

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2083 Baishakh

Exam.	Back (New Course)		
Level	BE	Full Marks	60
Programme	BEL	Pass Marks	24
Year / Part	I / II	Time	3 hrs.

Subject: - Advanced Computer Programming (ENCT 153)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. Explain different programming paradigms with examples. Which one is Python based on and why? [2+2]
2. What are application areas of Python in electrical engineering? Mention features of Python. [2+2]
3. Explain comparison operators with examples. Write a Python program using loop and conditional statements to check whether a number is prime or not. [2+4]
4. What is lambda function? Write a Python program using lambda function to filter even numbers from a list. [2+3]
5. Explain the use of set, dictionary, list and tuples data types in Python with examples. [5]
6. What is the purpose of the `__init__()` method in Python classes? Write a Python program to declare class student with attributes name, roll, marks and method to display student details. Create an object of student and display the student details. [2+4]
7. Explain the concept of inheritance. Show single, multiple, hierarchical and multi-level inheritance in Python with suitable example. [2+4]
8. Define operator overloading. Overload binary operators (+ and -) to calculate the sum, difference of two vectors. Use class as Vector with attributes x and y. [2+4]
9. Differentiate between syntax error and exception with examples. Write a Python program to define a custom exception class. [2+4]
10. What is NumPy? Explain how to create, slice and reshape NumPy arrays with examples. [1+3]
11. What are Python modules, packages and libraries? What are the common ways of importing a module? [1+3]
12. Describe how NumPy can be used to calculate basic statistical measures such as mean, median, standard deviation and variance with example. [4]

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1. Compare object-oriented and functional programming paradigms with examples. List two advantages and disadvantages of imperative programming. [2+2]
2. What are top python implementations? Mention limitations of Python. [2+2]
3. Explain logical operators with examples. An Electrical engineer collects resistance values (in ohms) from 10 different resistors. Write a Python program to store these values in a list and calculate sum and average using loops and operators. [2+4]
4. What is lambda function? How does it differ from a user defined function? Explain with examples. [5]
5. Explain the difference between mutable and immutable data types in python. Write a Python program to create a set and perform union and intersection operations. [2+3]
6. Define classes and objects in Python. Write a python program that represent a rectangle class with attributes length and width. Add methods that return area and perimeter of the rectangle. [2+4]
7. How can a Python class be made iterable? Describe the necessary methods to implement and their roles. Give an example of an iterable class. [2+4]
8. Explain operator overloading in Python. Create a class Book with "noOfPages" as an attribute. Overload + operator to add two book objects. [2+4]
9. Explain exception handling in Python with try-except-finally block. [1+2]
10. Explain file handling in Python. Write a python program to write and read from a binary file. [1+2]
11. What are Python modules, packages and libraries? List any three commonly used libraries. [3+2]
12. Explain with an example how NumPy arrays are better than Python lists for numerical operations. Use NumPy to create two 2x2 matrices representing current (I) and resistance (R) in a simple electrical network, perform matrix multiplication using $V=IR$, and output the resulting voltage matrix. [3+4]

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1. Discuss about the different programming paradigms with their advantage and disadvantage. [4]
2. Briefly explain different application areas of python programming. [4]
3. Define recursive function. Write a program to find the n^{th} - term of Fibonacci series using recursive function. [2+4]
4. Explain the concept of mutable and immutable data type in python. For the given list of dictionaries, find the TOTAL MARKS obtained: [4+4]

$$d = [{"subject": "math", "marks": 80},$$
$${"subject": "science", "marks": 90},$$
$${"subject": "english", "marks": 80}]$$
5. Explain the significance of lambda function with an example. [2]
6. Explain the benefits of object-oriented programming over procedural programming. [6]
7. Explain the concept of dynamic binding. Write python code to illustrate concept of abstract class. [2+4]
8. Using concept of binary operator overloading, find the sum of complex numbers. Use class called as complex, with two attributes: [real and imaginary]. [6]
9. Define exception. You cannot divide a given number by zero. Based on given statement, write python code to handle the given exception. [2+4]
10. Discuss the difference between a Python module, package, and library. What are the different ways to import modules? [3+3]
11. How do you reshape a NumPy array? Write a program to solve following system of linear equations using NumPy. [2+4]

$$2x + 3y = 12$$

$$4x - 5y = -2$$

TRIBHUVAN UNIVERSITY
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2081 Ashwin

Exam.	Regular (New Course -2080 Batch)		
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Year / Part	I / II	Time	3 hrs.

Subject: - Advanced Computer Programming (CT 153)

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1. Explain different programming paradigm with example for each. [4]
2. List out the features and limitations of python. [2+2]
3. What do you mean by operators? Explain different types of operators available in python with example. [2+4]
4. With example, explain following data structures in python: [6]
 - a) List
 - b) Tuple
 - c) Dictionary
5. Using two-dimensional list, write a program to add two matrices and create the third matrix and display it. [4]
6. In object-oriented programming, explain the concept of constructor. Write a python code to illustrate the concept of constructor. [2+4]
7. Write python code to explain the concept of Single, Hierarchical and multi-level inheritance. [6]
8. Write a program to create a class called **Time** with attributes (**hour, minute and second**) to represent time and add time objects and return the result. [6]
9. Explain different types of errors in python program. Write a python program to create a file called "record.txt" and use it to store the information of two students [Name. Roll No and college Name]. Ask user to enter the information. [2+4]
10. Explain the advantages of using NumPy array over python sequences with an example. [3]
11. Write a python program to create two 2X2 NumPy arrays and performs matrix addition, subtraction and element-wise multiplication and display the result. [9]
