



(b) A Coffee Vending Machine dispenses coffee to customers. Customers order coffee by selecting a recipe from a set of recipes. Customers pay for the coffee using coins. Change is given back, if any, to the customers. The 'Service Assistant' loads ingredients (coffee powder, milk, sugar, water, chocolate) into the coffee machine. The 'Service Assistant' adds a recipe by indicating the name of the coffee, the units of coffee powder, milk, sugar, water and chocolate to be added as well as the cost of the coffee. The Service Assistant can also edit and delete a recipe.

- (i) Develop the use case diagram for the specification above. (6)
- (ii) For any two scenarios draw an activity diagram and sequence diagram. (5 + 5)

12. (a)
- (i) What is the purpose of feasibility study? (2)
  - (ii) State the inputs and results of the feasibility study. (4)
  - (iii) List any four issues addressed by a feasibility study. (4)
  - (iv) Elaborate the phases involved when carrying out a feasibility study. (6)

Or

- (b) (i) Differentiate functional and non-functional requirements. (5)
- (ii) For the requirement given below, identify stakeholders, functional and non-functional requirements: (11)

A software is to be built that will control an Automated Teller Machine (ATM). The ATM machine services customers 24 X 7. ATM has a magnetic stripe reader for reading an ATM card, a keyboard and display for interaction with the customer, a slot for depositing envelopes, a dispenser for cash, a printer for printing receipts and a switch that allows an operator to start/stop a machine.

The ATM services one customer at a time. When a customer inserts an ATM card and enters the personal identification number (PIN), the details are validated for each transaction. A customer can perform one or more transactions. Transactions made against each account are recorded so as to ensure validity of transactions.

If PIN is invalid, customer is required to re-enter PIN before making a transaction. If customer is unable to successfully enter PIN after three tries, card is retained by machine and customer has to contact bank.

The ATM provides the following services to the customer:

- (1) Withdraw cash in multiples of 100.
- (2) Deposit cash in multiples of 100.
- (3) Transfer amount between any two accounts.
- (4) Make balance enquiry.
- (5) Print receipt.

Each of the above transactions must be made within 60 seconds. In case the time exceeds 60 seconds, then the transaction is cancelled automatically. Also, if the machine is not used for more than two minutes after entry of card, the card is retained by the machine.

An operator panel with a key-operated switch allows an operator to start and stop the servicing of customers. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc. The operator is required to verify and enter the total cash on hand before starting the system from this panel.

13. (a) What is system modelling? Explain the process of creating models and the factors that should be considered when building models. (16)

Or

- (b) Tamil Nadu Electricity Board (TNEB) would like to automate its billing process. Customers apply for a connection (domestic/commercial). EB staff take readings and update the system. Each customer is required to pay charges bi-monthly according to the rates set for the type of connection. Customers can choose to pay either by cash/card. A bill is generated on payment. Monthly reports are provided to the EB Manager.

- (i) Give a name for the system. (1)  
(ii) Draw the Level - 0 DFD (Context Flow Diagram) (5)  
(iii) Draw the Level - DFD. (10)
14. (a) Given a set of numbers 'n', the function FindPrime(a[ ],n) prints a number if it is a prime number. Draw a control flow graph, calculate the cyclomatic complexity and enumerate all paths. State how many test cases are needed to adequately cover the code in terms of branches, decisions and statement? Develop the necessary test cases using sample values for 'a' and 'n'. (16)

Or

- (b) (i) What is black box testing? (2)  
(ii) What is Equivalence Class Partitioning? list rules used to define valid and invalid equivalence classes. Explain the technique using examples. (7)  
(iii) What is Boundary Value Analysis? Explain the technique specifying rules and its usage with the help of an example. (7)
15. (a) (i) Explain the COCOMO model for estimation. (8)  
(ii) State ZIPF's law. (2)  
(iii) What is the purpose of Delphi method? State advantages and disadvantages of the method. (6)

Or

- (b) What is Software Configuration Management? Explain various aspects of Configuration Management. (16)