RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Information Technology
First Year - Semester I Examination – May 2022

ICT 1402 – PRINCIPLES OF PROGRAM DESIGN AND PROGRAMMING

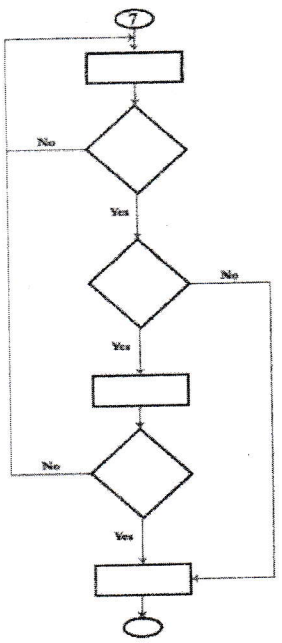
Answer all questions **Time: THREE (03) hours**

1.

a) Write a pseudo code for an algorithm with a natural number, n, as its input which calculates the following formula and display the result in the standard output: S = ½ + ¼ + … +1/n. (06 marks)

b) The following empty flowchart gives the steps to be followed while seeking admission to new school. The phrases to be filled in the boxes are also given. Complete the flowchart by filling in the number of the corresponding phrase, inside each box. For example: the number corresponding to the first box in the flowchart is 7. (05 marks)

1. Search for a school
2. Prepare for the admission test and write the test.
3. Did you pass the exam?
4. Submit necessary documents and get admission.
5. End
6. Are seats available?
7. Start
8. Is there an admission test?



c) Briefly explain the use of comments in programming. (04 marks)

d) Mention whether the following programming errors are logical errors or run time error. (05 marks)

i. Type mismatch: cannot convert.
ii. Input Output device error
iii. Variable already defined.
iv. Mismatch brackets
v. Division by zero

2.

a) You have to store a value in between -32768 and 32767 in a variable. Mention what is the best suitable data type for the variable and specify the reasons for your answer. (04 marks)

b) There are two (02) suggested variable names as **first@name** and **_first_name.** State whether the names are correct or incorrect with the reasons for your answers. (05 marks)

c) A company insures its drivers in the following cases: (06 marks)

If the driver is married

If the driver is unmarried, male and above 30 years of age

If the driver is unmarried, female and above 25 years of age

Read age, sex and marital status through the keyboard and output whether the driver is insured or not. (Hint: use less number of statements as much as possible.)

d) Specify the disadvantages of using switch case over if else. (05 marks)

3.

a) Write the output of following program. (05 marks)

```
int main()
{
        int i;
        for(i=0; i<=100; i+=5)
```

```
        printf( "%d ",i);

    return 0;
}
```

I. Change the code to display until number 50. (03 marks)

II. Change the code to display the same output except numbers 50 and 60. (03 marks)

b) Write the output of following program (05 marks)

```
int main()
{
    int i=1,j=1;
    char x='a';
    float y=1.2;

    printf("%d", i+x);
    printf("%f", (float)j+y);
return 0;
}
```

c) Mention the disadvantage of using implicit type conversion over explicit type conversion. (04 marks)

4.

a) Write a program to print diagonal elements of the following matrix having a positive slope

2	3	9	3
4	8	5	6
6	4	7	4
8	7	1	5

Output should be: 2,8,7,5 (06 marks)

b) Write the output of following program and mention the reasons for your answer.

```
#include <stdio.h>
```

```
int g = 20;
int main()
{
        int g = 10;

        printf("value of g = %d\n", g);
        return 0;
}
```

(04 marks)

c) Briefly explain two (02) advantages of using global variables than using local variables. (04 marks)

d) Compare and contrast the *write_only mode* and *append mode* in file handling. (06 marks)

5.

a) Write the output of following program (04 marks)

```
int main()
{
        char *s= "hello";
        char *p = s;
        printf("%c\t%c", p[0], s[1]);
        return 0;
}
```

b) Explain the use of realloc() function related to dynamic memory allocation. (04 marks)

c) Define a complex number using a struct. (Hint: complex number contains real value and imaginary value) (06 marks)

d) Write a user defined function which takes 2 complex objects and perform the addition on them (Hint: Use the struct you have created in part(c)). (06 marks)

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