

Code: 9A05401

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**DATABASE MANAGEMENT SYSTEMS**

(Common to CSS, IT and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Discuss about the evolution of data models.  
(b) List and explain different types of data models.
- 2 (a) Explain about specialization and generalization constraints.  
(b) Compare and explain single valued and multi valued attributes.
- 3 (a) What are the differences between select and project operations? Explain with examples.  
(b) Discuss about 1:M and M:N relationships with examples.
- 4 Explain about all the SQL functions in advanced SQL with syntax and example.
- 5 (a) Write a short note on MVD (Multivalued dependencies).  
(b) What are the inference rules for MVD? Explain.
- 6 (a) What is transaction? Explain about its properties.  
(b) Explain about 2-phase locking and lock granularity?
- 7 (a) What is immediate database modification and deferred database modification? Explain.  
(b) Explain about the concept recovery with concurrency transaction?
- 8 Explain multi - key file organization in detail?

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2

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**DATABASE MANAGEMENT SYSTEMS**

(Common to CSS, IT and CSE)

Time: 3 hours

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- 1 (a) Define structural independence. Why is it important? Explain.  
(b) Discuss about the external model with example.
- 2 (a) Discuss about the ternary relationship with example.  
(b) What is specialization hierarchy? Explain in detail with example.
- 3 (a) Discuss about: (i) System catalog. (ii) Data dictionary.  
(b) Discuss about any four set operators with example.
- 4 (a) What are the DML commands? Explain each with syntax.  
(b) Explain how the computed columns and column aliases work in select queries.
- 5 (a) If  $R = \{A, B, C, D\}$  and the functional dependencies are  $= \{AB \rightarrow CE, E \rightarrow AB, C \rightarrow D\}$ . Why R is in 2NF but not in 3NF? Explain?  
(b) Explain the following with examples:  
(i) Lossless join dependency.  
(ii) Dependency preservation.
- 6 (a) Explain the terms binary lock, shared lock/exclusive lock.  
(b) Explain about database recovery management.
- 7 (a) Explain how the immediate database modification and deferred database modification are used.  
(b) Discuss how the recovery can be done with concurrent transaction.
- 8 Explain the method of invented file organization.

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3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**DATABASE MANAGEMENT SYSTEMS**

(Common to CSS, IT and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
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- 1 (a) Explain the database system environment with a neat diagram.  
(b) What are the advantages of external model? Explain.
- 2 How to develop an ER diagram? Write steps for developing an ERD with example?
- 3 Consider a table and perform the queries using all the set operators on that table.
- 4 (a) What is a database schema and what are the data types that are used in data definition commands?  
(b) How to use updatable views? Explain.
- 5 (a) What is the dependency preservation property for decomposition? Which one must be definitely satisfied between the properties of dependency preservation and lossless? Why?  
(b) Why is 4NF preferred to BCNF?
- 6 Explain about concurrency controlled with optimistic method.
- 7 (a) How the terms fuzzy check pointing and recovery algorithm are used in advanced recovery technique?  
(b) What is immediate database modification and deferred database modification? Explain.
- 8 What is RAID? Discuss.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**DATABASE MANAGEMENT SYSTEMS**

(Common to CSS, IT and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
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- 1 (a) Define table. Explain linking relation tables with examples.  
(b) What are the two main purposes of file system methods? Explain.
- 2 (a) What is redundancy? What are the problems caused by the redundancy?  
(b) Explain about the derived attributes and write its advantages and disadvantages.
- 3 (a) What is an index? What are the components of an index?  
(b) Discuss about any two relationships in relational database.
- 4 (a) How to create a table structure? Explain.  
(b) Create a table and write queries to display minimum and maximum elements in a selected column and row.
- 5 (a) A Relation R (A, B, C, D) has FD  $C \rightarrow B$ . is in 3NF? Justify your answer.  
(b) A Relation R (A, B, C,) has FD's  $A \rightarrow AC$ , is R is in 3NF? Does  $AC \rightarrow C$ ? Justify your answer.
- 6 (a) Explain about inconsistent retrieval and scheduler in the concurrency controlled.  
(b) Explain about the various level of lock granularity.
- 7 (a) Explain about concept of the buffer management in details.  
(b) What is recovery algorithm? Explain in details.
- 8 Describe the important means of file organization.

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1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**OBJECT ORIENTED PROGRAMMING**

(Common to CSS, IT and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
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- 1 Write short notes on:
  - (a) Overriding.
  - (b) Exceptions.
  
- 2 (a) Explain garbage collection.  
(b) What is method overloading? Explain with an example.
  
- 3 (a) What is inheritance? Discuss the differences in inheritances in C++ and java?  
(b) What is inheritance? Explain the member access mechanism in inheritance with an example?
  
- 4 (a) How to create sub package to a package?  
(b) What is an API? Explain briefly.
  
- 5 (a) Describe the ways in which a thread can be created.  
(b) What is multitasking? Give an example.
  
- 6 (a) Explain the label AWT control.  
(b) Explain the button AWT control.
  
- 7 (a) Explain various methods of applet class with necessary examples.  
(b) What are containers? List various containers. Explain the usage of JPanel with example.
  
- 8 State whether type parameters can be instantiated using generics. Explain the reasons.

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**OBJECT ORIENTED PROGRAMMING**

(Common to CSS, IT and CSE)

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Max Marks: 70

Answer any FIVE questions  
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- 1 Distinguish the following terms:
  - (a) Inheritance and polymorphism.
  - (b) Dynamic binding and message passing.
  
- 2 (a) What is an array? Why arrays are easier to use compare to a bunch of related variables?
  - (b) Write a java program to sort the list of integers.
  
- 3 (a) Write the different forms of inheritances.
  - (b) Explain how you can define constants in java. Explain with example.
  
- 4 Write a program to create a private inner class that implements a public inter-face. Write a method that returns a reference to an instance of the private inner class, up-cast to the interface. Show that the inner class is completely hidden by trying to downcast to it.
  
- 5 (a) What is a thread? Explain the concept of a multithreading programming.
  - (b) List the various methods defined by the thread class.
  
- 6 (a) Describe any four mouse events.
  - (b) What is listener? With an example, describe the usage of event listener.
  
- 7 (a) Explain the following methods of an applet: Init( ), Start( ), Stop( ), Paint( )
  - (b) Write an applet program that display simple message "ALL THE BEST".
  
- 8 Write about single-member annotations, with a suitable example.

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- 1 (a) What is inheritance? Explain the concepts of reusability and extensibility with an example.  
(b) What is data abstraction? Compare data hiding and data encapsulation with an example.
- 2 (a) What is recursion? Write a java program to find factorial of given number.  
(b) What is a comment? Explain different types of comments available in java.
- 3 (a) Contrast: super Vs these keywords.  
(b) What is abstract class? Explain its importance. How is it designed in java?
- 4 (a) Explain about string tokenizer class.  
(b) Write a java program to find date and time.
- 5 (a) What is synchronization? Why is thread synchronization important for Multithreaded programs?  
(b) What is a monitor? Explain.
- 6 (a) What is the functionality supported by java related to fonts?  
(b) How using different fonts improves the user interface?
- 7 (a) Explain the use of JTable class with an example.  
(b) What are the mandatory attributes of applet tag? Explain them.
- 8 Explain different client TCP/IP socket constructors and usable methods in detail.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**OBJECT ORIENTED PROGRAMMING**

(Common to CSS, IT and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Distinguish the following terms:
  - (a) Objects and classes.
  - (b) Data abstraction and data encapsulation.
  
- 2 (a) Why java is important on internet? Explain.  
(b) Write a java program using command line arguments. Explain.
  
- 3 (a) Explain dynamic method dispatch with an example.  
(b) List and explain the methods defined in the object class.
  
- 4 Create an interface with at least one method, in its own package. Create a class in a separate package. Add a protected inner class that implements the interface. In a third package, inherit from your class and, inside a method, return an object of the protected inner class, up-casting to the interface during the return.
  
- 5 (a) Illustrate by program how try and catch can be put in a loop.  
(b) Explain how a multiple catch statement works.
  
- 6 (a) Explain any two layout managers with suitable examples.  
(b) Write a java program to display the different car names using list object.
  
- 7 (a) What is the use of JFrame? Create a JFrame containing a JDesktoppane, which has a single JInternal frame?  
(b) Explain icons and Labels of swing?
  
- 8 (a) Discuss about internet addressing in TCP/IP.  
(b) What is the use of Inet address class?

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B.Tech II Year II Semester (R09) Regular &amp; Supplementary Examinations, April/May 2013

**DESIGN AND ANALYSIS OF ALGORITHMS**

(Common to CSS, IT and CSE)

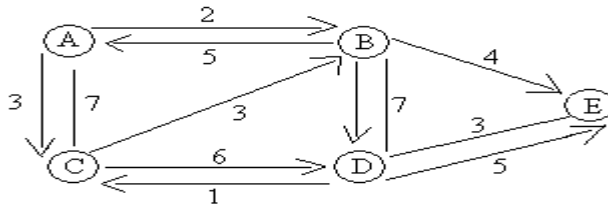
Time: 3 hours

Max Marks: 70

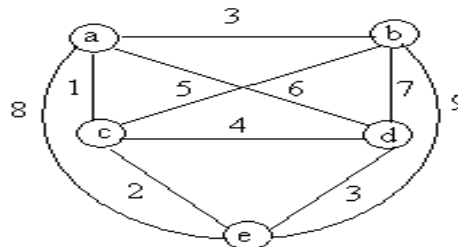
Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Give brief description about performance measurement.  
(b) Write an algorithm to implement magic square.
- 2 (a) Define collapsing rule. Write the algorithm for COLLAPSING FIND by using COLLAPSING RULE.  
(b) Draw the different trees for the following sets  $S_1 = \{1, 7, 8, 9\}$ ,  $S_2 = \{2, 5, 10\}$ ,  $S_3 = \{3, 4, 6\}$  with root nodes as 1, 5 and 3.
- 3 (a) Draw the tree calls of the function merge for the following set of elements:  
(5, 80, 30, 20, 50, 10, 70, 60, 40, 90).  
(b) Sort the above set of elements by using merge sort.
- 4 With the help of a suitable example, explain the greedy knapsack.
- 5 Find the shortest path b/w all pairs of nodes in the following graph.



- 6 (a) Explain how the solution to the backtracking problems is represented. And how it is built.  
(b) Give the explicit and implicit constraints in 8-queens problem.
- 7 Solve the traveling sales man problem for the following graph by using branch and bound.



- 8 Explain about decision and optimization problems with an examples.

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Time: 3 hours

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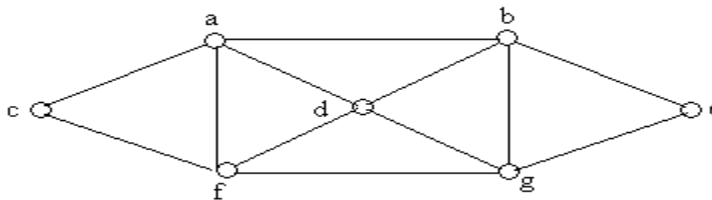
Answer any FIVE questions  
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- 1 (a) Explain the different areas of research where the algorithms can be applied.  
(b) Explain how to identify the repeated elements.
- 2 (a) Explain the scheme to construct bi-connected graph.  
(b) What is articulation point? Explain with example.
- 3 (a) Write an algorithm to sort N numbers in ascending order using merge sort.  
(b) Compute the time complexity for merge sort.
- 4 (a) Present a greedy algorithm for sequencing unit time jobs with deadlines and profits.  
(b) Present an optimal randomized algorithm for minimum cost spanning trees.
- 5 Find the optimal sequence by using traveling sales person for the following given instance.

	A	B	C	D
A	$\alpha$	12	5	7
B	11	$\alpha$	13	6
C	4	9	$\alpha$	18
D	10	3	2	$\alpha$

- 6 (a) Apply backtracking to the problem of finding a Hamiltonian circuit in following graph.



- (b) Write the implementation of the above algorithm.
- 7 (a) Write FIFOBB algorithm for the 0/1 knapsack problem.  
(b) Explain the general method of branch and bound.
- 8 (a) Prove that if  $X \in NP$  y is NP-hard, then  $X \leq_r^P Y$ . In other words, NP-hard problems are at least as hard as any problems in NP.  
(b) Prove that any two NP-complete problems are polynomially turning equivalent.

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**DESIGN AND ANALYSIS OF ALGORITHMS**

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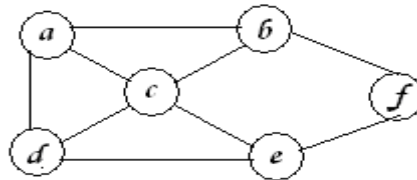
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- 1 (a) Write Miller-Rabin's primality testing algorithm.  
(b) Discuss the different approaches to find the time complexity of algorithm.
- 2 (a) Give the trees for the set  $\{1, 2, 3, 4, 5, \dots, n\}$  by using weighting rule.  
(b) Give an algorithm for implementation of union instruction using linked list and explain its implementation.
- 3 (a) Derive the time complexity for strassen's matrix multiplication.  
(b) How many additions, multiplications and subtractions are needed for a  $2 \times 2$  matrix multiplication?
- 4 (a) Write a detailed note on job sequencing with deadlines.  
(b) Explain in detail about the optimal randomized algorithm for minimum cost spanning trees.
- 5 (a) How would you construct an optimal binary search tree for a set of  $n$  keys if all the keys are equally likely to be searched for? What will be the average number of comparisons in the tree if  $n = 2^k$ ?  
(b) Write a pseudo code of the bottom-up dynamic programming algorithm for the knapsack problem.
- 6 (a) Generate all permutations of  $\{1, 2, 3, 4\}$  by backtracking.  
(b) Apply backtracking to solve the 3-coloring problem for the graph of.



- 7 (a) Explain how the traveling salesperson problem is solved by using LC branch and bound.  
(b) Write the general algorithm for branch and bound.
- 8 Give a dynamic programming solution for the subset sum problem. Analyze the asymptotic order of your solution. Explain why this solution does not put the subset sum problem in NP-hard.

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**DESIGN AND ANALYSIS OF ALGORITHMS**

(Common to CSS, IT and CSE)

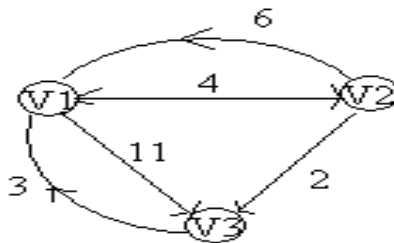
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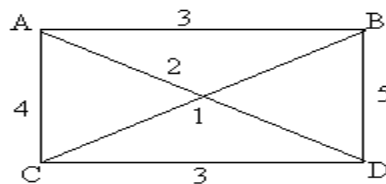
Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Define an algorithm. Explain the different criteria that satisfy the algorithm.
- (b) Briefly explain about asymptotic notations.
  
- 2 Explain spanning trees and minimum cost spanning trees with suitable examples.
  
- 3 (a) What are the advantages of Strassens' matrix multiplication over normal one?
- (b) Present an algorithm for quick sort by using iterative method.
  
- 4 (a) Present a general method of greedy technique.
- (b) Explain the greedy knap sack with suitable example.
  
- 5 (a) Solve the following instance of the ALL PAIRS shortest path problem.



- (b) Discuss how to compute the cost of binary search tree.
  
- 6 Draw and explain the tree organization of the 4-queen solution space.
  
- 7 Solve the TSP problem for the following graph using branch and bound technique.



- 8 Consider the problem DNF-DISSAT which takes a Boolean formula S in disjunctive normal form (DNF) as input and asks if S is dissatisfiable that is variable of S so that if evaluates to 0. Show that DNF-DISSAT is Np- complete.

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1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**COMPUTER ORGANIZATION**

(Common to ECC and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
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- 1 With the help of a neat diagram explain the interconnection of processor and main memory.
- 2 (a) Explain the operation of 4-bit adder-subtractor with example.  
(b) Give hardware implementations to perform logic and shift operations.
- 3 Discuss in detail the design of control unit with block diagram.
- 4 (a) Perform the arithmetic operations given below with binary and negative numbers in signed -2's complement representation. Use seven bits to accommodate each number together with its sign. (i)  $(-53) + (-80)$  (ii)  $(-53) - (+80)$   
(b) Explain the decimal division algorithm flowchart with a suitable example.
- 5 (a) Explain with the help of a block diagram the cache memory system.  
(b) A block set-associative cache consists of 64 blocks divided into 4 block sets. The main memory contains 4096 blocks; each consists of 128 words of 16 bits length.  
(i) How many bits are there in main memory?  
(ii) How many bits are there in each of the TAG, SET and WORD fields?
- 6 (a) How are hardware controlled I/O also known as? Discuss the merits of the same.  
(b) Discuss in detail interrupt driven I/O.
- 7 (a) Explain the attached array processor with conventional computer.  
(b) What is structural hazard?
- 8 (a) Explain memory update policies to prevent cache coherence problem.  
(b) Discuss on the advantages of loosely coupled systems.

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**COMPUTER ORGANIZATION**

(Common to ECC and CSE)

Time: 3 hours

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- 1 (a) Write a note on performance measure.  
(b) Explain basic operational concepts of a computer with neat diagram.
- 2 (a) Explain interrupt cycle with flow chart.  
(b) Describe general branch and call/return instructions.
- 3 (a) Explain mapping techniques to convert an operation to a micro routine address in control memory.  
(b) Explain the operation of a micro programmed control unit.
- 4 (a) Multiply 100111 with 11011 using booths algorithm.  
(b) Give and explain the hardware implementation for signed 2's complement addition and subtraction.
- 5 Explain the various features and applications of DVD.
- 6 (a) Explain the PCI bus commands.  
(b) Draw and explain the timing diagram for PCI read operation.
- 7 Classify the pipeline processors and explain them in detail.
- 8 (a) What do you mean by bus arbitration?  
(b) Explain the serial arbitration technique with the help of a neat diagram. State advantages and disadvantages.

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**COMPUTER ORGANIZATION**

(Common to ECC and CSE)

Time: 3 hours

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- 1 Explain in detail on floating-point representation. Support your answer with examples wherever necessary.
- 2 (a) Explain the setup involved in instruction execution using state diagram.  
(b) Explain the various addressing modes of an instruction.
- 3 (a) Write about the control memory in detail.  
(b) Compare and contrast hardwired control and micro-programmed control. Is it possible to have a hardwired control associated with a control memory?
- 4 (a) Draw the flow chart for multiplication of two signed magnitude fixed point number and explain with a numerical example.  
(b) With the help of diagram explain "all serial decimal addition".
- 5 (a) Explain the concept of cache updating and the need for its updating. Discuss the different updating systems.  
(b) Explain the necessity of replacement algorithms for cache memory.
- 6 (a) Explain the arrangement for group handling of priority interrupts.  
(b) Explain the need for assigning priorities to the interrupts.
- 7 Explain the two phases instruction fetch and execute.
- 8 (a) Explain with the help of a neat sketch how a time shared bus inter connection system for multiple processors provide a common communication path connecting all of the functional units.  
(b) Draw the sketch and explain the multiprocessor with unidirectional buses.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**COMPUTER ORGANIZATION**

(Common to ECC and CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

\*\*\*\*\*

- 1 (a) Distinguish between fixed-point and floating-point representations of given number.  
(b) What are the various ways of representing negative numbers? Explain with an example.
- 2 Draw and explain the flow chart for instruction cycle.
- 3 (a) Support or oppose the statement “the control unit is a firmware”.  
(b) What are micro-sub-routines? Write micro-subroutines for ADD and SUB operations.
- 4 (a) Explain non restoring method of division with a simple example.  
(b) With the help of a flow chart explain the division operation.
- 5 Describe and explain in detail optical memories.
- 6 (a) What is I/O interface? Explain I/O interface with the help of a block diagram.  
(b) With the help of a neat sketch explain the I/O interface for I/O device and I/O interface for O/P device.
- 7 (a) Explain the hardware organization for four stage instruction pipeline.  
(b) What is a data hazard?
- 8 Discuss the cache coherence in the centralized share memory architecture.

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B.Tech II Year II Semester (R09) Regular &amp; Supplementary Examinations, April/May 2013

**FORMAL LANGUAGES & AUTOMATA THEORY**

(Computer Science and Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Describe the following languages over the input set  $A = \{a, b\}$   
 (i)  $L_1 = \{a, ab, abb, aba\}$  (ii)  $L_2 = \{a^n b^n \mid n \geq 1\}$  (iii)  $L_3 = \{a^n b^n \mid n > 0\}$   
 (b) What is the Kleen closure? Let  $\Sigma = \{a, b\}$  obtain:  
 $\Sigma^* = \Sigma_0 \cup \Sigma_1 \cup \Sigma_2 \cup \Sigma_3 \dots$
- 2 Find the Minimal DFA's for the language  $L = \{a^n b^m, n \geq 2, m \geq 1\}$ .
- 3 (a) Write a regular expression to denote a language L which accepts all the strings which begin or end with either 00 or 11.  
 (b) Construct a R.E. for the language which accept all strings with at least two c's over the set  $\Sigma = \{c, b\}$   
 (c) Construct a R.E for the language over the set  $\Sigma = \{a, b\}$  in which the total number of a's are divisible by 3.
- 4 (a) Construct the CFG for set of all strings over  $\{a, b\}$  consisting of equal number of a's and b's  
 (b) Give CFG for  $L = \{a^n b^m \mid n \geq 1, m \geq 1\}$ .
- 5 (a) In a CFG, a variable A is live if  $A \Rightarrow^* x$ . Give a recursive definition and corresponding algorithm to find live variables in a given CFG.  
 (b) Convert the following CFG into CNF.  
 $S \rightarrow ABC / BaB$                        $A \rightarrow Aa / BaC / a$   
 $B \rightarrow bBb / a$                                $C \rightarrow aC / bC / c$
- 6 (a) Define a PDA. Design a PDA for  $L = \{xcx^r \mid x \in \{a, b\}^*\}$ . Process the string abbacabba. Note:  $x^r$  stands for reverse of the string x.  
 (b) What do you mean by an instantaneous description of a PDA? Explain with example.
- 7 (a) How can we compute a function using TM? Design a TM for computing  $f(x, y) = x + y$ , where x and y are any two positive integers.  
 (b) Discuss about Church's hypothesis.
- 8 (a) What is PCP? Find the solution to the following instance of PCP.  
 $w = (1, 10111, 10)$  and  $x = (111, 10, 0)$   
 (b) Discuss in detail about LBA model with one example.

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**FORMAL LANGUAGES & AUTOMATA THEORY**

(Computer Science and Engineering)

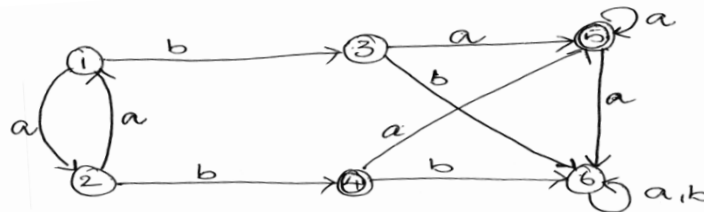
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- 1 Design a finite automation that reads strings made up of letters in the word CHARIOT and recognize those strings that contain the word 'CAT' as a substring.
- 2 Using the algorithm minDFSM. Minimize the FSM in the figure below.



- 3 (a) What is the closure property of regular sets?  
(b) What is the relationship between finite automata and regular expression?  
(c) Give the R.E for the language such that every string will have at least one 'a' followed by at least one 'b'.
- 4 (a) Write the procedure for the conversion of right linear grammar to left-linear grammar.  
(b) Explain the properties of deviation trees.
- 5 (a) State and prove pumping lemma for Context Free Languages.  
(b) Using pumping lemma, prove that  $L = \{ a^i b^j c^k / j \geq i + k \text{ and } i, j, k > 0 \}$  is not a CFL.
- 6 When do you say that a language L is recognized or accepted by a PDA? Design PDA for  $L = \{ a^i b^j c^k / j \geq i + k \text{ and } i, j, k > 0 \}$ . Process the string aaabbbbbbbccc using instantaneous description.
- 7 (a) Write about the process of combining different TMs with example.  
(b) Design a TM for  $L = \{ x \in \{a, b\}^* / x \text{ contains even no. of } a\text{'s and odd no. of } b\text{'s} \}$ . Show the moves of the TM for the input string abaabba.
- 8 (a) Define LR (0) grammar. Specify a grammar and show that it is LR (0).  
(b) Discuss the P and NP computational complexity of problems with suitable examples.

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Code: 9A05407

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**FORMAL LANGUAGES & AUTOMATA THEORY**

(Computer Science and Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Draw a DFA that recognizes the language of all strings of 0's and 1's for length  $\geq 1$  that, if they were interpreted as binary representations of integers, would represent integers evenly divisible by 3. Leading 0's are permissible.
- 2 Prove the theorem "if L is accepted by an NFA with  $\epsilon$  - transitions then L is accepted by an NFA without  $\epsilon$  - transitions".
- 3 (a) Discuss the applications of a regular expression.  
(b) Explain and prove 'if  $L_1$  and  $L_2$  are two languages then  $L_1 \cup L_2$  is regular.
- 4 (a) Explain in detail about right and left linear grammars with example.  
(b) Explain the equivalence and differences between regular grammar and finite automata.
- 5 (a) Show that if L is a CFL and F is finite set, L-F is a CFL.  
(b) Decide whether  $L = \{ a^n b^m a^m b^n / m, n \geq 0 \}$  is a CFL or not? Justify your answer.
- 6 (a) Construct PDA for accepting the language  $L = \{ xcx^r / x \in \{a, b\}^* \}$  by empty stack.  
(b) Compare and contrast the regular languages and context free languages.
- 7 (a) Discuss in detail about any three modifications that can be done to the basic model of a Turing Machine.  
(b) Design a TM for recognizing  $L = \{ x \in \{a, b, c\}^* / x \text{ contains } a \text{ or } b \text{ in the third position from right end.} \}$
- 8 (a) Define P and NP problems with examples.  
(b) What is PCP? Explain why PCP with two lists  $x = (01, 1, 1)$  and  $y = (0101, 10, 11)$  has no solution?

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Code: 9A05407

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**FORMAL LANGUAGES & AUTOMATA THEORY**

(Computer Science and Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Design an NFA to accept strings with 1's and 0's such that string contains two consecutive 1's or two consecutive 0's.
- 2 Prove the theorem 'Let L be a set accepted by non-deterministic finite automata, then there exists a DFA that accepts L'.
- 3 (a) Explain and prove "The complement of regular language is regular"  
(b) Explain and prove "if  $L_1$  and  $L_2$  are two regular languages then  $L_1 \cap L_2$  is regular."
- 4 (a) Let L be the language  $\{0^n 1^n 2^n \mid n \in \mathbb{N}\}$  is L context free? i.e. there is a grammar that generates L. Explain.  
(b) Prove the theorem "Let  $G = (V_n, \Sigma_1, P, S)$  be a CFG. Then  $s \Rightarrow^* \alpha$  if and only if there is a derivation tree for G with yield  $\alpha$ "
- 5 (a) Show that context free languages are not closed under complement.  
(b) Convert the CFG with following productions into GNF.  
 $A \rightarrow BC \quad B \rightarrow CA / b \quad C \rightarrow AB/a$
- 6 (a) Prove that the PDA accepting a language L by final state is no more powerful than PDA accepting L by empty stack.  
(b) Construct a PDA for  $L = \{a^{2n} b^n \mid n \geq 1\}$ . Show the moves of the PDA for aaaabb.
- 7 (a) Design a TM for recognizing  $L = \{wcw \mid w \in \{a, b\}^*\}$ . Show the moves of the TM for the string abbcabb.  
(b) Give a brief note on counter machines.
- 8 (a) Explain in detail about PCP and MPCP.  
(b) Write about Universal Turing Machine.

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Code: 9ABS402/9ABS303

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**ENVIRONMENTAL SCIENCE**

(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Define environment and environmental science.  
(b) Explain the scope of environmental science in our daily life.
- 2 Write a short notes on:
  - (a) Hydrological cycle.
  - (b) Droughts.
  - (c) Soil erosion.
  - (d) Bio gas.
- 3 What are ecological pyramids? Write about various types of ecological pyramids with examples.
- 4 What do you mean by consumptive use value, productive use value, social value, ethical value, aesthetic value and option value of biodiversity?
- 5 (a) Define pollution and various types of pollution.  
(b) Explain about the source, effects of water pollution.
- 6 Population, consumerism and waste production are interrelated. Explain.
- 7 What is the importance of environmental education? What is value based education?
- 8 (a) What are the environmental parameters to be taken into consideration when visiting an industry?  
(b) Write about the structural and functional components of an ecosystem.

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Code: 9ABS402/9ABS303

2

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**ENVIRONMENTAL SCIENCE**  
(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 How would environmental awareness help to protect our environment?
- 2 (a) What are renewable and non-renewable sources? With examples.  
(b) Explain in brief various renewable resources in native.
- 3 Explain the functional attributes of ecosystem.
- 4 Write a short notes on:
  - (a) Ex situ conservation.
  - (b) Hot spots.
  - (c) Poaching.
  - (d) Endemic species.
- 5 Explain and write notes on solid waste management.
- 6 What are the measures to be taken for conservation of water resources?
- 7 Write notes about:
  - (a) GIS.
  - (b) Population characteristics.
  - (c) Human immune deficiency syndrome.
- 8 Explain the salient features of forest Eco-system.

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Code: 9ABS402/9ABS303

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**ENVIRONMENTAL SCIENCE**

(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Define:
  - (i) Concept of Eco-mark.
  - (ii) Green marketing.(b) Write notes on people's contribution and awareness towards environmental protection.
- 2 Explain the ecological and commercial uses of forests. Discuss major causes consequences of deforestation.
- 3 Write about:
  - (a) Grazing food chain.
  - (b) Oxygen cycle.
  - (c) Primary production of an ecosystem.
  - (d) Ecological succession.
  - (e) Homeo stasis.
- 4 Explain the Bio-geographical classification of India.
- 5 Write about soil pollution and explain the impacts of modern agriculture on soil.
- 6 Write short notes on:
  - (a) Rain water harvesting.
  - (b) Acid rain.
  - (c) Green house gases.
- 7 Explain the role of information technology in environment.
- 8 (a) Which water quality parameters are to be taken into consideration while assessing a drinking water sample testing in a laboratory?
  - (b) Write BIS: 10500: 1991 drinking water quality parameter charts.

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Code: 9ABS402/9ABS303

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

**ENVIRONMENTAL SCIENCE**

(Common to CE, ME, IT, CSE, AE, BT and MCT)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Define natural resources. Explain about the mineral resources, uses of minerals, environmental impacts of mineral mining.
- 2 What are Bio-geochemical cycles? Explain in brief about:
  - (i) Nitrogen cycle.
  - (ii) Carbon cycle with neat diagrams.
- 3 (a) Explain the types of conservation techniques taken for biodiversity.  
(b) Major threats to biodiversity.
- 4 Explain the multidisciplinary nature of environmental studies with flow chart.
- 5 Write briefly:
  - (a) Minamata disease.
  - (b) Bio chemical oxygen demand.
  - (c) Chernobyl nuclear disaster.
  - (d) Landslides.
- 6 Discuss various issues and measures for women and child welfare at international and national level.
- 7 Explain the following:
  - (a) Environmental protection act, 1986.
  - (b) Wild life protection act 1972.
- 8 Write about different types, characteristics and components of aquatic eco-system.

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