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(CBCS)

(5th Semester)

PHYSICS

EIGHTH (B) PAPER

(C Language and Numerical Methods)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(Marks : 10)

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

1×10=10

1. A& 2 is equivalent to

(a) A 2& A ()

(c) A 2& ()

(b) A A&2 ()

(d) A 2&2 ()

2. How many tokens are there in the C statement?

printf("Hello, This is my first program \n");

(a) 1 ()

(c) 5 ()

(b) 3 ()

(d) 9 ()

3. gets() is used to read a/an
 (a) character () (b) string ()
 (c) integer () (d) floating point ()

4. A function can return
 (a) one value () (b) two values ()
 (c) three values () (d) four values ()

5. The output of the following C program will give

```
#include <stdio.h>
int main ( )
{
for (int a = 10; a <= 20; a = a + 1)
{
printf("value of a:%d\n", a);
}
return 0;
}
```

- (a) 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 ()
 (b) 10, 12, 14, 16, 18, 20 ()
 (c) 10 loops ()
 (d) 20 loops ()

6. An array size must be an integer constant
 (a) greater than or equal to zero ()
 (b) greater than zero ()
 (c) not less than one ()
 (d) equivalent to type number ()

7.
$$P_n(x) = P_n(x_0 + uh) = y_0 + \frac{u^{(1)}}{1!} y_0' + \frac{u^{(2)}}{2!} y_0'' + \dots + \frac{u^{(r)}}{r!} y_0^{(r)} + \dots + \frac{u^{(n)}}{n!} y_0^{(n)}$$

where $u^{(r)} = u(u-1)(u-2)\dots(u-r+1)$ is

- (a) Lagrange's interpolation formula ()
 (b) Newton's forward interpolation formula ()
 (c) Linear interpolation formula ()
 (d) Quadratic interpolation formula ()

8. How many significant figures are in 1000?
 (a) One () (b) Four ()
 (c) Three () (d) Two ()

9. Lagrange's interpolation formula is used when
- (a) the values of independent variable x is equally spaced ()
 - (b) the values of independent variable x is not equally spaced ()
 - (c) the values of independent variable x is equally spaced with y ()
 - (d) None of the above ()
10. The truncation error in the trapezoidal rule is of the order
- (a) h ()
 - (b) h^2 ()
 - (c) h^3 ()
 - (d) h^4 ()

SECTION—B

(Marks : 15)

Answer the following questions :

3×5=15

1. What is an identifier? Explain with examples.

OR

2. Write the truth table for bitwise operator and write the output for A 1000 1100 and B 1100 0011 for A&B, A^B and A|B.

3. What is the general format of printf() function? What does the formatting characters c , d , e mean?

OR

4. Explain the two ways in which arguments can be passed to a function.

5. Draw the flow chart of a while loop.

OR

6. What is null pointer? Explain with an example.

7. What are absolute and relative errors?

OR

8. Find the positive root of $x^3 - 6x - 4$ between 0 and 1 by Newton-Raphson method correct to 5 decimal places.

9. What is interpolation?

OR

10. What is the difference between Simpson's one-third and one-eighth rule?

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. (a) What are real constants? Explain with examples. 5
- (b) Write a variable statement to declare that the variable 5
- (i) count will be used to store an integer
 - (ii) grade will be used to store a floating point integer
 - (iii) initial will be used to store a character

OR

2. (a) What are arithmetic, relational and logical operators? Explain with examples. What will be the output of the following C program? 7

```
#include <stdio.h>
main ()
{
int a = 19;
int b = 10;
int c;
    a++;
    b+ = 10
    c = a+b/2
printf ("The value c = %d\n", %c);
    return 0;
}
```

- (b) What are different types of integer constants? How are they declared? 3
3. (a) What are the formatted output operators in C? Explain how these commands are used in C programming with examples. 6
- (b) Write a C program to find the bigger of two numbers to show the use of user defined functions. 4

OR

4. (a) What is a function prototype? Explain how it works with the help of an example. 6
(b) Write a C program to read a single character using `getchar()` and print it. 4
5. (a) Write the general format of the switch structure. Write a C program using the switch structure to compare Grade 'B' among the grades 'A', 'B', 'C' and 'F'. 6
(b) Write a C program to display the odd numbers between 1 and 50. 4

OR

6. (a) Write a C program to find the average of 20 numbers using FOR loop structure. 6
(b) What do you mean by pointers? Explain using example. 4
7. (a) Assuming that a root of $x^3 - x - 1$ lies in the interval (1, 2), find the root by bisection method. 5
(b) Using Newton's method, find the positive root of $f(x) = 2x^3 - 3x - 6 = 0$ correct to 5 decimal places. 5

OR

8. Explain Gregory-Newton forward difference interpolation. Find the value of y at $x = 28$ from the following data using Gregory-Newton forward difference interpolation : 5+5=10

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

9. Evaluate $I = \int_0^6 \frac{1}{x} dx$ by using Simpson's rule (both 1/3 and 3/8). Also check up the value by direct integration. 4+4+2=10

OR

10. Explain trapezoidal rule. Evaluate $\int_0^6 \frac{dx}{x^2}$ by using trapezoidal rule. 5+5=10
