

M.TECH/IT/1ST SEM /INFO 5104/2015
2015

Software Engineering And Case Tools
(INFO 5104) 15

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following: 10 x 1=10
- (i) When two bubbles are interconnected directly, it is referred to as
(a) Synchronous DFD (b) Direct DFD
(c) Serial DFD (d) Balanced DFD.
- (ii) How many diagrams are there in Unified Modelling Language?
(a) Six (b) Nine (c) Five (d) Eight.
- (iii) Which one of the following is the MOST desirable type of cohesion?
(a) Coincidental cohesion (b) Temporal cohesion
(c) Functional cohesion (d) Procedural cohesion.
- (iv) DMAIC is related to
(a) ISO (b) CMM (c) Six Sigma (d) None of these.
- (v) MTBF is measured in terms of
(a) day (b) year (c) hours (d) minutes.
- (vi) The type of failure that occurs for all input values while invoking a function of the system is
(a) transient failure (b) permanent failure
(c) recoverable failure (d) unrecoverable failure.
- (vii) In function point analysis, number of complexity adjustment factor is
(a) 10 (b) 14 (c) 15 (d) 16.
- (viii) Swim lane is defined in
(a) State Chart Diagram (b) Activity Diagram
(c) Use Case Diagram (d) Sequence Diagram.
- (ix) To allocate resource to activities we use
(a) Gantt Chart (b) PERT chart
(c) Network Diagram (d) Activity Network.

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- (x) What Does a Composite name consists of in a UML Class and object diagram?
(a) Delimiter (b) Simple Names
(c) Digits (d) All of These.

Group - B

2.(a) Distinguish between Static and Dynamic Testing. What is integration testing? Explain with suitable example.

(b) Draw a control flow graph for a C function that finds largest among three integer numbers. Hence find the cyclomatic complexity. Explain the use of prototyping in software development.

$$(2 + 3) + (2 + 3 + 2) = 12$$

3.(a) List out all the phases of SDLC. Explain the problems that might be faced by an organization if it does not follow any software life cycle model.

(b) What is the user's expectation from the SRS document? Discuss the strength and the weakness of CASE Tools. Explain the situation where a prototype of the actual product is preferred.

$$(1 + 3) + (2 + 4 + 2) = 12$$

Group - C

4.(a) Consider Library Membership Automation Software (LMS) where it should support the following three options:

- New member
- Renewal
- Cancel membership

When the 'new member' option is selected, the software asks details about the member like the member's name, address, phone number etc. If proper information is entered then a membership record for the member is created. If the 'renewal' option is chosen, the LMS asks for the member's name and his membership number to check whether he is a valid member or not. If the membership is valid then membership expiry date is updated and the annual membership bill is printed, otherwise an error message is displayed. If the 'cancel membership' option is selected, then the software asks for member's name and his membership number. The membership is cancelled, a cheque for the balance amount due to the member is printed and finally the membership record is deleted from the database.

Make the decision tree representation and the decision table representation of the above examples.

(b) Explain different types of Coupling used in software design process.

$$(5 + 5) + 2 = 12$$

5.(a) A supermarket needs to develop the following software to encourage regular customers. For this, the customer needs to supply his/her residence address, telephone number, and the driving license number. Each customer who registers for this scheme is assigned a unique customer number (CN) by the computer. A customer can present his CN to the check out staff when he/she makes any purchase. In this case, the value of the purchase is credited against CN. At the end of each year, the supermarket intends to award surprise gifts to 10 customers who make the highest total purchase over the year. Also, it intends to award a 22 carat gold coin to every customer whose purchase exceeded Rs.10, 000. The entries against the CN are the reset on the day of every year after the prize winners' lists are generated.
Draw the context diagram, level 1 diagram and level 2 diagrams based on the above scenario.

(b) What does the term "balancing a DFD" mean? Give an example to explain your answer. Differentiate between a structure chart and a flow chart.

$$(2 + 3 + 3) + (2 + 2) = 12$$

Group - D

6.(a) Draw the PERT diagrams for the given set of tasks and dependencies. Also draw the Gantt Chart for the given task showing critical path.

Subtask	Time to complete	Dependencies
1	10	-----
2	10	5
3	10	4,6
4	20	1,6,2
5	8	1,6
6	5	1

(b) What do you mean by dependency among different activities? Explain Activity Network with examples.

$$(2 + 3 + 4) + (1 + 2) = 12$$

7.(a) Suppose a system for office automation has to be designed. From the requirements, it is clear that there will be four major modules in the system: data entry, data update, query, and report generator. It is also clear from the requirements that this project will fall in the organic category. The sizes for the different modules and the overall system are estimated to be:

- Data Entry 0.6 KLOC
- Data Update 0.6 KLOC
- Query 0.8 KLOC
- Reports 1.0 KLOC

From the requirements, the ratings of the different cost driver attributes are assessed. These ratings, along with their multiplying factors, are:

- Complexity High 1.15
- Storage High 1.06

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Experience Low 1.13

Programmer Capability Low 1.17

Find the Effort and Duration required to design the system.

(b) What is Work Breakdown Structure (WBS)? Give examples. Describe Risk component and Driver with respect to risk analysis and management.

(3 + 3) + (3 + 3) = 12

Group - E

8.(a) Draw the Use case diagram for a credit card processing system in which merchant submits some credit card transaction request to the credit card payment gateway on behalf of a customer. Bank which issued customer's credit card could approve or reject the transaction. If transaction is approved, funds will be transferred to merchant's bank account. The requested amount of money should be first authorized by Customer's Credit Card Bank, and if approved, is further submitted for settlement. During the settlement funds approved for the credit card transaction are deposited into the Merchant's Bank account. In some cases, only authorization is requested and the transaction will not be sent for settlement. In this case, usually if no further action is taken within some number of days, the authorization expires. Merchants can submit this request if they want to verify the availability of funds on the customer's credit card, if item is not currently in stock, or if merchant wants to review orders before shipping.

(b) Draw the sequence diagram for printing the graduation report of university student. Include atleast four objects.

6 + 6 = 12

9.(a) Suppose you are responsible for designing an online photograph library. Users should be able to create and modify their profile, upload and manage their images, and share their images with selected friends.

You assume the roles of both the system analyst and the developer. Following are the requirements of the system:

Each user should be able to create and modify their profile

Each user should be able to search for and friend other users

Each user should be able to accept or deny friend requests

Each user should be able to create, store and view albums

Each user should be able to create, delete, store, view, and organize photos

Each user should be able to mark their photos as public, private, or friends-only

Each user should be able to add comments to both photos and albums

Draw the Class diagram of the above system.

(b) List out the key components required for drawing the collaboration diagram and deployment diagram. Model an activity diagram for a situation when driver is starting a car.

6 + (3 + 3) = 12