Question Bank For PG Course

Mathematics

Paper-4B

COMPUTER PROGRAMMING & ITS APPLICATION TO NUMERICAL ANALYSIS : PGMT-IVB

Question 1

Assuming *i* is an integer variable, which of the following C expression/s is/are equivalent to (i + = 1).

i) i + +ii) + + i

Question 2

Find below an expression in C where a, b, c and d are integer variables.

$$-a-b+-c-+d$$

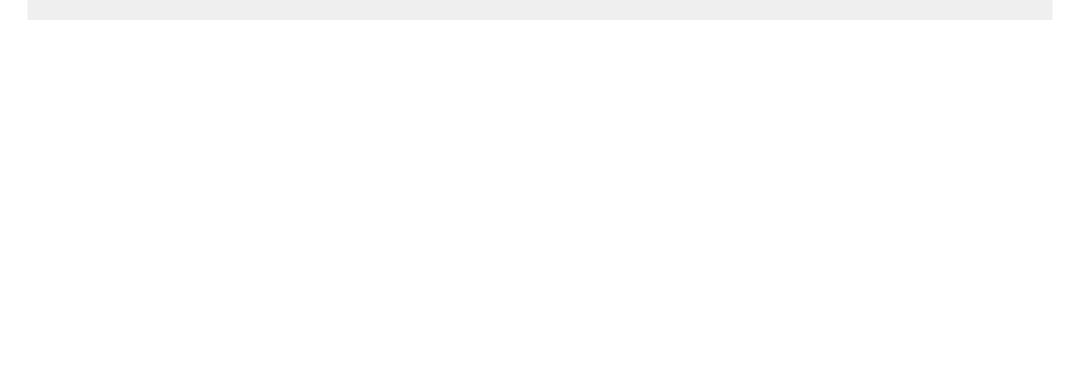
Supply Parentheses to show how the compiler would interpret the above expression based on the precedence and associativity of the arithmetic operators.

Question 3

Find below an expression in C where a, b, c and d are integer variables.

-a-b+-c-+d

Supply Parentheses to show how the compiler would interpret the above expression based on the precedence and associativity of the arithmetic operators.



```
The main block of two different C-programs
are given below.
Program-1 (main)
int sum = 0, x;
for ( x = 0 ; x <= 100 ; x++ )
{
sum = sum + x;
}
printf ( "%d" , sum ) ;
Program-2 (main)
int sum = 0, x;
for (x = 0; x <= 100;)
{
sum = sum + x;
x++;
}
printf ( "%d", sum );
Determine whether the above two
programs are legal and produce same
output or not.
```

Question 5

A two-dimensional integer array m is declared as follows:

Int m[3][4]={ {1,2,-1} , {2,3,4,5}} ;

Find out the value of m[0][3] and m[2][0].

Question 6

What are the different types of storage classes defined in C language?

Question 7

Find below a main block of a C program:

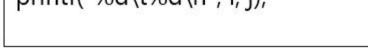
```
Program - ( main )

inti, j;

for(i=1; i<= 3; i++)

for(j = 1; j <= 4; j++)

printf("%d\t%d\n", i, j);
```



If we want to rewrite the above program using goto statement instead of using "for"loop, then write down the main block of the program.

Question 8

What is void pointer?

Question 9

If i is a variable and p points to i then which of the following expressions have the same value as .i?

i)* <i>p</i>	ii)* & p	iii) * <i>i</i>
iv)* <i>&i</i>	v)& p	vi)
&*p		

Question 10

Find below a function print_rev which takes a positive integer n and displays all the integers starting from n up to 1 in decreasing order:

```
void print_rev(int n)
{
    inti ;
    for( i = n ; i> 0 ; i-- )
    printf("%d\n", i ) ;
}
```

Implement the same function using recursion instead of loop?

Question 11

Suppose that x is a one-dimensional array and p is a pointer variable. Assuming that the assignment p = xhas just been performed. Based on the above information determine which of the following expressions are true/false?

i)
$$p = = x[0]$$
 ii) $p = = \&x[0]$
iii) $* p = = x[0]$

What is the value of the string str1 after following statements have been executed?

```
Strcpy( str1, "Linear" ) ;
Strcpy( str2, "Algebra") ;
if( strcmp ( str1, str2) <0 )
strcat( str1, str2 );
   else
strcat ( str1, str2 );
```

Question 13

Evaluate the following postfix expression:

5	3	+	2	*	6	9	7	-	1	-
---	---	---	---	---	---	---	---	---	---	---

Question 14

Which of the following statements are true?

- i) $5n+3 = O(n^2)$ [big-oh notation] ii) 5n + 3 = O(n) [big-oh notation]
- iii) 5n + 3 = o(n) [little-oh notation]
- iv) $5n + 3 = \theta(n^2)$ [θ notation]

Question 15

Which data structure is mainly used for insertion and deletion of data at the same end?

Question 16

Assuming i, j, k are integer variable, following expression is written in C.

k = + + i + j + +;Split the above complex expression into multiple simpler expressions.

Find below an expression in C where a, b, c and d are integer variables.

$$a = b + = c - d + - -e / - f$$

Supply Parentheses to show how the compiler would interpret the above expression based on the precedence and associativity of the arithmetic operators.

Question 18

Find below few statements in Clanguage.

> float x = 18.23 ; printf ("%1.1f\n" , x) ; printf ("%-8.3f" , x) ;

Determine the output.

Question 19

The main block of two different Cprograms are given below.

```
Program-1 ( main )
int sum = 0, i=0;
for ( ; i <= 50; i++ )
{
    sum = sum + i;
  }
printf ( "%d", sum );</pre>
```

```
Program-2 ( main )
int sum , i ;
for ( i = 0 ; i <= 100 ; i++ ; )
{
    sum = sum + i ;
}
printf ( "%d" , sum ) ;</pre>
```

Are the above programs legal?

Question 20

A two-dimensional integer array arr is declared as follows:

int arr[4][4]={ $\{5,2,-1\}$, $\{2,3,4,5\}$, $\{1,7,8,9\}$ };

Find out the value of arr[0][3] and arr[3][4].

The main block of a C-program to calculate the sum of the first 10 natural number is given below.

```
int n = 10, i = 1, s = 0;
start:
s=s+i;
i++;
if ( i<=n )
   goto start;
else
   goto end;
end:
printf( "Sum=%d",s );</pre>
```

Replace the goto statement by appropriate "while loop" and Modify the program.

Question 22

Suppose, a programmer wants to write a C program which displays the digit (1 to 3) in words. The variable i is used to store the digit given as input. If i = 2 then the program displays "Two". The part of the program is written by the programmer is given below:

```
switch ( i ) {
case 1 : printf("one");
case 2 : printf("two");
case 3 : printf("Three");
}
```

What is the mistake done by the programmer?

Question 23

A processor needs 4 bytes to allocate an integer. A programmer is executing following C instructions in the processor. int *p ;

p = (int *) malloc (30*sizeof(int));

What value will be returned by the pointer if 100 bytes of space is available in memory?

Question 24

If i is an integer variable and p, q are the pointers to integer then which of the following assignments are legal?

i) p = i ii) p = &q iii) * p = *qiv) p = q v) * p = &i vi) p = &g

Question 25

Which data structure is more suitable for adding two polynomials?

Question 26

What are the values of j and k after executing the following statements? # define cube_macro(x) x*x*x

```
int cube_fun (int x) { return x * x * x;}
main() {
    int i=2 , j , k;
    j = cube_fun ( 3+i ) ;
    k = cube_macro ( 3+i ) ;
}
```

Question 27

Assume an array a[n] contain n integers

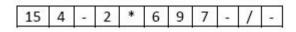
 $x_0, x_1, x_2, \dots, x_{n-2}, x_{n-1}$. Two pointers p and q are pointing to the first element (x_0) and the last element

 (x_{n-1}) of the array respectively. What are the contents of the array after executing the following while loop?

while (p < q) {
 temp = *p;
 *p = *q;
 *q = temp;
 p = p + 1;
 q = q - 1;
}</pre>

Question 28

Evaluate the following postfix expression:



Question 29

Assume a processor needs 4 bytes and 8 bytes to allocate an integer and double data type respectively. Two objects are declared in a program and each of them contains two members as follows:

Object A	Object B		
union { int i ;	struct { int i ;		
double d ;	double d ;		
}	}		

Calculate the size of **object A** and **object B**. (Assume that the compiler leaves no 'holes' between members).

Suppose a programmer has written a C program to compute x^y using a recursive function where x and y both are integers as follows.

int power (int x, int y) {
 if (y == 0)
 return 1;
 else return x*power(x , y-1));
}

Then he noticed that if y is an even number then instead of calling the power function recursively y times he could have called it for (y/2)times and use the formula $x^y = x^{y/2}$ $\cdot x^{y/2}$ and make the program more efficient. Modify the above program using the idea.