

Reg. No.



Indian Institute of Information Technology, Surat
Department of Computer Science & Engineering
Mid Semester Examination, 1st Sem, 2025-26
Fundamentals of Computer and C Programming (CS101)

Timing: 9:30 AM to 11:00 AM

Date: 11 Oct 2025

Marks: 30

Read all Instructions: Attempt all parts of a question at one place.

1. Write a single line of C code for each of the following scenarios. Assume all variables have been declared with the appropriate data type and the snippet is within a main function with correct header files. Your answer should be a **single**, complete C statement. (2x2=4)

- You are given two **int** variables, x and y, that have already been assigned values. You are also given another integer variable min_val. Write a single statement using the ternary operator to find the smaller of the two values and assign it to min_val.
- You are given an unsigned **int** variable x. You are also given another **int** variable is_odd. Write a single statement using either a bitwise operator or a logical operator, to assign to is_odd value 1 if x is odd and 0 if x is even.

2. For each of the following questions, write the output of the C code. Assume that the code snippet is enclosed suitably within the main function and correct header files are included. If you think the code gives compilation error or runtime error (including segmentation fault) or it runs into an infinite loop, clearly state so. (4x2=8)

a.

```
for(int i=5; i--; i>=0) {  
    printf("%d ", i);  
}
```

b.

```
int x = 14;  
int y = ++x + x--;  
printf("x=%d y=%d", x, y);
```

c.

```
char c = 'c';  
do {  
    printf("%c ", c);  
    c -= 1;  
} while(c >= 'c');
```

d.

```
int a = 1;  
int b = -1;  
switch(a && b) {  
    case 0: printf("case 0 ");  
    case 1: printf("case 1 ");  
    default: printf("default ");  
}
```

3. Answer **any 2** of the following with brief explanations.

(2x4=8)

- a. What is the bitwise XOR of the first 250 natural numbers ($1 \oplus 2 \oplus 3 \oplus \dots \oplus 250$)? You may assume that they are stored as 32-bit integers. Show calculations and box the final answer, which should be a number. Do not write a C program.
- b. How is the **switch** statement different from the **if-else** decision statement? Explain how array data structure is fundamental to strings, making sure to describe the specific C convention used to terminate a string.
- c. Explain the difference between:
 - i. the **break** and **continue** statements when used inside a loop.
 - ii. Entry-Controlled loop and Exit-Controlled loop.

4. Write complete programs in C for **any one** of the following questions. Write descriptive user-input prompts and perform appropriate input validation. **Indent and properly comment your code.**

(1x10=10)

- a. Take input a positive **long int** N and print its prime factors and their powers in increasing order.
- b. Take input a positive **int** N ≤ 60 and print first N terms of the series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...
- c. Take input of 20 **long double** elements in an array. Then, print the elements located at even indices in the array in the reverse order.