II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
FORMAL LANGUAGES & AUTOMATA THEORY
(Computer Science & Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Define string and alphabet and discuss the operations on string.
    (b)   Define language. Discuss its operations.

2   Prove the theorem "Let M = $(Q, \Sigma, \Delta, \sigma, \lambda, q_0)$ be a Mealy machine then there exists a Moore machine M^1 equivalent to M".

3   (a)   Prove "If L is accepted by DFA and then there exists an equivalent regular expression which develops L".
    (b)   Discuss the method for conversion of regular expression to finite automata.

4   For each of the following languages give a CFG that generates it:
          (a) $\{a^i b^j c^k: i<j$ or $i>k\}$.
          (b) $\{a^i b^j,: i \leq j <=2i\}$.
          (c) $\{a^m b^n,: m \geq n$ and m-n is even$\}$.

5   (a)   What are useless variable in a CFG? How do you find out useless variable in a given CFG? Explain with an example.
    (b)   Eliminate ambiguity from the following grammar: E $\rightarrow$ E+E / E*E / (E) / id**.**

6   Construct CFG for the language recognized by PDA with following moves:
                    $\delta(q0, 1, Z_0) = (q0, XZ_0)$ $\delta(q0, 1, X) = (q0, XX)$
                    $\delta(q0, 0, X) = (q1, X)$ $\delta(q0, \epsilon, Z_0) = (q0, \epsilon)$
                    $\delta(q1, 1, X) = (q1, \epsilon)$ $\delta(q0, 0, Z_0) = (q0, Z_0)$
          Simplify the resulting grammar by eliminating useless variables.

7   Define a Turing Machine (TM) and the language accepted by a TM. Design a TM for recognizing the language (a+b)*aba (a+b)*. Draw its transition diagram and table. Using the instantaneous description notation process the string aabaabaaab.

8   (a)   Differentiate between NP hard and NP complete complexity of problems. Explain with suitable examples.
    (b)   Explain about PCP and MPCP in detail.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
FORMAL LANGUAGES & AUTOMATA THEORY
(Computer Science & Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What is the finite state machine? Define finite automata and discuss the representation of finite automata.
    (b)   Discuss the applications of finite automata.

2   Design a Moore and mealy machine for a binary input sequence such that if it has a substring 101 the machine outputs 'A' if input has substring 110 it outputs B, otherwise it outputs C.

3   (a)   What are the applications of regular expressions and finite automata?
    (b)   Denote a regular expression for the language that accepts all strings in which 'a' appears tripled over the set $\Sigma = \{a\}$ and also construct the finite automata for the same.

4   Prove using the pumping lemma that the following language L is not context – free.
          $L = \{w \neq x: w, x \in \{0,1\}^* \text{and } w \text{ is a prefix of } x\}$.

5   (a)   Find out a context free grammar for the language of strings over the alphabet {0, 1} such that the number of 0's are more than the number of 1's in the strings.
    (b)   Show that the following grammar is ambiguous: $E \rightarrow E+E \: / \: E*E \: / \: a$.
          Eliminate the ambiguity from the above grammar using precedence of + is higher than the precedence of * in evaluating the expressions.

6   (a)   Design a PDA for recognizing the language of palindromes over the alphabet {0, 1}. Draw the computations tree showing all possible moves for the strings 00100 and 00101.
    (b)   Explain the procedure for converting a PDA which accepts a language L by final state into a PDA which accepts the L by empty stack.

7   Define a TM and the instantaneous description of a TM. Design a TM for recognizing
          $L = \{x \in \{a, b\}^* \: / \: x \text{ ends with aba}\}$. Specify its transition diagram. Process the strings abaaba and ababaa using ID notation.

8   (a)   What is universal TM? Explain in detail.
    (b)   Write about NP hard and NP complete complexity of problems.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
FORMAL LANGUAGES & AUTOMATA THEORY
(Computer Science & Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What is NFA? Discuss in detail about NFA.
     (b)   Distinguish between NFA and DFA.

2   (a)   Discuss about the "Equivalence of Moore and Mealy machine".
     (b)   Discuss the method for converting the Moore machine to mealy machine.

3   Discuss and prove that the closure properties of regular sets are closed.

4   (a)   Construct a grammar for the language L which has all the strings which are all palindrome
            over Σ= {a, b}.
     (b)   Differentiate between sentences and sentential forms.

5   (a)   If G is a CFG in CNF and x Є L (G) with |x| = k, how many steps are required to derive x
            in G. Prove your answer.
     (b)   A variable A in a CFG is said to be reachable if S ==>* α A β. Develop a procedure for
            finding out reachable variable in a given CFG. Illustrate your procedure with an example.

6   (a)   When do we say that a PDA is non deterministic? Design a PDA for recognizing the
            language of palindromes over the input alphabet {a, b}.
     (b)   Distinguish between a DPDA and NPDA.

7   (a)   Design a TM for recognizing the language of palindromes over the input alphabet {a, b}.
            Show the moves of TM for the string abbbba.
     (b)   What is instantaneous description of a TM? Briefly explain.

8   (a)   Write in detail about Turing reducibility with examples.
     (b)   Explain about PCP and MPCP with suitable examples.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
FORMAL LANGUAGES & AUTOMATA THEORY
(Computer Science & Engineering)

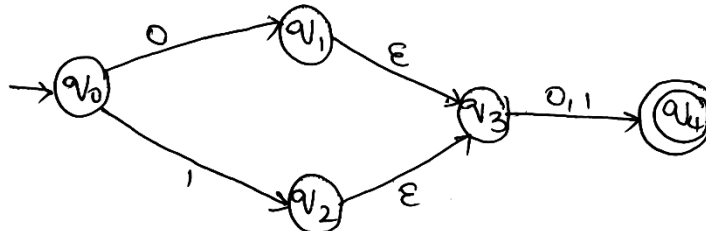Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   Design NFA accepting all strings ending with 101 over $\Sigma = \{0, 1\}$.
    (b)   Construct a NFA in which triple '1' is followed by triple '0' over $\Sigma = \{0, 1\}$.

2   (a)   Convert the given NFA with Σ to its equivalent DFA.

    (b)   What is the "Minimization of FSM"? Explain the method for construction of minimum state automata.

3   Write R.E for the following and explain:
          (a) All strings over {0, 1} with the substring '0101'.
          (b) All strings beginning with '11' and ending with ab.
          (c) Set of all strings over {a, b} with 3 consecutive b's.
          (d) Set of all strings that end with '1' and has no substring '00'.

4   Discuss and explain the following:
          (a) CFL is not closed under intersection and complementation.
          (b) A regular grammar generates an empty string.
          (c) A regular language is also context free but not reverse.

5   (a)   Show that $L = \{a^p \ / \ p \text{ is a prime number}\}$ is not a CFL.
    (b)   Show that every context free language without ϵ, can be generated by a context free grammar in which all productions are of the form $A \rightarrow a$ and $A \rightarrow a\alpha b$.

6   (a)   Construct a PDA for recognizing the language of all strings over the input alphabet {a, b} such that the number of b's in each string are twice the number of a's. Show the moves of the PDA for the string abbabbbba.
    (b)   Write a short note on NPDA and DPDA's.

7   (a)   Define recursively enumerable languages and recursive languages. Prove that the union of two recursive languages is also recursive.
    (b)   Design a TM for computing the square of a given positive integer. Show the moves of the TM for a value of 2.

8   (a)   Discuss about the classes of the computational complexity for problems in detail.
    (b)   Explain about PCP and MPCP with suitable examples.
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Code: 9ABS402/9ABS303

II B.Tech II Semester (R09) Regular & Supplementary April/May 2012 Examinations
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering,Mechanical Engineering,Information Technology,Computer Science & Engineering, Aeronautical Engineering and Bio Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

*****

1. (a) Define environmental studies. Give the scope and importance of studying environmental science.
    (b) Discuss the need for public awareness on environmental hazards.

2. (a) Define energy. Discuss the different types of energy.
    (b) What is sustainable agriculture? Write short notes on integrated crop management.

3. (a) Write about concept of an ecosystem.
    (b) What is a grassland ecosystem? Write about the different types of grasslands in India.

4. (a) Give the biogeographic classification of India.
    (b) Write about in-situ and ex-situ conservation of biodiversity.

5. (a) Discuss the effects of air pollution on the following
        I.   Human beings
        II. Plants
    (b) Give concepts that help individuals contribute towards a better quality of our environment and human life.

6   (a) Give the classification of wastelands. Write about the need for wasteland development.
    (b) Write notes on global warming and its effects on temperature and rainfall.

7. (a) Discuss how environmental issues are closely linked to human rights.
    (b) What is the nature of population growth? Discuss its variation among nations.

8. (a) Prepare a proforma for fieldwork on documenting environmental assets of river ecosystem.
    (b) Write the general guidelines for study of common plants, insects and birds.

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II B.Tech II Semester (R09) Regular & Supplementary April/May 2012 Examinations
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering,Mechanical Engineering,Information Technology,Computer Science & Engineering, Aeronautical Engineering and Bio Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

*****

1. (a) Define environmental studies. Give the scope and importance of studying environmental science.
    (b) Discuss the need for public awareness on environmental hazards.

        Write about the following earth's resources:
2. (a) Atmosphere
    (b) Biosphere

3. (a) Write about concept of an ecosystem.
    (b) What is a desert ecosystem? Write about the structure and functions of the desert ecosystem.

4. (a) What is a biodiversity hot spot? Explain giving examples.
    (b) Discuss the different threats to biodiversity.

5. (a) What is marine pollution? Give the different pathways of marine pollution.
    (b) Discuss disaster management. What are different phases and professional activities associated to disaster management?

6. (a) Discuss the different functions of watershed management
    (b) What is climate change? What are the causes for climate change?

7. (a) Discuss how environmental issues are closely linked to human rights.
    (b) What is value education? Discuss its importance in the present day context.

8. (a) Prepare a proforma for fieldwork on documenting environmental assets of forest ecosystem.
    (b) Write the general guidelines for study of common plants, insects and birds.

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II B.Tech II Semester (R09) Regular & Supplementary April/May 2012 Examinations
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering,Mechanical Engineering,Information Technology,Computer Science & Engineering, Aeronautical Engineering and Bio Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

*****

1. (a) Discuss the multidisciplinary nature of environmental studies.
    (b) Discuss the need for public awareness on environmental hazards.

2. (a) List the available energy sources for the world today and 40 years from now in order of decreasing importance in accordance to your perception.
    (b) Discuss the environmental consequences of mining industry.

3. (a) Define an ecosystem. Discuss about energy flow in ecosystems.
    (b) Cite three examples of large diversified ecosystems and note the factors threatening their existence.

4. (a) Define biodiversity. Discuss the human benefits of biodiversity.
    (b) What is a biodiversity hot spot? Explain with examples.

5. (a) Discuss the effects of presence of the following contaminants in water
        I.   pathogens
        II.   organic matter
        III. Inorganic nutrients
        IV.   Toxic and hazardous substances.
    (b) Describe an integrated urban and industrial waste management strategy.

6. (a) What is an acid rain? What are the effects of acid rain on aquatic and terrestrial ecosystems?
    (b) Define sustainable development. How can one ensure sustainable development?

7. (a) Write about family welfare programs taken up by our country in response to phenomenal population growth.
    (b) What are values? Discuss the role of value education in the context of environment.

8. (a) Prepare a proforma for fieldwork to study the cause and effects of pollution at a local polluted site.
    (b) Write the general guidelines on aspects that can be observed and documented during ecosystem field studies.

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II B.Tech II Semester (R09) Regular & Supplementary April/May 2012 Examinations
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering,Mechanical Engineering,Information Technology,Computer Science & Engineering, Aeronautical Engineering and Bio Technology)

Time: 3 hours   Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

*****

1. (a)   Define environmental studies. Give the scope and importance of studying environmental science.
    (b)   Discuss the need for public awareness on environmental hazards.

2.   What is sustainable lifestyle? Discuss the equitable use of resources for sustainable lifestyle.

3. (a)   Write about concept of an ecosystem.
    (b)   What is an aquatic ecosystem? Write about the structure and functions of the desert ecosystem.

4. (a)   Write short notes on conservation of biodiversity.
    (b)   What are the human benefits of biodiversity.

5. (a)   Discuss the effects of soil pollution on the following
          I.   Health
          II.   Ecosystem
    (b)   Give concepts that help individuals contribute towards a better quality of our environment and human life.

6. (a)   Give the classification of wastelands. Write about the need for wasteland development.
    (b)   Write notes on consumerism and its effect on society and environment.

7. (a)   Discuss how environmental issues are closely linked to human rights.
    (b)   What is population explosion? Discuss its effect on environment and human health.

8. (a)   Prepare a proforma for fieldwork on documenting environmental assets of grassland ecosystem.
    (b)   Write the general guidelines for study of common plants, insects and birds.

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Code: 9A05401

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What are the problems of file system? Explain.
    (b)   Explain the object-oriented model with example.

2   (a)   Explain 1:1 recursive relationship with example.
    (b)   What are the characteristics of a primary key? Explain.

3   Discuss about the following with examples:
           (a) Any four relational set operators.
           (b) Data redundancy.

4   (a)   What is the purpose of a trigger? Explain with example.
    (b)   Explain about arithmetic and logical operators in SQL.

5   (a)   Explain the need for normalization.
    (b)   Explain about functional dependency.

6   (a)   Explain how the concurrency can be controlled using optimistic method.
    (b)   How to ensure serializibility in concurrency control using 2 phase locking and lock types?

7   (a)   What is log based recovery, explain?
    (b)   Explain clearly about restart recovery and recovery algorithm.

8   (a)   What is B-Tree?
    (b)   What are the advantages, disadvantages and applications of B-Tree?

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Code: 9A05401

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What are the functions of DBMS? Explain.
    (b)   Explain the development of data models.

2   (a)   What are the differences between composite and simple attributes? Explain with
          examples.
    (b)   Distinguish between primary key and foreign key with example.

3   (a)   Explain how all joins are performed on a table with examples.
    (b)   Define key. What are the various keys that are used in relational database? Explain them
          with the context of library system.

4   (a)   What is data definition language? What are the commands that are performed in this
          language?
    (b)   Explain about WHERE and ANY and ALL sub queries with example.

5   (a)   What is partial dependency? With which Normal form is it associated.
    (b)   What is 3NF? How it is achieved and what are its advantages over 2NF?

6   (a)   Explain about inconsistent retrieval and uncommitted data in concurrency control?
    (b)   Explain about transaction recovery in database recovery management?

7   (a)   Explain about buffer management in details.
    (b)   What is fuzzy check pointing and transaction roll back, explain?

8   Explain the following terms:
          (a) Hard disk controller.
          (b) Tertiary storage.
          (c) Accessibility.
          (d) Addressability.

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Code: 9A05401

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT & CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What is business rule and what is its purpose in data modeling?
    (b)   How end user interaction with database is managed in DBMS?

2   (a)   What are the challenges in data base design? Explain.
    (b)   Define the terms entity super types and sub types with examples.

3   (a)   Explain the entity integrity and referential integrity are important in DS.
    (b)   Consider two tables customer, agent and perform all the relational set operations on those tables.

4   (a)   How to restore the table contents and how to delete the table rows? Explain each with example and syntax.
    (b)   What is an attribute list sub query and correlated sub query? Explain

5   (a)   Show that if a relation schema is in BCNF, then it is in 3NF, but if a relation schema is in 3NF then it is not necessary in BCNF. Explain with an example.
    (b)   What are the anomalies in BCNF?

6   (a)   How the concurrency can be controlled using optimistic method? Explain.
    (b)   Explain about database recovery management.

7   Explain about the following:
          (a) Immediate database recovery.
          (b) Deferred database recovery.
          (c) Check point.

8   Describe the structure of B-Tree and B+ Trees.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DATABASE MANAGEMENT SYSTEMS
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What is data anomaly? Discuss about various types of anomalies.
   (b) Describe the basic features of the relational data model.

2 (a) Explain the terms connectivity and cardinality with examples.
   (b) What is weak entity? How to identify a weak entity in an ERD?

3   What are the rules that are used to define a relational data base system?

4 (a) What is an index? What are the operations that are performed on an index?
   (b) Write about the conversion functions in advanced SQL.

5   Explain 1 NF and 2 NF with suitable example.

6 (a) Explain about transaction properties in transaction management.
   (b) Briefly explain about lost updates and inconsistent retrieval in concurrency control.

7 (a) Explain the concepts of ARIES and its features?
   (b) What is log based recovery, explain?

8   List the advantages and disadvantages of B-Trees.

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Code: 9A05402

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   Briefly write the OOP principles.
     (b)   What is an object oriented programming? How is it different from procedure oriented programming?

2   (a)   Explain java buzz words.
     (b)   How java is suitable for Internet?

3   (a)   Write a java program to demonstrate static polymorphism.
     (b)   What is inheritance? Write its advantages.

4   Write a program to create a package PKg1 which includes an interface ABC with two methods Read
            ( ) and Area ( ) and a constant PI. Create another package PKg2, which include two class circle and
            rectangle implements ABC interface to compute area of circle and area of rectangle. And also
            explain the compilation and execution of above program.

5   (a)   How are synchronized methods implemented?
     (b)   What is inter thread communication? What methods are employed?

6   What is the task performed by layout manager? Explain different layout managers.

7   (a)   What is an applet? Explain applet life cycle.
     (b)   Write the differences between applet and stand alone applications.

8   Define the following,
            (a) Socket.
            (b) Proxy server.
            (c) Internet address.
            (d) Domain name service.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT & CSE)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Write about the concept of "Responsibility" in object oriented programming?
  (b) What are the messages and methods? Write about information hiding with respect message passing.

2 (a) List the differences between C++ and Java.
  (b) Explain briefly about bitwise operators.

3 (a) What are the costs of using inheritances foe software development?
  (b) What are the differences between private, static and final variables?

4 (a) What is a package? How do we design a package?
  (b) How do we add a class or interface to a package?

5 What is the necessity of exception handling? Explain exception handling taking "Divide – by Zero" as an example.

6 (a) What is dialog? Explain with an example.
  (b) Explain about graphics class.

7 (a) What are the limitations of AWT?
  (b) Discuss model view architecture.

8 (a) Define URL. What is the format of URL?
  (b) What is the use of URL connection class?

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Describe with a flow chart how various tools are used in the applet development.
   (b) "Java is platform independent language". Why?
   (c) What is a class? How do classes help us to organize our programs?

2 (a) What is an operator? Write about unary operators in java?
   (b) Explain the structure of java program with an example?

3   Create a base class with an abstract print ( ) method that is overridden in a derived class. The overridden version of the method prints the value of an int variable defined in the derived class. At the point of definition of this variable, give it a nonzero value. In the base-class constructor, call this method. In main ( ), create an object of the derived type, and then call its print ( ) method. Explain the results.

4   What is a package? How do create a package? Explain about access protection in packages.

5   Describe the life cycle of a thread with a neat sketch.

6 (a) Describe grid and card layout managers.
   (b) Create a simple java program to draw filled ellipse and circle.

7 (a) Explain briefly how to pass parameters to an applet.
   (b) What is swing? Discuss its features.

8   Write about the following:
        (a) Inet address.
        (b) URL.
        (c) URL connection.

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Code: 9A05402

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
OBJECT ORIENTED PROGRAMMING
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Explain different programming approaches. Write their advantages and disadvantages.

2   (a)   Write a java program to find roots of quadratic equation.
     (b)   What is type casting? What are the rules followed for type casting?

3   (a)   What is inheritance? Explain different types of inheritances.
     (b)   Explain benefits and limitations of inheritances.

4   (a)   Explain about implicit and explicit import statements.
     (b)   How to extend one interface by another interface? Explain with an example.

5   (a)   What is a thread group class? Explain any three methods of this class.
     (b)   How can we set the priorities for a thread?

6   (a)   Write a java program to create a file menu.
     (b)   Write short notes on color and font classes.

7   (a)   Explain the process of creating applets.
     (b)   What is an applet? What are the differences between local and remote applets?

8   Write short notes on the following:
         (a) TCP / IP programming.
         (b) Client/Server model implementation.
         (c) Getting information from internet.

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Code: 9A05403

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DESIGN & ANALYSIS OF ALGORITHMS
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   Define an algorithm. What are the different criteria that satisfy the algorithm?
    (b)   Explain the different areas of research where the algorithms can be applied.

2   (a)   Present an algorithm for union with weighting rule.
    (b)   What is collapsing rule? Explain with example.

3   (a)   Give a control abstraction for divide and conquer.
    (b)   Write the Iterative algorithm for searching an element by using binary search.

4   (a)   Find an optimal solution to the knapsack instance n = 7, m = 15, P[1 : 7] = 10,5,15,7,6,18,3)
          and W [1: 7] = (2,3,5,7,1,4,1)
    (b)   Write an algorithm for Knapsack problem by using greedy technique.

5   (a)   Device an algorithm m to find the optimal order of multiplying n matrices using dynamic
          programming technique.
    (b)   Explain the time efficiency of an algorithm OBST is cubic.

6   (a)   Write an algorithm to estimate the efficiency of backtracking.
    (b)   Explain the 4-queen problem using backtracking.

7   (a)   What do you mean by bounding? Explain how these bounds are useful in branch and bound
          method.
    (b)   Explain FIFO branch and bound.

8   Given an integer m x n matrix A and an integer m-vector b, the 0-1 integer programming
          problem asks whether there is an integer n-vector x with elements in the set {0,1} such that
          Ax ≤ b. Prove that 0-1 integer programming is Np-complete.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DESIGN & ANALYSIS OF ALGORITHMS
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What are the different techniques to represent an algorithm? Explain.
     (b)   Give an algorithm to solve the towers of Hanoi problem.

2   (a)   Write a pseudo code for UNION algorithm with weighted rule.
     (b)   Present an algorithm for FIND using collapsing rule.

3   (a)   Search for an element -2 from the below set by using binary search:
            A = {-15, -6, 0, 7, 9, 23, 54, 82, 101, 112}.
     (b)   Draw the binary decision tree for the above.

4   (a)   Give brief description about the single source shortest path by using greedy technique.
     (b)   Write a high – level description for job sequencing algorithm.

5   (a)   Using divide and conquer approach coupled with the set generation approach. Show
            how to obtain an $O(2^{n/2})$ algorithm for O/1 knapsack problem.
     (b)   Develop an algorithm that uses the approach to solve the O/1 knapsack problem.

6   Generalize Hamiltonian so that it processes a graph whose edge have costs associated
            with then and finds a Hamiltonian cycle with minimum cost. You can assume that all
            edge costs are positive.

7   (a)   Write an algorithm of LC branch and bound to find minimum cost answer node algorithm.
     (b)   Explain the solution to the traveling sales person problem by using LC branch and
            bound.

8   Show that partition α the minimum finish time non-preemptive three processor flow shop
            schedule use only one job. That has three non-zero tasks. All other jobs have only one
            non-zero task.

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II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
DESIGN & ANALYSIS OF ALGORITHMS
(Common to CSS, IT & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Present an algorithm that searches an unsorted array a [1...n] for the element x. If x occurs, return the position in the array else return zero.
    (b)   If S is a set of n elements, the power of set S is the set of all possible subsets of S. Write a recursive algorithm to compute power set (S).

2   Explain in detail the set representation with suitable example.

3   (a)   Explain the sorting of elements by using merge sort technique.
    (b)   Present an Iterative algorithm for binary search.

4   (a)   Prove that the greedy method produces an optimal solution to the job sequencing problem.
    (b)   Present greedy algorithm for sequencing unit time jobs with deadlines and profits.

5   (a)   Find the solution for the knapsack problem. When n=3, (W_1, W_2, W_3) = (18, 15, 10,).
          (P1, P2, P3) = (25, 24, 15) and m=20.
    (b)   Explain the general concept of dynamic programming.

6   How many solutions are there to the eight queens problem? How many distinct solutions are there if we do not distinguish solutions that can be transformed into one another by rotations and reflections?

7   (a)   Compare FIFO branch and bound and LC branch and bound.
    (b)   Explain the method of reduction to solve TSP problem using branch and bound.

8   (a)   Mention the classes of complexity in algorithms.
    (b)   Give out the relation between NP-hard and NP-complete problems.

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1   (a)   Write an algorithm for transpose of a matrix by using step count method.
      (b)   What are the advantages and disadvantages of randomized algorithms?

2   (a)   Explain the different set operations with suitable examples.
      (b)   Give brief description about the array representation of sets.

3   Explain in detail about the Stressen's matrix multiplication.

4   (a)   Define minimum cost spanning trees. Explain them with suitable example.
      (b)   Present faster algorithm for job sequencing.

5   Solve the all- pair's shortest path problem for the digraph with the weight n-matrix.

$$\begin{bmatrix} 0 & 2 & \alpha & 1 & 8 \\ 6 & 0 & 3 & 2 & \alpha \\ \alpha & \alpha & 0 & 4 & \alpha \\ \alpha & \alpha & 2 & 0 & 3 \\ 3 & \alpha & \alpha & \alpha & 0 \end{bmatrix}$$

6   (a)   Derive the bounding functions of sum of subsets problem and write the algorithm for the same.
      (b)   Define the following terms: live node, E-node, dead node.

7   Write and explain an algorithm for a LIFO branch and bound algorithm to find the minimum cost answer node.

8   (a)   Explain about non deterministic algorithm.
      (b)   Discuss NP-hard and NP-complete problems.

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Code: 9A05406

II B. Tech II Semester (R09) Regular & Supplementary Examinations, April/May 2012
COMPUTER ORGANIZATION
(Common to ECC & CSE)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
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1   What is a digital computer? Discuss briefly on various types of computers.

2   Convert the following numerical expression into reverse polish notation and show the
         stack operations for evaluating the numerical result: (3+4)*(10*(2+6) +8).

3   (a)   Explain micro program sequencer.
     (b)   Distinguish between micro programmed control and hardwired control.

4   (a)   Perform the following arithmetic subtractions using 9's and 10's complement
           representation: i) 436-291   ii) 962-354
     (b)   With the help of diagram explain parallel decimal addition.

5   List and explain the different characteristics of memory system.

6   (a)   Discuss the USB transfer types for different applications.
     (b)   What is USB controller? Explain the elements of USB controller.

7   (a)   Explain the function of arithmetic pipeline. List out the sub operations to be performed to
           perform the floating point addition/subtraction.
     (b)   Let us consider that we have to add number X and Y. Where $X = m_A \times 2^{e_A} = 0.11110 \times 2^3$
           $Y = m_B \times 2^{e_B} = 0.11101 \times 2^4$.

8   (a)   Explain the 8X8 Omega switching network with a neat sketch.
     (b)   What is Synchronization?

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Time: 3 hours   Max Marks: 70

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1   What are the advantages and disadvantages of hardwired and micro programmed control?

2   (a) Explain how floating point division is done.
        (b) Perform the following divide operations:
            (i) 110/111.
            (ii) 0011/1011.

3   What are functional units? Discuss on basic functional units of a computer.

4   (a) Explain about various arithmetic micro operations.
        (b) Show the block diagram that executes the statement T: A←B, B←A.

5   (a) Write detailed notes on compact disk with Laser beam control mechanism and draw a neat sketch.
        (b) Explain the disadvantage of the magnetic tape in being used as a sequential access device.

6   (a) Discuss the various I/O interfacing techniques.
        (b) Discuss the programmed I/O.

7   (a) How MIMD computer differs from SISD computer?
        (b) Discuss on the handler classification of pipelined processors.

8   (a) Explain the inter processor communication using message passing.
        (b) How does message transfer system function?

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1   (a)   Differentiate between multiprocessors and multi computers.
     (b)   What is parity bit? Explain even and odd parity bit generation and design 3 bit odd parity
            generator and checker.

2   (a)   Explain how data flows during fetch and interrupts cycles.
     (b)   Explain the operation of 4-bit binary adder with example.

3   Draw a block diagram of a control memory with associated hard work for finding out
            next instruction address and mention the need of some bits of current microinstruction
            to generate address of the next microinstruction.

4   With the help of an example explain about addition and subtraction using signed 2's
            complement notation. Also provide its hardware implementation.

5   (a)   List and explain the different formats of DVDs.
     (b)   Describe in detail the different capacities of DVDs.

6   (a)   Compare memory mapped I/O and I/O mapped I/O.
     (b)   What is programmed I/O?

7   (a)   Discuss the concept of parallel processing.
     (b)   Explain the functioning of Single instruction stream single data stream.

8   (a)   Write about Hypercube interconnection.
     (b)   Define bus and protocol.

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1 (a) Give the operational concepts of a digital computer.
   (b) Discuss the interconnection structure of a computer.

2 (a) Compare CISC and RISC computers.
   (b) Explain zero address, one address, two addresses and three address instructions with examples.

3 (a) Support or oppose the statement. If we want to add a new machine language instruction to a processors instruction set, simply write a C program and compile and store the resultant code in control memory.
   (b) Why do we need subroutine register in a control unit? Explain.

4   What are the essential steps required to perform addition and subtraction operation on floating point numbers? Explain in detail with help of a flow chart.

5 (a) Explain with help of a sketch the internal structure of 64X1 DRAM.
   (b) Describe in detail the timing diagram of the READ and WRITE cycle of dynamic RAM.

6 (a) What is meant by interrupt nesting? What is the necessity of assigning priorities to the interrupts?
   (b) Explain the interrupt priority system using daisy chain.

7 (a) What are conflicts?
   (b) Explain resource conflicts in the instruction pipelining.

8 (a) What is a computer module? Explain the function of message transfer system.
   (b) Explain in detail the loosely coupled system.

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