Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 85019

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

First Semester

Civil Engineering

CS25C02 — COMPUTER PROGRAMMING : PYTHON

(Common to Aeronautical Engineering/Aerospace Engineering/Automobile Engineering/Civil Engineering (Environmental Engineering)/Electronics and Instrumentation Engineering/Environmental Engineering/Environmental Science and Technology/Geoinformatics Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Mechanical Engineering/Mechanical Engineering (Specialised in Automobile)/Mechanical Engineering (Specialised in Smart Manufacturing)/Mechanical and Automation Engineering/Mechatronics Engineering/Robotics and Automation/Agricultural Engineering/ Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Fashion Technology/Food Technology/Handloom and Textile Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Textile Chemistry/Textile Technology)

(Regulations 2025)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How will you find the total number of squares in a chess board using algorithmic thinking?

2. What is operator precedence and associativity in python? Give an example.

3. Compare between nested if and if-elif statements with an example.

4. Differentiate break and continue statements in python.

5. When do we need set datatype? Give an example.

6. Why do we use Lambda functions? Give an example.

7. Predict the output of the following code

```
str1 "Hello World"
str2=str1*2
print(str2[ 8 : -2])
```

8. How will you add and remove keys in dictionary? Give an example.

9. List the file opening modes in Python.

10. Write down any four methods of Pandas package.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail the steps involved in Algorithmic problem solving. (8)

    (ii) What is an algorithm? Illustrate the characteristics of a good algorithm with an example. (8)

Or

(b) (i) Draw a flowchart and write an algorithm for checking the greatest among three numbers (8)

    (ii) Write a python program for finding the roots of the $ax^2 + bx + c = 0$ quadratic equation with an appropriate data types and user defined message if the discriminant is negative. (8)

12. (a) (i) Write a python program to convert a decimal number to binary and from binary to decimal number without using built in function. (8)

    (ii) A number is a perfect number if is equal to sum of its proper divisors, that is, sum of its positive divisors excluding the number itself. For example 6 is a perfect number, because it is sum of its divisors 1, 2, 3 (excluding 6 — the number itself).

    $6 = 1+2+3$

    Write a python program find out whether a given number is perfect number or not. (8)

Sample Inputs	Sample Outputs
28	28 is a perfect number
25	25 is a not a perfect number
496	496 is a perfect number

Or

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(b) (i) Write a python function to find the average of 'n' given numbers. (8)

(ii) An Armstrong number is a 3-digit number that is equal to the sum of the 3rd powers of its digits. For example,

$153 = 1^3 + 5^3 + 3^3$

$407 = 4^3 + 0^3 + 7^3$

Write a python program to find out whether a given three digit number is Armstrong number or not. (8)

Sample Inputs	Sample Outputs
371	Given number is an Armstrong number
118	Given number is not an Armstrong number

13. (a) (i) Write a python recursive function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument. (8)

(ii) Write a Python program to get a list, sorted in increasing order by the last element in each tuple from a given list of non-empty tuples.
Sample List: [(2, 5), (1, 2), (4,4), (2, 3), (2, 1)]
Expected Result : [(2, 1), (1, 2), (2, 3), (4, 4), (2, 5)] (8)

Or

(b) (i) Compare and contrast between Slicing, Splitting, and Stripping operations in string with relevant examples. (8)

(ii) Explain in detail about various types of parameters passing mechanism in the functions of python with examples. (8)

14. (a) Create an address book to store the roll Number, name, mobile number and address of all the students in a class. Select the suitable python datatype(s) and perform the following operations on it:

- List all the students you have stored by roll number.

- Add a new student

- Print the mobile number of a student with the given roll number

- Print all the students of the class with their names sorted

Or

(b) Design an algorithm and develop a Python program for the following problem statement:

Read the string in a given file named as "input.txt", and produce a new file named as "output.txt" in which each word from the input string is getting reversed.

input.txt : "It is a great day"

output.txt: "tI si a taerg yad"

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15. (a) (i) Describe in detail about SciPy package and its functions in python with examples. (8)

     (ii) Write a python code to check whether a Numpy matrix contains a specified row. (8)

Or

(b) (i) What is a module in python? What are the benefits of modular development? Compare between built-in and user-defined modules. (8)

     (ii) Define a function Isprime(n). Isprime(n) returns true if n is prime and false otherwise. Store this in a user define module. Import this module and find the first 1000 prime numbers using Isprime(n) function. (8)

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