**KABARAK  UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**MAIN CAMPUS**

**SECOND SEMESTER 2020/2021 ACADEMIC YEAR**

**EXAMINATION FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY, BACHELOR OF BUSINESS MANAGEMENT IN INFORMATION TECHNOLOGY**

**COMP 320 INTE325 IT BMIT BBIT OBJECT ORIENTED ANALYSIS AND DESIGN**

**STREAM: Y3S2 TIME: 2:00-4:00PM**

**EXAMINATION SESSION: MAY - AUGUST DATE: 18/08/2021**

**INSTRUCTIONS TO CANDIDATES**

1. **Answer Question 1 and any other two questions in the answer booklet provided.**
2. **Do not write on your question papers. All rough work should be done in your answer booklet.**
3. **Clearly indicate which question you are answering.**
4. **Write neatly and legibly.**
5. **Edit your work for language and grammar errors.**
6. **Follow all the instructions in the answer booklet**

**SECTION A: (COMPULSORY) TOTAL MARKS FOR THIS SECTION IS 30.**

**1.**

1. State the two trends in the evolution of Programming Languages. **(2 Marks)**
2. Outline Wegner’s classification of high order programming languages according to the features they first introduced. **(6 Marks)**
3. Explain the following concepts
   * 1. OOP **(2 Marks)**
     2. OOA **(2 Marks)**
     3. OOD **(2 Marks)**
4. A Programming style is a way of organizing programs on the basis of some conceptual model of programming and an appropriate language to make programs written in that style clear. There are five main kinds of programming styles: list them with the kinds of abstractions they employ. **(5 Marks)**
5. A hospital admission system records the details of the admission, treatment and discharge of all patients. It also provides a number of official reports to satisfy the requirements of external authorities. Admission consists of the following tasks: Administration staff enters the patient’s personal details from a completed hospital admission form and sometimes helping them to complete the form. Next they allocate appropriate hospital accommodation if one or more nights stay is required. Following this they assign a doctor to attend for an initial examination, and check (in the case that private medical care is required) that the patient has valid medical insurance. Doctors and nurses use the system to record medical care given to patient during their stay. (This medical care consists of treatments given and drugs administered). Only a doctor may prescribe drugs to a patient, and this information is also recorded in the system. Both doctors and nurses may administer drugs and doses are similarly recorded. Only doctors have the authority to discharge a patient, and this information is, again, recorded within the system.

From the above narrative draw a use-case diagram of the hospital admissions system. **(8 Marks)**

1. Differentiate between the concepts: Assignment, Copying and Equality. **(3 Marks)**

**SECTION B. TOTAL MARKS FOR THIS SECTION IS 40.**

**ANSWER ANY TWO QUESTIONS FROM THIS SECTION. EACH QUESTION IN THIS SECTION CARRIES 20 MARKS.**

**2.**

1. Explain the THREE minor elements of the object model. **(6 Marks)**
2. An operation denotes a service that a class offers to its clients. Explain the FIVE operations that a class offers its clients. **(5 Marks)**
3. A dental surgeon keeps information about its patients, who may be either private or health service. For each patient the surgeon records the name, address, phone number, date of birth and either the health service number or the payment method.

Draw a class diagram for the above use-case, include class attributes, to represent the information given in the paragraph above. **(3 Marks)**

1. Write a note on the following concepts
   * 1. Link **(2 Marks)**
     2. Visibility **(2 Marks)**
     3. Synchronization **(2 Marks)**

**3.**

1. Write a note on the following types of abstractions.
   * 1. Entity **(2 Marks)**
     2. Action **(2 Marks)**
     3. Virtual Machine **(2 Marks)**
     4. Coincidental **(2 Marks)**
2. What is delegation? Explain with an example. **(4 Marks)**
3. Clients wishing to put their property on the market visit the estate agent, who will take details of their house, flat or bungalow and enter them on a card which is filed according to the area, price range and type of property.

Potential buyers complete a similar type of card which is filed by buyer name in an A4 binder.

Weekly, the estate agent matches the potential buyer's requirements with the available properties and sends them the details of selected properties.

When a sale is completed, the buyer confirms that the contracts have been exchanged, client details are removed from the property file, and an invoice is sent to the client. The client receives the top copy of a three-part set, with the other two copies being filed.

On receipt of the payment the invoice copies are stamped and archived. Invoices are checked on a monthly basis and for those accounts not settled within two months a reminder (the third copy of the invoice) is sent to the client. From the above case study: Draw a class diagram. **(8 Marks)**

**4.**

1. Differentiate between an Interface and Implementation of a Class. **(2 Marks)**
2. Explain the three approaches to classification. **(6 Marks)**
3. Differentiate KEY ABSTRACTIONS from MECHANISMS with regard to design of OO based systems **(4 Marks)**
4. You are the system administrator of Kabarak University, explain with the aid of a use case diagram a system how you would develop an online student registration system. **(8 Marks)**

**5.**

1. Write a note on the following concepts and their use in OO Analysis
   * 1. Classical analysis **(2 Marks)**
     2. Behavior analysis **(2 Marks)**
     3. Domain analysis **(2 Marks)**
     4. Use case analysis **(2 Marks)**
2. With the aid of a welllabeled diagram explain the package diagram clearly illustrating Dependencies and Visibility within the diagram. **(4 Marks)**
3. Explain the process of cash withdrawal from an ATM using a well labeled Activity Diagram. **(8 Marks)**