Roll No. 2022UG3008

**Indian Institute of Information Technology Ranchi**

**Department of Electronics & Communication Engineering/Computer Science & Engineering**

**B. Tech End Semester Examination –Autumn Semester 2022-23**

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| **Semester: 1st** | **Course Instructor:** |
| **Course Code: CS1001** | **Course Name: Computer Programming: Concepts and Practices** |

**QUESTION PAPER**

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|---|---|
| **Duration: 3 hrs.** | **Max Marks: 100** |

**Instructions:**
(1). Number in [ ] indicates marks.
(2). Any missing data can be assumed suitably.
(3). Symbols have their usual meaning.

**Section A:** Answer all the questions.

**1** Write down the outputs with justification- [5+5+5]

**(a)**

```
#include<stdio.h>
int main(){
int a = 320;
char *ptr;
ptr =( char *)&a;
printf("%d ",*ptr);
return 0; }
```

**(b)**

```
#include<stdio.h>
int main(){
 float a=0.7;
if(a<0.7){
printf("C"); }
else{
printf("C++"); }
return 0; }
```

**(c)**

```
#include<stdio.h>
#include<string.h>
int main(){
char *ptr1 = NULL;
char *ptr2 = 0;
strcpy(ptr1," c");
strcpy(ptr2,"questions");
printf("\n%s %s",ptr1,ptr2);
return 0; }
```

**2 (a)** Write a general-purpose function to convert any given year into its Roman equivalent. *Use these* Roman equivalents for decimal numbers: 1- I, 5-V, 10-X, 50-L, 100-C, 500-D, 1000-M. [10]
*Eg:* Roman equivalent of *1525* is *MDXXV*
*Roman equivalent of 1988 is MDCCCCLXXXVIII*

**(b)** *Explain and compare* r,w,a and r+, w+ and a+ file operation mode. [5]

**3 (a)** [5]

```
#include <stdio.h>
void f (int *p, int *q) {
p=q;
*p=2;}
int i = 0, j = 5;
int main ( ){
f(&i, &j);
printf ("%d %d \n", i, j);
return 0;}
```

Explain the output of the program.

**(b)** Write a program to convert a string integer value to an equivalent integer value without using any inbuilt functions. [5]
Eg: char x[10] = "123", the equivalent integer output for this should be 123.

**(c)** Write macro definition to test whether a character is a small case letter or not. [5]

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|---|---|---|---|
| 4 | (a) | What will be the output of the following snippet of the program along with justification. | [5+5+5] |

**i)**
```
#include<stdio.h>
int main() {
char c[]= "ABCD2023";
char *p=c;
printf("%s",p + p[3]-p[1]);
return 0; }
```

**ii)**
```
#include<stdio.h>
int main() {
int b[3][3][3]= {{11,12,13,
24,15, 76,78,98,99},{20, 27,
26, 23, 34, 35, 36, 39,
38},{69, 60, 81, 82, 73, 34,
65, 96, 57}};
int i = 0,j = 0, k = 0;
for(i = 0; i < 3; i++) {
 for(k = 0; k < 3; k++)
 printf("%d", b[i][j][k]);
 printf("\n"); }
return 0; }
```

**iii)**
```
#include <stdio.h>
int main(){
int
arr[]={1,2,3,4,5,6,7,8,9,0,1,2,
5}, *ip=arr+4;
printf("%d\n", ip[1]);
return 0;}
```

**Section B:** Answer any **two** questions

| | | | |
|---|---|---|---|
| 5 | (a) | What are the different types of storage specifiers in the C programming language? Explain with respect to storage type, initial value, scope and lifetime. | [6] |
| | (b) | Given three variables x, y, z. Write a function to circularly shift their values to right. In other words, if x=5, y=8, z=10, after circular right shift, y=5, z=8, x=10. Call the functions with variables a,b,c to circularly shift values. | [6] |
| | [c] | Write a C program using array student[5][3] to store the details of 5 students' Student_Id, Roll_no and marks.<br>i) Display the average marks of student<br>ii) Display the details of the student having the lowest marks.<br>iii) Display the details of the employee having Highest marks. | [2+3+3] |
| 6 | (a) | What will be the output of the program? Justify your answer.<br>`char p[20];`<br>`char *s= "Hello";`<br>`int len= strlen(s);`<br>`for (i=0; i< len; i++)`<br>`p[i]=s[len-i];`<br>`printf("%s",p);` | [5] |
| | (b) | What are the differences between array of pointer and pointer of array? Explain with suitable examples. | [5] |
| | (b) | `main()`<br>`{ static char *s[]={ "ice", "green", "cone", "please"};`<br>`static char **ptr[]= {s+3, s+2, s+1, s};`<br>`char ***p=ptr;`<br>`printf("\n %s", **++p);`<br>`printf("\n %s", *--*++p+3);`<br>`printf("\n %s", *p[-2]+3);`<br>`printf("\n %s", p[-1][-1] +1); }`<br>What will be the output of the above C program segment? Explain it. | [10] |
| 7 | (a) | Explain the fundamental differences of the following-<br>(i) call by value vs call by reference (ii) malloc() vs calloc () (iii) structure and union<br>(iv) function and recursive function | [4X4=16] |
| | (b) | Justify your output-<br>`#include<stdio.h>`<br>`extern int x;`<br>`int main(){`<br>`do{ do{`<br>`printf("%d",x); }`<br>`while(!-2); } while(0);`<br>`return 0; } int x=8;` | [4] |

***End***