NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA-769008
END-SEMESTER EXAMINATION, 2020
SESSION: 2020 – 2021 (Spring)
B. Tech. 8th Semester

Subject code: CS 6404 Subject Name: Software Testing Dept. Code: CS
Full Marks: 40 Duration:30 minutes

Answer All Questions.
Each correct answer will carry 1 mark and each wrong answer will attract -0.25 mark.

1. Identify the synonyms among the following terms related to program testing: error, bug, mistake, failure, and fault:
   a. error, bug, mistake, failure, and fault:
   b. error, bug, failure:
   **c. error, bug, fault**
   d. bug, failure, fault:

2. Verification is _____ .
   a. making sure that it is what the user really wants
   b. checking that we are building the right system
   **c. checking that we are building the system right**
   d. performed by an independent test team

3. Which of the followings cannot be detected by static analysis?
   **a. Memory leaks**
   b. Improper storage allocation and deallocation
   c. The use of a variable before it has been defined
   d. Array indices out of bound
4. Test cases are designed during:
   a. Test recording.
   b. Test configuration.
   c. Test planning.
   **d. Test specification**
5. The equivalence classes for the input range (-15 to -100) are:

   a. (-15 to -100)
   b. (>=-101), (-15 to -100), (<=-15)

Cont...

**c. (<=-101), (-15 to -100), (>=-14)**

d. None of these

6. If the invoking module for a module which is unit tested is not available, we should use
   a. A stub module
   **b. A driver module**
   c. A global module
   d. No special module

7. Consider a program that computes largest among three integers A,B,C, where A lies in between [1,10], B lies in between [1,20 ] and C lies in between [1,30]. How many test cases can be designed, if you are using Robustness Testing method?
   a. 13
   b. 15
   c. 17
   **d. 19**
8. Consider a function named compute-grade that computes the grade of a student based on his attendance and the total marks obtained out of 100. If the attendance is below 80%, the student is assigned an “F” grade irrespective of the marks scored. If the attendance of a student is 80% or more, the student with mark M is assigned a grade from EX, A, B, C, D, P, F depending upon whether M>89%, 90%>M>79%, 80%>M>69%, 70%>M>59%, 60%>M>49%, 50%>M>29%, or M<30%. If the decision making about the grade computation is represented in the form of a decision table, how many test cases are needed for decision table testing?
   a. 2
   b. 7
   **c. 8**
   d. 9
9. 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) or (i<45)) x=x+1;
   a. 2
   b. 14
   **c. 16**
   d. 8
10. A changed version that has not passed a regression test is called …….
    a. Baseline version
    **b. Delta version**

c. Delta build
d. Modified version

11. Test log is ……
    a. An evaluation report prepared when the testing over
    b. A form of bug report
    **c. A record of the testing events that takes place during test**
    d. None of these
12. For a typical software product, testing should account for what percentage of the total software development costs?
    a. 5-10
    b. 10-20
    **c. 40-50**
    d. 80-90
13. Among the following data-flow anomalies, which one is the most dangerous one?
    a. du
    b. ud
    **c. ku**
    d. uk

14. Suppose, T contains 100 tests of which 25 are modification-revealing for P and P' and a regression test selection technique M selects 5 of these 25 tests, then what is the inclusiveness of M relative to P, P' and T?
    a. 10
    **b. 20**
    c. 30
    d. 80

15. If you have 3 variables that have 3 values each, then the possible number of test cases using orthogonal array testing will be _____.
    a. 3
    **b. 9**
    c. 27
    d. 81
16. A program computes $a^b$ where a lies in the range of [1,20] and b lies in the range of [1, 12]. How many test cases are possible using worst-case testing method?
    a. 31
    **b. 25**
    c. 125

d. 625

17. Problem to choose a subset T' of T with which P' will be tested is called -----
    **a. regression test selection problem**
    b. coverage identification problem
    c. test suite execution problem
    d. test suite maintenance problem
18. Regression testing is helpful in
    a. Detecting bugs
    b. Detecting undesirable side effects by changing the operating environment
    c. Integration testing
    **d. All of these**
19. The set of statements executed under a test case, having an effect on the program output under that test case is called
    a. Execution slice
    **b. Dynamic slice**
    c. Relevant slice
    d. Static slice
20. Cluster level testing refers to -----
    a. Testing of interactions among the components of an individual class
    b. The internal testing of an individual method in a class
    **c. Testing of interactions among a group of cooperating classes**
    d. External inputs and outputs visible to the users of a system
21. Inherited methods should be retested in the context of a / an -----
    a. Super class
    **b. Subclass**
    c. Base class
    d. Object
22. System testing can be performed with ---
    a. Object diagram
    b. Class diagram
    **c. Use-case diagram**
    d. Package diagram

23. When a service does not respond, it is known as
    a. Cross site scripting
    **b. Denial of service**
    c. Memory leakage
    d. Buffer overflow
24. The percentage of time a resource is busy, is known as
    a. Response time

**b. Resource utilization**
c. Round-trip time
d. Turnaround time

25. In agile testing, which test cases are written prior to the code writing?
**a. Unit**
b. Integration
c. System
d. Regression

26. In case of object-oriented programs, what is the basic unit of testing?
a. Statement
b. Method
**c. Object**
d. Program

27. Inheritance ------ encapsulation.
**a. Weakens**
b. Strengthens
c. Does not affect
d. Is not related with

28. Which of the following coverage criterion is not appropriate for object-oriented programs?
**a. Statement coverage**
b. Condition coverage
c. Message coverage
d. Message path coverage

29. Fault-based testing misses which error?
**a. errors due to interactions among subsystems**
b. unexpected result
c. wrong operation/message used
d. incorrect invocation.

30. Which one of the followings categorizes and tests operations based on the generic function each performs?
a. State-based partitioning
b. Attribute-based partitioning
**c. Category-based partitioning**
d. Equivalence partitioning

31. Which one of the following testing technique integrates the classes required to demonstrate one collaboration
a. Thread-based testing technique

b. Use-based testing technique
**c. Cluster testing technique**
d. Pair-wise integration testing technique

32. Which one of the followings uncovers interaction errors?
a. Fault-based testing
b. Random testing
c. Partition testing
**d. Scenario-based testing**

33. Behavioral integration testing can be performed using which diagram?
a. Use-case diagram
b. Class diagram
c. Package diagram
**d. State chart diagram**

34. JMeter is used for---------
**a. Load testing**
b. GUI testing
c. Regression testing
d. Functional testing

35. Which one of the followings can be considered as a fault-based testing technique?
a. Cause-effect graphing
b. Data flow testing
c. Orthogonal array testing
**d. Mutation testing**

36. Which one of the following techniques a manager uses to estimate the number of errors still remaining in a program after the testing is complete?
a. Mutation testing
**b. Error seeding**
c. Pair-wise testing
d. Cause-effect graphing

37. Which one of the followings is an example of negative test case?
a. A test designed to crash the software
b. A test designed with negative integral values
c. A test case causing software failure
**d. A test case with values outside the valid range of values**

38. A defect –seeding program inserts 81 defects into an application. Inspections and testing found 152 defects. Of these, 72 were seeded defects. Approximately how many defects are expected to remain as undetected in the application?

a. 123
b. 105
**c. 19**
d. 90

39. Atleast how many test cases are required to achieve MC/DC coverage of the following code segment:
    If ((a>5) and (b<100) and (c >50)) x = x + 1;
    a. 1
    b. 2
    c. 3
    **d. 4**

40. Which one of the followings techniques is used to determine the adequacy of the test suite?
    a. Boundary value testing
    b. MC/DC based testing
    c. Equivalence class partitioning
    **d. Mutation testing**

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**END-SEMESTER EXAMINATION, 2021**
**SESSION: 2020 – 2021 (Spring)**
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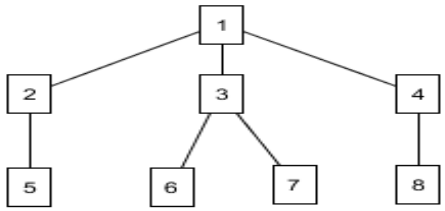
**Subject code:** CS6104 **Subject Name:** Software Testing **Dept. Code:** CS
**No. of pages:** 2 **Full Marks:** 60 **Duration:** 1.5 *Hours*

**Figures at the right hand margin indicate marks.**
**All parts of a question should be answered at one place.**
**Answer all questions.**
**Clearly mentions the assumptions you have taken, wherever necessary.**

| Q. No. | Particulars | Marks |
|---|---|---|
| 1. | | 10*2=20 |
| (a) | Consider a program for determining the day of the week. Its input is a triplet <day, month, year> with the values in the range<br>1≤day≤31,<br>1≤month≤12,<br>1900≤year≤2058.<br><br>The possible outputs would be the day of the week or invalid date. Design the test cases using BVC technique. | |
| (b) | Consider a system having an FSM for a stack having the following states and transitions:<br><br>**States**<br>Initial: Before creation<br>Empty: Number of elements=0<br>Holding: Number of elements>0, but less than the maximum capacity<br>Full: Number of elements=maximum<br>Final: After destruction<br>**Transitions**<br>Initial to Empty: Create<br>Empty to Holding, Empty to Full, Holding to Holding, Holding to Full: Add<br>Empty to Final, Full to Final, Holding to Final: Destroy<br>Holding To Empty, Full to Holding, Full to Empty: Delete<br><br>Design test cases for this FSM using state table based testing. | |

Cont.

| | | |
|---|---|---|
| 2. | | 10*2=20 |
| (a) | Write a function in C which takes an integer array as input and stores it in ascending order.<br>Draw the CFG for the above function.<br>Determine the cyclomatic complexity.<br>List all independent paths.<br>Design test cases from all independent paths. | |
| (b) | Consider the following program. Find out the possible mutants and check how many of them are killed by taking a set of arbitrary test data. Add new test data if required.<br>`#include<stdio.h>`<br>`main(){`<br>`float x,y,z;`<br>`printf("Enter the three variables x,y,z");`<br>`scanf("%f%f%f",&x,&y,&z);`<br>`if(x>y){`<br>`if(x>z)`<br>`printf("x is greatest");`<br>`else`<br>`printf("z is greatest");`<br>`}`<br>`else{`<br>`if(y>z)`<br>`printf("y is greatest");`<br>`else`<br>`printf("z is greatest");`<br>`}`<br>`}` | |
| 3. | | 10*2=20 |
| (a) | Perform top-down and bottom-up integration procedure from the following system hierarchy.<br>  <br><br>Calculate the number of test sessions. | |
| (b) | Briefly explain about the process of behavioral integration testing. Consider the class **CreditCard** in a banking system. Draw the state transition diagram and generate test cases for the class **CreditCard** using behavioral integration testing. You may assume appropriate operations of the class **CreditCard.** | |