



Mid Term (Odd) Semester Examination October 2024

Roll no.....

Name of the Course and semester: MCA

Name of the Paper: PROGRAMMING and PROBLEM SOLVING

Paper Code: TMC 103

Time: 1.5 hour

Maximum Marks: 50

Note:

- (i) Answer all the questions by choosing any one of the sub questions
- (ii) Each question carries 10 marks.

Q1.

(10 Marks)

- a. What is computational thinking, and what are the key approaches used to apply it effectively in problem-solving? CO 1

OR

- b. What are the characteristics of the C programming language? Explain the difference between procedure-oriented and object-oriented programming. CO 1

Q2.

(10 Marks)

- a. What is a flow chart?

CO 1 / CO 2

Draw a flow chart for the following scenario.

Bhogilal sells mangoes, bill is generated on the following basis

- Number of mangoes ≥ 50 , rate = rs 10 per mango
- $50 > \text{Number of mangoes} \geq 25$, rate = rs 15 per mango
- Number of mango < 25 , rate = rs 20 per mango

OR

- b. Explain bitwise operators. Write a C program to find even or odd numbers using bitwise operator. CO 2

Q3.

- a. What is meant by type conversion? Why it is necessary? Explain about implicit and explicit type conversion with examples. CO 2

(10 Marks)

OR

- b. Explain the structure of a C program. Explain the difference between Syntax error and semantic errors. CO 1

Q4.

(10 Marks)

- a. Write a C program to print the number of trailing zeroes in $n!$, for a given integer n . Note that $n! = n * (n - 1) * (n - 2) * \dots * 3 * 2 * 1$. CO 3

Example 1: Input: $n = 3$, Output: 0, Explanation: $3! = 6$, no trailing zero

Example 2: Input: $n = 5$, Output: 1, Explanation: $5! = 120$, one trailing zero

OR

- b. Given an integer N , Write a C program to print the number of digits in N that divide N . An integer val divides N if $N \% val == 0$. CO 3

Example :

Input: num = 1248

Output: 4

Explanation: 1248 is divisible by 1, 2, 4 and 8. So total digits are 4. So answer is 4

26 is divisible by 2. So total digits are 1. So answer is 1



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Q5.

(10 Marks)

- a. Write a C program to input basic salary of an employee and calculate gross salary according to given conditions. CO 2

- Basic Salary ≤ 10000 : HRA = 20%, DA = 80%
- Basic Salary is between 10001 to 20000 : HRA = 25%, DA = 90%
- Basic Salary ≥ 20001 : HRA = 30%, DA = 95%

OR

- b. Guess the output:

CO 2/ CO 3

i. `#include <stdio.h>`

```
int main () {  
    int m = 10;  
    int n, n1;  
    n = ++m;  
    n1 = m++;  
    n--;  
    --n1;  
    n -= n1;  
    printf("%d",n);  
    return 0;  
}
```

ii. `#include <stdio.h>`

```
int main(){  
    int sum;  
    float j = 1.0, i = 2.0;  
    while (i/j > 0.0625)  
    {  
        j = j + j;  
        sum = sum + 1;  
    }  
    printf("%d",sum);  
    return 0;  
}
```