DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER I [CE/EC/IT]
SUBJECT: (ESC201) PROGRAMMING FOR PROBLEM SOLVING - I

Examination	**: 2nd Sessional**	**Seat No**	**: CE-032**
Date	**: 14/12/2022**	**Day**	**: Wednesday**
Time	**: 03.45pm to 05.00pm**	**Max. Marks**	**: 36**

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 **Do as directed.** **[12]**

CO1 **R** (a) Define 'Array' in C and verify the statement "Array is a fundamental data type of C language". [2]

CO2 **A** (b) Demonstrate different ways of reading strings from terminal. [2]

CO2 **A** (c) Interpret and mention incorrect statement(s) from following that will not store the concatenation of strings s1 & s2 in string s3. [2]

i. s3 = strcat(s1, s2);
ii. strcat(s3, s2, s1);
iii. strcpy(s3, strcat(s1, s2));
iv. strcpy(strcat(s1, s2), s3);

CO1 **R** (d) Explain nesting of functions in C. [2]

CO1 **U** (e) "Use of Terminating null character is a better logical solution while dealing with character arrays". Explain above statement. [2]

CO3 **N** (f) Differentiate 'Pass by Value' and 'Pass by Address'. [2]

Q.2 **Attempt *Any TWO* from the following questions.** **[12]**

CO5 **E** (a) Predict the output by debugging the following ***code snippet(s)***: [6]

i)

```
int i;
char a[20]="ABC";
for(i=1;i<=3;i++)
    printf("#%-5.*s#\n",i,a);
```

ii)

```
int arr[] ={1,2,3,4,5,6};
int i,j,k;

j=++arr[2];
k=arr[1]++;
i=arr[j++];

printf("i=%d, j=%d, k=%d", i, j, k);
```

CO5 **E** (b) Given are two one-dimensional arrays A and B which are sorted in ascending order. Write a program to merge them into a single sorted array C that contains every item from Arrays A and B in ascending order. [6]

CO5 E (c) Formulate a recursive function "rec_fun" which will work according to given function call. Also write appropriate main() function. [6]

Assume Function Prototype: "int rec_fun(int, int)"

Function Call:
int x = rec_fun(2,5);
Output:
2
4
8
16
32

Function Call:
int x = rec_fun(3,4);
Output:
3
9
27
81

Q.3 Do as directed. [12]

CO4 C (a) Design a single user defined function which will perform matrix multiplication and subtraction. Results should be displayed in main(). [6]

CO3 N (b) Compare approaches of following two ways to reverse a string and write a program of any one: [6]

i) Reverse a string without using any other char array. (In-place reverse)
(Hint: str1="Spain" → **str1** = "niapS")
ii) Reverse a string with the help of another char array.
(Hint: str1="Spain" → **str2** = "niapS")

OR

Q.3 Do as directed. [12]

CO4 C (a) Design a c program which read one string S1 from user. String S1 might contain alphabets, digits and special characters. Create a string S2 that contains all the alphabets from S1 and create a string S3 that contains all the digits and special characters from S1. Also include Last character in String S2 and S3 as total number of characters in it. [6]

Hint:
S1 = "1Hello@3By3e"
S2 = "HelloBye8"
S3 = "1@334"

S1 = "Ab42@3xy4#"
S2 = "Abxy4"
S3 = "42@34#6"

CO3 N (b) Examine following function categories and discuss their functionality. Also write code snippets for same: [6]

i) Functions without argument and with return value (Code Snippet: Area of Triangle)
ii) Functions with argument and with return value (Code Snippet: Area of a Circle)

(Hint: Area of Circle = πr^2, Area of Triangle = ½ x base x height)

Blooms Taxonomy levels: R-Remembering, U- Understanding, A-Applying, N-Analyzing, E- Evaluating, C-Creating