

**SOFTWARE ENGINEERING
(INFO 3104)**

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 alternative for the following: **10 × 1 = 10**
- (i) At least how many test cases are required to achieve multiple condition coverage of the following code segment:
If ((a>5) and (b<100) and (c>50)) x=x+1;
(a) 2 (b) 4 (c) 6 (d) 8.
- (ii) What would be the cyclomatic complexity of the following program?
int find-maximum(int i,int j,int k){
 int max;
 if(i>j) then
 {if(i>k) then max=i;
 else max=k;
 }
 else
 {if(j>k) then max=j
 else max=k;
 }
 return(max);
}
(a) 2 (b) 3 (c) 4 (d) 5
- (iii) When in the development cycle, code review is carried out?
(a) After coding is complete and before the code is compiled
(b) After unit testing is over
(c) After coding is complete and after the code is compiled
(d) After system testing is over
- (iv) Which of the following describes "Is-a-Relationship" ?
(a) Aggregation (b) Inheritance
(c) Dependency (d) None of these

B.TECH/IT/5TH SEM/INFO 3104/2020

- (v) If the condition expression in a conditional statement is composed of n atomic conditions, what is the number of test cases required to achieve multiple condition coverage?
(a) n (b) 2^n
(c) $2 \times n$ (d) $2 \times n + 1$
- (vi) Which of the following UML diagrams has a static view?
(a) Collaboration (b) Use case
(c) State chart (d) Activity
- (vii) What is related to the overall functionality of the delivered software?
(a) Function-related metrics (b) Product-related metrics
(c) Size-related metrics (d) None of the mentioned
- (viii) Which one of the following models is not suitable for accommodating any change?
(a) Build & Fix Model (b) Prototyping Model
(c) RAD Model (d) Waterfall Model
- (ix) Which of the following is not a maturity level in CMM?
(a) Design (b) Repeatable
(c) Managed (d) Optimizing
- (x) Schedule slippage is a type of
(a) Business risk (b) Project risk
(c) Technical risk (d) None of the above

Group – B

2. (a) Briefly explain the different stages of Agile model. Mention the major shortcomings of a DFD model.
- (b) Draw a DFD(Upto 2nd level) for a Vehicle Showroom system that includes the following features:
Provides the searching facilities based on various factors such as selling vehicles like cars, bikes from show room, vehicle bookings and vehicle delivery.
Vehicle Showroom Management system also manage the selling vehicles details, customers details, employee details.
It tracks all the information of selling vehicles like cars, bikes etc. and manages the information and description of the repaired vehicle.
(3 + 2) + (2 + 3 + 2) = 12
3. (a) Draw the context level diagram and Level-1 DFD for Hotel Management system.
- (b) Write the components of SRS in brief
- (c) Differentiate between Decision Tree and Decision Table with a proper example.
(2 + 3) + 3 + 4 = 12

Group – C

4. A college runs a student admission system every year for a batch of 30 students for the first year of M.Tech. in IT course. The procedure includes announcement of the admission in the newspaper advertisement. Applications are invited from the candidates. Written test is administered and a list of 30 qualified students is pasted on the notice board. The selected students are asked to pay an amount of Rs. 15,000/- fee within a week from the date of the notice of the final list. In this domain, perform the following actions:
- Identify actors and use cases.
 - Draw class diagram.
 - Draw activity diagram.

(2 + 2) + 4 + 4 = 12

5. (a) Differentiate between a structure chart and a flow chart with a proper example.

- (b) Draw the Structure Chart of the following C program :

```
void main(){
    int n, first = 0, second = 1, next, c;
    printf("Enter the number of terms\n");
    scanf("%d", &n);
    printf("First %d terms of Fibonacci series are:\n", n);
    for (c = 0; c < n; c++)
    {
        if (c <= 1)
            next = c;
        else
        {
            next = first + second;
            first = second;
            second = next;
        } printf("%d\n", next);
    }
}
```

6 + 6 = 12**Group – D**

6. (a) Suppose a program contains N decision points, each of which has *two* branches. How many test cases are necessary for branch testing? Distinguish between static and dynamic analysis of a program.
- (b) A program consists of m sequence type statements, n decision type statements and p iterative statements. Determine the number of test cases required to achieve condition coverage and path coverage respectively.

(4 + 4) + 4 = 12

B.TECH/IT/5TH SEM/INFO 3104/2020

7. (a) Design a black-box test suite for a program that accepts two strings and checks if the first string is a substring of the second string and displays the number of times the first string occurs in the second string. Assume that each of the two strings as size less than 20 characters.
- (b) Distinguish between Alpha testing and Beta Testing
- (c) Define a metric for measuring the structural complexity of a program.

$$6 + 4 + 2 = 12$$

Group – E

8. (a) Suppose you are a manager of a software project team and you want to develop a product for business application. Now it is estimated that the effort required for completion of the project to be 50 person-months. Can you complete the project by employing 50 engineers for a period of one month? Justify your answer.
- (b) Draw the PERT diagram for the given set of tasks and dependencies. Also draw the Gantt Chart for the given task showing critical path. Assume start time =0.

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

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

9. (a) Consider a project with four major modules of size 10 KLOC, 10 KLOC, 24 KLOC and 16 KLOC. Use COCOMO to determine development effort, development time. Assume that this project will fall in an organic category. The different cost driver attributes along with their multiplying factors are :
- (i) Complexity High : 1.15
- (ii) Reliability High : 1.15
- (iii) Experience Low : 1.13
- (iv) Programmer's Capability Low : 1.17.
- (b) Write short notes on Work Breakdown Structure.
- (c) What is FTR? List out the objectives of FTR.

$$6 + 3 + (1 + 2) = 12$$

Department & Section	Submission Link
IT	https://classroom.google.com/c/NzE2Nzk4MjU3MTFa/a/Mjc0NTM1OTI0NTY3/details