Registration Number:

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| col LOGO outline**ST.JOSEPH’S UNIVERSITY, BENGALURU -27**  **B.Sc – I SEMESTER**  **SEMESTER EXAMINATION: OCTOBER 2023**  **( Examination conducted in NOVEMBER/DECEMBER 2023 )**  **CS 121 – Computer Fundamentals & Programming in C**  **Time: 2 Hours Max Marks: 60**  **This paper contains 2 printed pages and 3 (A, B & C) parts** | | |
| **Part A**  **Answer all the 5 questions** **2x5=10** | | |
| 1 | What is the output of this code segment? Which series is the following code generates?  T1 = 0, T2=1; i=1;  printf(“%d %d “, T1, T2);  while( i<=5){  T3 = T1 + T2;  printf( “%d “, T3);  T1= T2;  T2 = T3;  i++;  } | 2 |
| 2 | What is a ternary operator? If A = 40 and B = 20, Show how **ternary operator** is used to find the maximum number between these two variables. | 2 |
| 3 | What do you mean by BCD? If 22, 41 and 24 are the **OCTAL equivalents** of alphabets S, J and U. Write the binary equivalent to represent SJU. | 2 |
| 4 | What is the **HEXADECIMAL** equivalent of the binary number **10101010**. Calculate the **decimal value**. | 2 |
| 5 | What do you understand by the term **CPU**? Explain. | 2 |
| **PART B**  **Answer any 5 out of 7 questions 4x5=20** | | |
| 6 | Write flowchart to input numbers into a 3x4 matrix. Find the maximum number and indicate its location. | 4 |
| 7 | Write a program in C to input some numbers into an array and search for a given number in that array. If found, a message to be displayed indicating the location otherwise indicate that the number does not exist in the array. | 4 |
| 8 | Write a function sub program in C to return 1 if a given number is a **PRIME** **number** or else return -1. | 4 |
| 9 | What do you mean by a pointer? How would you allocate memory to an integer point?  int X, \*ptrX; X = 40, Y;  Show how would you assign the address of X to ptrX? And how you would access the data at ptrX and assign it to Y? | 4 |
| 10 | Which **string function** would you use to compare two strings? What are various values returned by this functions? If S1 and S2 are two strings containing “Ashok” and “Ashish”, what is the value returned by this function? | 4 |
| 11 | Write a program in C to find the sum of N terms of the following series.  S = 1 + 3 + 5 +… N Terms. | 4 |
| 12 | What do you mean by the **TRACE** of a matrix? Write a program in C to input data into a square matrix and find the trace of that matrix. | 4 |
| **PART C**  **Answer any three out of 4 questions 10 x 3=30** | | |
| 13 | 1. Pictorially show the **basic organization** of a digital computer system. 2. Write **function sub programs** to input and print and find the sum of matrices of dimensions MxN. Use them in the main program to input data into two matrices and find the sum of those two matrices and print the result. | 3  7 |
| 14 | 1. Show how you would you find the sum of ( 0110)2 **and**  (1011)2 and subtract 1110 from 10110 using 1s complement? 2. Write a program in C to input some numbers into an array and sort them using **SELECTION SORT** technique. | 3  7 |
| 15 | 1. Write a function sub program **using pointers** to return the length of a string.   b) Write **function sub programs** in C to return the **cosine of an angle** in degrees by summing the terms of the cosine series as long as the absolute value of the term generated is more than equal to 0.0001. Use this function in the main program to list the cosine of angles between 0 to 180 for every 10 degrees. | 3  7 |
| 16 | 1. What is the difference between a **structure** and a **union** in C. Using a structure declare a new data type **COMPLEX** to represent a COMPLEX NUMBER having real and imaginary parts. Create a data variable **Cmp** of COMPLEX type and show how you would assign the values of the complex number (**5 – 7i)** to it. 2. Write a program in C to compute the Gross and net salary of an employee given his name and Basic salary under the conditions given: If the basic salary is less than 5000, DA = 30% of the basic and Tax= 8% of Basic. If the basic pay is great than equal 5000 and less than 10,000, DA= 40% of Basic and Tax= 10% of Basic. If the basic is greater than equal to 10,000 then DA= 50% and Tax=20% of basic. HRA is 20% of Basic. Gorss = Baisc+DA + HRA, Net Salary = Gross – IT. Print the pay slip. | 4  6 |
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