



KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

General Instructions: Use Calculator for problems

Answer ALL Questions

(10 X 10 = 100 Marks)

1. a) Describe the role of a software along with the changing nature of it with a technological perspective. [5]
b) Explain the transformation of software engineering from the earlier days to the modern world scenario. [5]
2. Assume that you run a startup based on the latest technologies like AI, ML, Cloud, IoT, and Full Stack development. The company has started with 4 people in the year 2020 and it has expanded to 30 people in 2023. The startup is responsible for taking requirements from the customers and delivering the quality software applications. A famous top and best educational institutions that you were familiar is approaching the startup for making an automation software for their institutional process along with a learning management portal. The institution is keen on the risk factors and updates the requirements on a yearly basis. As a CEO of the startup identify the suitable software model for developing the automation software along with the phases.
3. a) Consider the project size measured in KLOC as 300 for computing the effort in months per person in all modes. [6]
b) Discuss any four examples for software risks with the description. [4]
4. The famous seven storey building sells all products to the customers. The statement from the manager of that store is given as follows. "Our new sales information system seems okay, the invoices are correct, the inventory records are correct, the discounts granted to our clients exactly follow our very complicated discount policy, **BUT** our new sales information system frequently fails, usually at least twice a day, each time for twenty minutes or more. Yesterday it took an hour and half before we could get back to work. Imagine how embarrassing it is to store managers. XYZ company has developed our computerized sales system, claims no responsibility." Discuss the classic model with three factors to improve quality and overcome this situation.

5. Discuss the steps for process improvement in developing the software applications and explain the two models pertaining to it with a neat sketch.
6. A famous car-pooling company is looking for the upgradation of the software. The CEO of the company looks for the good quality of software design from you as you are an expert in designing the software. Draw class, use case, sequence diagrams with all proper notations that can convey all the aspects of the software to design the above scenario and get approval from the CEO of the car-pooling company.
7. Tele is the well-known IT company located in Pune that develops the product-based software application. They have finalized the requirements from the client for developing an ATM machine. They are in the process of converting the requirements into design model. Help them to create a model by adhering to proper guidelines for design and also brief the concepts of object-oriented construction principles (any four).
8. Discuss the concepts of verification and validation with your own mobile application as an example and also explain the hierarchy of software testing that will be conducted during the development of the same.
9. At the earlier stage of software development, most of the users' requirements were stable, and development followed the plans without major changes. However, as software development involved more critical and dynamic industrial projects, new difficulties emerged according to the growth of companies. Evolving requirements: customer requirements are changing due to evolving business needs or legislative issues. Some customers realize what their true requirements are only when they use an application that does not really meet their needs. Another source of change comes from experiences gained during the development. Customer involvement, Deadlines & budgets, and Miscommunications. With the existence of such problems, the OO software development methodologies cannot satisfy the objectives of software development companies. New development methodologies have to be applied in order to overcome these problems. Discuss the process model that is updated with latest technologies to solve the above problem.

10. A Library Management System (LMS) is given with different activities of the library of our institute pertaining to the issue and return of the books by the members of the library and various queries regarding books as listed below are to be automated.

- The library has 10,000 books. Each book is assigned a unique identification number (called ISBN number).
- The library clerk should be able to enter the details of the book into the LIS through a suitable interface.
- There are four categories of members of the library: undergraduate students, post graduate students, research scholars, and faculty members.
- Each library member is assigned a unique library membership code number.
- Each undergraduate student can issue up to 2 books for 1 month duration.
- Each postgraduate student can issue up to 4 books for 1 month duration.
- Each research scholar can issue up to 6 books for 3 months duration.
- Each faculty member can issue up to 10 books for six months duration.
- The LMS should answer user queries regarding whether a particular book is available. If a book is available, LMS should display the rack number in which the book is available and the number of copies available.
- LMS registers each book issued to a member. When a member returns a book, LMS deletes the book from the member's account and makes the book available for future issue.
- Members should be allowed to reserve books which have been issued out. When such a reserved book is returned, LMS should print a slip for the concerned member to get the book issued and should disallow issue of the book to any other member for a period of seven days or until the member who has reserved the books gets it issued.
- When a member returns a book, LMS prints a bill for the penalty charge for overdue books. LMS calculates the penalty charge by multiplying the number of days the book is overdue by the penalty rate.

The following activities to be done for the above scenario.

- a. Create a software requirements specification report
- b. Evaluate any 3 test cases with procedures for above scenarios.

⇔⇔⇔