

05.12.2023 (E)



Maximum Marks: 100	Semester: July 2023 - October 2023	Duration: 3 Hrs.
Programme code: O1	Examination: ESE Examination	
Programme: B. Tech Computer Engineering	Class: SY	Semester: III (SVU 2020)
Name of the Constituent College: K. J. Somaiya College of Engineering	Name of the department: Computer Engineering	
Course Code: 116U01C304	Name of the Course: Object Oriented Programming	
Instructions: 1) Draw neat diagrams. 2) All questions are compulsory 3) Assume suitable data wherever necessary		

Que. No.	Question	Max. Marks
Q1	Solve any Four	20
i)	'Java is platform-independent'. Is this true? Justify or contradict this statement accordingly.	5
ii)	Compare abstract class and interface in java, with the help of an example of each and three important points of difference.	5
iii)	What are packages? Why are they useful? Give the syntax and brief example of creating and using a package.	5
iv)	What are the static methods? Give an example of calling a static method.	5
v)	'Java is a strongly typed language'. Is this true? Justify or contradict this statement accordingly.	5
vi)	How is memory allocated to objects in Java?	5

Que. No.	Question	Max. Marks
Q2 A	Solve the following Write a Java program for the following problem statement: Given an array of integers nums and an integer target , return indices of the two numbers such that they add up to target . You may assume that each input would have exactly one solution, and you may not use the same element twice. You can return the answer in any order. Example: Input: nums = [2,7,11,15], target = 9 Output: [0,1] Because nums[0] + nums[1] == 9 , we return [0, 1].	10
ii)	Write a Java program for the following problem statement: Given an integer array nums of length n, you want to create an array ans of length 2n where ans[i] = nums[i] and ans[i + n] = nums[i] for 0 <= i < n . Return the array ans . Your program should take the input from the user and display the output to the user.	5
Q2 A	Given a string s, check if it can be constructed by taking a substring of it and appending multiple copies of the substring together. For example, Input: s = "abcabcabcabc" Output: true	10

Because, it is the substring "abc" four times or the substring "abcabc" twice.	
Q 2 B	Solve any One
i)	Draw a class diagram for the following scenario: Consider a library automation application to automate the bookkeeping activities of a Library. The Library has a large number of Issuables. Each Issuable is either a book, a journal or a magazine. The state of each issuable can either be 'on_shelf', 'issued out' or 'on reserve'. A penalty is applicable if the Issuables are not returned on time. Teachers and students can request for new Issuables to be added to the library. Librarian accordingly orders for new Issuables from the distributors, who satisfy the order by delivering the books from the Publisher.
ii)	Develop the class diagram for the following problem. Write the Java skeletal code corresponding to your class diagram: A hospital employs many doctors and many patients are registered with the hospital. A patient can take an appointment with any of the doctors of the hospital on any specific date and at specific time. A patient can have multiple appointments even with the same doctor and even on the same day

Que. No.	Question	Max. Marks
Q3	Solve any Two	20
i)	Explain all the steps to create user defined packages and the steps to use those in another program, with the help of suitable examples.	10
ii)	Explain the life cycle of a thread in detail with relevant method names at each state and with a neat labelled diagram.	10
iii)	Explain the use of all of the following keywords in exception handling with the help of suitable examples: try, catch, finally, throw, throws	10

Que. No.	Question	Max. Marks
Q4	Solve any Two	20
i)	Write a program that creates two threads. Both execute a loop with 10 iterations. One thread generates squares of numbers from 1 to 10. Another thread generates cubes of numbers from 1 to 10. Both of them store their results in a shared array in the order: square followed by cube. So the array will contain : 1,1,4,8,9,27,...100,1000. Use the synchronized keyword.	10
ii)	Write a Java program that takes job applicants' data including their name, age and address (PIN code) as input and stores it in an array. Define two exceptions called "IncorrectName" which will be thrown if there are any non-alphabetic characters in name, and "IncorrectAddress" which will be thrown if the PIN code is not in correct format (6 digit integer). Use these exceptions when you are validating input in your program.	10
iii)	Develop a user-defined package called datetime with a class DateUtils. The DateUtils class should contain methods for working with date and time, such as calculating the difference between two dates or formatting date/time in a specific way. Create a Java program that uses the datetime package to perform date and time operations.	10

Que. No.	Question	Max. Marks
Q5 i)	(Write notes / Short question type) on any four Explain final variables, final methods and final classes with the help of an example of each.	20 5
ii)	Explain the for-each loop	5
iii)	Explain Wrapper classes and their applications.	5
iv)	Explain the use of Enumeration interface	5
v)	What is the difference between local variables and instance variables?	5
vi)	Explain the access modifiers in Java with examples	5