DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF MANAGEMENT AND INFORMATION SCIENCES
FIRST SESSIONAL
SUBJECT: (MCA-203) Data Structures

Examination	**: MCA Semester - II**	**Seat No.**	**: _____**
Date	**: 15-02-2023**	**Day**	**: Wednesday**
Time	**: 02:00 PM to 03:15 PM**	**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]**

(a) What will be the outcome for the following line in a 32 bit system? Provide a proper explanation to support your answer. [2]
CO2 A

```
printf("%d", sizeof(void *));
```

(b) What will be the outcome for the following code in a 32 bit system? Provide a proper explanation to support your answer. [2]

```
#include<stdio.h>
int main(int argc, char *argv[]){
    int x = 1, z[2] = {10, 11};
    int *p = NULL;
    p = &x;
    *p = 10;
    p = &z[1];
    *(&z[0] + 1) += 3;
    printf("%d, %d, %d\n", x, z[0], z[1]);
    return 0;
}
```

CO2 A

(c) What will be the outcome for the following code? Provide a proper explanation to support your answer. [2]

```
#include <stdio.h>
int main(){
    int arr[]={1,2,3,4,5};
    int *ptr, i;
    ptr=&arr[2];
    *ptr = -1;
    *(ptr+1) = 0;
    *(ptr-1) = 1;
    printf("\n Array is: ");
    for(i=0;i<5;i++)
    printf(" %d", *(arr+i));
    return 0;
}
```

CO2 A

(d) What will be the outcome for the following code? Provide a proper explanation to support your answer. [2]

```
#include<stdio.h>
void swap(char *str1, char *str2){
    char *temp = str1;
    str1 = str2;
    str2 = temp;
}
int main(){
    char *str1 = "Hello!";
    char *str2 = "How Are You?";
```

CO2 A

```
    swap(str1, str2);
    printf("str1 is %s \nstr2 is %s",str1,str2);
    return 0;
}
```

CO2 A (e) Discuss the *calloc* and *free* function. [2]

CO2 A (f) Given the base address of an array A[1300.....1900] as 10200 and size of each element is of type int in the memory for 32-bit compiler. Find the address of A[1500]. [2]

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

CO5 E (a) Convert the following infix expression to postfix. Mention steps performed on operator and output stack. [6]

```
( 2 - 3 + 4 ) * ( 5 + 6 * 7 )
```

CO5 E (b) Consider an empty stack of integers. Let the numbers 1,2,3,4,5,6 be pushed onto this stack in the order they appear from left to right. Let S indicate a push and X indicate a pop operation. Permute the Output into the order 325641(output)? Show necessary steps/ operations on stack in detail to perform the operation. Provide the Operation sequence required for the same. [6]
(*Sample: operation sequence SSSSSSXXXXXX create output 654321*)

CO5 E (c) Discuss algorithm and Solve the following postfix expression. Mention steps performed on output stack. [6]

```
2 3 - 4 + 5 6 7 * + *
```

Q.3 Attempt the following questions. **[12]**

CO3 A (a) Write a C program to create structure for book{name, price, pages} records. Create a menu driven program that enables users to enter book N books which are stored in a stack of size N. Sort the stack of books created by the user based on the book price and display books in the final sorted stack. [08]
[*Implement method for PUSH, POP, IS_EMPTY, IS_FULL*]

CO1 A (b) Explain the following with examples: [04]
(i) Constant pointer vs Pointer to Constant (ii) Dangling Pointer

OR

Q.3 Attempt the following questions. **[12]**

CO3 A (a) Write a C program where the user provides an array of N elements and M indexes, for each index, find the next greater element in the array and print its value. If there is no such greater element to its right then print -1. Solve this using stack data structure. [08]
[*Assume you have a file "intstackimplementation.h" which has basic generic method for PUSH, POP, IS_EMPTY, IS_FULL - mention only signature for each in your solution*]
Sample Input :

```
data[] = {1, 5, 3, 36, 55, 89, 100, 62}
indexes[] = {3, 6, 1}
```

Sample Output:

```
55  -1  36
```

CO1 A (b) What is Stack? Explain below Stack operation with their algorithms/ pseudo code. [04]
(i) PUSH (ii) POP (iii) PEAK (iv) PEEP