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II B. Tech II Semester Regular Examinations, May/June - 2015
ADVANCED DATA STRUCTURES
 (Com. to CSE, IT)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) The elements 32, 15, 20, 30, 12, 25 and 16 are inserted one by one in the given order into a max-heap. What is the resultant Max-heap?
- b) Compare quicksort and radix sort.
- c) Calculate the big-O notation of $5n^2 + n^{3/2}$
- d) Differences between AVL tree and Binary search tree.
- e) Discuss the Problems associated with Quadratic probing.
- f) What are the Applications of minimum cost spanning trees? (4M+4M+4M+4M+3M+3M)

PART-A

2. a) How will you handle overflow and collision detection in a hash table? Discuss methods.
- b) Construct the open hash table and closed hash table for the input:
 30, 20, 56, 75, 31, 19 using the hash function $h(k) = k \text{ mod } 11$ (8M+8M)
3. What is an AVL tree? Explain the need for rotation of AVL trees. Construct an AVL Tree for the list 8,9,11,6,5,7,10 by using successive insertion. Illustrate the steps Clearly. (16M)
4. a) Write an algorithm to insert an element in to a heap. Explain with a suitable example.
- b) Explain the concept of priority queue with suitable example. (8M+8M)
5. a) Explain single source shortest path problem with an example.
- b) How Wars hall's algorithm and Floyd's algorithm will find the shortest paths? (8M+8M)
6. a) Use heap sort for the data: 26,5,77,1,61,11,59,15,48,9 for sorting
- b) Work out the time complexity of merge sort in the worst case. (8M+8M)
7. a) What is a binary trie? Construct a binary trie with elements: 0001, 0011, 1000, 1001, 1100, 0010, 1101, 1010.
- b) Draw the flowchart for Knuth-Morris-Pratt algorithm (8M+8M)



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**PART-A**

1. a) Differentiate between best, average, and worst case complexities  
 b) Height balancing in AVL tree.  
 c) What is a height balanced tree? How rebalancing is done in a height balanced tree?  
 d) Define the terms: file, record, field.  
 e) Write the Differences between spanning tree and minimum spanning tree.  
 f) Discuss the Advantages of hashing.

(4M+4M+4M+4M+3M+3M)

**PART-B**

2. a) Explain the linear probing method in hashing. Discuss its performance analysis.  
 b) What is a dictionary? Give the applications of dictionary or dictionary with duplicates in which sequential access is desired. (8M+8M)
3. a) Construct AVL tree for the days of week on their lexicographical order. Initial order of the days is as they occur in a week from Sunday to Saturday  
 b) Explain the concept of 2-3 tree. How can keys be inserted into it. Comment on the efficiency of search operations on a 2-3 tree (8M+8M)
4. a) Construct a heap using the following list of numbers: 12,9,8,3,7,5,10,18  
 b) What is a priority queue? List and explain different ways of representing them. (8M+8M)
5. What is a minimum spanning tree? Explain with an example, Krushkal's algorithm for constructing a minimum cost spanning tree. (16M)
6. a) Sort the following data using merge sort. Discuss the time complexity of the algorithm if the data size is n. 15, 10, 2, 11, 17, 12, 5, 8, 9, 1, 3, 13, 6.  
 b) Discuss about the lower bound on complexity for sorting methods. (8M+8M)
7. a) Explain the differences between sequential files and indexed sequential files.  
 b) Explain the main features of Boyer-Moore algorithm (8M+8M)



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**PART-A**

1. a) What are tries? Give their advantages.  
 b) What are the Applications of graphs?  
 c) Explain about the delete procedure of the Binary search tree  
 d) Give the properties of binomial heaps.  
 e) Differences between hashing and skip lists.  
 f) Define and give an example of a Minimum Cost Spanning Tree. (4M+4M+4M+4M+3M+3M)

**PART-A**

2. a) What is hashing with chains? Explain. Compare this with linear probing.  
 b) Describe the skiplist representation of dictionary with an example. (8M+8M)
3. a) What is an AVL tree? Write the algorithm to search for an element of an AVL search tree.  
 b) Construct a 2-3 tree for 4, 6, 3, 2, 1, 7, 9 (8M+8M)
4. a) Discuss the insertion and deletion operations in a priority queue.  
 b) Illustrate the algorithm for deletion of an element from heap with an example. (8M+8M)
5. Develop an algorithm to compute the shortest path using Dijkstra's algorithm. Validate the algorithm with a suitable example. (16M)
6. a) Show the outcome of different passes for sorting the following sequence of data using quick sort algorithm Choose the first element as pivot. 8, 11, 3, 15, 6, 9, 12, 39  
 b) How to derive the lower bounds from decision trees for sorting algorithms? Explain. (8M+8M)
7. a) Which pattern matching algorithm avoids the repeated comparison of characters? Discuss with suitable example.  
 b) What is a record? What are the ways in which records can be organized in a file? (8M+8M)



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**PART-A**

1. a) Discuss about special characters in files.  
 b) Draw a sequence of rotations required to perform a single right rotation and a LR rotation in an AVL tree  
 c) Discuss about lazy binomial queues.  
 d) Compare Closed hashing Vs Open hashing.  
 e) Describe the three main steps in Quicksort.  
 f) Write the Applications of priority queues. (4M+4M+4M+4M+3M+3M)

**PART-B**

2. a) With a procedure and a relevant example discuss separate chaining in hashing.  
 b) Define Dictionary and Dictionary with duplicates. List the operation performed on dictionary. (8M+8M)
3. a) What is an AVL search tree? How do we define the height of it? Discuss about the balance factor associated with a node of an AVL tree.  
 b) Construct a 2-3 tree for the list 9, 5, 8, 3, 2, 4 and by successive insertion. (8M+8M)
4. Explain the implementation of a binomial heap and its operation with suitable example. (16M)
5. What is transitive closure? Which algorithm uses transitive closure in calculating shortest path? Explain it with an example. (16M)
6. An array contains the following elements [17 46 5 23 20]. Use the heap sort method to sort the elements in increasing order. Draw the heap trees as you move through each step (16M)
7. a) Which pattern matching algorithm scans the characters from right to left? Explain it with suitable example.  
 b) State different file organizations and discuss their advantages and disadvantages. (8M+8M)



**II B. Tech II Semester Regular Examinations, May/June - 2015**  
**COMPUTER ORGANIZATION**  
 (Com. to CSE, IT, ECC)

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PART-A

1. a) Find (1001101 - 10101001) using 1's complement?
 b) What is instruction cycle?
 c) Write the advantage of RISC over CISC?
 d) Draw the circuit diagram and Truth table for Full adder?
 e) Draw the hierarchy of memory? Why memory hierarchy is important in computer system?
 f) Differentiate between Synchronous and Asynchronous modes of data transfer?
 (3M+3M+4M+4M+4M+4M)

PART-B

2. a) Discuss three representations of Signed integers with suitable examples.
 b) Explain the components of the Computer system. (8M+8M)
3. a) List and explain the steps involved in the execution of a complete instruction
 b) What is Micro operation? Briefly explain the arithmetic micro operations? (8M+8M)
4. a) Explain the organization of registers.
 b) Explain how microinstructions execution takes place. (8M+8M)
5. a) Explain the issue involved with multiplication operation.
 b) Design 4-bit adder/Subtractor and explain its function. (8M+8M)
6. What is a mapping function? What are the ways the cache can be mapped? Explain in detail. (16M)
7. a) What is multiprocessor system? Explain the advantages of multi processors over uniprocessors
 b) Explain the functions of typical input-output interface. (8M+8M)



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PART-A

1. a) What are 2's Complement? Give its Significance?
 b) What is interrupt? Give the steps for handling interrupt?
 c) Compare RISC and CISC?
 d) Realize full adder using two half adders and logic gate?
 e) What is Auxiliary memory?
 f) What are different forms of parallelism? (4M+4M+4M+4M+3M+3M)

PART-B

2. a) Explain the functional architecture of the computer system.
 b) Discuss the concept of compliments used to represent signed numbers. (8M+8M)
3. a) What is instruction cycle? Briefly explain with the help of state diagram?
 b) Briefly explain the arithmetic logic shift unit (8M+8M)
4. a) Explain the various addressing modes with examples.
 b) Explain the basic organization of microprogrammed control unit (8M+8M)
5. a) Design carry look ahead adder and explain its function.
 b) Derive and explain an algorithm for adding and subtracting 2 floating point binary numbers (8M+8M)
6. a) Explain the Address Translation in Virtual Memory
 b) Explain different types of mapping functions in cache memory (8M+8M)
7. a) How data transfers can be controlled using handshaking technique?
 b) Explain organization of multiprocessor system with neat sketch. (8M+8M)



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PART-A

Part A

1. a) What is parity? Give its significance?
 b) What is one address, two address and three address instruction formats?
 c) What is Register Indirect Addressing mode? Give an example?
 d) Draw the circuit diagram and Truth table for half adder?
 e) What is Cache memory? Mention its advantages?
 f) What is the use of priority interrupt? (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Describe the connections between the processor and memory with a neat structure diagram
 b) Find 2's complement of the following
 i) 10010 ii) 111000 iii) 0101010 iv) 111111 (8M+8M)
3. a) Explain the Memory reference instructions? Give examples?
 b) List and explain the shift micro operations? (8M+8M)
4. a) Explain micro instruction sequencing in detail.
 b) With a neat diagram explain the internal organization of a processor. (8M+8M)
5. a) Explain hardware implementation of Binary multiplier with example.
 b) Discuss decimal arithmetic operations (8M+8M)
6. a) Explain about associative memory
 b) Explain internal organization of memory chips. (8M+8M)
7. a) With a neat sketch explain the working principle of DMA
 b) Explain the interconnection structure for multiprocessor systems (8M+8M)



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**PART-A**

1. a) What Sign magnitude representation? Give an example?  
 b) Draw the structure of basic computer system?  
 c) What is addressing mode? List any four Addressing modes?  
 d) Draw the diagram for 4-bit adder?  
 e) What is Virtual memory? Why it is significant?  
 f) What is DMA? Write its Advantages? (4M+3M+4M+3M+4M+4M)

**PART-B**

2. a) Discuss about fixed point and floating point representations  
 b) What are functions of ALU and explain. (8M+8M)
3. a) What is RTL? Explain with suitable examples? What is its significance Instructions?  
 b) What is Interrupt? Explain Input output interrupts? (8M+8M)
4. a) Explain different addressing modes.  
 b) Mention the advantages and disadvantages of microprogrammed control hardwired control (8M+8M)
5. a) Explain division algorithm with example.  
 b) Explain Booth Multiplication algorithm with example. (8M+8M)
6. a) Analyze the memory hierarchy in terms of speed, size and Cost.  
 b) Design 64k X 16 memory chip using 16k X 8 memory chips (8M+8M)
7. a) What are handshaking signals. Explain the handshake control of data transfer during input and output operation  
 b) What is parallel processing? Explain any parallel processing mechanism. (8M+8M)



**II B. Tech II Semester Regular Examinations, May/June - 2015**  
**FORMAL LANGUAGE AND AUTOMATA THEORY**  
 (Computer Science and Engineering)

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Max. Marks: 70

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 2. Answer **ALL** the question in **Part-A**  
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**PART-A**

- 1 a) What is Finite State Machine? What are the elements of FSM? (3)
- b) What is the difference between CFG and CSG? (3)
- c) Consider a DFA  $M = (Q, \Sigma, \delta, q_0, F)$ , What is the minimum and maximum number of initial states in it? (2)
- d) Give the formal definition of Moore machine (2)
- e) What are the applications of CFG? (3)
- f) List out the components of turing machine (3)
- g) What is dead state? Give an example. (3)
- h) Give the formal definition of TM? Give the block diagram of TM (3)

**PART-B**

- 2 a) What is Computation? What are the different models of Computation? Explain (5)
- b) What are the different classes of automata? How they are classified? Explain in detail. (5)
- c) Give the formal definition of FSM? What are the examples of FSM? (6)
- 3 a) What are the different operations on strings? Explain with examples? (3)
- b) What are the different types of languages in automata theory? Clearly give the rules for each of these languages and the relationship among these languages (6)
- c) Consider a language  $L^*$ , where  $L = \{ab, cd\}$  with  $\Sigma = \{a, b, c, d\}$ . (7)
  - (i) write all words in  $L^*$  that have six or less letters/symbols
  - (ii) What is the shortest string in  $\Sigma^*$  that is not in the language  $L^*$ ?



- 4 a) Construct a DFA accepting the language  $L = \{w : |w| \bmod 8 \neq 0\}$  on  $\Sigma = \{a, b\}$  (8)  
 b) Obtain a DFA to accept strings of  $a$ 's and  $b$ 's such that, each block of 5 consecutive symbols has at least two  $a$ 's. (8)

- 5 a) What is Arden's Theorem. Explain (4)  
 b) Convert the following DFA to RE. (6)

|   |   |   |
|---|---|---|
|   | 0 | 1 |
| p | p | q |
| q | q | r |
| r | r | r |

- c) Check whether the following two DFA's are equal or not (6)

|    |    |    |
|----|----|----|
|    | 0  | 1  |
| q1 | q1 | q2 |
| q2 | q3 | q1 |
| q3 | q2 | q3 |

|    |    |    |
|----|----|----|
|    | 0  | 1  |
| q4 | q4 | q5 |
| q5 | q6 | q4 |
| q6 | q7 | q6 |
| q7 | q6 | q4 |

- 6 a) What is Chomsky's hierarchy? Explain (5)  
 b) What is Unit production? What is the procedure to remove the unit productions in CFG. (4)  
 c) Convert the following grammar to CNF. (7)  
 $S \rightarrow bA \mid aB$   
 $A \rightarrow bAA \mid aS \mid a$   
 $B \rightarrow aBB \mid bSbb$

- 7 a) Design a total Turing machine to accept the language:  $L_2 = \{w \in \{a, b, c\}^* \mid \#a(w) \leq \#b(w) \leq \#c(w)\}$  (Note: '#' means number) (12)  
 b) Explain about P and NP classes of languages. (4)



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PART-A

- 1 a) What is Finite State Machine? What are the advantages of FSM (4)
- b) Define regular expression (2)
- c) Consider a NFA $M=(Q,\Sigma, \delta, q_0, F)$, What is the minimum and maximum number of states in it? (3)
- d) Give the formal definition of Mealy machine. Give an example (3)
- e) What is ambiguous grammar? Give an example (3)
- f) What is trap state? Give an example (3)
- g) Differentiate between PDA and TM with respect to tape and head (4)

PART-B

- 2 a) What is state diagram and state transition table. Explain with an example. (5)
- b) What are the different classes of automata? How they are classified? Explain in detail. (5)
- c) What are the components of FSM? Explain. (6)
- 3 a) What is push down Automata? Show how context free language is accepted by push down automata. (8)
- b) Consider a language L^* , where $L=\{ab, cd\}$ with $\Sigma=\{a,b,c,d\}$. (8)
 - (i) Write all words in L^* that have six or less letters/symbols
 - (ii) What is the shortest string in Σ^* that is not in the language L^* ?



- 4 a) Construct a DFA accepting the language: $\{W \in \{a,b\}^* : W \text{ has both } ab \text{ and } ba \text{ as substrings}\}$ (8)
 b) Design a ϵ -NFA for the regular expression $a^*bc/ab^*/c^*$ (6)
 c) Define ϵ -closure of a state? Give an example (2)

- 5 a) What are the properties of Regular sets? Explain (4)
 b) Convert the following DFA to RE. (6)

	0	1
p	p	q
q	q	r
r	p	r

- c) Check the following two DFA are equal or not (6)

	0	1
q1	q1	q2
q2	q3	q1
q3	q2	q3

	0	1
q4	q4	q4
q5	q6	q4
q6	q4	q6
q7	q6	q4

- 6 a) What is use of simplification of CFG? What is the procedure to simplify the CFG? Explain (8)
 b) Simplify the following grammar. (8)
 $S \rightarrow aAa$
 $A \rightarrow bBB / D$
 $B \rightarrow ab / \epsilon$
 $C \rightarrow aB$
- 7 a) Give the formal definition of TM? What are the components of TM? What is *id* of TM? (6)
 b) Design a Turing Machine for the $\{L=ww^R/w \in (0+1)^*\}$ (10)



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PART-A

- 1 a) What is Finite State Machine? What are the disadvantages of FSM (3)
 b) $\Phi^* = \text{-----}$ and $\epsilon^* = \text{-----}$ (2)
 c) Consider a ϵ -NFA $M = (Q, \Sigma, \delta, q_0, F)$, What is the minimum and maximum (2)
 number of states in it?
 d) What is Unit Production? If you eliminate the unit productions from the given (3)
 CFG, what will be the effect on the language by the resultant grammar
 e) When you convert ϵ -NFA to NFA, how do you decide the final states of (4)
 resultant NFA. Give an example
 f) What is left recursion? How to eliminate the left recursion (4)
 e) Differentiate between PDA and TM with respect to: halt state and final state (4)

PART-B

- 2 a) Give the formal definition of FSM? What are the examples of FSM? (5)
 b) Write short note on classification of Automata (5)
 c) What is state diagram and state transition table? Explain with an example. (6)
- 3 a) Differentiate NFA with DFA (3)
 b) Describe on detail about recursive enumerable language (6)
 c) Write regular expression for the language over $\{0,1\}$: the set of all strings that (7)
 contain 1011.
- 4 a) What are the advantages of NFA (4)
 b) Design a ϵ -NFA for the regular expression $a^*/b^*/c^*$ (6)
 c) Construct a DFA accepting the language: $\{W \in \{a,b\}^* : W \text{ has neither } aa \text{ nor } bb \text{ as a substring}\}$ (6)



- 5 a) Write short note on i) optimum DFA ii) Two way DFA. (4)
 b) Convert the following DFA to RE. (6)

	0	1
p	p	r
q	q	r
r	q	r

- c) Check the following two DFA are equal or not (6)

	0	1
q1	q1	q2
q2	q3	q1
q3	q3	q3

	0	1
q4	q6	q5
q5	q6	q4
q6	q7	q5
q7	q6	q4

- 6 a) Define Chomsky Normal form and Greibach Normal form? What is the difference between these two normal forms. (8)

- b) Convert the following CFG into GNF. (8)

$$A_1 \rightarrow A_2 A_3$$

$$A_2 \rightarrow A_3 A_1 / b$$

$$A_3 \rightarrow A_1 A_2 / a$$

- 7 a) Give the formal definition of TM? What are the different types of TMs? Explain. (6)

- b) Design a Turing Machine for $L = \{wcw^R/w \in (0+1)^*\}$ (10)



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PART-A

- 1 a) What is Finite State Machine? What are the applications of FSM (3)
 b) If $L = \{ \epsilon, 00, 01, 10, 11, 000, \dots, 111, \dots \}$, find \bar{L} over the alphabet $\{0,1\}$ (3)
 c) Consider a DFA $M = (Q, \Sigma, \delta, q_0, F)$, What is the minimum and maximum number of final states in it? (2)
 d) What is useless symbol in a CFG? If you eliminate the useless symbols and productions from the given CFG, what will be the effect on the language by the resultant grammar (3)
 e) What is left recursion? How to eliminate the left recursion (3)
 f) Give the formal definition of Moore machine? (2)
 g) What is an infinite loop in TM? Explain with an example. (3)
 h) Give the differences between DFA and 2DFA with examples. (3)

PART-B

- 2 a) Give the general procedure for drawing a state diagram from transition table. (5)
 b) Construct a finite automata with transition for the regular expression $r = 01^* + 10$ (5)
 c) Define cellular and geographic automata. (2)
 d) What are the components of FSM? Explain (4)
- 3 a) Write a short note on i) Symbols ii) Alphabets and ii) Strings. (3)
 b) Write a short note on PDA with an example. (6)
 c) Write regular expression for the language over $\{0,1\}$: the set of all strings that contain 100. (7)
- 4 a) Define ϵ -closure of a state? Give an example (3)
 b) Design a DFA to accept odd number of a 's and even number of b 's, where $\Sigma = \{a,b\}$. Show the acceptance of a string with an example (7)
 c) Design a ϵ -NFA for the regular expression $a^*b/cb^*/ac^*b$ (6)



- 5 a) List out the properties of Regular sets and Regular languages (4)
 b) Minimize the following DFA, where state '0' is the start state and 3,5,6&7 are the final states. (6)

	a	b
0	1	2
1	4	5
2	3	-
3	-	-
4	4	2
5	6	-
6	7	-
7	7	-

- c) Check the following two DFA are equal or not (6)

	0	1
q1	q1	q2
q2	q3	q1
q3	q2	q3

	0	1
q4	q4	q5
q5	q5	q4
q6	q7	q6
q7	q6	q4

- 6 a) What is normalization of CFG? What is the use of Normalization? What are the different normal forms? Explain (8)
 b) Convert the following CFG into GNF. $S \rightarrow AA|0$, $A \rightarrow SS|1$ (8)
- 7 a) Design Turing machine to compute the function $n!$ (Factorial of a number) (12)
 b) Explain about undecidable problem (4)



II B. Tech II Semester Regular Examinations, May/June – 2015
JAVA PROGRAMMING
 (Com. to CSE, IT)

Time: 3 hours

Max. Marks: 70

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 2. Answer **ALL** the question in **Part-A**
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PART-A

1. a) What is Object Oriented Programming? How it is different from Procedural concepts?
 b) What is an Object? How to allocate memory for objects?
 c) Can a method be overloaded based on different return type but same argument type ?
 d) What is the purpose of Alive () function in Java.
 e) "Java class can be used both as an applet as well as an application" - Support this statement with an example.
 f) What are the different types of controls available in AWT?
 g) What are assertions?
 h) "Interfaces are able to extend more than one Interface but a Class can't extend more than one Class" - Why? (4M+4M+4M+2M+4M+4M+2M+4M)

PART - B

2. a) Explain briefly the following object oriented concepts.
 i) Abstraction ii) Polymorphism
 b) "Java is called Machine Independent language" - Justify this statement with proper explanation. (8M+8M)
3. a) Write a Java program to sort a given set of strings in the alphabetical order where the strings are supplied through the command line.
 b) What do you mean by static class and static method? Can we make an instance of an abstract class? Justify your answer with an example? (8M+8M)
4. a) What are the different forms of inheritance? Explain.
 b) How Packages differ from Interfaces? Explain it with a suitable example program to calculate student marks statement. (8M+8M)
5. a) Write a Java program that prints numbers from 1 to 10 line by line after every 5 seconds
 b) What is thread synchronization? Discuss with an example. (8M+8M)
6. a) Write a Java program to create a combo box which includes list of subjects. Copy the subjects in text field on click using applet.
 b) Differentiate between init() and start() methods with examples. (8M+8M)
7. a) Write a Java program to illustrate the use of Flow Layout Manager.
 b) Write a short note on the following i) JList ii) JScrollPane (8M+8M)



II B. Tech II Semester Regular Examinations, May/June – 2015
JAVA PROGRAMMING
 (Com. to CSE, IT)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) Write a short note on the features of Object Oriented Programming
 b) List out the characteristics of the static method.
 c) What is the difference between an interface and an abstract class?
 d) What is the importance of synchronization in java?
 e) What is the role of layout manager in AWT or Swing?
 f) What are the ways in which we can pass parameters to the applet?
 g) What are the advantages of event driven programming?
 h) "Java does not support operator loading" - Support this statement with appropriate reasoning. (4M+4M+4M+2M+4M+2M+4M+4M)

PART - B

2. a) Write a Java program to generate a pyramid of numbers for given number N using for loop.
 b) Discuss on the advantages and disadvantages of Object Oriented Programming. (8M+8M)
3. a) Write a Java program to accepts a file name as command line argument and finds The Length of the longest line in the file and displays an error message if the file Does not exist.
 b) Explain various access specifiers supported by Java with an example (8M+8M)
4. a) Write a java program to illustrate "Constructor Overloading".
 b) What are the various types of exceptions available in Java? Also discuss on how they are handled? (8M+8M)
5. a) Write a Java program for creating four threads to perform the following operations
 i) Getting N numbers as input ii) Printing the even numbers
 iii) Printing the odd numbers iv) Computing the average
 b) Explain how communication between threads takes place with a programming example. (8M+8M)
6. a) Write Applets programs to accomplish the following tasks:
 i) Drawing polygons ii) Drawing a line graph.
 b) Can applet class have a constructor? Justify your answer with proper explanation and example. (8M+8M)
7. a) Discuss in detail Menu bars and menus in Java with examples.
 b) Write a short note on the following
 i) JFrame ii) JTabbedPane (8M+8M)



II B. Tech II Semester Regular Examinations, May/June – 2015**JAVA PROGRAMMING**

(Com. to CSE, IT)

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PART-A

1. a) "Write Once and Run Anywhere" - Support this statement with proper reasoning.
 b) What is a constructor? When does the compiler supply default constructor for a class?
 c) Differentiate between array and vector with examples.
 d) What is a daemon thread?
 e) What is an event? What methods are available to handle events in java?
 f) List out the differences between AWT and Swings.
 g) Give an example to illustrate the use of parseInt() method?
 h) What is the difference between the >> and >>> operators?
 (4M+4M+2M+4M+4M+4M+2M)

PART - B

2. a) Write a Java program to interchange the rows and columns of a given matrix.
 b) Write short note on the following Object Oriented concepts
 i) Encapsulation ii) dynamic binding (8M+8M)
3. a) Discuss various control structures available in Java.
 b) Write a program to perform the following functions using classes, objects, constructors and destructors wherever necessary
 i) Read 5 subjects marks of 5 students
 ii) Calculate the total and print the result on the screen (8M+8M)
4. a) Explain Creating Packages and Accessing a Package with examples.
 b) Write a Java program to find the area and perimeter of square and circle using interface. (8M+8M)
5. a) Explain the following with necessary code snippets
 i) Creating thread ii) Stopping and Blocking a Thread
 b) "Threads can be given priorities" - Support this statement with suitable example. (8M+8M)
6. a) Describe the different stages in the life cycle of an Applet.
 b) Explain in brief the event-handling mechanism in java with an example. (8M+8M)
7. a) Explain about any two Layout Managers with example programs.
 b) Explain the features of Swings in java. (8M+8M)



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JAVA PROGRAMMING
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PART-A

1. a) Write a Java program to find the value of n!, where n is a given integer.
 b) Illustrate type casting in java with an example.
 c) Differentiate between sleep () and wait ().
 d) Discuss various methods used to create threads?
 e) What is source and listener in java event handling?
 f) List the features of swings.
 g) "Abstract classes can be defined without any abstract methods" - support this statement with proper reasoning.
 h) What is the difference between & operator and && operator?

(4M+2M+4M+4M+4M+4M+2M)

PART - B

2. a) Write a Java program to check whether a given number is palindrome or not?
 b) Explain about Java Tokens with examples. (8M+8M)
3. a) Write a java program to simulate the operation of numerical calculator to perform the functions Addition (+), Subtraction (-), Multiplication (*) and Division (/).
 b) Explain clearly about how Java handles cleaning up of unused objects. (8M+8M)
4. a) Explain about Exception Handling in Java with examples.
 b) Why do constructors does not have any return type? Explain it with proper example. (8M+8M)
5. a) Write a Java program to demonstrate multithreading operation.
 b) Explain various thread states and properties in detail. (8M+8M)
6. a) Write an applet program that has different shapes in it.
 b) Explain action event with suitable example. (8M+8M)
7. a) Explain any two AWT controls in java with suitable examples.
 b) Design a screen in Java which accepts text in text box. If the left mouse is clicked, convert the text to uppercase and if the right button is clicked, convert it to lower case. (8M+8M)



II B. Tech II Semester Regular Examinations, May/June - 2015
PROBABILITY AND STATISTICS
 (Com. to CSE, IT, CHEM, PE, PCE)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

1. a) The diameter of an electric cable is assumed to be continuous random variables X with Probability density function $f(x) = 6x(1-x)$, $0 \leq x \leq 1$. Determine b such that $P(X < b) = P(X > b)$.
- b) Four coins are tossed. What is its expectation of the number of heads?
- c) A population random variable has mean 100 and standard deviation 16. What are the mean and standard deviation of the sample mean for random samples of size 4 drawn with replacement.
- d) Define (i) Test of statistical hypothesis (ii) Type – I and Type – II error.
- e) Fit a Straight line $y = a + bx$ to the following data by the method of least squares:

x	0	1	3	6	8
y	1	3	2	5	4

- f) What is a control chart? Explain briefly the construction and uses of Mean chart and Range hart. (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Find the probability that by guess work a student can correctly answer 25 to 30 questions in a multiple choice quiz consisting of 80 questions. Assume that in each question with four choices only one choice is correct and student has no knowledge of the subject.
 b) If the mean and standard deviation of a normal distribution are 70 and 16, find $P(38 < x < 46)$. (8M+8M)
3. a) A variate X has the probability distribution

x :	-3	6	9
P(X=x):	1/6	1/2	1/3

 Find E(X) and E(X²). Hence evaluate E (2X + 1)²
 b) Find Mean and Standard deviation of Binomial Distribution. (8M+8M)



4. a) Define Point Estimation and Interval Estimation.
 b) A population consists of the four numbers 2, 3, 6, 8. Consider all possible samples of size Two that can be drawn with replacement from this population.
 Find (i) The populations mean,
 (ii) The population standard deviation,
 (iii) The mean of the sampling distribution of means (7M+9M)

5. a) The lifetime of electric bulbs for a random sample of 10 from a large shipment gave the following data :

Item	1	2	3	4	5	6	7	8	9	10
Life in 1000s of hrs.	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average life time of bulb is 4000 hrs? Use a 0.05 level of significance.

- b) A random sample of 10 boys had the following I.Q's 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q of 100? (8M+8M)
6. The following table gives the figures of monthly drop in Acidity level and Chlorine concentration in a swimming pool. Set up a two-way variance analysis table and analyze the results. (16M)

Chlorine Concentration	Acidity Level				Total
	Low	Medium	High	Very High	
Low	23	18	9	7	57
Medium	10	12	8	4	34
High	9	9	7	4	29
Total	42	39	24	15	120

7. a) What is a control chart? Explain briefly the construction and uses of mean chart, p-chart and range chart.
 b) During an examination of equal length of cloths the following are the number of defects observed.
 2, 3, 4, 0, 5, 6, 7, 4, 3, 2
 Draw a control chart for the number of defects and comment whether the process is under control or not. (8M+8M)



II B. Tech II Semester Regular Examinations, May/June - 2015
PROBABILITY AND STATISTICS
 (Com. to CSE, IT, CHEM, PE, PCE)

Time: 3 hours

Max. Marks: 70

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PART-A

1. a) A random variable x has the following probability function: values of

$x:$	-2	-1	0	1	2	3
$p(x):$	0.1	k	0.2	$2k$	0.3	k

Find the value of k and calculate mean.

b) If $f(x) = \begin{cases} \frac{1}{2}(x+1), & -1 < x < 1 \\ 0, & elsewhere \end{cases}$

represents the density of a random variable X , find $E(X)$.

- c) A sample of 11 rats from a central population had an average blood viscosity of 3.92 with a S.D of 0.61. Estimate the 95% confidence limits for the mean blood viscosity of the population. 1 of 2
- d) Explain briefly the following
 i) Type I error ii) Type II error iii) One tailed test iv) Two tailed test
- e) Find the co-efficient of correlation between industrial production and export using the following data and comment on the result.

Production(in corer tons)	55	56	58	59	60	60	62
Exports(in corer tons)	35	38	38	39	44	43	45

- f) Explain the clearly the construction and function of (i) X - chart and (ii) C - chart
 (3M+4M+4M+4M+4M+3M)

PART-B

2. a) Find the probability of getting at least 55 heads when 100 coins are tossed using Normal distribution.
- b) If X is normally distributed with mean 30 and standard deviation 5. Find $P(|X - 30| > 5)$.
 (8M+8M)



3. a) A Continuous distribution of a variable x in the range $(-3, 3)$ is defined as

$$f(x) = \begin{cases} \frac{1}{16}(3+x)^2 & -3 \leq x < -1 \\ \frac{1}{16}(2-6x^2) & -1 \leq x < 1 \\ \frac{1}{16}(3-x)^2 & 1 \leq x < 3 \end{cases}$$

Show that the mean is zero.

- b) Find Mean and Standard deviation of Binomial Distribution. (8M+8M)
4. a) The mean and standard deviation of a population are 11,795 and 14,054 respectively. What can one assert that 95% confidence about the maximum error if $\bar{X} = 11,795$ and $n = 50$. And also construct 95% confidence interval for the true mean.
- b) If the population is 3, 7, 9, 11, 15
- i) List all possible samples of size 3 that can be taken without replacement from the finite population. ii) Calculate the mean of each of the sampling distribution of means. iii) Find the standard deviation of sampling distribution of means. (8M+8M)
5. a) A sample poll of 300 voters from district A and 200 voters from district B showed that 56% and 48%, respectively, were in favor of a given candidate. At a level of significance of 0.05, test the hypothesis that the candidate is preferred in district A
- b) Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results.

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

Test whether the two horses have the same running capacity. (8M+8M)

6. a) The following are data on the drying time of a certain paint and the amount of an additive that is intended to reduce the drying time

Amount of paint additive (grams) x	0	1	2	3	4	5	6	7	8
Drying time (hrs) y	12	10.5	10	8	7	8	7.5	8.5	9

Fit a second degree polynomial (parabola) by the method of least squares. Use the result to predict the drying time of the paint when 6.5 grams of the additive is being used.

- b) Find the correlation co efficient between x and y from the given data (9M+7M)

x	1	2	3	4	5	6	7	8	9	10
y	10	12	16	28	25	36	41	49	40	50

7. a) What is a control chart? Explain briefly the construction and uses of mean chart, p-chart and range chart.
- b) During an examination of equal length of cloths the following are the number of defects observed.

2, 3, 4, 0, 5, 6, 7, 4, 3, 2

Draw a control chart for the number of defects and comment whether the process is under control or not. (8M+8M)



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PROBABILITY AND STATISTICS
 (Com. to CSE, IT, CHEM, PE, PCE)

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- ~~~~~

PART-A

1. a) A random variable x has the following probability function:
 values of x: 0 1 3 4 5 6 7
 $p(x)$: 0 k 2k 2k 3k k^2 $7k^2 + k$
 Find the value of k and also find $P(0 < x < 5)$.
- b) Find the moment generating function of the exponential distribution
 $f(x) = \frac{1}{c} e^{-\frac{x}{c}}, 0 \leq x < \infty, c > 0$. Also find its means.
- c) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence.
- d) Explain briefly the following
 i) Null Hypothesis, ii) Alternative hypothesis iii) Type I error & Type II error
- e) Calculate the coefficient of correlation from the following data.

x	1	2	3	4	5	6	7
y	9	8	10	12	11	13	14

- f) What is a control chart? Explain briefly the construction of p- chart.

(3M+4M+4M+4M+4M+3M)

PART-B

2. a) In a referendum 60% of voters voted in favour. A random sample of 200 voters was selected. Find the probability by using normal distribution that in the sample
 i) more than 130 voted in favour ?
 ii) between 105 and 130 inclusive voted in favour?
 iii) 120 voted in favour?
- b) Find the mean and Standard deviation of a normal distribution in which 31% of items are under 45 and 8% of over 64. (8M+8M)



3. a) X is a random variable giving time(in minutes) during which a certain electrical equipment is used at maximum load in a specified time period. If the probability density function is given by

$$f(x) = \begin{cases} \frac{x}{(1500)^2} & 0 \leq x < 1500 \\ -\frac{(x-3000)}{(1500)^2} & 1500 \leq x < 3000 \\ 0 & \text{elsewhere} \end{cases}$$

Find the expected value of X.

- b) Find Mean and Standard deviation of Poisson distribution. (8M+8M)
4. a) When a sample is taken from an infinite population, what happen to the standard error of the mean, if the sample size is decreased from 800 to 200.
- b) If the population is 3, 6, 9, 15, 27
- List all possible samples of size 3 that can be taken without replacement from the finite population.
 - Calculate the mean of each of the sampling distribution of means.
 - Find the standard deviation of sampling distribution of means. (8M+8M)
5. a) In a mathematics examination 9 students of class A and 6 students of class B obtained the following marks. Test at 0.01 level of significance whether the performance in mathematics is same or not for the two classes A and B. Assume that the samples are drawn from normal populations having same variance.
- A: 44 71 63 59 68 46 69 54 48
- B: 52 70 41 62 36 50
- b) Fit a Binomial distribution to the following data and test for its goodness of fit at level of significance 0.05. (8M+8M)

No. of Heads	0	1	2	3	4	5
No. of Tosses(Frequency)	38	144	342	287	164	25

6. a) The following table shows the respective heights x and y of a sample of fathers and their Oldest sons. Find the regression line of x on y.

Height x of Father (inches)	65	63	67	64	68	62	70	66	68	67	69	71
Height y of son (inches)	68	66	68	65	69	66	68	65	71	67	68	70

- b) Obtain the rank correlation coefficient for the following data: (8M+8M)

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

7. a) Discuss the need and utility of statistical quality control.
- b) Draw the mean and range charts from the following data and state your conclusion.

Sample No.	1	2	3	4	5	6	7	8	9	10	Total
Sample Mean	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2	135.3
Sample Range	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.5	2.0	25.9

(Given $n = 5$, $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.115$)

(8M+8M)



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PART-A

1. a) The probability density function of a variable X is
 X : 0 1 2 3 4 5 6
 p(X): k 5k 7k 9k 11k 13k 15k
 Find $P(x < 4)$ and $P(x \geq 5)$.
- b) If x be random variable with probability generating function $P_x(t)$, find the probability generating function of $(x+2)$.
- c) What is the maximum error one can expect to make with probability 0.90 when using the mean of a random sample of size $n = 64$ to estimate the mean of population with σ^2 .
- d) Explain briefly the following
 i) Null Hypothesis, ii) Alternative hypothesis iii) Type I error & Type II error
- e) The following are data on the drying time of a certain paint and the amount of an additive that is intended to reduce the drying time

Amount of paint additive (grams) x	0	1	2	3	4	5	6
Drying time (hrs) y	12	10.5	10	8	7	8	7.5

Fit a straight line $y = a + bx$, by the method of least squares.

- f) What is a control chart? Explain briefly the construction and uses of Mean chart and Range chart.

(3M+4M+4M+4M+4M+3M)

PART-B

2. a) Find the mean and Standard deviation of a normal distribution in which 31% of items are under 45 and 8% of over 64.
 b) If the mean and standard deviation of a normal distribution are 70 and 16, find $P(38 < x < 46)$. (8M+8M)
3. a) If $f(x) = \begin{cases} \frac{1}{4}(x+1), & -1 < x < 1 \\ 0, & elsewhere \end{cases}$
 represents the density of a random variable X, find $E(X)$ and $Var(X)$.
 b) Find Mean and Standard deviation of Poisson distribution. (8M+8M)



4. a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative.
 b) A population consists of the four numbers 2, 3, 4, 5. Consider all possible samples of size two that can be drawn with replacement from this population.
 Find (i) The population mean, (ii) The population standard deviation,
 (iii) The mean of the sampling distribution of means (7M+9M)
5. a) The IQ s (intelligence quotients) of 16 students from one area of a city showed a mean of 107 with a standard deviation of 10, while the IQs of 14 students from another area of the city showed a mean of 112 with a standard deviation of 8. Is there a significant difference between the IQs of the two groups at a 0.05 level of significance?
 b) In experiments on pea breeding, the following frequencies of seeds were obtained:
- | Round and yellow | Wrinkled and yellow | Round and green | Wrinkled and green | Total |
|------------------|---------------------|-----------------|--------------------|-------|
| 315 | 101 | 108 | 32 | 556 |
- Theory predicts that the frequencies should be in proportions 9:3:3:1. Examine the correspondence between theory and experiment. Use a 0.01 level of significance. (7M+9M)
6. a) For a set of values of x and y , the two regression lines are $31x - 37y + 5 = 0$ and $50x - 36y - 612 = 0$. Identify the regression line of y on x and that of x on y . Also obtain the values of \bar{x} , \bar{y} and r .
 b) The following are measurements of the air velocity and evaporation coefficient of burning fuel droplets in an impulse engine:
- | | | | | | | | | | | |
|--|------|------|------|------|------|------|------|------|------|------|
| Air velocity x cm/sec | 20 | 60 | 100 | 140 | 180 | 220 | 260 | 300 | 340 | 380 |
| Evaporation Coefficient y mm ² /sec | 0.18 | 0.37 | 0.35 | 0.78 | 0.56 | 0.75 | 1.18 | 1.36 | 1.17 | 1.65 |
- Fit straight line to these data by the method of least squares, and use it to estimate the evaporation coefficient of a droplet when the air velocity is 190 cm/sec. (8M+8M)
7. a) What is a control chart? Explain briefly the construction and uses of mean chart, p-chart and range chart.
 b) A manufacturer of transistors found the following number of defectives in 25 sub-groups of 50 transistors.
 3, 5, 4, 2, 3, 2, 7, 0, 2, 4, 2, 3, 4,
 1, 2, 4, 8, 2, 4, 2, 6, 4, 3, 1, 4,
 Construct a control chart for the fraction defective, plot the sample data on the chart and comment on the state of control. (8M+8M)