## FreshmenEngineeringDepartment

| COURSEDETAILS | | |
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| **Class:**I B.Tech | **Semester:**II | **AcademicYear:**2025-26 |
| **CourseTitle:**Data Structures | | **CourseCode:23CS2001** |
| **Regulation:**NECRBTECH 23 | | **Credits:**3 |
| **Faculty:**Dr.V.Sireesha,Mrs.Sk.Sofia,Mrs.E.Swathi,Mrs.K.Prathyusha,P.MeharKarishma(NECN) Mrs. A.Malathi, Dr. N. MaryJasmin, Mr. T. Guruprasad, Mr. V. Kasthuraiah, Mrs. V. Surekha, A.Ramesh, Mrs.Jayanthi(NECG) | | |

**MODELQUESTIONBANK**

| MODULE-I | | | | |
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| INTRODUCTION | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | Definetimeandspacecomplexity. | 1 | 1 | 2 |
| 2 | Statetheprerequisiteforperformingabinarysearch on a list of elements. | 1 | 1 | 2 |
| 3 | DefineDataStructures. | 1 | 1 | 2 |
| 4 | Writedifferenttypesofdatastructures. | 1 | 1 | 2 |
| 5 | DefineAbstractDataType. | 1 | 1 | 2 |
| 6 | Differentiatelinearandnonlineardatastructures. | 1 | 1 | 2 |
| 7 | Writethesyntaxtodeclareandinitializeanarray. | 1 | 1 | 2 |
| 8 | Listouttypesofasymptoticnotations. | 1 | 1 | 2 |
| 9 | Definelineardatastructurewithtwoexamples. | 1 | 1 | 2 |
| 10 | ListoutAbstractDatatypes. | 1 | 1 | 2 |

| MODULE-I | | | | |
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| INTRODUCTION | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | ExplainvarioustypesofdataStructuresindetail. | 1 | 2 | 10 |
| 2 | a) DefineADT.Giveanexampleforit.<br>b) Compareandcontrastlinearandnonlineardata structures. | 1 | 2 | 5+5 |
| 3 | a) ListouttheadvantagesofAbstractdatatype.<br>b) ExplainCharacteristicsofADTs. | 1 | 2 | 5+5 |
| 4 | a) Brieflydiscussvariousasymptoticnotationswith examples.<br>b) Writeanalgorithmfordeterminingthetranspose ofa matrixusingamultidimensionalarray. | 1 | 2 | 5+5 |
| 5 | Explaininbriefaboutmulti-dimensionalarrayswith anexample. | 1 | 2 | 10 |
| 6 | Describe the significance of time and space complexity with an example. | 1 | 2 | 10 |
| 7 | ExplainLinearsearch algorithmin detailwith an example program. | 1 | 2 | 10 |
| 8 | WriteaProgramtoreversetheelementsofanarray. | 1 | 2 | 10 |
| 9 | Explainvariousoperationsofarrays. | 1 | 2 | 10 |

| MODULE-II | | | | |
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| **LINKEDLISTS** | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | DefineLinkedListandspecifyvarioustypesof Linked lists. | 2 | 1 | 2 |
| 2 | Nametworealworldapplicationsoflinked list. | 2 | 1 | 2 |
| 3 | Writetheproceduretoinsertanelementinthe middle of SLL. | 2 | 1 | 2 |
| 4 | Explain the traversal operation on a singly linked list. | 2 | 1 | 2 |
| 5 | Define the insertionoperationona doubly linked list. | 2 | 1 | 2 |
| 6 | Definecircularlinkedlist. | 2 | 1 | 2 |
| 7 | ListvariousOperationsofCircularLinkedList. | 2 | 1 | 2 |
| 8 | Definecirculardoublylinkedlist. | 2 | 1 | 2 |
| 9 | Comparearraysandlinkedlists. | 2 | 1 | 2 |
| 10 | Listoutthetwomaincomponentsofanodein SLL. | 2 | 1 | 2 |

| MODULE-II | | | | |
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| **LINKEDLISTS** | | | | |
| **Sno** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | Differentiate between array andlinkedlistw.r.t. storage, accessing, size etc. | 2 | 2 | 10 |
| 2 | ExplainSLLrepresentation.Writealgorithmsto perform the following operations:<br>a) Insertionatspecificposition<br>b) Deletionofanode byvalue<br>c) Searchingforanelement | 2 | 2 | 10 |
| 3 | DifferentiateSinglyLinkedListandDoublyLinked List. | 2 | 2 | 10 |
| 4 | Writeaprogramthatremovesallduplicateelements from a linear linked list. | 2 | 2 | 10 |
| 5 | Explain variousoperationsof doubly linked listsin detail. | 2 | 2 | 10 |
| 6 | Explainthefollowingoperationsinadoublylinked list:<br>(a) Createanemptylist.<br>(b) Insertttheelements10and20atthefrontofthelist.<br>(c) Insertttheelements30atthe middleofthe list.<br>(d) Insertttheelements15,45attheendofthelist.<br>(e) Deletethemiddleelementfromthelist. | 2 | 2 | 10 |

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| 7 | a) Definecircularlinkedlistandillustrateitwithan appropriate example.<br>b) Write procedures for insertion and deletion operations on a circular linked list. | 2 | 2 | 10 |
| 8 | Explaintraversaloperationofcircularlinkedlistwith anexample. | 2 | 2 | 10 |
| 9 | Writeaprogramtoreverseelementsofasinglelinked list. | 2 | 2 | 10 |
| 10 | DescribeanytwoApplicationsoflinkedlistwith suitable examples. | 2 | 2 | 10 |

| MODULE-III | | | | |
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| STACKS | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | Definestack. | 3 | 1 | 2 |
| 2 | Differentiate betweenpush( ) and pop( ) operations in stack. | 3 | 1 | 2 |
| 3 | Comparestackoverflowandunderflowconditions. | 3 | 1 | 2 |
| 4 | Listvariousapplicationsofstacks. | 3 | 1 | 2 |
| 5 | Writevariousnotationstorepresentanexpression. | 3 | 1 | 2 |
| 6 | Convertthefollowingexpressionfrominfixtoprefix notation: (A+B)*C | 3 | 1 | 2 |
| 7 | Convertthefollowingexpressionfrominfixtopostfix notation: A+B-C | 3 | 1 | 2 |
| 8 | Evaluatethefollowingexpression:a+b^cifa=5and b=2,c=4 | 3 | 1 | 2 |
| 9 | How does a stack support backtracking in algorithms? | 3 | 2 | 2 |
| 10 | DefineLIFOPrinciple. | 3 | 1 | 2 |

| MODULE-III | | | | |
|---|---|---|---|---|
| STACKS | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | a) Writeadvantagesofstackoverlinkedlist.<br>b) Construct an empty stack and perform PUSH operationforanyfiveelements.AlsoperformaPOP operationfortwoelementsandshowthevalueonthe top of the stack. | 3 | 2 | 5<br>5 |
| 2 | Listandexplaindifferentoperationsonstacksusing arrays. | 3 | 2 | 10 |

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| 3 | Explainstack operations usinga linked list withan example. | 3 | 2 | 10 |
| 4 | Writeaprogram todeterminewhetherthegiven string is palindrome or not. | 3 | 2 | 10<br>5 |
| 5 | Describethestepbystepprocessofconvertingthe given expression from infix to postfix.<br>(A+ B)^C–(D*E)/F). | 3 | 2 | 10 |
| 6 | Write aprocedureto evaluate anexpression using stacks with an example. | 3 | 2 | 10 |
| 7 | Explainrecursionprocedureforfindingafactorialof a number. | 3 | 2 | 10 |
| 8 | ExplainBacktrackingalgorithmwithanexample using stack. | 3 | 2 | 10 |
| 9 | Howcanwereversealistusingstack?Explainwith an example. | 3 | 2 | 10 |
| 10 | Implement a program to check for balanced parentheses using a stack. | 3 | 3 | 10 |

| **MODULE-IV** | | | | |
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| **QUEUESANDTREES** | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | Comparequeueoverflowandunderflowconditions. | 4 | 1 | 2 |
| 2 | Defineandlistoutvariousoperationsofcircular queue. | 4 | 1 | 2 |
| 3 | WritetheroleofqueueinCPUschedulingorprint spooling? | 4 | 1 | 2 |
| 4 | Definedoubleendedqueue,mentionitstwo variations. | 4 | 1 | 2 |
| 5 | Listoutvariousoperationsondeque. | 4 | 1 | 2 |
| 6 | DefineFIFOprincipleofqueue. | 4 | 1 | 2 |
| 7 | Definebinarysearchtree. | 4 | 1 | 2 |
| 8 | Writevarioustreetraversalstechniques. | 4 | 1 | 2 |
| 9 | Differentiatebinarytreeandbinarysearchtree. | 4 | 1 | 2 |
| 10 | Defineheightanddepthofatree. | 3 | 1 | 2 |

| MODULE-IV | | | | |
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| **QUEUESANDTREES** | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | Explainqueueoperationsusingarrayswithan example. | 4 | 2 | 10 |
| 2 | Implementoperationsonaqueue usingalinked list with an example. | 4 | 3 | 10 |
| 3 | Writean algorithm toimplementinsertanddelete operationsonQueueswitharrayimplementationfor thefollowingelements88,25,67,15,56withdiagrammat icrepresentations. | 4 | 2 | 10 |
| 4 | Implement various deque operations with an example. | 4 | 3 | 10 |
| 5 | Explainvariousoperationsofthecircularqueuewith an example. | 4 | 2 | 10 |
| 6 | Implementbinarytreeoperationswithanexample. | 4 | 3 | 10 |
| 7 | Write about tree traversal techniqueswith suitable examples. | 4 | 2 | 10 |
| 8 | DefinebinarySearchTree?Whatistheaverage depth of abinary search tree?Howisitdifferent from a binary tree? Justify your answer. | 4 | 2 | 10 |
| 9 | Definebinarytree.Explainitstypeswithexamples. | 4 | 2 | 10 |
| 10 | Explaininsertion anddeletion operationin binary search tree with an example. | 4 | 2 | 10 |

| MODULE-V | | | | |
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| **GRAPHSANDHASHING** | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | ListoutvariousrepresentationsofGraph. | 5 | 1 | 2 |
| 2 | Statethedefinitionofhashfunctionand its purpose in data retrieval. | 5 | 1 | 2 |
| 3 | Definecollisionresolution. | 5 | 1 | 2 |
| 4 | ListouttypesofcollisionResolutions. | 5 | 1 | 2 |
| 5 | Outlinedouble hashingwithanexample. | 5 | 1 | 2 |
| 6 | Definebuckethashing. | 5 | 1 | 2 |
| 7 | Writeaboutextendiblehashing. | 5 | 1 | 2 |
| 8 | Definedirected graphwithanexample. | 5 | 1 | 2 |
| 9 | WhatisBreadth-FirstSearch(BFS). | 5 | 1 | 2 |
| 10 | Describeaspanningtree. | 5 | 1 | 2 |

| MODULE-V | | | | |
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| GRAPHSANDHASHING | | | | |
| **S.No** | **Questions** | **CO** | **BL** | **MARKS** |
| 1 | Explainterminologiesofgraph. | 5 | 2 | 10 |
| 2 | Explain thevariousrepresentationsof graphswith examples in detail. | 5 | 2 | 10 |
| 3 | ExplainDijkstra'sAlgorithmwithanexample | 5 | 2 | 10 |
| 4 | IllustrateTopologicalSortingwithanexample | 5 | 2 | 10 |
| 5 | a) Distinguishbetweenstaticanddynamichashing.<br>b) Howagraphisrepresentedasahashtable. | 5 | 2 | 5<br>5 |
| 6 | CompareChainingandOpenAddressingwithan example | 5 | 2 | 10 |
| 7 | DifferentiateLinearProbingandQuadratic Probing with an example | 5 | 2 | 10 |
| 8 | Giveninput{4371,1323,6173,4199,4344,9679, 1989}andahashfunctionh(x)=x(mod10),show the resulting:<br>(i) Openahashtableusinglinearprobing.<br>(ii) Openhashtableusingquadraticprobing.<br>(iii) Openhash tableusingdoublehashingwith second hash function h2(x) =7-(x mod 7). | 5 | 3 | 10 |
| 9 | ExplainBreadthfirstsearchalgorithmwithan example. | 4 | 2 | 10 |
| 10 | Explain Depth first search algorithm with an example. | 4 | 2 | 10 |

| | **Preparedby** | **Verifiedby** | **Check&Distributionof BL** | **Qualitychecked by** |
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| **NECN** | | | | |
| **NECG** | | | | |