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Section-AU

C Programming 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.

A.1.

```
#include <stdio.h>
#include<conio.h>
int main()
 {
float originalPrice;
        float taxRate;
        float totalPrice;
   printf("Enter the original price of the product: ");
   scanf("%f", &originalPrice);
   printf("Enter the sales tax rate (in percentage): ");
   scanf("%f", &taxRate);
   totalPrice = originalPrice + (originalPrice * (taxRate / 100.0));
   printf("Total price after tax: %.2f\n", totalPrice);
   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.

A.2.

```
 #include <stdio.h>
#include<conio.h>
int main()
{
   float hourlyWage;
   float weeklyWages;
   int hoursWorked;
   printf("Enter the hourly wage: ");
   scanf("%f", &hourlyWage);
   printf("Enter the number of hours worked: ");
   scanf("%d", &hoursWorked);
   if (hoursWorked <= 30)
 {
      weeklyWages = hourlyWage * hoursWorked;
   }
         else
 {
      weeklyWages = (hourlyWage * 30) + ((hoursWorked - 30) * (hourlyWage
* 2));
   }
   printf("Weekly wages: ruppes %.2f\n", weeklyWages);
   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.

A.3.

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

```
int main()
{
   float wallet = 500.0;
   float totalCost = 0.0;
   float applePrice = 50.0;
   float mangoPrice = 35.0;
   float potatoPrice = 10.0;
   float tomatoPrice = 15.0;
   float appleQty = 2.0;
   float mangoQty = 1.5;
   float potatoQty = 2.5;
   float tomatoQty = 1.0;
   totalCost = (applePrice * appleQty) + (mangoPrice * mangoQty) +
(potatoPrice * potatoQty) + (tomatoPrice * tomatoQty);
   if (totalCost <= wallet)
        {
      float amountToReturn = wallet - totalCost;
      printf("Mr. X will receive Rs. %.2f in change.\n", amountToReturn);
   }
else
{
      printf("Mr. X does not have enough money to make the purchase.\n");
   }

   return 0;
}
```

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

A.4.

```
#include <stdio.h>
int main()
{
 printf("Name:Prakhar Srivastav\n");
```

```
    printf("Date of Birth: 03/09/2004\n");
    printf("Mobile Number:  8858274606\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.

A.5.

```
#include <stdio.h>
int main()
{
    int integerInput;
    char charInput;
    float floatInput;
    printf("Enter an integer: ");
    scanf("%d", &integerInput);
    printf("Enter a character: ");
    scanf(" %c", &charInput);
    printf("Enter a float: ");
    scanf("%f", &floatInput);
    printf("You entered:\n");
    printf("Integer: %d\n", integerInput);
    printf("Character: %c\n", charInput);
    printf("Float: %.2f\n", floatInput);
    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

A.6.

```
#include <stdio.h>
int main() {
   double cost = 172.53;
   printf("The sales total is : $ %.2lf .\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.

A.7.

```
#include <stdio.h>
int main() {
   float rajuFromRaghu = 6.5;
   float rajuFromSheenu = 6.5;
   float rajuFromAkash = 6.5;
   float totalApples = rajuFromRaghu + rajuFromSheenu + rajuFromAkash;
   printf("Raju has a total of %.1f apples without adding them.\n", totalApples);
   return 0;
}
```

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

A.8.

```
#include <stdio.h>
int main() {
   double number;
   printf("Enter a floating-point number: ");
   scanf("%lf", &number);
   printf("Exponential format: %.2e\n", number);
   return 0;
}
```

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

A.9.

```
#include <stdio.h>
int main() {
   long long int mobileNumber;
   printf("Enter your 10-digit mobile number: ");
   scanf("%lld", &mobileNumber);
   if (mobileNumber >= 1000000000 && mobileNumber <= 9955814580)
 {
  printf("Your mobile number is: %lld\n", mobileNumber);
   }
 else {
       printf("Invalid input. Please enter a 10-digit mobile number.\n");
   }
   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)

A.10.

```
#include <stdio.h>
int main() {
   int initialPopulation = 30000;
   initialPopulation = initialPopulation + (initialPopulation * 0.20);
   initialPopulation = initialPopulation + (initialPopulation * 0.30);
   printf("Population after two years: %d\n", initialPopulation);
   return 0;
}
```

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

A.11.

```
#include <stdio.h>
int main() {
   char character;
   printf("Enter a character: ");
   scanf("%c", &character);
   int asciiValue = character;
   printf("The ASCII value of '%c' is %d\n", character, asciiValue);
   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.

A.12.

```
#include <stdio.h>
int main() {
   float basicPay, hra, ta, salary;
   printf("Enter the basic pay: ");
   scanf("%f", &basicPay);
   hra = 0.15 * basicPay;
   ta = 0.20 * basicPay;
   salary = basicPay + hra + ta;
   printf("Salary: %.2f\n", 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.

A.13

```
#include <stdio.h>
#include <math.h>
int main() {
   double xp, yp, xq, yq;
   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);
   double slope = (yq - yp) / (xq - xp);
   double angle = atan(slope) * 180.0 / M_PI;
   printf("The slope of the line is: %.2lf\n", slope);
   printf("The angle of inclination is: %.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:

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

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.

A.14

```
#include <stdio.h>
int main() {
   int k = 5;
   float grade_points[] = {21,22.18,20,25};
```

```
    int credits[] = {4,3,3,2,1};
    float spi = 0.0;
    int i;
    for (i = 0; i < k; i++) {
        spi += grade_points[i] * credits[i];
    }
    spi /= i;
    printf("SPI for k = %d is %.2f\n", k, 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.

A.15

```
#include <stdio.h>
int main() {
    double wavelength, speed, frequency;
    printf("Enter the wavelength (λ) in meters: ");
    scanf("%lf", &wavelength);
    printf("Enter the speed (c) of the wave in meters per second: ");
    scanf("%lf", &speed);
    frequency = speed / wavelength;
    printf("The frequency (f) of the wave is %.2lf Hz\n", 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]

A.16.

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

```
int main()
{
   double initial_velocity = 30.0;
   double acceleration = 5.0;
   double distance = 70.0;
   double final_velocity = sqrt(pow(initial_velocity, 2) + 2 * acceleration * distance);
   printf("The final velocity of the car is %.2lf m/s\n", final_velocity);
   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]

A.17.

```
#include <stdio.h>
#include <math.h>
int main()
{
   double initial_velocity = 30.0;
   double acceleration = 5.0;
   double distance = 70.0;
   double final_velocity = sqrt(pow(initial_velocity, 2) + 2 * acceleration * distance);
   printf("The final velocity of the car is %.2lf m/s\n", final_velocity);
   return 0;
}
```

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

A.18.

```
 #include <stdio.h>
int main()
 {
```

```
    char rollNumber[] = "GLA2023-14070032";
    int sum = 0;
for (int i = 4; i < 8; i++)
{
        sum += (rollNumber[i] - '0'); // Convert character to integer
    }
    printf("Sum of the last four digits of your university 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**

A.19.

```
#include <stdio.h>
#define CM_TO_INCH 0.393701
#define KG_TO_POUND 2.20462
const double height_cm = 180.0;
const double weight_kg = 90.0;
int main() {
    double height_inch = height_cm * CM_TO_INCH;
    double weight_pound = weight_kg * KG_TO_POUND;
    printf("Height: %.2f cm = %.2f inches\n", height_cm, height_inch);
    printf("Weight: %.2f kg = %.2f pounds\n", weight_kg, weight_pound);
    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

A.20.

a) char option;

b) int sum=0;

c) float product=1;

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

A.21

```
#include <stdio.h>

int main()
 {
   int numbers[9]; // Declare an array to store nine integers
   // Input nine integers
   printf("Enter nine integers, one at a time:\n");
   for (int i = 0; i < 9; i++) {
      scanf("%d", &numbers[i]);
   }
   // Display the numbers in groups of three
   printf("Numbers in groups of three:\n");
   for (int i = 0; i < 9; i++)
{
      printf("%d", numbers[i]);
      if ((i + 1) % 3 == 0)
{
         printf("\n"); // Print a newline after every three numbers
      }
else
{
         printf(", "); // Print a comma and space between numbers
      }
   }
   return 0;
}
```

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

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);
}
```

A.23. 50 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);
 }
```

A.24 GLA UNIVERSITY

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

A.25. Library functions in C language are inbuilt functions which are grouped together and placed in a common place called library.Each library function in C performs specific operation.

Four library functions are:

1.stdio.h

2.conio.h

3.math.h

4.string.h

Above mentioned all are header functions and contain many inbuilt specific defined functions in them .

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);
}
```

A.26. C is placement oriented LanguageHi30 36 1e

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

A.27. The statement is a bit unconventional and not recommended.

Q28. What will be the output of following program?

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

A.28. "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.

A.29.

```
#include<stdio.h>
#include<conio.h>
int main()
{
float m,s;
  printf(" enter the distance between Delhi and GLA");
  scanf("%f",&m);
  s=m/4;
  printf(" the speed of bus %2f km/hr",m);
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.

A.30.

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

```
int main()
 {
 int suman=70,satyam=50,shyam=80,avg;
   avg=(suman+satyam+shyam)/3;
 printf(“avg marks is %f”,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.

A.31.

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

int main() {
   double saurav_money, sajal_money, temp;

   printf("Enter the amount given to Saurav: ");
   scanf("%lf", &saurav_money);

   printf("Enter the amount given to Sajal: ");
   scanf("%lf", &sajal_money);

   temp = saurav_money;
   saurav_money = sajal_money;
   sajal_money = temp;

   printf("After rectification:\n");
   printf("Amount given to Saurav: %.2lf\n", saurav_money);
   printf("Amount given to Sajal: %.2lf\n", 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.

A.32.
```
include<studio.h>
int main()
{
int min,kmh;
int meter;
min= 3;
kmh = 4;
meter= (kmh*1000*min)/60;
printf("distance travelled is %d metre",meter);
return 0;
}
```

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

A.33: Yes two or more escape sequences such as \n and \t can be used in a single line of code in c programming.

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

A.34. Comments are extra information about the code for the programmer. It is not supposed to run during execution of the program.
There are two types of comments:
1)Single line comment.
2)Multiline comment.

Single line comment:

In this type of comment we comment a single line of code.
We use // in starting of the line we want to comment.
Example:

```
// printf("hello class");
```

Multi line comment:

In this type of comment we comment more than one line of code
We use /*in starting of portion we want to comment and */ at last of the portion.
Example:

```
/*int a,b;
a= 20;
b= a*6;
printf("b is %d",b);*/
```

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

A.35. In this statement there is no & sign before variable number due to which value entered by user cannot be assigned to the variable number.
The correct syntax should be like:
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;
}
```

A.36. NO

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

A.37. gross-salary: It contains hyphen which is not allowed in variable name of c.
salary of emp: It contains spaces which is not considerable in variable name of c.
avg.: It contains . Which cannot be used in variable name

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.

A.38.

```
#include<studio.h>
int main()
{
int R,T,TV;
TV= 175;
R= 25;
T= TV/R;
printf("Time for draining complete tank :- %d hours",T);
return 0;
}
```

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

A.39.

```
#include<studio.h>
int main()
{
int x,y;
y= 75;
x=-( (1-y)/0.2);
printf("battery will drain after %d hours",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

A.40. Option (a). Compiler

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

A.41. Option (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

A.42. Option (b). %.2f

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

A.43. Option (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

A.44. Option (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

A.45. Option (d). Garbage,5

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

A.46. Option (b). Basic_pay

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

A.47. Option (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) $(772)_{10} = (?)_7$

A.48.

a) 101101101.10001100110011001101
(b) 705.51463146314631463146
(c) 142C.1EB851EB851EB851EB85
(d) 43.31111111111111111111

(e) 2152

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

A.49.

(a) 125.944

(b) 4789.9140625

(c) 482.90625

. **(d) 44180.76953125**

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

$(DB56.CD4)_{16} = (?)_2, \ (?)_8, \ (?)_4$

A.50. $(DB56.CD4)_{16} =$ **$(1101101101010110.1100110101)_2$**, **$(155526.6324)_8$**, **$(31231112.30311)_4$**

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

$(473.42)_8 = (?)_2, \ (?)_{10}, \ (?)_{16}, \ (?)_5$

A.51. $(473.42)_8$ = **$(100111011.10001)_2$**, **(315.53125)** **$(13B.88)_{16}$**, **$(2230.231200342312003423 12)_5$**

Q52. Find the value of A?

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

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

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

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

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

```
printf(“%d”,a);
}
```

A.53. 32770

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

A.54. Temperature in Fahrenheit is 37.00