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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF INFORMATION SCIENCE
END TERM EXAMINATION - JAN 2023**

Semester : Semester I - 2022

Date : 11-JAN-2023

Course Code : CSA1001

Time : 9.30AM - 12.30PM

Course Name : Sem I - CSA1001 - Problem Solving using C

Max Marks : 100

Program : BCA / BCV / BCG / B.Sc-Data Science

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE FOLLOWING QUESTIONS

10 X 2 = 20M

1. Explain the syntax of printf and scanf statement with example.

(CO1) [Knowledge]

2. Explain the logical operators with example.

(CO1) [Knowledge]

3. What happens when we execute the code

```
fact=1;
for(i=0;i<=10;i++);
    fact=fact+i;
printf("Fact=%d\n",fact);
while(fact!=0);
{
fact--;
}
printf("FAct=%d\n",fact);
```

(CO2) [Knowledge]

4. Write the syntax of switch statement. What happens if break is not given inside the switch.

(CO2) [Knowledge]

5. Explain How 2D array can be declared and accessed with example

(CO3) [Knowledge]

6. Explain with an example how values are stored in arrays and how they can be accessed.

(CO3) [Knowledge]

7. How does strcmp() works. Explain with example (CO3) [Knowledge]
8. What is an union? How union are different from structures (CO4) [Knowledge]
9. What is structure? Explain the advantages of structures over arrays. (CO4) [Knowledge]
10. Given the value of p=10 and address of p=1001 and we have a pointer variable ptr1 whose address is 2001 and ptr2 whose address is 3001 if we have the declaration *ptr1=&p and **ptr2=&ptr1. What is the value of *ptr1, &ptr1, *ptr2, **ptr2, &ptr2, &p. (CO4) [Knowledge]

PART B

ANSWER ALL THE FOLLOWING QUESTIONS

5 X 10 = 50M

11. Ms. XYZ conducts a yoga class with minimal charges in her place for 15 days. Many of the kids joined to the yoga class, after the yoga class the kids helped her to prepare the mask, where each mask is of the cost 25Rs. Each student prepared 20 masks per day. The kids were also involved in pot painting and each student painted 2 pots per day which was sold for Rs.75 each. After 15 days she sold the masks with discount of 12% and the pots with discount of 25%. What is the income Ms. Vedha earned these 15 days.
 Requirements
 a. Capture the number of students registered for yoga class
 b. Capture the fee for each student
 c. Compute the number of masks prepared in total 15 days and the total cost of it
 d. Compute the number of pot painting in total 15 days and the total cost of it
 e. Compute the amount Ms. XYZ got after selling the masks with discount of 12%
 f. Compute the amount Ms. XYZ got after selling the posts with the discount of 25%
 g. Compute total amount earned by Ms. XYZ and display the same.
- (CO2) [Comprehension]
12. Section BCA student's plans for a trip during the vacation. Mr. ABC takes In-charge of booking bus. They book a Bus, for 1000 km travel they need to pay Rs.15000, in case the distance travelled is between 1000km to 1500km they need to pay an additional amount of Rs.5000. if the distance travelled is above 1500 km they need to pay an additional cost of Rs.12000. Mr. ABC wants to know the final amount he needs to pay to the bus agency. Following are requirements to solve the problem
 a. The total distance travelled in trip has to be captured. b. Check the distance travelled and calculate the amount. c. The total amount Mr.Jayanth has to pay to the bus agency should be displayed.
- (CO2) [Comprehension]
13. Ms. XYZ works in a company. She maintains the details of all the employees of the company. Some times she has to check whether the employee is there are not. She needs an application to perform the search of employee based in the employee id. Write a C application to perform searching given "n" employee id's and display the appropriate message.
- (CO3) [Comprehension]
14. Mr. ABC works in a baking company as an accountant. His role is to compute the salary for each employee at the end of every month. He feels that a software would be best instead of calculating the salary monthly. Given the function signature float calculate(float HRA, float DA, float IT, float Basic); Write the complete C application where the salary is computed as follows. GrossSalary=Basic+HRA+DA and Total Salary=Gross Salary-IT.
- (CO4) [Comprehension]

- 15.** In mathematics while performing some calculations we need to perform operations between complex numbers. A Complex number is a number which has real part and imaginary part value. One such operation is multiplication of two complex numbers. Since a complex number contains real and imaginary part it has to be grouped together. Write a suitable user defined datatype which combines and stores the real and imaginary values as one entity. Write a C application to perform complex number multiplication.

(CO4) [Comprehension]

PART C

ANSWER ALL THE FOLLOWING QUESTIONS

2 X 15 = 30M

- 16.** In image processing, during the preprocessing stage sometimes we add the mask to the image to check about the quality of the image. Mask is also represented as an image. Note that if the resolution of the image is different then images can not be added. Create a C application as to add two images.

(CO4) [Application]

- 17.** Mr. ABC is given the task to write a library for mathematical functions. He decides to include nCr also as a part of the library. There are various categories of functions available. Suggest the better category of function and Write a C program to compute nCr using concept of functions.

(CO4) [Application]
