B.S. College, Chiplun
Semester - II ATKT Examination March-25
Class:- F.Y.C.S. Subject:- Design & Analysis of Algorithms
Date:- 10/3/2025 Time:- 2.00pm to 4.30pm.

Time: - 2 hr. 30 min. **Marks: -75**

N.B. **1) All questions shall be compulsory with internal choice within the questions.**
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q.1 **Attempt any four.** **20**

a) Write a python 1-d array program for searching an element in an array.
b) State and explain the asymptotic notations used in analysis of algorithms.
c) How to compare algorithms explain with example.
d) Convert following infix expression to postfix:
T-(R+C) +(D*E)/G) +H
e) What is Polynomial? Explain polynomials represented as linked lists.
f) Write a python 2-d array program for displaying sum of diagonal elements.

Q.2 **Attempt any four.** **20**

a) Differentiate: Recursion and Iteration.
b) Explain bubble sort technique in detail.
c) Write a python program to find pattern in a given string using brute force technique
String: - ABBCBBDABBCBBABBBABBC
Pattern: - ABBC.
d) Find the factorial of any number using recursion.
e) Compare Linear Search and Binary Search technique.
f) Write advantages and disadvantages of insertion sort technique.

Q.3 **Attempt any four.** **20**

a) Describe classification of algorithm by using design methods.
b) Write and explain pros and cons of greedy method.
c) Explain backtracking programming.
d) Write a short note on divide and conquer strategy.
e) Elaborate implementation of file merging problem using greedy technique.
f) Explain implementation of longest Common sub sequence problem using Dynamic Programming

Q.4 **Attempt any five.** **15**

a) Write a note on the rate of growth of algorithm.
b) Explain the partition-based selection algorithm.
c) Write a python program for Tower of Hanoi.
d) The sum of two numbers is 44. If one number is 10, find the numbers by framing a linear equation.
e) Explain properties of algorithm
f) What is dynamic programming? Explain.

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Time: 2 Hours 30 Min. Total Marks: 75

Notes:

1. Figures to the right indicate full marks.
2. All questions are compulsory. Use internal options to the questions.
3. Illustrations, in-depth answers and diagrams will be appreciated.
4. Mixing of sub-questions is not allowed.

Q. 1 Attempt any four of the following. (20M)

a) What is thread? Which methods are provided to the thread class? Explain.

b) Explain the following term:

i) Calendar Module

ii) timedelta Module

c) Write a python program to read the content of the 'first.txt' file and write the same content in the 'second.txt' file.

d) What is a regular expression? Explain with an example.

e) Write a python program to read numbers from number.txt file and find out the number is Armstrong if the number is Armstrong then store it in Armstrong.txt file.

f) With the help of an example, differentiate between match() and search() function.

Q. 2 Attempt any four of the following. (20M)

a) With the help of an example, differentiate between checkbox and radiobutton.

b) Explain the following exception:

i) TypeError ii) ValueError

iii) ZerodivisionError iv) NameError

c) What is GUI programming? Write advantages and disadvantages of GUI programming.

d) Write a program in python to create a login window.

e) When is the 'finally' and 'else' clause used in python exception handling? Explain.

f) Create a table student(rollno, name, subject, marks) and execute the following queries:

i) Insert three records in the student table.

ii) Update student marks whose rollno is 3.

iii) Display name, rollno and marks from student in descending order.

iv) Delete data from student whose subject is Python

Q. 3 Attempt any four of the following. (20M)

a) Explain polymorphism in object oriented programming with an example.

b) Explain method overriding with the help of an example.

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c) Explain following terms with examples:
   i) How to create an object
   ii) Assigning value to an object
   iii) Modify value to an object
   iv) How to pass value to class using an object

d) What is Abstract class? Explain with an examples how abstract base class work.

e) Differentiate between Single Level Inheritance and Multilevel Inheritance.

f) Write a program in python to develop a payroll program for a company using abstract class. The company has two groups of employees: full-time employees and hourly employees. The full-time employees get a fixed salary while the hourly employees get paid by hourly wages for their services. The payroll program needs to print out a payroll that includes employee names and their monthly salaries. To model the payroll program in an object-oriented way to create the following classes:
Employee, FulltimeEmployee, HourlyEmployee, and Payroll.

Q. 4 Attempt any five of the following. (15M)

a) Explain with examples various types of file mode.

b) With the help of an example explain date and time in python.

c) What is socket? Which functions are used to create sockets? Explain.

d) How to use font and colour in python? Explain with examples.

e) What is operator overloading? Explain with examples.

f) Explain following Object Oriented Programming terms :
   i) __init__() function ii) class iii) self

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