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(Pre-CBCS)

(5th Semester)

PHYSICS

EIGHTH (B) PAPER

(C Language and Numerical Methods)

(Revised)

Full Marks : 55

Time : 2½ hours

(PART : A—OBJECTIVE)

(Marks : 20)

The figures in the margin indicate full marks for the questions

SECTION—A

(Marks : 5)

Tick (✓) the correct answer in the brackets provided :

1×5=5

1. The effect of \n in C programming is

- (a) backslash ()
- (b) to start a new line ()
- (c) to produce a bell sound ()
- (d) to print bracket ()

2. The output of the following C program is

```
#include<stdio.h>
{
    int n;
    for (n=6; n=0; n--);
    printf("n=%d", n--);
    getchar( );
    return 0;
}
```

- (a) 0, 1, 2, 3, 4, 5, 6, 7 () (b) 0, 1, 3, 4, 5, 6, 7 ()
(c) infinitely loop () (d) 6 loops ()

3. The result of a relational operator is

- (a) true and false () (b) <or> ()
(c) ==or!= () (d) None of the above ()

4. The library function rand is under which of the following header files?

- (a) stdio.h () (b) math.h ()
(c) string.h () (d) None of the above ()

5. The function $f(x) = (1-p)f_0 + pf_1$, where $p = \frac{x-x_0}{x_1-x_0}$ represents

- (a) Lagrange interpolation formula ()
(b) Newton's forward difference formula ()
(c) linear interpolation formula ()
(d) quadratic interpolation formula ()

SECTION—B

(Marks : 15)

Answer the following questions :

3×5=15

1. Write a C program loop to output the odd integer between 1 and 49.
2. What are the general formats of 1-dimensional and multi-dimensional array declarations?
3. Write a C program to find the maturity value of a principal P due to the rate of compound interest $r\%$ using the formula.

$$\text{maturity} = P(1 + r/100)^n$$

4. What are absolute and relative errors?
5. What is interpolation?

(PART : B—DESCRIPTIVE)

(Marks : 35)

The figures in the margin indicate full marks for the questions

1. (a) What is a C variable? Explain with an example. Give two examples of an invalid name in C giving the reason for invalidity. 4
- (b) Write the following as C integer constants : 3
- (i) 2,168
- (ii) 7 185 10²
- (iii) 7 65 10³

OR

- (a) What are arithmetic, relational and logical operators? Explain with examples. What will be the output of the following C program segment? 5

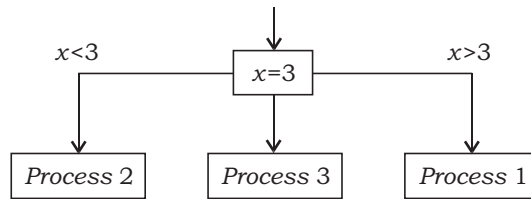
```
{
    int a=2;
    int b=2, sum;
    a+ +;
    b -=5;
    sum=b/3+a;
    printf("the value of the sum is %d\n", sum);
}
```

- (b) What are the two numeric type C constants? Explain both with examples. 2
2. (a) What are the formatted and unformatted input and output operators in C? Explain how these commands are used in C programming with examples. 5
- (b) Using formatted input and output commands, write a simple C program to enter one integer and two real numbers and then print the entered three numbers in different lines. 2

OR

- (a) What are the library functions under the header file *math.h*? Write a C program to illustrate the uses of some of the functions. 4
- (b) Write a C program to read a single character using `getchar()` and print it. 3

3. (a) Write a logical IF and IF-Else statements of the following flowchart : 4



- (b) Write the general format of the switch structure and explain with an example. 3

OR

- (a) Write a C program to find the average of 10 numbers using FOR loop structure. 4
- (b) What do you mean by array of pointers? Explain using example. 3

4. (a) Assuming that a root of $x^3 - 9x - 1 = 0$ lies in the interval (2, 4), find the root by bisection method. 4

- (b) Using Newton's method, find the root between 0 and 1 of $x^3 - 6x - 4$ correct up to 5 decimal places. 3

OR

Explain Gregory-Newton's forward difference interpolation. Find the value of y at $x = 21$ from the following data using Gregory-Newton's forward difference interpolation : 4+3=7

x	:	20	23	26	29
y	:	0.3420	0.3907	0.4384	0.4848

5. Evaluate $I = \int_0^6 \frac{1}{1+x} dx$ by using Simpson's rule (both $\frac{1}{3}$ and $\frac{3}{8}$). Also check up the value by direct integration. 3+3+1=7

OR

Write the logic expressions, logic diagrams and truth tables of the first and second De Morgan's theorems. Derive the Boolean expression for the logic circuit shown below : 4+3=7

