Reg. No. : 8 1 0 0 2 1 6 2 2 0 2 1

Question Paper Code : 12327

M.C.A. DEGREE EXAMINATIONS, JANUARY 2022.

First Semester

(BRIDGE COURSE)

BX 4002 – PROBLEM SOLVING AND PROGRAMMING IN C

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the factors which will help us to analyze the efficiency of algorithms.
2. How will you verify a program for its correctness?
3. Define a compiler and an interpreter
4. What is pseudo code?
5. Outline a conditional control statement with an example.
6. What is a compound statement? Give example.
7. Outline a multidimensional array with an example.
8. Name the various storage classes available in C.
9. Distinguish between a sequential and a random access file.
10. Write a note on command line arguments.

PART B — (5 × 13 = 65 marks)

11. (a) (i) What is top down design? Elaborate with an example. (8)

(ii) Write an algorithm to print the first '*n*' prime numbers. (5)

Or

(b) Outline best, worst and average case algorithm analysis with an example. (13)

12. (a) (i) Draw a flow chart to accept three numbers, find the greatest and display the result. (5)

(ii) Write an algorithm and pseudocode to accept a number, check whether the number is an Amstrong number or not and display the result. (8)

Or

(b) (i) Outline the functions performed by a loader and a linker. (4)

(ii) Elaborate the features of structured programming. (9)

13. (a) (i) Outline type conversion in 'C' with an example. (4)

(ii) Outline the conditional statements in 'C' with an example. (9)

Or

(b) Write a C program to print the Pascal's triangle from numbers 1 to 5.

```
        1
      1 2 1
    1 2 3 2 1
  1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1
```

14. (a) (i) Write a C program to find the square root of a number using function. (6)

(ii) Write a C program to find the factorial of a given number using recursion. (7)

Or

(b) (i) Write a C program to accept a string and find whether it is a palindrome or not. (Palindrome : MALAYALAM). (6)

(ii) Write a C program to accept a sentence and find the number of words in it. (7)

15. (a) Write a C program to create a structure called "Football" with the data members player name, team name, batting average for 100 players. Read the array of structure and display the Teamwise list.

Or

(b) Write a C program using pointers to accept two matrices and generate the product of the two matrices.

PART C — (1 × 15 = 15 marks)

16. (a) Write a C program to find the sum of the sine series

$$X - \frac{X^3}{3!} + \frac{X^5}{5!} \ldots N \text{ terms.}$$ (15)

Or

(b) XYZ is a software company. In that, the details of the employees are stored in the database file. Write an interactive, file oriented C program that will maintain the list of Employee Number, Employee Names, Address, DOB, Date of Joining, Qualification, Experience and Mobile Numbers in alphabetical order

Include a menu that will allow the user to select any of the following features :

Add a record,

Modify an existing record,

Retrieve and display an entire record for a given name and

Exit.

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Question Paper Code : 90213

M.C.A. DEGREE EXAMINATIONS, APRIL/MAY 2022.

First Semester

(Bridge Course)

BX 4002 — PROBLEM SOLVING AND PROGRAMMING IN C

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the advantages of a top-down design.
2. What are fundamental algorithmic strategies?
3. Differentiate Compiler and interpreter.
4. Write pseudocode to find the minimum of two values.
5. Compare Break, goto and Continue statements.
6. How does a control string in a printf() function differ from the control string in a scanf() function?
7. Why is it necessary to give the size of an array in an array declaration?
8. What are the various dynamic memory allocation functions?
9. Define nested structure.
10. Compare structures and unions.

PART B — (5 × 13 = 65 marks)

11. (a) (i) State the purpose of algorithm analysis. Mention the factors of algorithm analysis. (6)

(ii) Discuss different techniques used for algorithm analysis. (7)

Or

(b) (i) What are the 7 steps to problem solving in computer? (7)

(ii) How do you measure the efficiency of the algorithm? (6)

12. (a) (i) Give a brief on building blocks of algorithms. (7)

(ii) Compare and contrast the classification of programming languages. (6)

Or

(b) (i) Write an algorithm to check whether the given number is Armstrong number or not. (7)

(ii) Draw a flowchart to find the biggest of three numbers. (6)

13. (a) (i) Write a program to find the number of primes between integers m and n (m<n). Also, print the prime numbers. (7)

(ii) Write a program to check whether a given integer is a perfect square or not. (6)

Or

(b) Write the different loop control structures available in C. Explain each one of them briefly. (13)

14. (a) (i) Write a program to check whether an array is ordered. If ordered, print a suitable message as "ascending" or "descending" otherwise "not ordered" (6)

(ii) Write a C program to find the largest element given in an array of elements. (7)

Or

(b) (i) Explain the concept of array of pointers with examples. (6)

(ii) Write a C program to read and display multiple strings using pointers. (7)

15. (a) Define structure and represent its syntax. create a structure of employees having the following information:

Employee id

Employee name

Date of joining

Salary

Write a C program to input information of 20 employees and display the details of the specified employee given the employee id. (13)

Or

(b) (i) Write the syntax for opening a file with various modes and closing a file. (6)

(ii) Explain the following file handling functions:

(1) fseek() (2) ftell()

(3) rewind() (4) feof() (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Write a program to check whether a string is palindrome or not, without using any built-in string functions. (8)

(ii) Write a C program for factorial using recursion function. (7)

Or

(b) (i) Explain initialization of one-dimensional and two-dimensional arrays with examples. (6)

(ii) Write a program to invert an array A having n integer elements without using another array. (ie) A[0] is interchanged with A[n-2], A[2] with A[n-3] and so on. (6)

(iii) Explain runtime initialization of arrays with an example. (3)

(4 a ii)

```
#
#
int long (int a[])
{
for ( i=1 , i<n i++)
{
if (a[i]>max){
max = a[i]}
}
return a[i];
}
```

```
int main() {
int i, a = {2, 1, 2, 3} , max;
n = sizeof array;
max = a[0];
print (" largest ", largest(a));
}
```