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 any seven questions:

 $1 \times 7 = 7$

- (a) Write the output of a:
 int a; a=5/2;
 - (b) Write one arithmetic and one logical operator in C.



- (c) What is a global variable?
- (d) Name the header file that is used to compile the function 'sqrt(x)'.
- (e) Which of the following can be used as a variable: x1, x_1 , x_2 , x_3 ?

- (f) Write two reserved words used in C language.
- (g) Convert the following mathematical expression into a C expression:

$$z = \frac{5x + 6}{3x^2 + 2} - \frac{\sin x^2}{\sqrt{x}}$$

- (h) State whether True or False: C-language is case-sensitive.
- (i) Write any two built-in functions used in C-language.
- (j) For x = 5, y = 2, write the output of x % y.
- (k) Write the utility of getch () function.
- (1) Define a two-dimensional array.
- 2. Answer any four questions: 2×4=8
 - (a) What is the difference between C character and C string?

- (b) Write four different C statements each adding 1 to integer variable x.
- (c) Name any four functions available in 'stdio.h'.
- (d) Write a C program that will input a character and give output, the same.
- (e) int a, b, temp;

$$a = 5$$
;

$$b = 3;$$

temp = a;

a = b;

b = temp;

Write the output of 'a' and 'b'.

- (f) Write the general syntax of scanf() function to read the integer variable a.
- (g) Write the syntax of 'nested if' statement in C language.



(h) Write the output of the following:

$$c = 0$$
 for $(i = 1; i \le 5; i + +)$

$$c = c + i$$
;

3. Answer any three parts:

 $5 \times 3 = 15$

(a) Write a C program to calculate the commission for a sales representative as per the sales amount given below:

if sales \leq 500, commission is 5% of sales

if sales > 500 but \leq 2000, commission is Rs. 35 plus 10% above Rs. 500 of sales

if sales > 2000 but ≤ 5000, commission is Rs. 185 plus 12% above Rs. 2000 of sales

if sales > 5000, commission is 12.5% of sales

(b) Write a C program to find the average of best three marks from the given four test marks.

1×2×x1

(c) Give a general syntax of 'switch' statement in C.

Write the outputs of a and b of the following:

(i)
$$a = 5$$
; (ii) $a = 5$; (iii) $a = 5$;
 $b = 7$; $b = 7$; $b = 7$;
if $(a > b)$ if $(a > b)$ if $(a > b || a < b)$
 $\{a = a + 1; a = a + 1; a = a + 1; b = b + 1\}$; $b = b + 1$

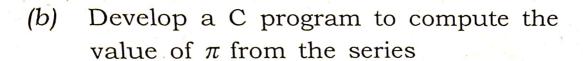
- (d) Write a C program to print integers from 1 to n omitting those integers which are divisible by 7.
- (e) Write a C program to generate the Fibonacci series up to n terms.
- Write a C program to find the sum of squares of all integers between 1 and n.
- (g) Write a C program to print the $n \times n$ zero, marix.
- (h) Write a C program to add 1 to each element of a 3×3 matrix.

4. Answer **any three** parts:

10×3=30

(a) Write the differences between 'while loop' and 'do-while' loop using examples. Write a C program to check whether the given number is an Armstrong number. (An Armstrong number is one that is equal to the sum of cubes of individual digits. For ex. 153 = 13 + 53 + .33)

5+5=10



$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} \cdots$$

Write a C program to convert a binary number into a decimal number.

5+5=10

- (c) Write a C program for each of the following: 5+5=10
 - (i) to find the mean and standard deviation of any n values.



(ii) to add two matrices of order $m \times n$.

(d) Write a C program to compute the value of e^x using the series

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$$



For this build two functions—one to find the factorial and the other to compute x^n , for a given n.

- (e) Write a C program to find the LCM of two numbers a and b, where b is the sum of the digits of a. Use two functions—one is to find LCM and the other is to find the sum of the digits.

 (gcd.lcm=a.b)
- Write the syntax of 'nested for' loop and show with a suitable C program. What are the differences between 'break' statement and 'exit()' function. Write a C program using 'break' statement, and write the outputs. Also write the outputs of the same program if the 'break' statement is replaced by 'exit()' function.

 1+4+2+3=10

- What is meant by recursive function? What is its use? Demonstrate the use of recursive function by a suitable C program. 2+2+6=10
 - (h) What are the uses of 'continue' and 'goto' statements in a C program? Explain each with a suitable C program segment.

 5+5=10