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 Reverse Engineering and Re-engineering. Differentiate between Reverse Engineering and Re-engineering.

b) Discuss the difference between black-box testing and structural testing and suggest how they can be used together for defect testing purpose.

c) What is "analysis" about? What is "design" about? Name the UML Models (structural and behavioral) that can be built during design and analysis.

d) What is Software Requirements Specification (SRS)? Why is it so important? Mention the qualities which are required for an ideal SRS.

e) What is a Component? What is Component-Based Software Engineering (CBSE)? What are its essentials? What are its design principles?

f) Differentiate between function-oriented and object-oriented design process. List three important rules for user interface design.

g) What are four different views to software architectures? Describe each of them in detail.

(7x4)

2.

a) Explain and describe in detail Spiral model and Rapid application development model.

b) Explain Requirements Engineering in detail. List out tasks of Requirements Engineering. Describe how to initiate Requirements Engineering. Also mention about the role of Quality Function Deployment (QFD).

c) Differentiate between a reference architecture and an architectural pattern. What are Achitectural Decription Languages (ADLs) ? Why should ADLs be used?

(6+6+6)

3.

a) Draw a Class diagram for an online shopping website. Also develop a set of Use Cases for the described system.

b) Explain difference between Critical Path Analysis and Critical Chain Schedules. Describe CPM and PERT with steps involved in it. Is critical path important if only one person is working on a software project? If yes, then give reason.

c) Define Agent. What is Agent-Oriented Software Engineering (AOSE)? In which kind of applications AOSE is beneficial?

(8+6+4)

4.

a) What do you mean by "designing for visibility"? Explain with an example. What are different types of visibility that are considered? Define all various types of visibility.

b) Explain the meaning of "Contracts" in Object-Oriented Analysis and Designing methodology. Write three kinds of post-conditions written in Contracts.

c) Describe in detail about ISO 9001:2000 and SEI CMM certifications. Write down the merits and demerits of ISO 9001:2000 certification.

(6+6+6)

5.

a) What is UML Deployment Diagram? What does various nodes and edges in deployment diagram stand for?

b) Explain Object-Oriented Methodology. Define Object Model, Dynamic Model and Functional Model. Differentiate between Object Model and Dynamic Model. What is the purpose of an object diagram? What things are taken into consideration before drawing an object diagram? Where should be object diagrams used? Also write about the relationship between object and class diagram.

c) Describe uses of Design Patterns. Define and explain in detail about Structural, Behavioural and Creational Design Patterns. Write about the criticisms faced by Design Patterns from the field of Computer Science.

(4+8+6)

6.

a) How can new Software Quality Assurance processes be introduced in an existing organization? Why is it often hard for management to get serious about quality assurance? Why does software have bugs?

b) Consider the following description for Hospital Management System:

In hospital there are many departments. For every patient a registration is performed at reception and patient ID is generated. After registration patient ask for any of the doctor that he/she wants to see and then follow prescriptions of doctor like medicines, lab tests, operations, etc.

Draw Activity Diagrams and State-chart Diagrams for the system described above.

c) List out ISO 9126 Software Quality Factors. Define measures, metrics and indicators. Which are the metrics for testing? Write down and explain each term in the equation of Software Maturity Index (SMI)? Also calculate SMI for a software which has 150 modules in its current release, where 30 modules are added and 20 modules are changed and 10 modules were deleted from preceding release. Determine whether this software product is near to stability or not?

(4+6+8)

7.

a) What do you mean by Data Modelling? What are the different implementation approaches in data modelling? What is an E-R Diagram? Explain the notations of E-R Diagram with an example.

b) What do you mean by software agents? List out types of software agents. What are the categories of agents? What are different types of agent architectures? Explain in detail about Reactive Agent.

c) Describe in detail about Software Process. Explain about software engineering layers. Which are the umbrella activities?

(6+6+6)