)+(mango_weight*mango_price_per_k
g)+(potato_weight*potato_price_per_kg)+(tomato_weight*tomato_price_per_kg);
   float amount_returned=wallet-total_cost;
   printf("Amount Returned To Mr.X=%.2f\n",amount_returned);

    return 0;
}
```

Q4.Write a C program to print your name, date of birth and mobile number in 3 different lines.

Sol. #include <stdio.h>

```
int main()
{
   printf("Name : Ishita Ranjan\n");
   printf("Date of Birth : 20 September 2005\n ");
   printf("Mobile Number : 91-xxxxxxxxxx\n");
    return 0;
}
```

Q5.Write a program to read an integer, a character and a float value from keyboard and display the same in different lines on the screen.

Sol. #include <stdio.h>

```
int main()
{
  int integer_input;
  char character_input;
  float float_input;
  printf("enter a integer");
  scanf("%d",&integer_input);
  printf("Integer = %d\n",integer_input);
```

```
  printf("enter a character");
  scanf("%c",&character_input);
  printf("Character = %c\n",character_input);
  printf("enter a float");
  scanf("%f",&float_input);
  printf("Float = %f\n",float_input);
    return 0;
}
```

Q6.Write a program to print the following line (Assume the total value is contained in a variable named cost)

The sales total is : $ 172.53

Sol.

```
#include <stdio.h>

int main()
{
  float cost=$172.53;
  printf("The Total Cost is = %.2f\n",cost);
    return 0;
}
```

Q7.Raju got 6 and half apples from each of Raghu, Sheenu and Akash. He wants to know how many apples he has in total without adding them. Write a program which could help Raju in doing this.

Sol.

```
#include <stdio.h>

int main()
{
  float apple_from_Raghu=6.5;
  float apple_from_Sheenu=6.5;
  float apple_from_Akash=6.5;
  float total_apple;
  total_apple=apple_from_Raghu+apple_from_Sheenu+apple_from_Akash;
  printf("Total Apple Raju Has= %.2f\n",total_apple);
    return 0;
}
```

Q8.Write a program that prints the floating point value in exponential format correct to two decimal places.

Sol.

```
#include <stdio.h>

int main()
{
  float float_value;
  printf("enter a float value");
  scanf("%f",&float_value);
```

```
  printf("Value of exponential format = %.2ef\n",float_value);
    return 0;
}
```

Q9.Write a program to input and print your mobile number (i.e. of 10 digits).

Sol.

```
#include <stdio.h>

int main()
{
  long long int mobile_number;
  printf("enter 10 digit mobile number");
  scanf("%lld",&mobile_number);
  printf("Mobile Number = %lld\n",mobile_number);
  return 0;
}
```

Q10.The population of a city is 30000. It increases by 20 % during first year and 30% during the second year. Write a program to find the population after two years? (Ans: 46800)

Sol.

```
#include <stdio.h>

int main()
{
  int initial_population=30000;
  float population_percentage_year1=0.20;
   float population_percentage_year2=0.30;
   int population_year1;
    population_year1=initial_population+(initial_population*0.20);
    int population_year2;
    population_year2=population_year1+(population_year1*0.30);
    printf("Total Population After Year 2 = %d\n",population_year2);
    return 0;
}
```

Q11. Write a program to find the ASCII value of a character.

Sol.

```
#include <stdio.h>

int main()
{
  char character;
  printf("enter a character");
  scanf("%c",&character);
  printf("ASCII Value is %d\n",character);
    return 0;
}
```

Q12. Write a program to calculate salary of an employee, given his basic pay (entered by user), HRA=15% of the basic pay and TA=20% of the basic pay.

Sol. #include <stdio.h>

```
int main()
{
  float basic_pay,hra,ta,salary;
  printf("enter basic pay");
  scanf("%f",&basic_pay);
  hra=0.15*basic_pay;
  ta=0.20*basic_pay;
  salary=basic_pay+hra+ta;
  printf("Salary = %.2f",salary);
   return 0;
}
```

Q13. Write a program to find the slope of a line and angle of inclination that passes through two points P and Q with coordinates (xp, yp) and (xq, yq) respectively.

Sol. #include <stdio.h>

#include<math.h>

```
int main()
{
   double xp,yp,xq,yq,slope,angle;
   printf("enter the coordinates of point P(xp yp):");
   scanf("%lf %lf",&xp,&yp);
   printf("enter the coordinates of point Q(xq yq):");
   scanf("%lf %lf",&xq,&yq);
   slope = (yq-yp)/(xq-xp);
   angle = atan(slope);
   angle = angle*(180.0/M_PI);
   printf("Slope of the line: %.2lf\n",slope);
   printf("Angle of inclination(in degrees):%.2lf degrees\n",angle);
   return 0;
}
```

Q14. The SPI (Semester Performance Index) is a weighted average of the grade points earned by a student in all the courses he registered for in a semester. If the grade points

associated with the letter grades awarded to a student are g1, g2, g3,…….gk etc. and the corresponding credits are c1, c2, c3,…..ck, the SPI is given by:

$$\text{SPI} = \frac{\sum_{i=1}^{k} c_i g_i}{\sum_{i=1}^{k} c_i}$$

Where, k is the number of courses for which the candidate remains registered for during the semester/ trimester. Write a program in C to calculate SPI for k =5.

Sol.
```
#include <stdio.h>

int main()
{
  float g1,g2,g3,g4,g5,SPI;
  int c1,c2,c3,c4,c5;
  printf("enter grade points and credit of 5 courses");
  printf("course 1 =");
  scanf("%f %d",&g1,&c1);
  printf("course 2 =");
  scanf("%f %d",&g2,&c2);
  printf("course 3 =");
  scanf("%f %d",&g3,&c3);
  printf("course 4 =");
  scanf("%f %d",&g4,&c4);
  printf("course 5 =");
  scanf("%f %d",&g5,&c5);
  SPI=(g1*c1+g2*c2+g3*c3+g4*c4+g5*c5)/(c1+c2+c3+c4+c5);
  printf("SPI of 5 courses = %.2f\n",SPI);
  return 0;
}
```

Q 15. Write a program to calculate the frequency (f) of a given wave with wavelength (λ) and speed (c), where c=λ*f.

Sol.
```
#include <stdio.h>

int main()
{
 double wavelength,speed,frequency;
```

```
  printf("enter wavelength");
  scanf("%lf",&wavelength);
  printf("enter speed");
  scanf("%lf",&speed);
  frequency=speed/wavelength;
  printf("frequency = %.2lf Hz",frequency);
   return 0;
}
```

Q 16. A car travelling at 30 m/s accelerates steadily at 5 m/s2 for a distance of 70 m. What is the final velocity of the car? [Hint: v2 = u2 + 2as]

Sol.

```
#include <stdio.h>

int main()
{
  float u=30.0,a=5.0,s=70.0,v;
  v=sqrt(pow(u,2)+2*a*s);
  printf("The Final Velocity of Car = %.2f m/s\n",v);
   return 0;
}
```

Q 17.A horse accelerates steadily from rest at 4 m/s2 for 3s. (a) What is its final velocity? (b) How far has it travelled? [Hint: (a) v = u + at (b) s = ut + ½at2]

Sol.

```
#include <stdio.h>

int main()
{
  float u=0.0,a=4.0,t=3.0,v,s;
  v=u+a*t;
  s=u*t+0.5*a*t*t;
  printf("(a)Final Velocity = %.2f\n",v);
  printf("(b)Distance Travelled = %.2f\n",s);
   return 0;
}
```

Q 18. Write a program to find the sum of your four last digit of your university roll number .

Sol.
```
#include <stdio.h>

int main()
{
   long long int roll_number,last_4_digit;
   printf("enter university roll number");
   scanf("%lld",&roll_number);
   last_4_digit=roll_number%10000;
   int sum=0;
   while(last_4_digit>0)
   {
      sum+=last_4_digit%10;
   last_4_digit/=10;
   }
   printf("Sum of last four digit of roll number = %d\n",sum);
   return 0;
}
```

Q19. Write a program to initialize your height and weight in cm. and kgs respectively demonstrating compile time initialization and convert them in feets and pounds respectively. **Note :- 1 cm = 0.393701inch , 1 Kg = 2.20462**

Sol.
```
#include <stdio.h>

int main()
{
  double height_in_cm=150.0,weight_in_kg=42.0,height_in_feet,weight_in_pounds;
  height_in_feet=height_in_cm*0.393701;
  weight_in_pounds=weight_in_kg*2.20462;
  printf("Height in Feet = %.2lf\n",height_in_feet);
  printf("Weight in Pounds = %.2lf\n",weight_in_pounds);
   return 0;
```

}

Q 20 . Code the variable declarations for each of following:

a) A character variable named option.
b) An integer variable sum initialized to 0
c) A floating point variable, product, initialized to 1

Sol. a) char option;

b) int sum = 0;

c) float product = 1.0;

Q21. Write a program that reads nine integers. Display these numbers by printing three numbers in a line separated by commas.

Sol.

```
#include <stdio.h>

int main()
{
   int numbers[i];
   printf("enter nine integers:\n");
   for(int i=0;i<9;i++)
   {scanf("%d",&numbers[i]);
   }
   printf("Numbers in groups of three separated by commas:\n");
   for(int i=0;i<9;i++)
   {printf("%d",numbers[i]);
   if((i+1)%3==0)
   {printf("\n");
   }
   else
   {printf(",");
   }

   return 0;
}
```

Q22. What are header files and what are its uses in C programming?

Sol. A header file is a file extention .h which contains C function declarations and macro definitions to be shared between several source files.

Q23. What will be the output of following program?

```
#include<stdio.h>
int main()
{   int num=070;
printf("%d\t%o\t%x",num,num,num);
}
```

Sol. 56 70 38

Q 24. What will be the output of following program?

```
#include <stdio.h>
void main()
{
int x = printf("GLA UNIVERSITY");
printf("%d", x);
 }
```

Sol. GLA UNIVERSITY14

Q25. What are library functions? List any four library functions.

Sol. Library functions are pre-defined functions provided by programming languages or libraries to perform common and useful operations.

The four common libraries are-

1) printf()
2) scanf()
3) sqrt()
4) strlen()

Q26. What will be the output of following program?

```
#include <stdio.h>
void main()
{
  int x = printf("C is placement oriented Language") – printf("Hi");
  printf("%d %o %x", x,x,x);
}
```

Sol. C is placement oriented LanguageHi30 36 1e

Q27. What is the meaning of following statement? printf(“%d”,scanf(“%d%d”,&a,&b));

Sol. scanf returns the number of successfully read items. If it successfully reads both integers, it will return 2. If it encounters an error while reading, it may return a different value.

printf then prints the value returned by scanf, which is either 2 or some other value.

So, the printf statement will print either 2 or the number of items successfully read by scanf. The exact output depends on the user’s input and whether scanf succeeds in reading two integers.

Q28. What will be the output of following program?

```
#include <stdio.h>
void main()
{
  printf(" \"C %% FOR %% PLACEMENT\"");
}
```

Sol. “C%FOR%PLACEMENT”

Q29. Suppose distance between GLA University and Delhi is m km (to be entered by user), by BUS you can reach Delhi in 4 hours. Develop a ‘C’ program to calculate speed of bus.

Sol.

```
#include <stdio.h>

int main()
{
 double distance,time=4,speed;
 printf("enter the distance between GLA University and Delhi");
 scanf("%lf",&distance);
 speed=distance/time;
 printf("The speed of bus = %.2lf\n",speed);
 return 0;

}
```

Q30. In an exam Satyam got 50 marks, Suman got 70 marks and Shyam got 80 marks, Write a ‘C’ program to find average marks of these three participants.

Sol. #include <stdio.h>

```
int main()
{
 int satyam_marks=50,suman_marks=70,shyam_marks=80,total_marks;
 float avg;
 total_marks=satyam_marks+suman_marks+shyam_marks;
 avg=total_marks/3;
 printf("Average Marks = %.2f\n",avg);

 return 0;

}
```

Q31. One day, Mohan called Saurav and Sajal and gave some money to them, later he realized that money that was given to Saurav should be given to Sajal and vice-versa. Develop a ‘C’ program to help Mohan so that he can rectify his mistake.

Sol. #include <stdio.h>

```
int main()
{
 int saurav_money,sajal_money,a;
 printf("enter amount of money given to saurav");
 scanf("%d",&saurav_money);
 printf("enter amount of money given to sajal");
 scanf("%d",&sajal_money);
 a=saurav_money;
 saurav_money=sajal_money;
 sajal_money=a;
 printf("After Rectification\n");
 printf("Money given to saurav=%d",saurav_money);
 printf("Money given to sajal=%d",sajal_money);
 return 0;
```

```
}
```

Q32. One day when I was going for a lunch, suddenly rain started, I was very hungry so started running with speed of 4km/h and it took 3 min to reach mess. Help me to develop a 'C' program to calculate distance travelled by me.

Sol.
```
#include <stdio.h>

int main()
{
 double speed_kmh=4.0,time_min=3.0,distance_km;
 distance_km=speed_kmh*(time_min/60);
 printf("Distance travelled=%.2lf",distance_km);
 return 0;

}
```

Q33. Can two or more escape sequences such as \n and \t be combined in a single line of program code?

Sol. Yes, you can combine multiple escape sequences in a single line of program code in languages like C and C++. Escape sequences are used to represent special characters or control codes within a string literal.

Q34. What are comments and how do you insert it in a C program?

Sol. Comments in a C program are non-executable statements that are used to provide explanations , discriptions , or notes within the source code. Comments are ignored by the compiler and are solely for the benefit of programmers to make the code more readable and understandable.

Comments can be inserted in two ways –

1) In single line – These comments are used to add explanation on a single line. The begins with //and continue until the end of the line.
2) In multi lines – These comments are used to span multiple lines. The begins with /* and ends with */.

Q35. What is wrong in this statement? scanf(“%d”,number);

Sol. In the given statement, the address is not provided to the variable. The correct statement is scanf(“%d”,&number);

Q36. What will be the output?

```
#include <stdio.h>
    int main()
{
   if (sizeof(int) > -1)
      printf("Yes");
   else
      printf("No");
   return 0;
}
```

Sol. No

Q37. Point out which of the following variable names are invalid:
gross-salary INTEREST , salary of emp , avg. , thereisbookinmysoup

Sol. gross-salary , salary of emp , avg.

Q38. Tom works at an aquarium shop on Saturdays. One Saturday, when Tom gets to work, he is asked to clean a 175-gallon reef tank. His first job is to drain the tank. He puts a hose into the tank and starts a siphon. Tom wonders if the tank will finish draining before he leaves work. He measures the amount of water that is draining out and finds that 12.5 gallons drain out in 30 minutes. So, he figures that the rate is 25 gallons per hour. Develop a ‘C’ program to help Tom to calculate time required to completely clean tank.

Sol. #include <stdio.h>

```
int main()
{
 double tank_size=175.0,drain_rate=25.0,time_required;
 time_required=tank_size/drain_rate;
 printf("Time required to completely clean the tank=%.2lf\n",time_required);
 return 0;

}
```

Q39. The percent y (in decimal form) of battery power remaining x hours after you turn on a laptop computer is $y = -0.2x + 1$. Develop a 'C' program to calculate after how many hours the battery power is at 75%?

Sol.
```
#include <stdio.h>

int main()
{
 double battery_power=0.75,x;
 x=(1-battery_power)/-0.2;
 printf("After %.2lf hrs ,the battery power is 75%%.\n",x);
 return 0;

}
```

Q40.Which of the following is used to convert the high level language in machine language in a single go?
a. Compiler b.Interpreter
c. Linker d.Assembler
Sol. (a) Compiler

Q 41. What is the format specifier for an Octal Number?
a.%0 b.%d
c. %o d. %e
Sol. (c) %o

Q 42. Which format specifier is used to print the exponent value upto 2 decimal places.
a. %e b.%.2f c. %f d.%.2e
Sol. (d) %.2e

Q 43. Which of the following is not a basic data type?
a. char
b. array
c. float
d. int
Sol. (b) array

Q 44. What is the output of following code?
```
#include<stdio.h>
void main()
{
  int x=0;
  x= printf("\"hello\b\"");
  printf("%d",x);
}
```
a. hello7 b. "hello"7 c. "hell"8 d. hell8
Sol. (c) "hell"8

Q 45. What is the output of following code?

```
#include<stdio.h>
void main()
{
  int b,c=5 ;
  int(“%d , %d”, b,c);
}
```

a. 5, 5 b. 5, 5.000000
c. Garbage, 5.000000 d. Garbage, 5
Sol. Garbage,5

Q46. Which of the following is an identifier?
a. &fact b. Basic_pay c. enum d. 1sum
Sol. &fact

Q 47. What is the output of the following program?

```
#include<stdio.h>
void main()
{
   char x, a=’c’;
   x=printf("%c",a);
   printf(“%d”,x);
}
```

a. c1 b. cgarbage
c. 1 c. c
Sol. (a) c1

Q48. Perform the following conversion from Decimal to other number as directed-

a) $(365.55)_{10} = (?)_2$
b) $(453.65)_{10} = (?)_8$
c) $(5164.12)_{10} = (?)_{16}$
d) $(23.65)_{10} = (?)_5$
e) $(772)_{10} = (?)_7$

Sol. a) (365.55)10 = (101101101.011)2 (Binary)
b) (453.65)10 = (750.16)8 (octal)
c) (5164.12)10 = (220C.E7)16 (Hexadecimal)
d) (23.65)10 = (43.131)5 (Base 5)
e) (772)10 = 2152 (Base 7)

Q49. Covert the following numbers to decimal number system-

a) $(325.54)_6 = (?)_{10}$

b) $(1001010110101.1110101)_2 = (?)_{10}$

c) $(742.72)_8 = (?)_{10}$

d) $(AC94.C5)_{16} = (?)_{10}$

Sol. a) (325.54)6 = 125.9444… in decimal (approximately)

b) (1001010110101.1110101)2 = 8193.9990234375 in decimal.

c) (742.72)8 = 482.125 in decimal.

d) (AC94.C5)16 = 44280.9453125 in decimal.

Q50. Perform the following conversion from Hexadecimal to other number as directed-

$(DB56.CD4)_{16} = (?)_{2,}\ \ (?)_{8},\ \ (?)_{4}$

Sol. (DB56.CD4)16 is equivalent to:

(11011011011011000011011000100)2 in binary.

(666665148)8 in octal.

2366660 in decimal.

Q51. Perform the following conversion from octal to other number as directed-

$(473.42)_8 = (?)_{2},\ \ (?)_{10,}\ \ (?)_{16},\ \ (?)_{5}$

Sol. (473.42)8 is equivalent to:

(100111011.100010)2 in binary.

123.202 in decimal.

7B.34 in hexadecimal

443.012 in base-5

Q52. Find the value of A?

a) $(23)_{10} = (17)_A$

b) $(21)_{16} = (41_)_A$

c) $(32)_8 = (101)_A$

Sol. a) A=4

b) A=8

c) A=6.77

Q53: What will be the output of following program? Assume integer is of 2 bytes

```
void main(){
int  a=32770;
```

printf(“%d”,a);

}

Sol. 32770

Q54: #include <stdio.h>
```
 int main()
{
 float c = 5.0;
 printf ("Temperature in Fahrenheit is %.2f", (9/5)*c + 32);
 return 0;
}
```
Sol. 37.00