

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) Enlist the software characteristics and discuss any two software characteristics in brief. Explain the bath tub curve of hardware reliability.
- b) Explain the steps of requirements engineering process?
- c) What are functional and non-functional requirements for software? Who will specify those requirements?
- d) Explain the importance of object reuse in detail. Briefly discuss the general activities in performing object-oriented analysis.
- e) List some benefits that can be realized through the object-oriented concepts of inheritance and encapsulation?
- f) What is the role of UML in framing the architectures for the software? Differentiate between component and deployment diagram.
- g) What is system design? Explain the process of designing a system. Identify several systems design strategies. Differentiate between logical and physical design.

(7x4)

2.

- a) What is a software development process? Name the various stages of the system development life cycle. Identify and explain the four phases of the simplified software development process. How do software myths affect a software process?
- b) Explain the waterfall model. Explain why it is more advantageous than ad-hoc methods. What is the advantage of using prototype software development model instead of waterfall model? Also explain the effect of designing a prototype on the overall cost of the software project?
- c) Differentiate among an object, class and reference. What is a class? Why is it important to correctly identify the objects (classes) and their relationships early in the development process? Explain the concept of super-class and sub-class with the help of an example.

(6+6+6)

3.

- a) How does the risk factor affect the model of software development? Explain the software life cycle model that incorporates risk factor. Spiral model is a realistic approach to the development of large scale systems and software. Justify this statement. Why Spiral model is considered as a meta-model?
- b) Define sequence and collaboration diagrams? What are the three additional design and implementation diagrams offered by UML? Define each of them.
- c) What is a state-chart diagram used for? What activities are to be performed for its construction?

(8+6+4)

- 4.
- a) Define a DFD. Write the conventions that govern the construction of DFDs. Also explain the steps used for transforming a DFD into a structure chart. Design a DFD for an institute management system.
 - b) Explain in detail ER model used to represent the static view of a problem domain. 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 type and balance.
 - c) What is a Data Dictionary? Explain each component of it? What are the points that should be considered while constructing a Data Dictionary? Write the Data Dictionary entry for student course registration form.

(6+6+6)

- 5.
- a) Define Design Pattern. Differentiate between Pattern, Framework and Architecture.
 - b) For the Social Networking site of your choice, prepare the following models by describing the system with the problem statement.
 - i) Draw the sequence diagram.
 - ii) Draw the activity diagram.
 - c) What is the difference between system analysis and system design? Can one begin to design without analysis? Explain.

(4+8+6)

- 6.
- a) Explain Equivalence Class Partitioning and Boundary value analysis. Compare the two. Consider a program which computes the square root of an input integer between 0 and 5000. Determine the equivalence class test cases. Determine the test cases using boundary value analysis also.
 - b) Define quality assurance. List the factors that affect the quality of a system.
 - c) Why is SRS (Software Requirement Specification) known as the black-box specification of system? Why is it important? What specific languages can be used in SRS? What are the advantages of using these specific languages of SRS? List any three characteristics of a good SRS. Also discuss the important issues that a SRS must address.

(4+6+8)

- 7.
- a) Differentiate between function oriented design and object oriented design.
 - b) Define testing? How is it done? Explain briefly the importance of testing? Write a short note on various types of testing techniques used before the implementation of the software.
 - c) Define Re-Engineering. What are the main objectives of re- engineering?

(6+6+6)