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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

**CIT3276: OBJECT ORIENTED SYSTEM AND DESIGN**

**DATE: NOVEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Differentiate between a model and a diagram (2 Marks)
2. Study and draw a suitable use case diagram based on the description given below: (6 Marks)

***You are asked to model a system for a video library. The librarian stocks both DVDs and video tapes. When a potential client visits the shop, the librarian checks in the database to establish whether the client is registered or not. If the client is not registered, he/she is advised by the librarian to register with the library first before any services could be rendered. Once a client has been registered, he/she is eligible to borrow at most one library item per week. The item borrowed must be returned before any* other *item can be borrowed. If the client does not return the item within a month, he/she is surcharged a certain amount per day up to the time he/she returns the item.***

1. Explain the term multiplicity, giving any three examples of multiplicities (4 Marks)
2. Explain the following concept of object oriented programming: (4 Marks)
3. Polymorphism
4. Encapsulation
5. Interface
6. Vector class
7. Study the following collaboration diagram and give descriptions referring to the numbered items notations used in context. (7 Marks)
8. Study the following class diagram and interpret all the notations (7 Marks)

**QUESTION TWO (20 MARKS)**

1. Explain the following UML concepts: (4 Marks)
2. Aggregation
3. Coupling
4. Realization
5. <<include>>
6. Explain the importance of Modelling (1 Mark)
7. Study the diagram below and:
8. Identify components and nodes, and (4 Marks)
9. Describe relationships among components and nodes (4 Marks)
10. Explain the concept of MVC architecture (2Marks)
11. Illustrate and discuss the RUP development process framework (5 Marks)

**QUESTION THREE (20 MARKS)**

1. Read the following carefully then answer the questions that follows:

*Sagante District hospital operates in such a way that doctors visit various patients in the wards. Details about the doctor such as doctor’s number, names, area of specialization and numbers of years of experience are recorded. The patient’s names, sickness, next of kin are also recorded. After that, the patient is usually assigned a number. A doctor normally visits many patients in the wards on a given day, however a patient is usually assigned to a specific doctor. A patient is usually attended to in a particular ward. A ward may consist of between 5 and 10 patients at any one given time. The ward number, name location and its capacity are recorded. Nurses are attached to various wards in the hospital. A ward can consist of many nurses at any one given time, but a nurse will always be attached to only one ward.*

1. Identify suitable classes (3 Marks)
2. Draw the corresponding class diagrams that include appropriate relationships and multiplicities. (5 Marks)
3. Justify each of the relationships identified. (2 Marks)
4. Differentiate between the following UML paradigms (4 Marks)
5. Structural and behavioural things
6. Grouping things and annotational things
7. Discuss any **four** Architecture patterns used in OOSD (4 Marks)
8. Differentiate between Patterns and Framework (2 Marks)

**QUESTION FOUR (20 MARKS)**

1. Given the following scenario of shopping online from Jumla. com, model the sequence diagram. (6 Marks)

Steps 1 and 2: Mbogua creates an order.

Step 3: Mbogua tries to add items to the order

Step 4 and 5: Each item is checked for availability in inventory

Step 6 and 7: If the product is available, it is added to the order

Step 8: He finds out that everything worked

1. Describe the following use case relationships, giving an example scenario of each one of them. (9 Marks)
2. <<Includes>>
3. <<Extends>>
4. <<Uses>>
5. UML provides **four** stereotype that apply to package. List and discuss (5 Marks)