C10-R4: SOFTWARE SYSTEMS

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Define a software process. What is incremental software development process? Give one conventional or document-driven software process that is based on incremental development process.
b) Explain briefly all phases of requirement engineering.
c) Explain and differentiate throw-away prototyping and evolutionary prototyping.
d) Discuss in brief functional design and object oriented design. Which design strategy is most popular and practical?
e) Differentiate between: a) bottom-up b) top-down and c) hybrid design.
f) What is a data dictionary? How is it useful and to whom? When should you consider to include data dictionary in a project?
g) Why are prototypes considered an effective tool in software project development efforts?

(7x4)

2.

a) What is the use of a data flow diagram? Explain the important concepts of data flow diagram.
b) Draw a context diagram for a Library management system.

(6+12)

3.

a) Write short notes on following models – Quick-fix Model and Iterative Enhancement model.
b) Name and characterise the commonly agreed properties of an agent.
c) Why does the software design improve when we use object-oriented concepts?

(6+6+6)

4.

a) Explain what do you understand by design walk through and critical design review?
b) Draw E-R diagram for the following situation: An account is a relationship between customer and bank. A customer has a name. A bank has a branch. A customer may have several accounts of different types and balance.

(9+9)

5. Consider an online reservation system for a bus company. The bus company includes several buses and realizes trips to different cities. Each bus is identified by its plate number and a separately assigned bus number. The trips are based on a predefined schedule and stop at predefined bus stations. Each bus can have only one trip per day. Each bus includes a driver and one hostess. For long trips, the bus will have breaks at service and rest areas. There are two types of trips, normal trips and express trips. Express trips do not stop at intermediate stations and get faster at the destination. Seats can be reserved by customers on the web site of the bus company. The customer has the option to directly pay for the seat through the website. In that case, the seat cannot be cancelled (neither by the customer nor by the bus company). If the customer has not paid for the seat, the bus company can cancel the seat if the customer does not show up one hour before the trip. When the reservation is cancelled, the seat will become free and can be sold to another customer. Both the customer and the company staff must authenticate themselves for performing operations with the system.

a) Define a stakeholder which are not an actor.
b) Draw a state diagram for describing the details of the “Seat object” for the above system.
c) Draw a sequence diagram for “reservation of a seat”. Show any boundary, control, and entity objects explicitly.

(3+7+8)

6.

a) Why SRS is known as the black box specification of system? List the characteristics of a good SRS.
b) Define software testing. Explain various level of testing.
c) How is software design different from coding?

(6+6+6)

7.

a) List some objectives of software design. Discuss in brief how an informal design can be transformed into a detailed design?
b) Design an ER diagram for the following problem:
There are many hotels in a country. Each hotel is identified by its id, name and rating. Each hotel provides many rooms. Rooms are identified by Room no. and type. Each room is rented for a cost. Cost is identified by its id and amount. A hotel has many facilities available with it. Facilities are identified by its id and name. A hotel is located at a particular location. Location is identified by street, town and pin code. Identify the entities, relationships, key attributes and other attributes.

(8+10)