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MCS-011

M. C. A. (REVISED)/B. C. A. (REVISED)
(MCA/BCA)

Term-End Examination

June, 2020

MCS-011 : PROBLEM SOLVING AND
PROGRAMMING

Time : 3 Hours

Maximum Marks : 100

Weightage : 75%

Note : (i) Question No. 1 is compulsory.

(ii) Answer any three questions from the rest.

1. (a) Give the equivalent C expression for the following algebraic expression : $2 \times 3 = 6$

(i)
$$\frac{a^2b^3c^4 - d^4}{e(m - n)}$$

(ii)
$$xy - \left[(p + q)^4 / r^2 \right]$$

P. T. O.

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- (b) Write a recursive function in C to generate a Fibonacci series. 6
- (c) Write an algorithm and draw a corresponding flow chart to check whether the given number is prime or not. 8
- (d) Write an interactive C program to perform the following operation on a 3×3 matrix with appropriate validation checks : 10

$$C = A * B$$

- (e) Explain the differences between static, auto, register and global variables with an example for each. $2\frac{1}{2} \times 4 = 10$
2. (a) List the arithmetic, logical and relational operators in C. When a , b , c and d are integers and values of a , b and c are 8, 6 and 4 respectively. Find the value of d , 8
if $d = a + (b - c) * a / c$

- (b) Write a program in C to generate the following pattern : 6

1

1 2

1 2 3

1 2 3 4

- (c) Differentiate between call-by value and call-by reference using an example program for each. 6
3. (a) Using pointers, write a program in C to count the no. of occurrence of each character in a given string. 10

Sample I/P : ARRANGE

O/P :

A - 2 times G - 1 time

R - 2 times E - 1 time

N - 1 time

- (b) Write a C program to calculate the income tax for 5 employees if name of the employee, designation, department and annual salary is given as per the following slab-rate : 10
- Below 5 lakhs : No tax
- Above 5 lakhs and below 7 lakhs : 10% tax on annual income
- Above 7 lakhs and below 10 lakhs : 20% tax on annual income
- Above 10 lakhs : 30% tax on annual income
4. (a) Using file handling concept, write a C program to read a file and count the no. of lines in the file. 10

(b) What are Unions ? Give an example code segment to initialize a union and to access a member of a union. Mention the difference between a structure and a union.

5. (a) Explain the following conditional statements with an example for each : 10

(i) If else statement

(ii) If statement

(iii) Nested if else statement

(iv) Else if ladder

(b) Define a function in C. List and explain various categories of functions. Also, illustrate a function to find square root of a given number. 10