Reg.No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES (MAHE)

III SEMESTER B.Sc. (Applied Sciences) MAKE -UP EXAMINATION – January 2022

SUBJECT: SOFTWARE DESIGN USING OBJECT ORIENTED PARADIGM (ICS 233)

(BRANCH: CS)

Timing: 3 hours **Date: 11th January 2022** **Max. Marks: 50**

- ✓ **Answer All questions**
- ✓ **Missing data, if any, may be suitably assumed**

1A. Explain Noun-Phrase Approach and apply the same for the below short case study to generate the domain model that use Noun-Phrase approach. **[5]**

A bank provides Bank Account and Debit Card services to its customers. The customer can operate his/her Bank Account and is also provided a debit card facility. At an additional charge additional debit card could be provided to the family members of the holder of the Bank Account. The bank being new in the area, the **Bank Manager** who manages the bank has started a new scheme to attract many customers and the bank want members of the same family to create bank accounts and has provided the facility to operate multiple accounts with the same Debit Card.

1B. State the guidelines when constructing a domain model? Provide a justification for each guideline. **[5]**

2A. Draw a sequence diagram for the below mentioned context. **[5]**
Student logs into the E-Learning System using username and password using a synchronous communication. The username and password are checked by the E-Learning System with Database using a synchronous communication and the database responds with success to E-Learning System. The E-Learning System responds the status of the login as success with Student. Now the Student can get the courses from the E-Learning System.
Objects: Student, E-Learning System and Database

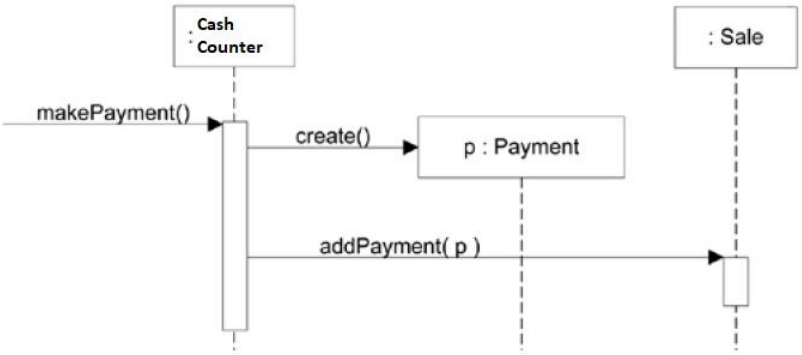
2B. Prepare a state diagram for the following scenario of an automobile transmission: The transmission can be in Reverse, Neutral, or Forward. In Forward, it can be First, Second or Third gear (First, Second, Third are nested states of Forward). Each of the nested states receives the outgoing transitions of its composite state. “N” has to be selected to transit to Neutral from any Forward state and “F” in the Neutral causes a transition to Forward state. There are 3 transitions that make up from Forward to Neutral: one from each Forward gear to gear to Neutral. “F” in Neutral causes transition to Forward. The First is the default state in the Forward (abstract state). The 3 nested states First, Second, Third share the transition on event stop from the Forward (composite state marked) to state First. In Forward, gear, stopping the car causes transition to the First gear. **[5]**

3A. List the rules to make sure the correct conceptual subclass is identified. Apply the rules to an example and demonstrate the same. **[5]**

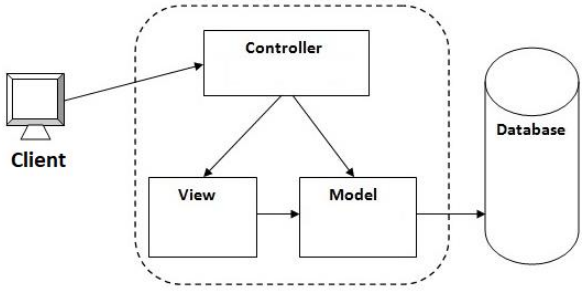
3B. Design the classes Customer and Reservation in the context of booking a table in a hotel for lunch. The Customer class should have the attributes name and phone number and Reservation class should have the attributes booking number, table number and table size.

Also show the relationship between the 2 classes where a customer can have any number of reservations and a reservation should be held by at least one customer. Write a UML class diagram from the above description provided. **[5]**

4A. Cash Counter, Sale and Payment are the classes used for Payment processing. The payment is made at Cash Counter and the Payment is made for the corresponding Sale. Is this possible to refine this scenario? If yes, how? **[5]**



4B. What is Model View separation principle. Identify a simple example of an application and place the corresponding components in the respective blocks as shown the diagram. **[5]**



5A. Demonstrate with the help of an appropriate example where Aggregation will not make sense when used for Composition and vice versa. **[5]**

5B. A company changed the port of a newly designed phone. The type of the charging port was changed to USB-C as per the guidelines mentioned in the compliance report. In order to cut down on e-waste, the new phones didn't ship with the new type of charger. This caused a problem for the customers as they had the old type of charger with lightning port. Apply a standard pattern to mitigate this issue so that the older charger could be used for the new phone with USB-C port. **[5]**
Hint: Required Java Code and UML diagram must be drawn.