

# END TERM EXAMINATION

SEVENTH SEMESTER [BTECH] JANUARY-FEBRUARY 2023

Paper Code: IT403

Subject: Software Testing

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q.No. 1 which is compulsory.

Q1 Explain the following (2.5x10=25)

- a) Fault vs failure
- b) Testing vs debugging
- c) Verification vs validation
- d) Alpha and beta testing
- e) Test case and Test suite
- f) Development and regression testing
- g) Domain testing
- h) Development testing
- i) GUI testing
- j) Error and incident

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Q2 a) Explain the boundary value analysis technique with a suitable example. (5)

b) Consider a program that determines the previous date. Its inputs are a triple of day, month and year with its values in the range:

$$1 \leq \text{month} \leq 12$$

$$1 \leq \text{day} \leq 31$$

$$1850 \leq \text{year} \leq 2050$$

The possible outputs are 'previous date' or 'invalid input'. Design the Robustness test cases (7.5)

Q3 a) Consider the following program segment:

```
/* sort takes an integer array and sorts it in ascending order */
1. void sort (int a [ ], int n) {
2.     int i, j;
3.     for(i=0;i<n-1;i++)
4.         for(j=i+1;j<n;j++)
5.             if(a[i]>a[j])
6.             {
7.                 temp=a[i];
8.                 a[i]=a[j];
9.                 a[j]=temp;
10.            }
11. }
```

- a) Draw the program graph for this program segment.
- b) Determine the cyclomatic complexity for this program.
- c) How is the cyclomatic complexity metric useful?

(6)

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b)

Consider the following program and draw the program path graph and DD path graph.  
Also find out cyclomatic complexity and independent paths.

```
void main ()  
{  
    int x, y;  
    scanf ("%d \n", &x);  
    scanf ("%d \n", &y);  
    while (x != y)  
    {  
        if (x > y)  
            x = x - y;  
        else y = y - x;  
    }  
    printf ("x = %d", x);  
}
```

(6.5)

- Q4 a) What is slice based testing? How can it improve testing? Explain the concept with the help of an example and write test cases accordingly. (6)  
b) What is mutation testing? What is the purpose of mutation score? Why are higher order mutants not preferred? (6.5)

- Q5 a) Consider a program to input two numbers and print them in ascending order given below. Find all du-paths and identify those du-paths that are definition clear. Also find all du-paths, all-uscs and all-definitions and generate test cases for these paths.

```
#include<stdio.h>  
#include<conio.h>  
1. void main()  
2. {  
3.     int a,b,t;  
4.     clrscr();  
5.     printf("Enter first number:");  
6.     scanf("%d",&a);  
7.     printf("Enter second number:");  
8.     scanf("%d",&b);  
9.     if(a<b){  
10.         t=a;  
11.         a=b;  
12.         b=t;  
13.     }  
14.     printf("%d %d",a,b);  
15.     getch();  
16. }
```

(7)

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b) Compare regression testing with development testing. Do we perform regression testing before the release of the software? (5.5)

Q6 a) How is risk analysis used in testing? How can we prioritize test cases using risk factor? (6)

b) What are different types of structural testing techniques? Discuss any one technique with the help of example. (6.5)

Q7 a) Show with the help of an example that a very high level of statement coverage does not mean that the program is defect-free. (6.5)

b) Explain the following with examples:

- a) Incidence matrix
- b) Adjacency matrix
- c) Paths

(2x3=6)

Q8 a) What is a path? How is it different from an independent path? (2.5)

b) Explain the following:

- i) Class Testing
- ii) GUI Testing
- iii) Static Testing Tools
- iv) Dynamic Testing Tools
- v) Characteristics of Modern Tools

(5x2=10)

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### END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH.] NOV.-DEC.-2019

Paper Code: IT403

Subject: Software Testing

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory.  
Select one question from each unit.

- Q1. Answer **any ten** of the following in brief.  $(10 \times 2.5 = 25)$
- a) What are Define/Reference anomalies?
  - b) Define 'Definition Clear Path'.
  - c) Differentiate between a bug and error.
  - d) Differentiate between functional and structural testing?
  - e) How do you find the du path?
  - f) What is a program slice?
  - g) Define risk.
  - h) What is integration testing?
  - i) What is debugging difficult?
  - j) What is state base testing.
  - k) Which du path is considered as dc clear path? Explain.

#### UNIT I

- Q2. a) Define software testing. Enumerate separately, its benefits to the users, client and to the developers? **(6)**  
b) Explain error, fault, bug, failure and incident giving examples of each. How are these related to one another? What is their individual role in software testing? **(6.5)**
- Q3. a) Discuss the software testing process. What is software testing life cycle? Explain? **(6)**  
b) What is correctness of a software? Enumerate other limitations of software testing. Is it possible to generate zero defect software? **(6.5)**

#### UNIT II

- Q4. a) Discuss Boundary Value Analysis and Cause Effect Graphing Technique of functional testing. Highlighting the merits and demerits of each of these. **(6)**  
b) Explain the features of Decision Table Based Testing with the help of a suitable example. **(6.5)**
- Q5. a) Explain in details the following with the help of illustrative examples:  
i) Statement coverage ii) Branch coverage iii) Condition coverage  
b) Give an overview of Data Flow Testing. **(6.5)**

#### UNIT III

- Q6. a) What is Regression Testing? Compare Development Testing with Regression Testing.  
b) How do you prioritize the test cases during regression testing? **(6.5)**
- Q7. a) Discuss code coverage prioritization technique. Explain the advantages of prioritization of test cases.  
b) Explain various levels of testing. **(6.5)**

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#### UNIT IV

- Q8. Draw an activity path for any example and show how the test cases can be generated for this example. **(12.5)**
- Q9. a) Differentiate between static and dynamic testing tools. **(6)**  
b) Discuss the characteristics of modern testing tools. **(6.5)**

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# END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH(CSE/IT)] NOVEMBER-DECEMBER 2018

Paper Code: IT-403  
Time: 3 Hours

Subject: Software Testing  
Maximum Marks: 75

Note: Attempt five questions in all including Q.no.1 which is compulsory.  
Select one question from each unit.

- Q1 Answer the following: (10x2.5=25)
- (a) Explain the limitations of testing.
  - (b) Explain the role of testing persons for a software.
  - (c) Define the following features used in graph theory: incidence matrix, adjacency matrix, paths, connectedness and cycles.
  - (d) Explain mutation testing. mention the purpose of mutation score.
  - (e) Explain the significance of decision tables in testing. What is the purpose of a rule count.
  - (f) Explain the process of prioritization of test cases.
  - (g) Mention the attributes of object oriented testing.
  - (h) What is the role of risk matrix for the reduction of test cases?
  - (i) Mention various debugging techniques.
  - (j) How is object oriented testing different from procedural testing?

## UNIT-I

- Q2 (a) Explain the limitations of software testing. (2)  
(b) Explain the terms error, failure, bug and fault. Give an example for each related to software program. (7.5)  
(c) Explain the process of verification and validation. (3)

OR

- Q3 (a) Mention the errors in software requirement that can limit the process of software testing. (4)  
(b) Give the template of test case. (4)  
(c) Explain how testing and quality assurance are related in software engineering. (4.5)

## UNIT-II

- Q4 (a) Compare data flow testing and control flow testing. (4.5)  
(b) Write a program to print the grade of a student according to the following criteria: (4+4)
- |                       |          |
|-----------------------|----------|
| (i) marks > 80        | A+ Grade |
| (ii) 70 < marks <=80  | A Grade  |
| (iii) 60 < marks <=70 | B Grade  |
| (iv) 50 < marks <=60  | C Grade  |
| (v) 40 < marks <=50   | D Grade  |

Generate all du-paths and write test cases for all du-paths.

OR

- Q5 (a) Explain the constraints in cause-effect graph. (2.5)  
(b) Consider a program that takes three numbers as input and print the values of these numbers in descending order. Its input is a triple of positive integers (say x, y and z) and values are from interval [300, 700]. Generate the following test cases: boundary value, robust and worst case. (6)

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- (c) Compare robust testing and equivalence class testing. Give their applications. (2+2)

### **UNIT-III**

- Q6 (a) Many techniques for the selection of test cases for regression testing. (4)  
 (b) Discuss the priority category schemes for prioritization of test cases. (2+2)  
     What is the role of risk matrix for the reduction of test cases?  
 (c) What is slice based testing, how can it improve testing? Explain the concept with the help of an example and write test cases accordingly. (4.5)

**OR**

- Q7 (a) Compare testing and debugging. (3)  
 (b) Explain the following levels of testing: (6)  
     (i) unit testing  
     (ii) integration testing  
     (iii) acceptance testing  
 (c) Mention the attributes of domain testing. (3.5)

### **UNIT-IV**

- Q8 (a) Compare static testing and dynamic testing. Give an example for each. (5)  
 (b) Explain the features of object oriented testing. (5)  
 (c) Explain features of GUI testing. (2.5)

**OR**

- Q9 (a) Explain any five characteristics of modern testing tools. (5)  
 (b) Mention the issues of class testing. (4)  
 (c) Compare object oriented integration testing and system testing. Give their applications. (3.5)

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# SUPPLEMENTARY EXAMINATION

SEVENTH SEMESTER [B.TECH./M.TECH] OCTOBER-NOVEMBER- 2016

Paper Code: IT-403

Subject: Software Testing

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any five questions including Q.No1 which is compulsory.

Select one question from each unit.

- Q1 Differentiate between the following:- (5x4=20)
- (a) Program and Software
  - (b) Alpha Testing and Beta testing
  - (c) du-path and dc-path
  - (d) Procedural Testing and Object Oriented Testing
  - (e) Static and dynamic Testing

## UNIT-I

- Q2 (a) Discuss any two limitation of software testing with example? (3)  
(b) Give the structure of a test case template. How is it helpful? Also design the structure of a test suite. (4)  
(c) What is verification? How is it different from Validation? (3)
- Q3 Write a program to find roots for a quadratic equation. Draw the program path graph and DD-graph. Find out the cyclomatic complexity and identify independent paths. (10)

## UNIT-II

- Q4 (a) Consider a program to find the median of three numbers. The input is a triple of positive integers in the interval (50,200). Generate boundary value test cases for this program. How many test cases can be created if worst case testing and robust worst case testing is done. (5)  
(b) Consider a program to perform binary search. Generate the test cases using equivalence class testing. What are "Do not Care" conditions in Decision Table bases testing? (5)
- Q5 (a) Define structural testing. How is it different from functional testing? List out some of them. (3)  
(b) What is path testing? What is the significance of using it? (2)  
(c) What is slice basted testing? (2)  
(d) What is the importance of mutation testing? Explain with an example. (3)

## UNIT-III

- Q6 (a) How is "Selective Retesting technique" different from "Prioritizing Technique". Explain with example. (4)  
(b) What is risk analysis? How can it be used during testing? (3)  
(c) What are the steps during regression testing process? Explain. (3)
- Q7 (a) What is the difference between System Testing and Integration Testing? (3)  
(b) How is 'Performance testing' carried out? What are the various metrics computed during performance testing. (4)  
(c) What is debugging. Explain any two techniques of debugging. (3)

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## **UNIT-IV**

- Q8 (a) What are the limitations of the basic state model in Object Oriented Testing? How can they be overcome? (3)
- (b) What is an activity diagram? What are the basic symbols used in the construction of such diagram. Explain with example. (4)
- (c) What is class testing? What are various issues related to class testing? (3)
- Q9 (a) What are the advantages of automated test data generation over manual test data generation? (5)
- (b) Write short notes on:  
(i) Coverage Analysis tools.  
(ii) Dynamic testing tools.

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**END TERM EXAMINATION**

SEVENTH SEMESTER [B.TECH] DECEMBER 2016 JANUARY-2017

Paper Code: IT 403

Subject: Software Testing

Time : 3 Hours

Maximum Marks :60

**Note:** Attempt any five questions including Q.No 1 which is compulsory.  
Select one question from each unit.

Q1. Explain the following:

(4x5=20)

- a) Bug Vs Incident
- b) Adjacency Matrix Vs. incidence Matrix
- c) DD Path
- d) Risk Exposure
- e) Debugging

**Unit-I**

Q2. What is the necessity of software testing? Name any two software failures which lead to huge loss in past. Can we ever say that testing is complete? Explain with suitable examples. (10)

Q3. What are the various components of a control flow graph? Take an example to show the conversion of a flow graph into incidence matrix. How incidence matrix helps in software testing. Take an example graph and demonstrate. (10)

**Unit-II**

Q4. What is cause effect based testing. Explain its applications, advantages and disadvantages. (10)

Q5. Write a program to find maximum of given three numbers. Write test cases for this program using data flow testing. (10)

**Unit-III**

Q6. What is regression testing? Write the procedure for regression test selection. Take an example to demonstrate the same. (10)

Q7. What is risk? How risk analysis is done? Take an example to show how risk analysis helps in test case prioritization. (10)

**Unit-IV**

Q8. What is class testing? Explain one method of testing a class. Create class test cases for stack class. (10)

Q9. Explain the following:

(2.5x4=10)

- a) GUI testing
- b) Dynamic testing tools
- c) Static Testing Tools
- d) System testing

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# END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH/M.TECH] DECEMBER 2015-JANUARY 2016

Paper Code: IT-403  
Time: 3 Hours

Subject: Software Testing  
Maximum Marks: 60

Note: Attempt any five questions including Q.no.1 which is compulsory.  
Select one question from each Unit.

- Q1 Attempt all the questions: (10x2=20)
- (a) Explain fault, bug, and failure with respect to testing.
  - (b) What is acceptance testing?
  - (c) Why is functional testing also known as black box testing? Explain.
  - (d) What are the limitations of boundary value analysis technique?
  - (e) Discuss the significance of decision table testing.
  - (f) Explain cause effect graph technique for testing.
  - (g) What is mutation testing? What is the purpose of mutation score?
  - (h) What are non-functional requirements?
  - (i) Differentiate between integration testing and system testing.
  - (j) What is cyclomatic complexity? Give example. Why it is used?

## Unit-I

- Q2 (a) Does exhaustive testing guarantee that the program is 100% correct? (3)  
(b) Discuss significance of V-shaped software life cycle model and also establish the relationship between its development and testing parts. (3)  
(c) Differentiate between the following: (4)  
(i) Alpha and Beta testing (ii) Verification and Validation.
- Q3 (a) What are the differences between a directed graph and un-directed graph? Which one is more relevant in software testing and why? (3)  
(b) Define a test case. What are the objectives of test case design? Discuss the various steps involved in designing test case. (3)  
(c) Write a function to find maximum of three numbers. Draw a graph corresponding to this function. Find the following: (4)  
(i) Incidence matrix  
(ii) Adjacency matrix  
(iii) Paths  
(iv) Cycles

## Unit-II

- Q4 (a) Why do we take robustness testing? What are the traditional benefits? Show additional test cases with the help of an example and justify the significance of these test cases. (5)  
(b) Consider a program to perform binary search and generate the test cases using equivalence class testing and decision table testing. (5)
- Q5 Write a program to find roots of a quadratic equation. Draw a program graph, DD path graph. Find independent paths and generate test cases. Find all du-paths. Identify those du-paths that are not dc-paths. Write test cases for the program. (10)

**Unit-III**

- Q6 (a) Compare development testing with regression testing. (3)  
 (b) Define risk analysis. How can it be used in software testing? (3)  
 (c) Define slice based testing. Take an example and explain how test cases are drawn using slice based testing. (4)
- Q7 (a) Explain the following and clearly differentiate: (3)  
 (i) Stress testing  
 (ii) Load testing  
 (iii) Performance testing  
 (b) Define domain testing. Draw the test cases using domain testing for an example. (3)  
 (c) What is debugging? Discuss two of the debugging techniques. Write the features of the technique and compare the important features. (4)

**Unit-IV**

- Q8 (a) What are the various levels of testing with respect to object oriented testing? Explain the testing process for object oriented programs. (6)  
 (b) How is the object oriented testing different from procedural testing? (2)  
 (c) What is class testing? What are the various issues in class testing? (2)
- Q9 (a) List the advantages of automated test case generation over manual test data generation. (5)  
 (b) Differentiate between static and dynamic testing tools. (5)

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# END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH]

DECEMBER 2014-JANUARY 2015

Paper Code: IT-403

Time: 3 Hours

Subject: Software Testing

Maximum Marks: 60

Note: Attempt any five questions including Q.no.1 which is compulsory.

Select one question from each Unit.

Q1 Explain the following:-

- (a) Fault Vs Failure
- (b) Mutation Testing
- (c) Debugging
- (d) Graph metrics
- (e) GUI

(4x5=20)

## Unit-I

Q2 What is software testing process? Why testing is said to be hard. Can we give an absolute proof of correctness of a given program? Explain with suitable examples. (10)

Q3 What are the incidence and adjacency matrices in a graph? Take an example graph and develop these matrices. (10)

## Unit-II

Q4 What is Decision table based testing. Explain its applications, advantages and disadvantages. (10)

Q5 Write a program to find minimum of given three numbers. Write test cases for this program using path testing. (10)

## Unit-III

Q6 What is slice based testing. Write a program to compute prime numbers and find its slice based test cases. (10)

Q7 What is test case prioritization? Explain various priority category schemes in detail. (10)

## Unit-IV

Q8 Explain whether the object oriented paradigm helps in making the testing easy or difficult. What is object oriented testing. Explain one of the class testing methods with a suitable example. (10)

Q9 What are software testing tools? How do they help in the process of software testing? What are various static testing tools and dynamic testing tools? Explain. (10)

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# END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH/M.TECH] DECEMBER 2013

Subject: Software Testing

Paper Code: ET-403

Time : 3 Hours

Maximum Marks : 60

Note: Attempt any five questions, including Q.no. 1 is compulsory. Select one question from each Unit.

2 X 10 = 20

Question 1 Answer the following:

- What is Gamma Testing?
- What are 'Risk to Buyer' and 'Risk to Seller' during acceptance testing?
- What is an audit of a product/process under progress?
- What are the assumptions in software testing?
- Differentiate between Walkthroughs and Inspections.
- What are the similarities and differences between testing and debugging?
- Draw all the five constraint symbols for any Cause-Effect Graph.
- What are DD Path Graphs? Why are these used in software testing?
- How do you create a software slice? Give example.
- What should we measure during testing?

## Unit 1

Question 2 a) What is a test case? Explain a typical test case template. Why are the test cases documented? 04

b) Discuss various types of documentation and operating system manuals that are required to be prepared for every phase of SDLC. 06

or

Question 3 What is a graph? How many graphs are there? Explain incidence and adjacency matrices with the help of suitable examples. 10

## Unit 2

Question 4 What is Robustness Testing and how is different from Boundary Value analysis?. What are Worst-Case and Robust Worst-Case Testing? How are these different? Explain with the help of suitable illustrations. 10

or

Question 5 Explain the guidelines for producing slices of a program/software. Consider a suitable example program, create its slices and test cases. 10

## Unit 3

Question 6 a) What is the prioritization of test cases? Why is it required? 05  
b) Explain Domain Testing. What is its specific role? 05

or

Question 7 What is the role of Deletion Algorithm? Explain its various steps with the help of suitable examples. 10

## Unit 4

Question 8 a) Explain various types of dynamic software testing tools. 05  
b) Explain the salient characteristics of modern software testing tools. 05

or

Question 9 Discuss various concepts of State Based Testing in reference to Object Oriented Testing. 10

**END TERM EXAMINATION**

SEVENTH SEMESTER [B.TECH./M.TECH.] DECEMBER-2012

Paper Code: IT403

Subject: Software Testing

Time : 3 Hours

Maximum Marks :60

**Note:** Attempt five questions including Q.no. 1 which is compulsory.  
Select one question from each unit.

- Q1 Explain the following in briefly:- (2x10=20)
- (a) Failure
  - (b) Test suite
  - (c) dd path
  - (d) Usage node
  - (e) Software project audit
  - (f) Walkth roughs
  - (g) Risk
  - (h) Slice
  - (i) Debugging
  - (j) Coupling

**UNIT-I**

- Q2 What is the testing process? How can it be implemented? Discuss its limitations? (10)

- Q3 What is a test case? Explain its template. How are test cases associated with a test suite? Explain various characteristics of test suite. (10)

**UNIT-II**

- Q4 Consider a program to find the median of three numbers. Its input is a triple of positive integers (a, b, c) and values are from interval [100, 500]. Generate boundary robust and worst-case test cases. (10)

- Q5 (a) Explain boundary value analysis technique. How is it different from equivalence class testing technique? (7)  
(b) Why is function testing also known as black box testing also? (3)

**UNIT-III**

- Q6 What is regression testing? Explain the techniques used for selecting test cases during regression testing. Differentiate between selective and 'retest all' re-test techniques. (10)

- Q7 What are the various priority categorization schemes for prioritization of test cases? Discuss. Explain the differences between general test case prioritization and version specific test case prioritization. (10)

**UNIT-IV**

- Q8 What is state based testing? Explain its limitations. How can these be overcome? Also, explain the significance of cyclomatic complexity. (10)

- Q9 Differentiate between static and dynamic testing tools.
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# END TERM EXAMINATION

SEMESTER [M.TECH] DEC-2010

Paper Code: IT403  
Time : 3 Hours

Subject: Software Testing

Maximum Marks : 60

Note: Attempt any five questions.

- Q1. (a) Why software testing is hard? Explain. (4)  
(b) Explain step by step software testing process. (5)  
(c) What are the limitations of testing? (3)
- Q2. Write a program to find minimum of a given n numbers. Evaluate its boundary value test cases. (12)
- Q3. What is data flow testing? Illustrate through an example. (12)
- Q4. (a) What is risk analysis? Explain the priority category schemes. (6)  
(b) What is regression Testing? Differentiate it from the development testing. (6)
- Q5. (a) What are various levels of testing? Explain all the levels. (6)  
(b) What do you mean by debugging? How it is performed. (6)
- Q6. (a) Explain object oriented testing. Differentiate it from conventional software testing. (6)  
(b) What are various types of software testing tools? Explain. (6)
- Q7. Explain the following: (4x3=12)  
(a) Domain testing  
(b) Slice based testing  
(c) Mutation testing  
(d) Cyclomatic complexity

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