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S. No.	Question	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
	GROUP - A (SHORT ANSWER QUESTIONS)		
1.	**Explain** goals for testing and model for testing in software testing?	Understand	1
2.	**Describe** phases in tester's mental life and state Complexity Barrier?	Knowledge	1
3.	**Explain** about test design and explain different types of testing?	Understand	1
4.	**Explain** the following a) Environment b) Program c) Bugs	Apply	1
5.	**State** pesticide paradox and complexity barrier in purpose of testing?	Knowledge	2
6.	**Demonstrate** nightmare list and when to stop testing in the consequences of bugs?	Knowledge	2
7.	**Illustrate** hardware architecture and software architecture?	Understand	2
8.	**Differentiate** function versus structure testing .and compare small versus large programming?	Understand	2
9.	**Demonstrate** test bug remedies and illustrate requirement bugs?	Understand	2
10.	**Explain** external interfaces and internal interfaces and discuss the consequences of bugs?	Understand	2
11.	**Define** path testing and explain about decision and case statements?	Knowledge	5
12.	**Explain** bug assumption and compare control flow graphs and flow charts?	Understand	5
13.	**State** control flow graph and list independence and co-relation of variables and predicates?	Knowledge	5

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14.	**State** process blocks and defines predicate and path predicates?	Knowledge	5
15.	**Demonstrate** path statement, path testing criteria and explain branch testing?	Understand	5
16.	**Explain** about simple independent and co-related predicates?	Knowledge	5
17.	**Define** loops and explain different types of loops and **Explain** nested loops	Understand	5
18.	**Explain** flow graph notational evolution and explain co-related independent predicates?	Understand	5
19.	**Explain** path nodes and links and explain the effectiveness and limitations of path testing?	Understand	5
20.	**Explain** multi entry and multi exit routines and describe path predicate expression?	Understand	5
	GROUP-B (LONG ANSWER QUESTIONS)		
1	a. **Discuss** that software testing will ensure the quality of a developed software? b. **Demonstrate** the trade - off between quality assurance costs and manufacturing costs?	Apply	1
2	a. **Describe** is it possible for a tester to find all the bugs in a system? Why might it not be necessary for a program to be completely free of defects before it is delivered to its customers? b. **Discuss** to what extent can testing be used to validate that the program is fit for its purpose?	Understand	1
3	a. **Demonstrate** the phases in a tester's mental life? b. **Describe** that testing is not everything?	Apply	1
4	a. **Explain** the principles of test case design? b. **List** out various dichotomies and explain?	Understand	2
5	a. **State** differences between functional and structural testing? b. **List** the factors on which the importance of the bugs depend and give the metrics for them? c. **Explain** various consequences of bugs? d. **Discuss** the remedies for test bugs?	Knowledge	2
6	a. **Classify** the different kinds of bugs and explain? b. **Explain** the procedure used in quantifying the nightmare list to stop testing? c. **Explain** the five types of structural bugs?	Understand	4
7	a. **Discuss** clearly about requirements, features, and functionality of bugs? b. **Discuss** control and sequence bugs and the methods to be caught?	Understand	4
8	a. **Summarize** white box testing and black box testing and give the differences between them? b. **Compare** static data and dynamic data?	Understand	4
9	a. **Discuss** interface, integration and system bugs with an example? b. **Explain** about resource management problem in software testing? c. **Define** testing and list out the remedies for test design bugs?	Understand	4
10	a. **Demonstrate** structural bugs, coding bugs, data bugs and system bugs and discuss methods to catch these bugs? b. **Discuss** the classes of bugs in the taxonomy of bugs?	Apply	4
11	a. **Define** software bug in software testing? b. **Discuss** pesticide paradox and complexity barrier? c. **Explain** model for testing?	Knowledge	4
12	a. **Define** integration testing and discuss the goals of integration testing? b. **Explain** clearly the white box tests and behavioral tests?	Knowledge	4
13	a. **Define** statement coverage (C1) and branch coverage (C2)? Explain with an example methods to select enough paths to achieve C1+C2? b. **Define** loop? State and explain various kinds of loops with suitable examples also discuss methods to select optimal paths for C1+C2. (Statement coverage + Branch coverage)?	Knowledge	5
14	a. **Discuss** about assignment blindness, and equality blindness of predicates? b. **Explain** the terms achievable and unachievable paths?	Understand	5

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15	a. **Discuss** about "Traversal marker" form of path instrumentation? b. **Explain** coincidental correctness? Give an example?	Understand	5
16	a. **Discuss** statement testing and branch testing? Give suitable examples? b. **State** and explain various path selection rules for path testing?	Understand	5
17	a. **Explain** about program's control flow? Is it useful for path testing? b. **Discuss** various flow graph elements with their notations?	Understand	5
18	a. **Justify** flowchart is different from a control flow graph? b. **Explain** about multi entry and multi exit routines and fundamental path selection criteria?	Understand	5
19	**Describe** the following concepts a. Predicates b. Predicate Expression c. Predicate Coverage d. Achievable paths	Understand	5
20	a. **Define** path sensitization and write heuristic the procedure used in path sensitization? b. **Explain** how concatenated loops can be tested? c. **Discuss** the three cases for single loop testing?	Knowledge	5
	GROUP-C (ANALYTICAL QUESTIONS)		
1	**Discuss** in practice, that life cycle model may have more, fewer or different levels of development and testing, depending on the project and the software product?	Understand	3
2	**Demonstrate** when the build comes to the QA team, the parameters to be taken for consideration to reject the build upfront without committing for testing?	Apply	2
3	**Discuss** that test cannot be automated? Acceptance test plan is prepared from? Explain the test case design methodology? Does test plan contain bug tracing procedure and reporting procedure?	Understand	4
4	**Discuss** the importance of a document for product? How will you test requirement and design document?	Understand	3
5	**Identify** yourself as a developer of flight control system? Describe any three test adequacy criteria you would consider applying to develop test cases for flight control system?	Understand	1
6	**List** and explain types of system test? Why is testing plan important for developing a repeatable and managed testing process? Give example.	Knowledge	1
7	**Define** role do user/client play in the development of test plan for a project? Should they be present at any of the test plan reviews? Justify.	Knowledge	2
8	**Discuss** developing a patient record system for health care centre, why one of the stop test will be most appropriate for this system? What is the role of the tester in supporting, monitoring and controlling of testing?	Understand	2
9	**Demonstrate** why is it important to meticulously inspect test result? Give Example? Discuss the drawbacks in case if you fail to inspect?	Apply	1
10	**Enumerate** why is it impossible for a tester to find all the bugs in a system? Why might it not be necessary for a program to be completely free of defects before it is delivered to its customers?	Knowledge	2
11	Consider the following fragment of code. **Explain** how many tests are required for 100% decision coverage? if width > length then biggest_dimension = width if height > width then biggest_dimension = height end_if else biggest_dimension = length if height > length then biggest_dimension = height end_if end_if	Understand	5

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12	**Design** test cases to provide 100% statement and 100% decision coverage for the following fragment of code. if width > length then biggest_dimension = width else biggest_dimension = length end_if The following has been added to the bottom of the code fragment above. print "Biggest dimension is " & biggest_dimensionprint "Width: " & width print "Length: " & length. How many more test cases are required?	Create	5
13	Given the following code, **Demonstrate** which statement is true about the minimum number of test cases required for full statement and branch coverage? Read p Read q IF p+q > 100 THEN Print "Large" ENDIF IF p > 50 THEN Print "p Large" ENDIF	Apply	5
14	**Describe** the activities or tasks and responsibilities for developer or tester in support of multilevel testing?	Understand	5
15	**List** the tasks that must be performed by the developer or tester during the preparation for unit testing?	Knowledge	5
16	**Illustrate** the importance of security testing and what are the consequences of security breaches, also write the various areas which has to be focused on during security testing and State the need for integration testing in procedural code?	Apply	5

17	For the code fragment given below, **Demonstrate** which answer correctly represents minimum tests required for statement and branch coverage respectively
	Discount rate=1;
	Fare = 1000;
	If ((person == "senior citizen") and ("travel month = January"))
	Bonuspoints = 100+Bonuspoints;
	If (class=="first")
	discountRate = .5;
	Fare = fare * discountRate;
		Apply	5

18	Consider pseudo code below were a programming language **Find** the no of tests are required to achieve 100% statement coverage?
	If x=3 then
	Display_messageX;
	If y=2 then
	Display_messageY;
	Else
	Display_messageZ;
		Apply	5

19	Given the following code, **Discuss** the minimum number of test cases required for full statement and branch coverage?
	Read p
	Read q
	IF p+q > 100 THEN
	Print "Large"
	ENDIF
	IF p > 50 THEN
	Print "p Large"
	ENDIF
		Understand	5

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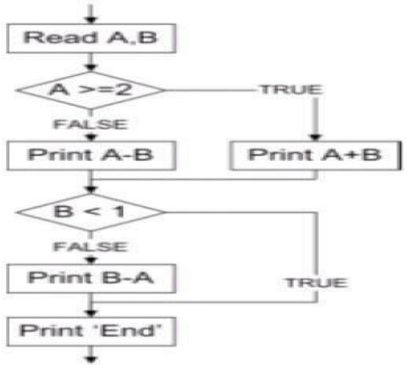
20	**Define** which combination of p, q and r values will ensure 100 % statement coverage?
	if (p = q) {
	r = r + 1;
	if (r < 5) {
	s = 10;
	}
	} else if (p > q) {
	s = 5;
	}
		Knowledge	5

21	For the following piece of code **Demonstrate** how many test cases are needed to get 100% statement coverage?
	
	Procedure X
	Read (Color) // Input color from user
	IF (Color == RED•) THEN
	Call Roses(Color)
	ELSEIF (Color == BLUE•) THEN
	Call Violets(Color)
	ELSE
	PRINT User is no Shakespeare
	SaveToDatabase(Color)
	End Procedure X
		Apply	5

22	For the following piece of code, **Demonstrate** how many test cases are needed to get 100% statement coverage?
	
	Procedure X
	Read (Color) // Input color from user
	IF (Color == “Red”) THEN
	Call Roses(Color)
	ELSEIF (Color == “Blue”) THEN
	Call Violets(Color)
	ELSE
	PRINT “User is no Shakespeare”
	SaveToDatabase(Color)
	End Procedure X
		Apply	5

23	Consider the following flow chart diagram:  **Demonstrate** the minimum number of test cases required for 100% statement coverage and 100%decision coverage, respectively?	Apply	5

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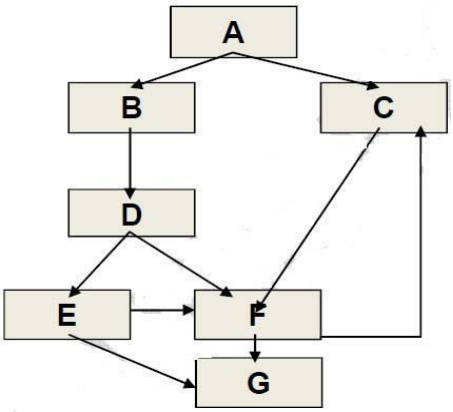
24	Consider the following sample of pseudo code:
	
	Read A, B, C;
	If A > B then
	Print "Primary ratio is" & A / B;
	End If
	If A > C then
	Print "Secondary ration is" & A / C;
	End If.
	
	Show which of the following test cases would achieve 100% statement coverage
		Apply	5

25	Consider the following sample of pseudo code:
	
	Input ExamScore
	If ExamScore <= 75 then
	Print "Candidate has failed"
	Else
	Print "Candidate has passed"
	If ExamScore >= 120 then
	Print "Candidate has achieved a distinction"
	EndIf
	EndIf.
	
	Show the minimum number of test cases required to guarantee 100% decision coverage?
		Apply	5

26	If the system requires 100% decision coverage at component testing for all modules. The following module has been tested with a single test case. The test case follows the path A, B, D, E, F, and G.Demonstrate What level of decision coverage has been achieved?	Apply	5
27	**Discuss** one of the test goals for the project is to have 100% decision coverage. The following three tests have been executed for the control flow graph shown below? Test A covers path: A, B, D, E, G. Test B covers path: A, B, D, E, F, G. Test C covers path: A, C, F, C, F, C, F, G.  	Understand	5

UNIT – II

GROUP - A (SHORT ANSWER QUESTIONS)

1.	**Define** transaction flow graph and define transaction with an example?	Knowledge	6
2.	**Illustrate** all c-uses/some p-uses strategies and discuss all p-uses/some c-uses strategies?	Knowledge	6
3.	**Explain** births and mergers in a transaction flow testing?	Understand	6
4.	**Demonstrate** transaction flow structure and discuss transaction flow testing techniques?	Apply	6
5.	**Demonstrate** du-path and define all du-paths?	Understand	6
6.	Define path selection and illustrate path sensitization?	Knowledge	6
7.	**Describe** all predicate uses and all computational uses strategy?	Apply	6

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8.	**Explain** transaction flow sensitization and discuss transaction instrumentation?	Understand	6
9.	**Demonstrate** data flow anomalies and explain components of data flow model?	Understand	6
10.	**Define** data flow testing and explain the application tools and effectiveness of data flow testing?	Understand	6
	GROUP-B (LONG ANSWER QUESTIONS)		
1	a. **Discuss** that data flow testing is helpful in fulfilling the gaps in path testing? b. **Explain** about data flow graphs? c. **Name** and explain data flow testing strategies?	Understand	7
2	a. **Demonstrate** an anomaly can be detected. Explain different types of data flow anomalies and data flow anomaly state graphs? b. **Write** applications of data flow testing?	Apply	7
3	a. **Demonstrate** the transaction flows? Discuss their complications? b. **Discuss** about static and dynamic anomaly detection?	Apply	6
4	a. **State** and explain various transaction flow junctions and mergers? b. **Explain** the terms inspections, reviews and walkthroughs?	Knowledge	6
5	a. **Discuss** the following strategies of data flow testing with suitable examples: i. All-predicate-uses (APU) strategy ii. All-computational (ACU) strategy b. **Compare** the path flow and data-flow testing strategies?	Understand	7
6	a. **Define** program slice? Discuss about static and dynamic program slicing? b. **Explain** the terms Dicing, Data-flow and Debugging?	Knowledge	7
7	a. **Explain** data-flow model? Discuss various components of it? b. **Demonstrate** transaction flows occurrence, illustrate with help of examples. Implementation of a transaction flow is usually implicit in the design of the systems control structure and database explains? c. **Discuss** about sensitization and instrumentation based on transaction flows?	Understand	6
8	a. **Explain** the transaction flow testing with an example? b. **Distinguish** between control flow and transaction flow?	Understand	6
9	a. **Define** transaction flow structure? Discuss the reasons that the transaction flows are often structured? b. **Discuss** the advantages and disadvantages of path selection in transaction flow?	Knowledge	7
10	a. **Define** the terms i. Biosis ii. Mitosis iii. Absorption iv. Conjugation b. **Demonstrate** transaction flow, explain it for online information retrieval system with the help of an example?	Knowledge	6
11	a. **Discuss** the different data object states in data-flow graphs? b. **List** nine possible two-letter combinations of the object states of data anomalies. classify them as buggy, suspicious and ok?	Understand	7
12	a. **Define** du path and definition-clear path segment? b. **Discuss** All-du-Paths (ADUP) is the strongest data-flow testing strategy?	Knowledge	7
13	a. **Explain** the modeling rules in data flow model? b. **Define** the terms i. Definition clear path segment ii. Loop free path segment iii. Simple path segment	Understand	7

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14	a. **Explain** the procedure to construct a Data flow graph? b. **Construct** the Dataflow graph for the following problem. i. Given L, t, and d, solve for Z. ii. cos(C) = cos(L) sin(t) iii. tan(M)= cot(L) cos(t) iv. tan(Z+F)= -sin(L) tant(t) v. tan (F) = cos(M) tan(M+d).	Understand	7
GROUP-C (ANALYTICAL QUESTIONS)			
1	Consider the following techniques. Find the static and dynamic techniques **Explain** them?	Understand	7
2	**Discuss** during an early period of test execution, a defect is located, resolved and conformed as resolved re-testing ,but is seen again later during subsequent test execution .what type of testing can be conducted for a related aspect of configuration management that is most likely to have broken down?	Understand	6
3	If a Product risk analysis is performed during the planning stage of the test process. During the execution stage of the test process, the test manager directs the testers to classify each detect report by the known product risk it relates to other. once a week test manager runs a report that shows the percentage of defects related to each known product risk and to unknown risks. **Discuss** what is one possible use of such a report?	Understand	6
4	**Demonstrate** the two specification based techniques are most closely related to each other? Write some key characteristics of specification based techniques?	Apply	7
5	**Discuss** the most important difference between the metrics based approach and the expert –based approach to test estimation?	Understand	7
UNIT – III			
GROUP - A (SHORT ANSWER QUESTIONS)			
1.	**Explain** domain and explain different domain bugs?	Understand	8
2.	**Explain** domain closure and define domain dimensionality?	Understand	8
3.	**Discuss** liberalizing transformation and co-ordinate transformation?	Knowledge	8
4.	**Explain** about a) Interior Point b) Boundary Point c) Extreme Point d) on-point e) off-point	Understand	8
5.	**Describe** co-incidental correctness and discuss representative outcome?	Understand	8
6.	**Demonstrate** complete and systematic boundaries and describe non-linear boundaries?	Understand	8
7.	**Explain** simple domain boundaries and compound predicates?	Understand	8
8.	**State** functional homogeneity of bugs and define random testing?	Knowledge	8
9.	**Illustrate** linear vector space and illustrate one-dimensional domain bugs closed boundaries?	Apply	8
10.	**Explain** loop free software and explain interface range/domain compatibility testing?	Understand	8
GROUP-B (LONG ANSWER QUESTIONS)			
1	a. **Demonstrate** a nice domain? Give an example for nice two-dimensional domains? b. **Discuss** the following terms: i. Linear domain boundaries ii. Non linear domain boundaries iii. Complete domain boundaries iv. Incomplete domain boundaries c. **Discuss** in detail the nice domains and ugly domains with suitable examples?	Apply	8
2	a. **Demonstrate** meaning of domain testing? Discuss various applications of domain Testing? b. **Explain** with a neat diagram, the schematic representation of domain testing ?	Apply	8

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3	a. **Explain** clearly method for testing one dimensional domains b. **Discuss** about equality and inequality predicates. Also explain how they are treated in domain testing?	Understand	8
4	a. **Explain** the domain boundary bugs for two dimensional domains? b. **Discuss** about systematic boundaries? c. **Discuss** about random testing?	Understand	8
5	a. **Discuss** in detail the domains and interface testing? b. **Classify** what can go wrong with boundaries, then define a test strategy for each case in domain testing?	Understand	9
6	a. **Discuss** about Linear, Non orthogonal, and Tilted domain boundaries with suitable examples? b. **Discuss** about ugly domains with suitable examples? c. **Discuss** about variations, tools and effectiveness of domain testing ?	Understand	8
7	a. **Define** the following concepts. i. Domains ii. Domain closure iii. Domain dimensionality iv. Bug Assumptions for domain Testing b. **Explain** simple domain boundaries and compound predicates?	Knowledge	8
8	a. **Define** domains and paths? Explain domains and testability tips b. **Explain** that domain testing can be used in both functional and structural testing?	Knowledge	8
9	a. **Discuss** about specified and implemented domains? b. **Discuss** about domain closure and domain dimensionality? c. **Explain** different one dimensional domain bugs?	Understand	8
10	a. **Describe** short notes on i. Ambiguities and contradictions ii. Simplifying the topology iii. Rectifying boundary closures b. **Define** the terms i. Interior point ii. Exterior point iii. Boundary point iv. On point and Off point	Understand	8
11	a. **Explain** the terms i. Domains and range ii. Closure compatibility ii. Domain compatibility testing b. **Explain** the differences between linearizing transformations and Co-ordinate transformation?	Understand	8
12	a. **Discuss** that programmers and testers treat ugly domains? b. **Explain** the restrictions that are made on the domains?	Understand	8
13	a. **Explain** in detail about domains and testability b. **Explain** the following terms i. Domain Testing ii. Linear zing Transformation iii. Non-Linear zing Transformation iv. Canonical program form c. **Define** domain and explain domain model in detail?	Understand	8
	GROUP-C (ANALYTICAL QUESTIONS)		
1	Consider a wholesaler sells printer cartridges. The minimum order quantity is 5. There is a 20% discount for orders of 100 or more printer cartridges. You have been asked to prepare test cases using various values for the number of printer cartridges ordered. **Demonstrate** which of the following groups contain three test inputs that would be generated using boundary value analysis?	Apply	8

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2	**Discuss** that would like to know whether black box testing techniques like boundary value analysis and equivalence partitioning during which phases of testing are they used, if possible with examples ?	Understand	8
3	**Demonstrate** why is it necessary to develop test cases for both valid and invalid input condition?	Apply	8
4	**Demonstrate** why it is necessary to develop test cases for both valid and invalid input condition. how important is document for product? how will you test requirement and design Document?	Apply	8
5	Consider programmer A and programmer B are working on a group of interfacing modules. Programmer A tends to be a poor communicator and does not get along well with Programmer B. Due to this situation, **Discuss** what types of defects are likely to surface in these interfacing modules?	Understand	9
6	A program validates a numeric field as follows: values less than 10 are rejected, values between 10 and 21 are accepted, values greater than or equal to 22 are rejected. **Define** which of the following covers the most boundary values?	Knowledge	9
7	**Discuss** In a system designed to work out the tax to be paid: An employee has $4000 of salary tax free. The next $1500 is taxed at 10% The next $28000 is taxed at 22%. Any further amount is taxed at 40% To the nearest $ which of these is a valid boundary value analysis test case?	Understand	9
8	**Demonstrate** the digital "Rainbow Thermometer" uses 7 colors to show the ambient temperature. Each color spans a range of just 5 Deg. C, with an operating minimum and maximum of minus 5 Deg. C and 30 Deg.C. Which of the following values is least likely to have been identified when applying the boundary value test design technique?	Apply	9

9	Given the following sample of pseudo code?
	Roman'">
	Input number of male rabbits
	Input number of female rabbits
	If male rabbits > 0 and female rabbits > 0 then
	Input Do you want to breed (Yes / No)
	If breed = "No"
	Print "Keep male and female rabbits apart!"
	End if
	End If.
	Demonstrate which of the following test cases will ensure that statement "06" is executed?
		Apply	9

10	Consider Arrive and Go airline wants to clarify its baggage handling policy, whilst maximizing revenues, and will introduce the following tariffs for all baggage per individual customer (weights are rounded up to the nearest 0.1Kg): The first 2Kg will be carried free of charge. The next 10 Kg will be carried for a flat charge of $10. An additional 15Kg will be charged a total charge of $17. Luggage over this amount will be charged at $5 per Kg, up to a maximum of 150Kg per person. No passenger may take more that 150Kg with them**. Define** Which of the following would constitute boundary values for baggage weights in the price calculation?	Knowledge	9
11	For a system designed to work out the tax to be paid. An employee has $4000 of salary tax free. The next $1500 is taxed at 10%. The next $28000 is taxed at 22% .Any further amount is taxed at 40% .To the nearest $.**Discuss** which of these is a valid boundary value analysis test case?	Understand	9
12	If the order numbers on a stock control system can range between 10000 and 99999 inclusive. **Demonstrate** the following inputs might be a result of designing tests for only valid equivalence classes and valid boundaries?	Apply	9
	UNIT – IV		
	GROUP - A (SHORT ANSWER QUESTIONS)		
1.	**Define** path expression and path product and discuss distributive law?	Knowledge	1
2.	**Explain** path sum and discuss approximate minimum number of paths?	Understand	1
3.	**Explain** the methods of regular expressions and flow anomaly detection?	Understand	1
4.	**Demonstrate** absorption law and explain the limitations of path testing?	Apply	1

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5.	**Define** loops and explain different loop terms?	Knowledge	1
6.	**Explain** identity elements and explain mean processing time of a routine?	Understand	1
7.	**Discuss** about cross-term step and explain maximum path count arithmetic?	Understand	1
8.	**Explain** parallel terms and demonstrate how many paths in a flow graph?	Understand	1
9.	**Discuss** loop terms and demonstrate lower path count arithmetic?	Understand	1
10.	**Explain** applications of path testing and explain push/pop and get/return?	Understand	1
11.	**Define** hardware logic testing and explain KV-charts?	Knowledge	1
12.	**Explain** about knowledge based systems in logic based testing?	Understand	1
13.	**Define** decision table and explain about don't care and impossible terms?	Knowledge	12
14.	**Compare** condition stub and action stub and discuss three successive stages of canonical processors?	Understand	12
15.	**Explain** decision table processors and discuss finding and translating the logic?	Understand	12
16.	**Explain** test case design and sketch KV-charts of 3 variables and 4 variables?	Understand	12
17.	**Discuss** predicates and relational operators in logic based testing?	Understand	12
18.	**Define** case tables and multi valued logics in knowledge based systems?	Knowledge	12
19.	**Demonstrate** the rules of Boolean algebra and explain them in detail?	Apply	12
20.	**Define** the operators of boolean algebra and list them with examples?	Knowledge	12
	GROUP-B (LONG ANSWER QUESTIONS)		
1	a. **Define** structured code and explain lower path count arithmetic? b. **Discuss** the looping probability of a path expression? Write arithmetic rules and explain with an example?	Knowledge	10
2	a. **Demonstrate** the steps involved in node reduction procedure. Illustrate all the steps with help of neat labeled diagrams? b. **Demonstrate** using reduction procedure to convert flow graph whose links are labeled into a path expression. Explain each step with flow graph?	Apply	11
3	a. **Explain** about maximum path count arithmetic with an example. b. In reduction procedure explain about: i. Cross-Term step ii. Parallel Term iii. Loop Term iv. Comments, Identities and Node - Removal Order	Understand	10
4	a. **Define** path product, path expression and path sum? Explain with an example? b. **Explain** applications of paths, path products and regular expressions?	Knowledge	10
5	a. **State** Huang's Theorem and explain its implementation? Explain its generalizations and limitations? b. **Write** short notes on: i. Distributive laws ii. Absorption Rule iii. Loops iv. Identity Elements	Knowledge	11
6	a. **Demonstrate** how to find approximate minimum numbers of paths with an example? b. **Explain** the probability of getting path expression with an example?	Apply	10
7	a. **Discuss** regular expressions and flow anomaly detection? b. **Explain** a regular expression and flow anomaly detection method with an example and limitations?	Understand	11
8	a. **Explain** about the mean processing time of a routine with an example? b. **Explain** the generalizations and limitations of regular expressions?	Understand	11
9	a. **Explain** the push/pop arithmetic with an example? b. **Explain** the get/return arithmetic with an example?	Understand	11
10	a. **Explain** the problem occurred in the regular expressions with an example? b. **Explain** the method that will be useful for regular expressions with an example?	Understand	11

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11	a. **Demonstrate** decision table and how is a decision table useful in testing? Explain with the help of an example? b. **Explain** prime implicate, sum-of-product form and product-of-sum form?	Apply	1 2
12	a. **Explain** about the don't care conditions in the logic based testing? b. **Discuss** about the ambiguities and contradictions in the specifications?	Understand	1 2
13	a. **Describe** the procedure for specification validation using KV charts? b. **Demonstrate** methods to check the consistency and completeness in the decision tables?	Understand	1 3
14	a. **Discuss** that can we form the specifications into the sentences and write down the different phrases which can be used for the words? b. **Explain** the following in logic based systems i. Path and domain ii. Test case design iii. Boolean equations	Understand	1 2
15	a. **Demonstrate** to minimize the function using karnaugh map method: F(A,B,C,D)= P(1,2,3,8,9,10,11,14)+ Pd(7,15) b. **Demonstrate** by means of truth tables the validity of the following theorems of Boolean algebra: i. Associative laws ii. Demorgans theorems for three variables iii. Distributive law of + over	Apply	1 3
16	a. **Demonstrate** Boolean algebra rules. Illustrate the rules with path expressions. b. Use a Karnaugh map to minimize F= B'C'D'+A'B'C'D'+ABC'D+A'BCD+ABD+B'CD'+A'BC'D	Apply	1 3
17	a. **Demonstrate** reduction the following functions using karnaugh map method F(A,B,C,D)=π (4,5,6,7,8,12,13)+d(1,15)	Apply	1 3
18	a. **Discuss** the different operators used in Boolean algebra and give tracts tables for them? b. **Explain** the testing strategies for KV charts?	Understand	1 3
19	a. **State** the representation of minterm and maxterm for three variables(D+M) b. **Minimize** the given expression using four variable k-map. F(A,B,C,D)= _ m(0,1,3,4,7,8,15).	Knowledge	1 3
20	a. **Explain** the terms i. Hardware logic testing ii. Specification systems and languages iii. Knowledge based systems b. **Explain** the terms i. Decision table processors ii. Expansion of immaterial cases iii. Test case design	Understand	1 2
21	a. **Explain** KV charts for two variables and three variables b. **Define** the terms predicate, relational operator of case statements and multi valued logics?	Understand	1 3
GROUP-C (ANALYTICAL QUESTIONS)			

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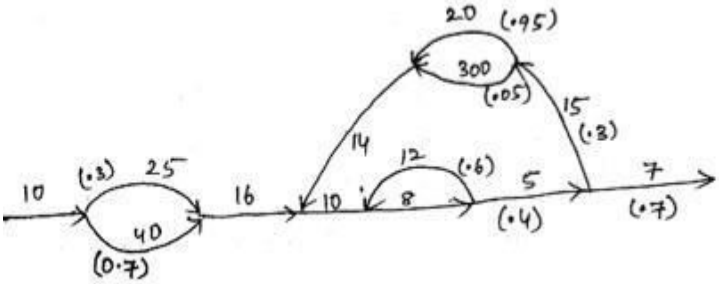
<table>
<tr><td>1</td><td>Evaluate the mean processing time of a program represented by the following flow graph numbers in the brackets are the probabilities and the other numbers are processing times?
 
</td><td>Evaluate</td><td>10</td></tr>
<tr><td>2</td><td>Describe the minimum combination of paths required to provide full statement coverage?</td><td>Understand</td><td>10</td></tr>
<tr><td>3</td><td>Given the following highly simplified procedure
Ask: "What type of ticket do you require, single or return?"
IF the customer wants return
Ask: "What rate, Standard or Cheap-day?”
IF the customer replies Cheap-day
Say: "That will be 11:20"
ELSE
Say: "That will be 19:50"
ENDIF
ELSE
Say: "That will be 9:75"
ENDIF
Calculate the minimum number of tests that are needed to ensure that all the questions have been asked, all combinations have occurred and all replies given.</td><td>Understand</td><td>11</td></tr>
<tr><td>4</td><td>Explain the relations between regular expressions and flow anomaly detection with an example. If X and Y are following path expressions, answer the given questions.
X = abc + def + ghi
Y = uvw + z
i) Find value of XY
ii) Is XY = YX.
Justify your answer.</td><td>Understand</td><td>11</td></tr>
<tr><td>6</td><td>Given the following decision table:
<table><tr><th></th><th>Rule 1</th><th>Rule 1</th><th>Rule 1</th><th>Rule 1</th></tr><tr><td>Conditions</td><td></td><td></td><td></td><td></td></tr><tr><td>Frequent Flyer</td><td>Gold</td><td>Gold</td><td>Silver</td><td>Silver</td></tr><tr><td>Class</td><td>Business</td><td>Economy</td><td>Business</td><td>Economy</td></tr><tr><td>Actions</td><td></td><td></td><td></td><td></td></tr><tr><td>Free Upgrade</td><td>First</td><td>Business</td><td>No</td><td>Business</td></tr><tr><td>Discounted Upgrade</td><td>N/A</td><td>First</td><td>First</td><td>None</td></tr></table>Describe what is the expected result for each of the following test cases?</td><td>Understand</td><td>12</td></tr>
</table>

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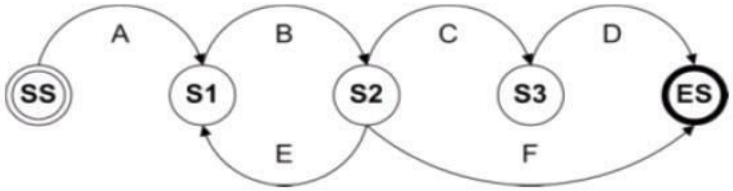
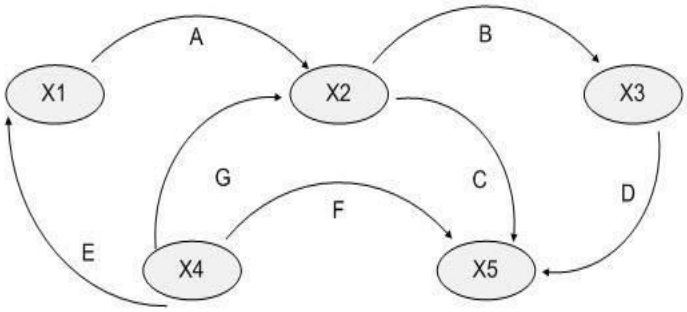
7	Given the following state transition diagram:  Demonstrate which of the test cases below will cover the following series of state transitions? SS - S1 - S2 - S1 - S2 - ES	Apply	1 3
8	**Define** how many test cases are required to cover 100% 0 - switch coverage respectively from X2?  	Knowledge	1 3
10	**Illustrate** the following functions using K-Maps F(A,B,C,D) = P(4,5,6,7,8,12,13)+d(1,15)	Apply	1 3
11	**Explain** how can we form specifications into sentences? Write down different phrases that can be used for words?	Understand	1 3
12	**Demonstrate** by means of truth tables the validity of the following theorems of Boolean algebra i. Associative Laws ii. Demorgan's theorems for three variables iii. Distributive Law iv. Absorption Rule	Apply	1 3
13	**Discuss** an example of decision table testing for a financial application applied at the system level?	Understand	1 3

UNIT-V

GROUP - A (SHORT ANSWER QUESTIONS)

1.	**Define** finite state machine and define number of states and impossible states?	Knowledge	14
2.	**Explain** state graphs and explain about equivalent states?	Understand	14
3.	**Define** transition and discuss unreachable states?	Knowledge	14
4.	**Explain** about state tables and define dead states?	Understand	14
5.	**Compare** time and sequence and explain about state bugs?	Understand	14
6.	**Explain** input encoding and input alphabet and illustrate output errors?	Understand	14
7.	**Discuss** output encoding and output alphabet and explain encoding bugs?	Understand	14
8.	**Demonstrate** state codes and state symbol products and explain limitations of state graphs?	Apply	14
9.	**Explain** the application comments for designers and testers?	Understand	14
10.	**Explain** switches, flags and unachievable paths and demonstrate unspecified and contradictory transitions?	Understand	14
11.	**Define** graph matrix and explain out-degree and in-degree?	Knowledge	15
12.	**Explain** connection matrix and explain about relations?	Understand	15
13.	**Explain** properties of relations and define parallel reduction?	Understand	15
14.	**Define** equivalence relation and explain loop reduction?	Knowledge	15
15.	**Explain** partial ordering relations and demonstrate cross-term reduction?	Understand	15
16.	**Explain** the powers of a matrix and define node reduction optimization?	Understand	16
17.	**Discuss** matrix power and products and illustrate linked list representation of graph matrices?	Understand	16

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18.	**Demonstrate** set of all paths and define loops?	Apply	16
19.	**Explain** partitioning algorithm of graph matrices?	Understand	16
20.	**Discuss** node reduction algorithm of graph matrices?	Understand	16
	GROUP-B (LONG ANSWER QUESTIONS)		
1	**Discuss** short notes on i. Transition bugs ii. Dead states iii. State bugs iv. Encoding bugs	Understand	14
2	a. **Differentiate** between good state graphs and bad state graphs? b. **Discuss** the principles of state testing? Explain its advantages and disadvantages?	Understand	14
3	a. **Compare** the differences between logic based testing, state testing and path testing? b. **Explain** all the rules in the conversion of specification into a state graph?	Understand	14
4	a. **Explain** the terms i. No of states ii. Impossible states iii. Equivalent States b. **Describe** the types of bugs that can cause state graphs?	Understand	14
5	a. **Demonstrate** the software implementation issues in state testing? b. **Discuss** tester's comments about state graphs?	Apply	14
6	a. **Explain** state testing and testability tips with an example? b. **Explain** state graphs with implementation with an example?	Understand	14
7	a. **Define** the following terms i. States ii. Inputs and transitions iv. Outputs iv. State tables b. **Define** the terms i. Unreachable states ii. Unspecified and contradictory transitions	Knowledge	14
8	a. **Illustrate** designer's comments about state graphs? b. **Draw** a hard disk recovery a state graph with a state table?	Apply	14
9	**Explain** and write a short notes on i. Switches, Flags, unachievable paths. ii. Essential an Inessential finite state behavior	Understand	14
10	**Demonstrate** design guidelines for building finite state machines into your code?	Understand	14
11	a. **Demonstrate** an algorithm for node reduction (general)? b. **Illustrate** the applications of node reduction algorithm?	Apply	15
12	a. **Discuss** a node reduction algorithm in terms of matrix operations? b. **Define** graph matrices and their applications?	Understand	15
13	a. **Illustrate** a partitioning algorithm with an example? b. **Discuss** strategy to write an algorithm for all pair's paths using matrix operations?	Apply	16
14	a. **Describe** about equivalence relation and partial ordering relation? b. **Discuss** relative merits and demerits of different graph matrix representations?	Understand	16
15	a. **Demonstrate** the operations does a toolkit consist for the representation of graphs? b. **Illustrate** about matrix powers and products?	Apply	16
16	a. **Demonstrate** the advantages of array representations? b. **Define** relations and give their properties? c. **Describe** loops and demonstrate loops in matrix representation?	Apply	16
17	a. **Discuss** the linked list representation? b. **Demonstrate** the matrix operations in tool building?	Understand	16

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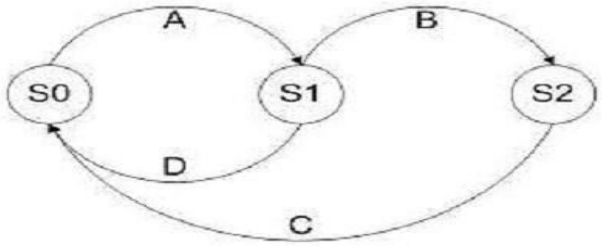
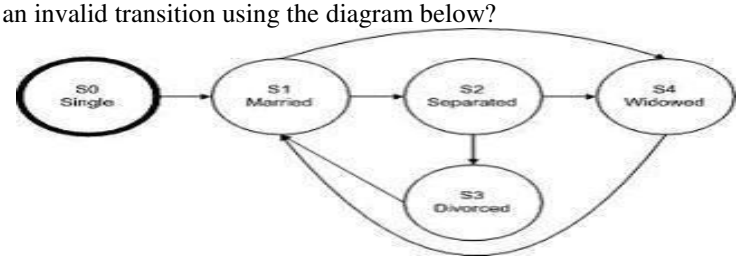
<table>
<tr><td>18</td><td>a. Define graph matrices and evaluate graph matrix with pictorial graph explain the basic algorithms?
b. Demonstrate maximum element and minimum element of a graph?</td><td>Knowledge</td><td>1
5</td></tr>
<tr><td>19</td><td>a. Define a relation? Explain relation matrix with examples?
b. Explain the properties of relations? Explain them with example?</td><td>Knowledge</td><td>1
6</td></tr>
<tr><td>20</td><td>a. Explain parallel reduction and loop reduction?
b. Write about equivalence relation and partial ordering relation?</td><td>Understand</td><td>1
6</td></tr>
<tr><td colspan="4">GROUP-C (ANALYTICAL QUESTIONS)</td></tr>
<tr><td>1</td><td>Explain the given following state transition table which of the test cases below will cover the following series of state transitions? S1 SO S1 S2 SO
 
</td><td>Understand</td><td>1
4</td></tr>
<tr><td>2</td><td>Consider Postal rates for 'light letters' are 25p up to 10g, 35p up to 50g plus an extra 10p for each additional 25g up to 100g. Discuss which test inputs (in grams) would be selected using equivalence partitioning</td><td>Understand</td><td>1
4</td></tr>
<tr><td>3</td><td>If thermometer measures temperature in whole degrees only. If the temperature falls below 18 degrees, the heating is switched off. It is switched on again when the temperature reaches 21 degrees. Show the best values in degrees to cover all equivalence partitions?</td><td>Apply</td><td>1
4</td></tr>
<tr><td>4</td><td>Evaluate a system designed to work out the tax to be paid: An employee has 4000 of salary tax free. The next 1500 is taxed at 10%.The next 28000 after that is taxed at 22%.Any further amount is taxed at 40%.To the nearest whole pound, Discuss which of these groups of numbers fall into three different equivalence classes?</td><td>Evaluate</td><td>1
4</td></tr>
<tr><td>5</td><td>Consider there is one application, which runs on a single terminal. There is another application that works on multiple terminals. Demonstrate what are the test techniques you will use on the second application that you would not do on the first application? Which test suite will check for an invalid transition using the diagram below?
 
</td><td>Apply</td><td>1
4</td></tr>
<tr><td>6</td><td>Consider the following state table:
<table>
<tr><th></th><th>On</th><th>Off</th><th>Channel 1</th><th>Channel 2</th><th>Channel >2</th><th>Stby</th></tr>
<tr><td>Standby</td><td>Live</td><td>N</td><td>N</td><td>N</td><td>N</td><td>N</td></tr>
<tr><td>Live</td><td>N</td><td>Standby</td><td>Display Channel 1</td><td>Display Channel 2</td><td>N</td><td>Standby</td></tr>
<tr><td>Display Channel 1</td><td>N</td><td>N</td><td>N</td><td>Display Channel 2</td><td>Live</td><td>Standby</td></tr>
<tr><td>Display Channel 2</td><td>N</td><td>N</td><td>Display Channel 1</td><td>N</td><td>Live</td><td>Standby</td></tr>
</table>
Demonstrate which of the following represents an invalid transition (N)?</td><td>Apply</td><td>1
4</td></tr>
</table>

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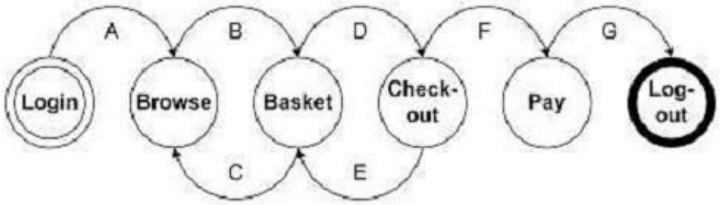
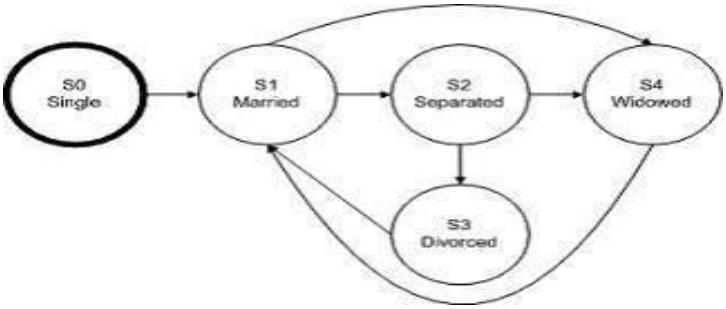
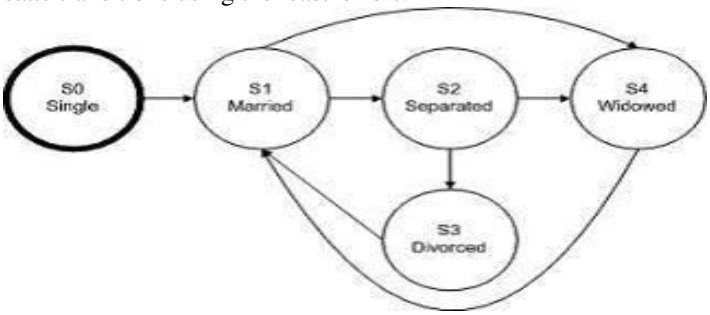
7	Consider the following state transition diagram .**Show** which of the following series of state transitions contains an invalid transition which may indicate a fault in the system design? 	Apply	1 4
8	Without testing all possible transitions, **Demonstrate** which test suite will test all marital statuses? 	Apply	1 4
9	Using the diagram below, **Explain** which test suite will check for all valid state transitions using the least effort? 	Understand	1 4
10	Consider Four testers each submitted an incident report in which each reported a problem with the user log-on process. User log-on is a critical component of the system. The table below describes the four defect reports submitted?	Apply	1 4
11	**Explain** win runner testing process?	Understand	1
12	**Discuss** how does win runner recognize objects on the application?	Understand	1
13	**Illustrate** the advanced scripting techniques for test execution tools?	Apply	1
14	**Discuss** the potential benefits from using tools in general to support	Understand	1
15	**Explain** the goal for a proof-of-concept or pilot phase for tool evaluation?	Understand	1

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