

[Total No. of Questions: 09]

[Total No. of Pages: 3]

Uni. Roll No.

Program: B.Tech. (Batch 2018 onward)

Semester: 2

Name of Subject: Programming for Problem Solving

Subject Code: ESC-104

Paper ID: 15935

Time Allowed: 03 Hours

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Max. Marks: 60

NOTE:

01 JUL 2022

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any-missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) Describe Operating System. List the various functions of the operating system.
- b) Discuss Syntax and logical errors.
- c) Explain the use of scanf statement.
- d) How to initialize a structure. Give an example.
- e) Analyze the program given below and write and explain the output.

```
#include <stdio.h>
void fun(int x)
{
    x = 30;
}
int main()
{
    int y = 20;
    fun(y);
    printf("%d", y);
    return 0;
}
```

- f) Determine the output of the following program? and explain your answer.

```
#include <stdio.h>
void fun(int *ptr)
{
    *ptr = 30;
}
int main()
{
    int y = 20;
    fun(&y);
    printf("%d", y);
    return 0;
}
```

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01 JUL 2022

Part – B

[Marks: 04 each]

- Q2. Define flowchart. Construct a flowchart and write an algorithm to compute the volume of a sphere. Use the formula: $V = (4/3) * \pi * r^3$ where π is equal to 3.1416 approximately. The r is the radius of the sphere. Display the result.
- Q3. Define structure and explain the concept of array of structures in detail.
- Q4. Define pointers? Demonstrate the working of a pointer with the help of a suitable example.
- Q5. What are functions? List types of user defined functions with suitable examples.
- Q6. Explain various conditional branching statements in detail.
- Q7. Distinguish between searching and sorting. Explain any sorting algorithm by taking a suitable example.

Part – C

[Marks: 12 each]

- Q8. Illustrate the need of recursion in C. Write a program in C to print the first 50 natural numbers using recursion.

OR

Write an algorithm for Selection sort and explain taking a suitable example.

- Q9. Define an array. Differentiate between 1-D and 2-D arrays. Create a Program to find the second largest & smallest elements in an array.

OR

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01 JUL 2022

Differentiate between while and do while loop, also write the syntax for 'FOR' loop.
Create a program to make a pyramid pattern using numbers and the Output of your
program must exactly match the below given.

```
1
12
123
1234
12345
```
