

2025

COMPUTER SCIENCE — HONOURS

Paper : DSCC-2

(Problem Solving Using C)

Full Marks : 75

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question no. 1** and **any three** from **Section - A** and **any five** from **Section - B**.

1. Answer **any five** questions : 2×5
- (a) State the difference between `fwrite()` and `fprintf()`.
 - (b) What is the use of `feof()` and `ferror()` in file handling?
 - (c) Mention the purpose of the `break` and `continue` statements.
 - (d) Define an array. How is it different from a variable?
 - (e) What is a function prototype? Why is it important?
 - (f) Briefly describe the main symbols used in a flowchart.
 - (g) How does 'sizeof' operator work? Explain.
 - (h) Swap two integers `p` and `q` using bitwise operators only.

Section - A

2. Write a C program to read a string from the user and count the number of vowels. 5
3. (a) Differentiate between `malloc()` and `calloc()` functions.
- (b) Write a C program to dynamically allocate memory for :
- One structure variable, and
 - An array of three structure variables
- The structure should contain `roll` and `age` as members. Use appropriate memory allocation functions. 2+3
4. How does a 'switch' differ from the 'if' statement? Explain with example. 5
5. Compare parameter passing techniques of 'call by value' and 'call by address' with an example. 5

Please Turn Over

(3455)

6. Write a program in C to create a function (using pointer parameters) that compares two integer arrays to check whether they are identical. The function returns 1 if identical, 0 otherwise. 5

Section - B

7. (a) Discuss about the following operators in C, with example :
- Bitwise operators
 - Increment and decrement operators.
- (b) Write a C program to check whether a number is prime or not. 4+6
8. (a) What is a ternary operator in C? Write a C program to find the largest of three integers using only the ternary operator.
- (b) Write a program in C that reads a positive integer and outputs the number of 1's in its binary representation. 5+5
9. (a) What is a macro in C? Compare and contrast macros and functions with suitable examples.
- (b) What is type casting? Explain implicit and explicit type casting with examples.
- (c) Which functions are used to compare two strings in a case-sensitive and a case-insensitive manner? (1+3)+(1+3)+2
10. (a) What is a void pointer in C? Why is it used?
- (b) Differentiate between a structure and a union in C.
- (c) Briefly describe the different storage classes available in the C language. (1+2)+3+4
11. What will be the output of the following C program codes? Justify your answers.
(Assume all necessary header files such as #include <stdio.h> are included.)
- (a) #define SQUARE(x) x * x
- ```
int main() {
 int a = 5, b = 3;
 printf("%d\n", SQUARE(a + b));
 return 0; }
```
- (b) int main() {
- ```
int arr[] = {1, 2, 3, 4};
int *ptr = arr;
printf("%lu\n", sizeof(arr) / sizeof(ptr));
return 0; }
```
- (c) Write a C program to find the sum of digits of a 5 digit number using recursion. 2+2+6

12. (a) Explain the actual and formal arguments of a function, using a suitable example.
(b) What is the advantage of using static variables inside a function? Explain with an example.
(c) Explain the difference between & and * operators in the context of pointers. 5+3+2
13. (a) How can we return multiple values from a function in C? Illustrate with an example.
(b) Write a code snippet in C to allocate a block of memory using malloc().
(c) Write the syntax for opening a file with various modes and closing a file. 5+3+2
14. (a) What are the problems faced while using array in a program?
(b) Write down what will be the output of the following function :

```
void abc(char *s)
{
    if(s[0]=='\0') return;
    abc(s+1);
    abc(s+1);
    printf("%c",s[0]);
}
main()
{
    abc("123");
}
```

- (c) What will be the output of the following code?

```
#include <stdio.h>
typedef struct
{
    int A;
    char B;
    char C;
} InfoData;
int main(int argc, char *argv[])
{
    printf("\n Size of Structure = %d\n\n", sizeof(InfoData));
    return 0;
}
```

2+4+4