

**B.TECH/BT/CE/CHE/EE/ME/1<sup>ST</sup> SEM/CSEN 1001/2018**  
**PROGRAMMING FOR PROBLEM SOLVING**  
**(CSEN 1001)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as  
practicable.*

**Group - A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) `#define sqr(a) a*a`  
`x = 5;`  
`y = sqr(x+2);`  
Value of y is  
(a) 49                      (b) 17                      (c) 94                      (d) 71.
- (ii) Which of the following is equivalent to `y = y * 2`, (data type of y is int)?  
(a) `y = y << 1`              (b) `y = y << 2`              (c) `y = y >> 1`              (d) `y = y >> 2`.
- (iii) If your program contains a line `#define M 20`, then, within the program  
(a) **M** can be assigned to zero only              (b) only **M--** is allowed  
(c) **M** can never be changed                      (d) only **M++** is allowed.
- (iv) What will be the output?  
`#include <stdio.h>`  
`int main()`  
{  
`int x = printf("%s", "KOLKATA");`  
`printf("%d", x);`  
`return 0;`  
}  
(a) syntax error              (b) 7                              (c) runtime error              (d) 0 (zero).
- (v) Which one of the following declarations is invalid?  
(a) `int 2A`                      (b) `int A2A`                      (c) `int A2`                      (d) `int AA2`.
- (vi) What will be the value of **c**? `int a = 5, b = 6; int c = ++b - a++;`  
(a) 0 (zero)                      (b) 2                              (c) -2                              (d) 11.
- (vii) Assuming the number in a 2's complement form (8-bit), the decimal equivalent of  $(10101011)_2$  is  
(a) +171                      (b) +85                              (c) -85                              (d) -43.

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- (viii) What is the octal representation of  $(A3B6.DF)_{16}$ ?  
(a)  $(121666.676)_8$                               (b)  $(121665.766)_8$   
(c)  $(121656.676)_8$                               (d)  $(121676.776)_8$ .
- (ix) Select the fastest memory unit.  
(a) Cache                      (b) RAM                              (c) Hard disk                      (d) Register.
- (x) In which part of the program compilation process macros are dealt with?  
(a) Assembly                              (b) Pre-processing  
(c) Linking                                      (d) None of the above

**Group - B**

2. (a) A float type variable **x** is assigned the decimal value of -14.25. What is the representation of **x** using the single-precision 32-bit floating point format IEEE-754 standard?  
(b) Draw a flowchart to print all the prime numbers ranging from 101 to 200.  
**7 + 5 = 12**

3. (a) Convert from one number system to the other:  
(i)  $(29.65)_{10} = (?)_2$   
(ii)  $(364364364)_8 = (?)_{16}$   
(iii)  $(10110.0101)_2 = (?)_{10}$   
(b) Calculate:  $(FACE)_{16} - (FEE)_{16}$   
(c) Calculate:  $(10010)_2 - (111)_2$   
(d) Calculate the following in binary 2's complement sign magnitude form:  
 $(19)_{10} + (-25)_{10}$   
**(2 × 3) + 1 + 1 + 4 = 12**

**Group - C**

4. (a) Rewrite the following if-else ladder using switch-case:  
`if (num == 1)`  
`strcpy(word, "ONE");`  
`else if (num == 2)`  
`strcpy(word, "TWO");`  
`else if (num == 3)`  
`strcpy(word, "THREE");`  
`else`  
`printf("Incorrect");`  
(b) When is it not possible to convert an if-else ladder to switch-case?  
(c) Write a program to check whether a number is a palindrome or not, without using array.  
**3 + 3 + 6 = 12**
5. (a) Write an iterative C program to find the GCD of two numbers. Now write a recursive C program to solve the same problem. Which one will you prefer to solve the above problem and why?  
(b) What is ternary operator? Explain with one example.  
(c) Write the differences between "break" and "continue" statements with examples.  
**(3 + 2 + 1) + (1 + 3) + 2 = 12**

**Group - D**

- 6.(a) Write a program in C to find the product of two matrices. First input the matrices, print them in matrix format, then check whether multiplication is possible or not; if possible, multiply the matrices and print the result in matrix format, otherwise print proper message.
- (b) Consider the following function prototype:  
`void swap(int*, int*);`  
 Write the body of the function and use it to swap two integers. Write the driver program to implement the function.
- (c) What are void pointer and null pointer?

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$$6 + 4 + 2 = 12$$

7. (a) Implement the following function with the prototype given below  
`int exponent (int x, int y);`  
 This function will evaluate and return  $x^y$  if there is no overflow. Otherwise in case of overflow(i.e value out of range for integer),the function will return 0.
- (b) Write a C program to reverse any number, using recursion.
- (c) How does a local static variable behave differently from a local variable in a function?

$$4 + 6 + 2 = 12$$

**Group - E**

8. (a) Write a program in C to count and print total number of characters in a text file. Also print the last  $n$  characters from the file. ( $n$  is a user input).
- (b) Create a structure to store the name, mobile number and the marks of student. Create an array to store the details for five students and print the details of the student whose marks is maximum.

$$(3 + 3) + 6 = 12$$

- 9.(a) Explain the meaning of the following declarations:  
`int (*a)[10];`  
`int *a[10];`
- (b) Write a function in C to find both maximum and minimum of some integers stored in an array. The function takes the array and size of the array as parameters and returns both the maximum and minimum values of the array. Write the driver program to test the function.

$$2 + 10 = 12$$