

OPTION-C

Paper : MAT-HE-5066

(*Programming in C*)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : $1 \times 7 = 7$
- (a) Write *any two* special characters that are used in C.
 - (b) Mention *two* data types that are used in C language.
 - (c) For $x = 2$, $y = 5$, write the output of the C function 'pow (x , y)'.
 - (d) Convert the mathematical expression
$$z = e^x + \log y + \sqrt{1 + x}$$
into C expression.
 - (e) Write the utility of clrscr () function.
 - (f) Write a difference between local variable and global variable.
 - (g) Write the C library function which can evaluate $|x|$.

2. Answer the following questions : $2 \times 4 = 8$

- (a) Write the difference between 'assignment' and 'equality'.
- (b) How does ' $x + +$ ' differ from ' $+ + x$ ' ?
- (c) What is a string constant ? Give an example.
- (d) Write *four* relational operators that are used in C.

3. Answer **any three** parts : $5 \times 3 = 15$

- (a) Explain arithmetic and logical operators in C with suitable examples.
- (b) List three header files that are used in C. Also write their utilities. $3 + 2 = 5$

$A = 5 ; B = 3$

$A = A + B ;$

$B = A - B ;$

$A = A - B ;$

Write the output of A and B from the above program segment in C.

- (c) Write a C program to find the sum of all odd integers between 1 and n .
- (d) Write the general form of do-while loop and explain how it works with the help of a suitable example.

(e) Write the utility of 'break' and 'continue' statements with the help of suitable examples.

4. Why are arrays required in C programming? How are one-dimensional arrays declared and inputs given to array? Explain briefly with example. Write a program to read given n numbers and then find the sum of all positive and negative numbers. $2+3+5=10$

Or

How are two-dimensional arrays declared? Write a C program to read a 3×3 matrix and print the same as output. Hence write a C program to read a 3×3 matrix, print its transpose and write the determinants of both. $1+4+5=10$

5. Write a C program for each of the following :

(a) To evaluate the function 5

$$f(x) = x^2 + 2x - 10, x \geq 0$$

$$= |x|, x < 0$$

(b) To find the biggest of three numbers.

5

Or

Explain with example the 'if' statement and nested 'if' statement in C. Write a C program to find the roots of a quadratic equation $ax^2 + bx + c = 0$, for all possible values of a, b, c . 5+5=10

6. What is the basic difference between 'Library functions' and 'User-defined functions'? Mention *two* advantages of using 'User-defined functions'. How are such functions declared and called in a program? Write a C program using function to find the biggest of three numbers. 1+2+2+5=10

Or

Write a C programme that reads a number, obtains a new number by reversing the digits of the given number, and then determine the gcd of the two numbers. To build the programme, use two functions — one to find gcd and another to reverse the digits. 10