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**TECHNICAL UNIVERSITY OF KENYA**

**FACULTY OF APPLIED SCIENCES AND TECHNOLOGY**

**SCHOOL OF COMPUTING & INFORMATION TECHNOLOGY**

**END OF SEMESTER EXAMINATION SERIES**

**SECOND SEMESTER EXAMINATIONS 2018/2019**

**THIRD YEAR EXAMINATIONS FOR THE DEGREE OF**

**BACHELOR OF TECHNOLOGY IN COMPUTER TECHNOLOGY**

**BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY**

**BACHELOR OF TECHNOLOGY IN COMPUTER AND COMMUNICATION NETWORK TECHNOLOGY**

**ECCI/ECSI/ECII 3205: OBJECT ORIENTED PROGRAMMING**

TIME: 2 Hours

**Instructions to candidates:**

This paper consists of FIVE Questions.

Answer Question ONE [30 Marks] and any other TWO Questions [20 Marks Each].

Write your college number on the answer sheet.

This paper consists of printed pages

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

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**QUESTION ONE: 30 MARKS**

1. Given the code below, you are required to indicate the output clearly explaining the answer [5 Marks].

|  |  |
| --- | --- |
| public class iTax{  public static void main(String[] args) {  System.out.println(“Welcome to iTax");  Person person1 = new Person(2,“Commissioner");  System.out.println(person1.password);  }  } | class Security {  String createPass(int id, String name) {  String pass = id+name.substring(1);  return pass;  }  } |
| public class Person {  int id; String name; String password;  public Person(int anId, String aName){  id=anId;  name = aName;  password = Security().createPass (id, name);  }  } |  |

1. Give 4 differences between a constructor and a method in a class [4 Marks]
2. Explain what is referred to as ***pass by reference*** in Java [2 Marks]
3. Develop code that defines an Abstract Data Type (ADT). You should provide description of how three characteristics of ADTs are evident in your code [5 Mark]
4. With use of examples, differentiate a programming paradigm from a programming language [4 Marks]
5. Describe the benefit of Polymorphism in software engineering practice [2 Marks]
6. Write example code that demonstrates functional overriding and function overloading [4 Marks]
7. Differentiate the two categories of Access and non-Access modifiers. For each category, describe two example modifiers in java. [4 Marks]

**QUESTION TWO: 20 MARKS**

1. A graduate intern has been tasked to develop a school information system in a given county as part of community engagement. You are required to demonstrate the difference between using the structured approach and the Object oriented Approach [12 Marks]
2. Describe three (3) benefits of Object Oriented Approach [6 Marks]
3. Describe two scenarios where OOP approach might not be suited in a project [2 Marks]

**Case study reading for Questions 3 and 4.**

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| --- |
| The Technical University of Kenya has set out to develop a smart campus. This involves automation of all processes in the university. In this context the University head of grounds security has approached you to design a simple system for the personnel officers (askaris) who are stationed at the University gate. The idea is to automate / computerize what happens at the gate. Starting with the Visitors-Book. The visitors’ book records all visitors to the University premises. At any given gate, a record of a visitor shows, among other things the following: The officer who attended to the visitor, the date of visit, details of the visitor, destination point/office, the purpose/objective of the visit, mode of traveling used (and corresponding details), report from the visited person, etc. After listening to the visitor, the personnel officer must indicate on the form whether the purpose of visit is official, private, or returning resident who resides in the university. Official can be administrative office visit, lecturing, studying, working, etc. Moreover, the system should be able to adapt to the characteristics of the officers, be scalable to have incorporate more features as the project evolves and share data with other systems in the university. |

**QUESTION THREE: 20 MARKS**

From the case described about development of a smart campus at TU-K, you are required to:

* 1. Describe why you would recommend use of OOP approach in developing the system [4 Marks]
  2. Come up with a flow chart describing the process [4 Marks]
  3. Identify 8 classes to be developed for the system. For each class, indicate relevant properties and behaviors/methods [4 marks]
  4. Demonstrate partial implementation of the system, taking into account OOP concepts of Inheritance and encapsulation [8 Marks]

**QUESTION FOUR: 20 MARKS**

Based on the case described about development of a smart campus at TU-K, you are required to:

1. Come up with a similar case scenario of your choice [6 Marks]
2. Come up with a use case diagram based on your case [4 Marks]
3. Identify 8 classes to be developed for the system. For each class, indicate relevant properties and behaviors/methods [4 marks]
4. Demonstrate partial implementation of the system, taking into account Inheritance as an OOP concept [6 Marks]

**QUESTION FIVE: 20 MARKS**

1. Describe how Object Oriented Databases differ from relational databases [4 Marks]
2. Illustrate the syntax for handling exceptions in Java [4 Marks]
3. Using code or otherwise, describe how Object orientation is used in creation of Graphical user interfaces composed of a Menu, Menu Items and handling events (making menu selections work) [8 Marks]
4. Generate Pseudocode (or syntactically correct code) to:
5. Read data from a file using java [2 Marks]
6. Connect to a Database in java [2 Marks]