SEN22352E - SOFTWARE VERIFICATION, VALIDATION & SECURITY

Comprehensive Exam: Software Testing Topics

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Total Duration: 90 Minutes

Total Marks: 100

Instructions: Answer all questions. Show all working for full marks.

Section A: Multiple Choice Questions (10 x 3 = 30 points)

1. Which of the following is a Type 2 anomaly in Data Flow Testing?

   a) x = x + 1;

   b) y = y * 2; where y is undefined

   c) z = 3; then unused

   d) a = a + b; where b is defined later

2. What distinguishes a stub from a driver?

   a) Stubs simulate upper modules

   b) Drivers replace lower modules

   c) Stubs simulate lower modules

   d) Drivers are for regression testing only

3. Which integration strategy helps in early system-level visibility?

   a) Big-Bang

   b) Sandwich

   c) Top-Down

   d) Bottom-Up

4. Which of the following is NOT an interface paradigm?

   a) Message Passing

   b) Shared Memory

   c) Return by Reference

d) Procedure Call

5. In which test are undefined but referenced variables detected?

a) Type 1

b) Type 2

c) Type 3

d) Type 0

6. What makes a path 'definition-clear' in Data Flow Testing?

a) It has multiple uses

b) No redefinition or undefinition

c) All variables are global

d) Path ends in a p-use

7. In which test strategy are top and bottom layers tested separately while the middle is tested together?

a) Top-down

b) Sandwich

c) Bottom-up

d) Big-Bang

8. What is the main purpose of System Integration Testing?

a) Test individual functions

b) Verify interface-level interactions

c) Test GUI behavior

d) Perform stress testing

9. What does the sequence du indicate in variable state transitions?

a) Read after define

b) Define after read

c) Define then not used

d) Undefine then used

10. Which test ensures the build is testable before formal testing?

a) Sanity Testing

b) Regression Testing

c) Smoke Testing

d) Localization Testing

Section B: Short Answer Questions (5 x 6 = 30 points)

11. Explain the difference between Static and Dynamic Data Flow Testing with examples.

12. Describe the three types of Data Flow Anomalies with examples.

13. What are stubs and drivers? Where are they used in system integration strategies?

14. Define what a du-path is in Data Flow Testing. Provide an example from a small code snippet.

15. Compare and contrast Top-down, Bottom-up, and Big-bang integration testing methods.

Section C: Applied Questions (2 x 20 = 40 points)

16. Given the following code, identify all variable definitions, c-uses, and p-uses. Then draw a data flow graph.

```
int a = 0;
int b = 5;
if (b > 2) {
    a = b * 2;
    print(a);
}
```

17. Suppose you are integrating a payment module with a billing system. Choose one integration strategy (Top-down, Bottom-up, Big-bang, Sandwich) and describe how you would test it. Include interface types and potential errors.