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SECTION- AU-1

G.L.A UNIVERSITY MATHURA, U.P.

ASSIGNMENT

SUBMITTED TO: MS. GURPREET KAUR MAM

SUBMITTED BY: ANKUR MITTAL

SECTION: AU-1

UNIVERSITY ROLL NO. : N/A

CLASS ROLL NO.: 11

BRANCH: BTECH CSE

SUBJECT: C PROGRAMMING

DEPARTMENT NAME: COMPUTER SCIENCE AND ENGINEERING

QUESTION NO.1: **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.**

ANSWER NO.1:

```
#include<stdio.h>

int main()

{
```

```
    float tax_rate, original_price;

    printf("enter tax rate:");

    scanf("%f",&tax_rate);

    printf("\nEnter original price: ");

    scanf("%f",&original_price);

    float Total_tax = (tax_rate/100)*original_price;

    float Total_A = Total_tax + original_price;

    printf("\n Total tax amount:$%.2f",Total_tax);

    printf("\n Total amount: $%.2f",Total_A);

    return 0;

}
```

QUESTION NO.2: **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.**

```
#include <stdio.h>

int main() {

   float wage_per_hour;

   int hours_worked;

   float total_wages;

   printf("Enter the wage per hour: ");

   scanf("%f", &wage_per_hour);

   printf("Enter the number of hours worked: ");

   scanf("%d", &hours_worked);

   if (hours_worked <= 30) {

      total_wages = wage_per_hour * hours_worked;

   } else {

      int regular_hours = 30;

      int extra_hours = hours_worked - 30;

      total_wages = (wage_per_hour * regular_hours) + (2 *
wage_per_hour * extra_hours);

   }
```

```
    printf("Weekly wages: $%.2f\n", total_wages);

    return 0;

}
```

QUESTION NO.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.

ANSWER 3:

```
 #include <stdio.h>

int main() {

    float total_cost, amount_paid, amount_returned;

    float apple_cost = 2.0 * 50.0;
```

```
    float mango_cost = 1.5 * 35.0;

    float potato_cost = 2.5 * 10.0;

    float tomato_cost = 1.0 * 15.0;

    total_cost = apple_cost + mango_cost + potato_cost +
tomato_cost;

    amount_paid = 500.0;

    amount_returned = amount_paid - total_cost;

    if (amount_returned >= 0) {

        printf("Amount to be returned to Mr. X: Rs %.2f\n",
amount_returned);

    } else {

        printf("Mr. X still needs to pay Rs %.2f\n", -
amount_returned);

    }

    return 0;
```

QUESTION 4: Write a C program to print your name, date of birth and mobile number in 3 different lines.

ANSWER 4: **#include <stdio.h>**

```
int main() {
   printf("Name: ANKUR MITTAL\n");
   printf("Date of Birth: Your 29-02-2004 \n");
   printf("Mobile Number:9461792651 \n");
   return 0;
}
```

QUESTION NO.5: 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.

ANSWER 5:

```
#include <stdio.h>
int main() {
   int integer_value;
   char character_value;
   float float_value;
   printf("Enter an integer: ");
   scanf("%d", &integer_value);
```

```
    printf("Enter a character: ");
    scanf(" %c", &character_value);
        printf("Enter a float value: ");
    scanf("%f", &float_value);
    printf("Integer value: %d\n", integer_value);
    printf("Character value: %c\n", character_value);
    printf("Float value: %.2f\n", float_value);
    return 0;
}
```

QUESTION NO.6: 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.

ANSWER 6:

```
#include <stdio.h>
int main() {
    float cost = 172.53;
    printf("The sales total is : $ %.2f.\n", cost);
    return 0;
}
```

QUESTION 7: .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.

ANSWER7:

```
#include <stdio.h>

int main() {

   int apples_per_person = 6;

   float half_apple = 0.5;

   float total_apples = 3 * (apples_per_person + half_apple);

   printf("Raju has %.1f apples in total.\n", total_apples);

   return 0;

}
```

QUESTION 8: Write a program that prints the floating point value in exponential format correct to two decimal places.

ANSWER 8:

```
#include <stdio.h>

int main() {

   float floatValue = 12345.6789;

   printf("Value in exponential format: %.2e\n", floatValue);

   return 0;
```

```
}
```

QUESTION 9: Write a program to input and print your mobile number (i.e. of 10 digits).

```
#include <stdio.h>

int main() {
    long long mobileNumber;
    printf("Enter your 10-digit mobile number: ");
    scanf("%lld", &mobileNumber);
    printf("Your mobile number is: %lld\n", mobileNumber);
    return 0;
}
```

QUESTION 10: 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?

```
#include <stdio.h>

int main() {
    int initial_population = 30000;
    float increase_percentage_1 = 20.0;
    float increase_percentage_2 = 30.0;
```

```
  float population_after_year1 = initial_population + (initial_population * (increase_percentage_1 / 100));

  float population_after_year2 = population_after_year1 + (population_after_year1 * (increase_percentage_2 / 100));

  printf("Population after two years: %.0f\n", population_after_year2);

  return

}
```

QUESTION 11: Write a program to find the ASCII value of a character.

ANSWER 11:

```
#include <stdio.h>

int main() {

  char ch;

  printf("Enter a character: ");

  scanf("%c", &ch);

  printf("ASCII value of %c is %d\n", ch, ch);

  return 0;

}
```

QUESTION NO. 12: **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.**

Answer 12:

```
#include <stdio.h>

int main() {

   float basicPay, HRA, TA, totalSalary;

   printf("Enter the basic pay of the employee: ");

   scanf("%f", &basicPay);

   HRA = 0.15 * basicPay;

   TA = 0.20 * basicPay;

   totalSalary = basicPay + HRA + TA;

  printf("Enter HRA value:%.2f\n",HRA);

  printf("Enter TA value:%.2f\n",TA);

   printf("Total Salary: %.2f\n", totalSalary);

   return 0;
```

QUESTION NO. 13: 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.

ANSWER 13: #include <stdio.h>

```
#include <math.h>

int main() {

   float xp, yp, xq, yq;

   printf("Enter the coordinates of point P (xp yp): ");

   scanf("%f %f", &xp, &yp);

   printf("Enter the coordinates of point Q (xq yq): ");

   scanf("%f %f", &xq, &yq);

   float slope = (yq - yp) / (xq - xp);

   float angle = atan(slope) * 180 / 3.14;

   printf("Slope of the line: %.2f\n", slope);

   printf("Angle of inclination (in degrees): %.2f\n", angle);

   return 0;

}
```

QUESTION NO. 14:

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:

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

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.

ANSWER : 14: #include <stdio.h>

```
int main() {
   int k = 5;
   float g1, g2, g3, g4, g5;
   float c1, c2, c3, c4, c5;
   float spi;
   printf("Enter grade points for each course (g1, g2, g3, g4, g5): ");
   scanf("%f %f %f %f %f", &g1, &g2, &g3, &g4, &g5);
   printf("Enter credits for each course (c1, c2, c3, c4, c5): ");
   scanf("%f %f %f %f %f", &c1, &c2, &c3, &c4, &c5);
   spi = (c1 * g1 + c2 * g2 + c3 * g3 + c4 * g4 + c5 * g5) / (c1 + c2 + c3 + c4 + c5);
   printf("SPI: %.2f\n", spi);
   return 0;
}
```

QUESTION NO. 15: Write a program to calculate the frequency (f) of a given wave with wavelength (λ) and speed (c), where c=λ*f.

ANSWER N0. 15:

```
#include<stdio.h>

int main()

{

    float c,w,f;

    printf("Enter Speed(c):\n ");

    scanf("%f",&c);

    printf("Enter Wave length (lambda): ");

    scanf("%f",&w);

    f=w/c;

    printf("The frequency is :%.2f Hz,",f);

    return 0;

}
```

QUESTION NO.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?**

ANSWER NO.16:

```
#include<stdio.h>
#include<math.h>
int main()
{
 float u = 30.0;
    float a= 5.0;
    float s = 70.0;
   float v;
v=sqrt(pow(u,2)+2*a*s);
    printf("The final velocity of the car is %.2f m/s\n",v);
    return 0;
}
```

QUESTION NO.17: **Horse accelerates steadily from rest at 4 m/s2 for 3s. (a) What is its final velocity? (b) How far has it travelled?**

```
#include <stdio.h>

int main() {

   double initial_velocity = 0;

   double acceleration = 4;

  double time = 3;

   double final_velocity = initial_velocity + acceleration * time;

   double distance_traveled = (initial_velocity * time) + (0.5 *
acceleration * time * time);

   printf("Final velocity of the horse: %.2lf m/s\n", final_velocity);

   printf("Distance traveled by the horse: %.2lf meters\n",
distance_traveled);

   return 0;

}
```

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

```
#include <stdio.h>

int main() {

  int rollNumber=2703606;

  int lastFourDigits = 0;

  lastFourDigits = rollNumber % 10000;

  int sum = 0;
```

```
    while (lastFourDigits > 0) {
        sum += lastFourDigits % 10;
        lastFourDigits /= 10;
    }
    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**

```
#include <stdio.h>
int main() {
    double height_cm = 175.0;
    double weight_kg = 70.0;
    const double CM_TO_INCH = 0.393701;
    const double KG_TO_POUND = 2.20462;
    double height_inch = height_cm * CM_TO_INCH;
    double height_feet = height_inch / 12.0;
    double weight_pound = weight_kg * KG_TO_POUND;
    printf("Height: %.2lf cm = %.2lf feet\n", height_cm, height_feet);
    printf("Weight: %.2lf kg = %.2lf pounds\n", weight_kg, weight_pound);
    return 0;
```

}

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

a) **A character variable named option.**

Answer : char name;

b) **An integer variable sum initialized to 0**

Answer : int sum =0;

c) **A floating point variable, product, initialized to 1**

Answer float 1.0;

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

```
#include <stdio.h>
int main() {
   int numbers[9];
   printf("Enter nine integers, one at a time:\n");
   for (int i = 0; i < 9; i++) {
      scanf("%d", &numbers[i]);
   }
      printf("Numbers entered (three per line):\n");
```

```
    for (int i = 0; i < 9; i++) {
        if (i > 0 && i % 3 == 0) {
            printf("\n");
        }
        printf("%d", numbers[i]);
        if (i < 8) {
            printf(", ");        }
    }
      printf("\n");
     return 0;
}
```

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

Header files in C programming are files containing declarations and function prototypes that are used across multiple source code files.

1. **Declaration of Functions and Variables:**
2. **Code Reusability**
3. **Error Detection**

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);
```

Answer 23: 56 78 30

}

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

```
#include <stdio.h>
void main()

{

int x = printf("GLA UNIVERSITY");

printf("%d", x);

 }
```

OUTPUT: GLA UNIVERSITY14

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

Ans 25. Library functions, also known as standard library functions or built-in functions, are pre-defined functions provided by programming libraries or the standard libraries of a programming language.

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);
}
```

OUTPUT: C is placement oriented LanguageHi30 36 1e

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

1. **scanf("%d%d", &a, &b) is the inner part of the statement. This is a scanf function call that expects the user to enter two integers separated by whitespace. It reads these two integers and stores them in the variables a and b.**
2. **printf("%d", ...) is the outer part of the statement. This is a printf function call that is used to print something to the screen. In this case, it uses the format specifier %d to print an integer.**
3. **Inside printf, we have scanf("%d%d", &a, &b). This means that the printf statement is trying to print the result of the scanf functio**

Q28. What will be the output of following program?

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

OUTPUT : "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.

```
#include <stdio.h>

int main() {
```

```
    float distance, time;
    printf("Enter the distance (in kilometers) from GLA University to Delhi: ");
    scanf("%f", &distance);
    time = 4.0;
    float speed = distance / time;
    printf("The speed of the bus is %.2f km/h\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.

```
#include <stdio.h>
int main() {
    int marks_satyam = 50;
    int marks_suman = 70;
    int marks_shyam = 80;
    float average = (marks_satyam + marks_suman + marks_shyam) / 3.0;
    printf("The average marks of Satyam, Suman, and Shyam is %.2f\n", average);
    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.

```
#include <stdio.h>

int main() {

   double money_saurav, money_sajal;

   printf("Enter the amount of money given to Saurav: ");

   scanf("%lf", &money_saurav);

   printf("Enter the amount of money given to Sajal: ");

   scanf("%lf", &money_sajal);

  double temp = money_saurav;

   money_saurav = money_sajal;

   money_sajal = temp;

   printf("After rectifying the mistake:\n");

   printf("Money given to Saurav: %.2lf\n", money_saurav);

   printf("Money given to Sajal: %.2lf\n", money_sajal);
```

```
    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.

```
#include <stdio.h>
int main() {
   float speed_kmph = 4.0;
    float time_min = 3.0;
    float time_hours = time_min / 60.0;
    float distance_km = speed_kmph * time_hours;
    printf("The distance traveled is %.2f kilometers\n", 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?

Yes, we can combine multiple escape sequences in a single line of program code in C and many other programming languages. Escape sequences are special character sequences that are used to represent non-printable or special characters in strings or character literals.

Some commonly used escape sequences include `\n` for a newline and `\t` for a tab.

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

Comments in C are explanatory notes or remarks that you can include in your code to provide information or explanations to yourself or other programmers. Comments are not executed as part of the program; they are simply ignored by the compiler.

In C, there are two ways to insert comments:

1. **Single-Line Comments: You can use double forward slashes (//) to insert a single-line comment. Everything after // on the same line is treated as a comment and is ignored by the compiler.**

2 : Multi-Line Comments: Multi-line comments, also known as block comments, are enclosed within /* and */. Everything between these delimiters is considered a comment.

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

ANSWER 35: In the statement **scanf("%d", number);**, the issue is that you are missing the address-of operator **&**.

Q36. What will be the output?

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

```
    return 0;
}
```

OUTPUT: NO

Q37. Point out which of the following variable names are invalid:

gross-salary INTEREST , salary of emp , avg. , thereisbookinmysoup

ANSWER 37 : gross-salary INTEREST , 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.

Answer 38:

```
#include <stdio.h>

int main() {
   double rate = 25.0;   // Rate of drainage in gallons per hour
   double tank_volume = 175.0; // Total tank volume in gallons
   double time_required = tank_volume / rate;
   int hours = (int)time_required;
   int minutes = (int)((time_required - hours) * 60);
   printf("Time required to completely clean the tank: %d hours %d minutes\n", hours, minutes);
   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%?**

Answer 39:

```
#include <stdio.h>
int main() {
   double battery_power = 0.75;
   double x;
   x = (1 - battery_power) / -0.2; // Solve for x
      printf("The battery power will be at 75%% after %.2lf hours.\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**

ANSWER 40 : (c) linker

Q 41. What is the format specifier for an Octal Number?

a.%0 **b.%d**

c. %o **d. %e**

Answer 41: © %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**

Answer 42: (b) %.2.f

Q 43. Which of the following is not a basic data type?

a. char

b. array

c. float

d. int

Answer 43: (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

Answer 44: (b) "hello"7

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

Answer : 45 (a) 5,5

Q46. Which of the following is an identifier?

a. &fact b. Basic_pay c. enum d. 1sum

Answer 46: (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

Answer 47: (a) c1

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

a) (365.55)10 = (101101101.101)2

b) (453.65)10 = (705.52)8

c) (5164.12)10 = (1424.2A)16

d) (23.65)10 = (43.12)5

e) (772)10 = (1661)7

Q49. Covert the following numbers to decimal number system-

a) (325.54)6 = (173.83333333333334)10 (rounded to 2 decimal places)

b) (1001010110101.1110101)2 = (4829.1162109375)10

c) (742.72)8 = (482.875)10

d) (AC94.C5)16 = (44116.7724609375)10

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

(DB56.CD4)16 = (1101101101010110.110011010100)2, (33326.64724)8, (6312.3153)4

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

(473.42)8 = (100111001.100000)2, (315.5)10, (199.20)16, (113.0)5

Q52. Find the value of A?

a) (23)10 = (17)A 17 in base A is equal to 2*16^0* + 7*16^1 = 2 + 112 = 114 in decimal, so A = 114.

b) (21)16 = (41) A 41 in base A is equal to 1*16^0* + *4*16^1 = 1 + 64 = 65 in decimal, so A = 65.

c) (32)8 = (101)A 101 in base A is equal to 1*8^0* + *0*8^1 + 1*8^2 = 1 + 64 + 512 = 577 in decimal, so A = 577.

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

```
void main(){

int  a=32770;

printf("%d",a);

}
```

OUTPUT : -32770

Q54: #include <stdio.h>

```
 int main()
```

```
{
 float c = 5.0;
 printf ("Temperature in Fahrenheit is %.2f", (9/5)*c + 32);
 return 0;
}
```

OUTPUT : Temperature in Fahrenheit is :37.00