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Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Final Examination, Fall- 2025
Course Code: SE 312
Course Title: Software Quality Assurance & Testing
Sections & Teachers: (A-C, QFF) (D-MNA) (E-AUA) (F-H, SA) (I, J-AAS) (K, L-SIM) (M, N-NAN)

Time: 2 Hours | Marks: 40

Answer ALL Questions
[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1	a)	Suppose you are testing a mobile banking app. On the login page, when you tap the Login button nothing happens and the page does not proceed. How would you ***Discover*** the cause of this issue and *propose* a solution?	[Marks-5]	CLO-3 Level-4

	b)	Consider the following code segment for Statement Coverage:
		`if (x > 5)`
		`{`
		`  if (Y < 5)`
		`  {`
		`  Print Y;`
		`  }`
		`  else`
		`  {`
		`  Print NY;`
		`  }`
		`}`
		`else`
		`{`
		`  if (Y > 5)`
		`  {`
		`  Print X;`
		`  }`
		`}`
		a. **Investigate** the program to identify all executable statements.
		b. **Determine** the necessary Test Cases with values of X and Y to cover each statement.
			[Marks-2+3]	CLO-3 Level-4

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	c)	#include <stdio.h>
		
		int main()
		{
		int n, i = 1, j, sum = 0;
		
		1. printf("Enter a number: ");
		2. scanf("%d", &n);
		
		3. while(i <= n)
		4. {
		5. for(j = 1; j <= 3; j++)
		6. {
		7. if(j % 2 == 0)
		8. printf("%d is even\n", j);
		9. else
		10. printf("%d is odd\n", j);
		11. }
		
		12. sum += i;
		
		13. if(sum > 5)
		14. printf("Sum is now greater than 5\n");
		
		15. i++;
		16. }
		
		17. printf("Total Sum = %d\n", sum);
		18. printf("Done!");
		19. }
		
		(a) **Draw** the CFG for the program.
		(b) **Calculate** the cyclomatic complexity of the program.
		(c) **Determine** any two independent paths.
			[Marks-10]
			6+2+2
				CLO-3
				Level-4

2	a)	**Apply** your understanding to explain the role of CMMI (Capability Maturity Model Integration) in software testing. How does CMMI improve the quality and effectiveness of the testing process? Provide examples of testing practices or activities influenced by different CMMI levels.	[Marks-5]	CLO-4 Level-4
	b)	Your QA team is currently testing a newly developed Invoice Processing Module in a financial application, which consists of 4,000 lines of code (LOC). During the initial system testing phase, the QA team identified 180 defects in the module. Over a period of 32 business days, the development team managed to resolve 140 of these defects. However, during re-testing, 28 of the resolved defects were still found to be problematic and required further attention. Out of those 28, the testing team rejected 16 defects due to improper fixes, incomplete resolution, or fixes that introduced new issues. In the second phase, over the next 20 business days, the developers resolved 25 defects from the remaining pool of open defects. After re-testing in the third phase, 12 of these 25 defects were again found to be problematic and were rejected by the QA team for improper or ineffective fixes. Based on the above scenario, Now, **Calculate** and present the formulas for the following: i. Defect Density, ii. Defect Removal Rate, iii. Defect Rejection Rate, iii. Turn Around Time	[Marks-5]	CLO-4 Level-4

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c)	Given the program (**0-based indexing**): *count = 0; sum = 0; i = 0;* *do {* *if (a[i] > 0) {* *if (a[i] % 2 == 0) count++;* *else sum += a[i];* *}* *i++;* *} while (i < 4);* *// Output = (count, sum)* i) Create three secondary mutants of the given program. ii) Suppose the following mutants are already created: • M1: if (a[i] >= 0) • M2: i = i + 2 You are also given the following test data: • TD1: {2, –3, 5, 8} • TD2: {0, 4, –1, 6} • TD3: {1, 3, 2, –2} Apply each test data to P, M1, and M2. Identify which mutants are killed.	[Marks-10] 3+7	CLO-4 Level-4