II B.Tech. II Semester Supplementary Examinations May 2017
Computer Organization
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Represent the decimal numbers +1.7 and -0.012 in 32-bit floating point notation (IEEE standard 754).   6M

   b) Convert the following boolean function to its canonical form: F(x,y,z)= (1,3,7)   8M

OR

2. a) Simplify the following expressions using Boolean algebra:

   i) A'B+ABC'+ABC'   ii) AB+A(CD+CD')   6M

   b) Represent the decimal 8620 in BCD code, excess-3 code, 2421 code and as an unsigned binary number.   8M

UNIT–II

3. a) Design a 4-bit Adder-Subtractor circuit.   4M

   b) Illustrate the block diagram of hardware that implements the following register transfer statement: yT_2 : $R2 \leftarrow R1, R1 \leftarrow R2$ 10M

OR

4. a) What do you mean by Reduced Instruction Set Computer (RISC)? Discuss relative advantages and disadvantages of such instruction set design.   7M

   b) With a neat flowchart, illustrate the different stages of an instruction cycle. What happens in case an instruction has some indirect memory references?   7M

UNIT–III

5. a) Define and differentiate between the following: micro-operation, micro instruction, microprogram and microcode.   8M

   b) Explain about control memory in a microprogrammed control organization.   6M

OR

6. Assume that the control memory of a microprogrammed control unit has 1024 words with 8 bits each. Draw the block diagram for the selection for address for this control memory. Also find the i) number of bits in the control address register, ii) the number of multiplexers required and iii) number of inputs in each multiplexer.   14M

UNIT–IV

7. Explain the Booth's multiplication algorithm with an example.   14M

OR

8. a) Design a 2M X 32 memory module using memory chips of capacity 512K X 8.   6M

   b) What is the major disadvantage of a direct mapped cache memory? A 4-way set associative cache has a size of 64 blocks. The main memory has 4096 blocks, each of 128 words. How many bits will be there in the main memory address? Also illustrate the bits required for each of the TAG, SET and WORD fields.   8M

UNIT–V

9. a) What is the major disadvantage of programmed I/O? How does the CPU decide priority when multiple devices raise interrupts? Explain the daisy chaining technique in this regard.   8M

   b) Define and differentiate between isolated I/O and memory-mapped I/O. Comment on the relative advantages and disadvantages of both.   6M

OR

10. a) With an example explain how delayed branching can handle branch instructions in a pipelined processor.   6M

    b) Explain how the steps of an instruction cycle can be devised as a 4-stage instruction pipeline. Draw the corresponding instruction pipeline.   8M

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II B.Tech. II Semester Regular Examinations May 2017
Design and Analysis of Algorithms
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) What is an Algorithm? What are the properties of an algorithm? Explain the Pseudo code conventions for the algorithms.   7M
   b) Write an algorithm for addition of two m x n matrices. And compute the space and time complexities.   7M

OR

2. Explain Asymptotic Notations with examples.   14M

UNIT–II

3. a) Explain divide and conquer. Write the control abstraction for divide and conquer.   7M
   b) Write the algorithm for Recursive binary search. Give the Binary decision tree for the list. -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151.   7M

OR

4. a) Write control abstraction for greedy method.   4M
   b) Explain Prim's algorithm. Obtain the minimum spanning tree of a given graph using Prim's algorithm.
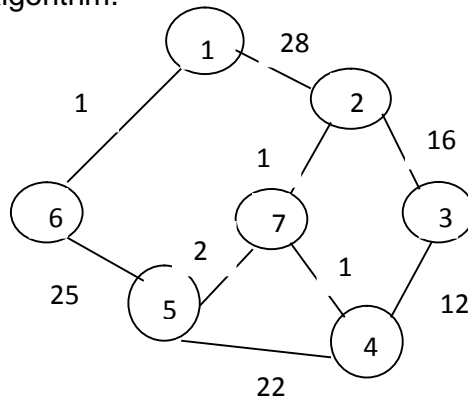

10M

UNIT–III

5. a) Solve the following Knapsack problem using dynamic programming technique for m=6, n=3, (P1:P3)=(1,2,5) and (w1:w3)=(2,3,4).   7M
   b) Find the optimal tour of a given directed graph for the Travelling Sales Person problem using Dynamic Programming method.   7M

OR

6. a) Find the shortest paths from node 1 to every other node in the below given graph using All Pairs Shortest Path Algorithm.
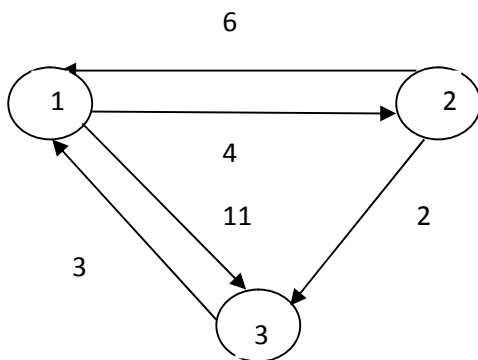
9M

   b) Explain multistage graphs with example.   5M

7. a) What is backtracking? Give the General iterative backtracking method   6M

    b)   Let w = {5, 7, 10, 12, 15, 18, 20} & m=35. Find all possible subsets of w that
        sum to m. Draw the portion of the state space tree that is generated.   8M

<div align="center">**OR**</div>

8.   Solve the following instance of travelling salesperson problem using LCBB.

$$\begin{bmatrix} & 7 & 3 & 12 & 8 \\ 3 & & 6 & 14 & 9 \\ 5 & 8 & & 6 & 18 \\ 9 & 3 & 5 & & 11 \\ 18 & 14 & 9 & 8 & \end{bmatrix}$$

14M

9. a) Explain the classes P and NP.   7M

    b) Explain the Non-deterministic algorithm with example   7M

<div align="center">**OR**</div>

10.   State and Explain Cook's Theorem.   14M

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II B.Tech. II Semester Supplementary Examinations May 2017
Database Management Systems
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours
Answer all five *units by choosing one question from each unit (5 x 14 = 70 Marks)*
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UNIT–I

1. a) What are five main functions of a database management administrator?   7M

    b) Explain various storage manager components and its functions.   7M

OR

2. a) Explain major disadvantages of file-processing system.   7M

    b) With diagram, explain various components of database architecture.   7M

UNIT–II

3. a) With diagram, explain week entity   7M

    b) Draw ER diagram for the airport database incorporating all the ER notations with explanation.   7M

OR

4. a) What is a relation? Differentiate between a relation schema and a relation instance.   7M

    b) How can we translate an ER diagram into SQL statements to create tables. How are entities mapped into relations? How are relationships sets mapped?   7M

UNIT–III

5. a) Write SQL statement to list all rows(records) in which the inventory stock dates occur on or after January 20, 2008.   7M

    b) Briefly discuss about aggregate functions. Explain any three aggregate functions.   7M

OR

6. a) Write SQL statement to list all products, whose prices are between $50 and $100.   7M

    b) Briefly discuss about relational set operators.   7M

UNIT–IV

7. a) Define Boyce-Codd normal form(BCNF). How does it differ from 3NF? Why is it considered a strong form of 3NF.   7M

    b) Explain 2nd normal form(2 NF) with example.   7M

OR

8. a) Suppose you are given a relation R = (A,B,C,D,E) with the following functional dependencies: {CE$\rightarrow$D, D$\rightarrow$B, C$\rightarrow$A}.

    i.   Find all candidate keys.

    ii. Identify the best normal form that R satisfies (1NF, 2NF, 3NF, or BCNF).   7M

    iii. If the relation is not in BCNF, decompose it until it becomes BCNF. At each step, identify a new relation, decompose and re-compute the keys and the normal forms they satisfy.

    b) Explain 1st normal form(1 NF) with example.   7M

UNIT–V

9. a) With an example, explain serializable schedule.   7M

    b) How data organized in a tree-based index. When would you use a tree-based index.   7M

OR

10. a) Briefly discuss the AICD prosperities of transaction.   7M

    b) What are the main difference between ISAM and B+ tree indexes?   7M

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Code: 4GC43

II B.Tech. II Semester Supplementary Examinations May 2017
Environmental Science
(Common to CE, ME & CSE)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　　Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Discuss the various segments of environment. 　　　　　7M
   b) What is the scope and importance of environmental studies? 　　　7M

OR

2. a) Write a short note on ethics of environmental studies? 　　　7M
   b) Describe the multidisciplinary nature of environmental studies. 　　7M

UNIT–II

3. a) Write about the various applications of alternative energy resources 　7M
   b) Write a short note on advantages of natural resources 　　　7M

OR

4. a) Distinguish between traditional agricultural and modern agricultural. 　7M
   b) Summarize the effects of dams on forest and tribal people. 　　7M

UNIT–III

5. a) Write a short note on sustainable development with examples. 　　7M
   b) Write a short note on food chain and food web with examples. 　　7M

OR

6. a) What are the various threats leading to loss of biodiversity? 　　7M
   b) Discuss the various strategies of in-situ conservation of biodiversity 　7M

UNIT–IV

7. a) What are the major effects and control measures of noise pollution? 　7M
   b) What are the various methods of control to reduce water pollution? 　7M

OR

8. a) Explain about causes of air pollution. 　　　　　　　7M
   b) Explain about any two pollution case studies. 　　　　　7M

UNIT–V

9. a) Write a note on global warming. 　　　　　　　　　7M
   b) What are the salient provisions of Wild life Act? 　　　　7M

OR

10. a) Explain the necessity of value of environment education. 　　　7M
    b) Explain the necessity of role of women and environment. 　　　7M

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R-14

Code: 4G143

II B.Tech. II Semester Supplementary Examinations May 2017
Formal Languages and Automata Theory
(Computer Science & Engineering)

Max. Marks: 70   Time: 3 Hours
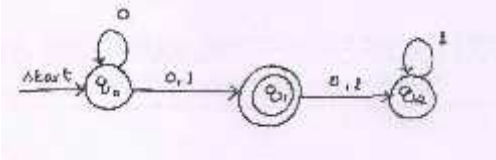Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Define Alphabets, Strings and Languages, with examples.   6M

   b) Construct a DFA to accept strings over {a,b} such that every block of length five contains atleast two a's.   8M

OR

2. a) Convert the following NFA to its equivalent DFA.

   7M

   b) Distinguish between Moore and Melay machines with an example.   7M

UNIT–II

3. a) Construct NFA for the Regular Expression (a* + b* + c*).   4M

   b) State and Prove Pumping Lemma for Regular Languages.
   Show that $L = \{ 0^n \mid n \text{ is prime} \}$ is not regular.   10M

OR

4. a) Write Regular Expressions for the following Languages.
   i. $L = \{ a^{2n} b^{2m+1} \mid m \geq 0, n \geq 0 \}$
   ii. $L = \{ a^n b^m \mid n \geq 4, m \leq 3 \}$
   iii. Set of strings over {0,1,2} containing atleast one 0 and atleast one 1.
   iv. $L = \{ w \mid w$ is a string of even number of 0's followed by odd number of 1's $\}$
   v. $L = \{ a^n b^m \mid (m+n) \text{ is even} \}$ 10M

   b) Covert the following automation to a Regular Expression.
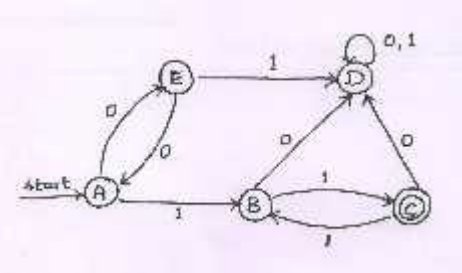
   4M

UNIT–III

5. a) Define CFG. Write CFG for the following languages.
   i. $L = \{ a^i b^j c^k \mid i+j = k, i \geq 0, j \geq 0 \}$
   ii. $L = \{ a^n b^m c^k \mid n+2m = k \}$ 7M

   b) Consider the grammar $E \rightarrow +EE \mid *EE \mid -EE \mid x \mid y$ Find leftmost and rightmost derivation for the string +*-xyxy and write parse tree.   7M

OR

6. a) What is ambiguous grammar? Show that the grammar shown below is ambiguous. $S \rightarrow AB \mid aaB, A \rightarrow Aa \mid a, B \rightarrow b$ 6M

   b) Define CNF and GNF. Convert the following grammar to CNF
   $S \rightarrow ASB \mid \epsilon, A \rightarrow aAS \mid a, B \rightarrow SbS \mid A \mid bb$ 8M

UNIT–IV

7. a) Design a PDA to accept the following language $L = \{ 0^{2n} 1^n \mid n \geq 1 \}$ 8M

   b) Draw the transition diagram for the constructed PDA. Also, show the moves made by PDA for the string "000011".   6M

OR

8. a) Convert the following grammar to a PDA that accepts the same language by empty stack.
   $S \rightarrow aABB \mid aAA, A \rightarrow aBB \mid a, B \rightarrow bBB \mid A, C \rightarrow a$ 8M

   b) Explain the working of a PDA with a neat diagram.   6M

UNIT–V

9. a) Explain with a neat diagram, the working of a Turing Machine model.   6M

   b) Design a Turing Machine to accept $L = \{ ww^R \mid w \in (a+b)^* \}$ 8M

OR

10. a) Discuss Posts Correspondence Problem.   5M

    b) Explain
       i. Counter Machine
       ii. Recursively Enumerable Languages   9M

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II B.Tech. II Semester Supplementary Examinations May 2017
Object Oriented Programming through JAVA
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define the features of JAVA?   6M

   b) Write a Java program, which creates String object, store a numerical value in that object, and display the value in words. Ex; 120 should be displayed as ONE TWO ZERO   8M

OR

2. a) Discuss the Necessity of Garbage collection in Java?   7M

   b) Write a program to find out factorial of given number with recursion?   7M

UNIT–II

3. a) Explain Dynamic method Dispatch?   7M

   b) How to prevent overriding using final?   7M

OR

4. a) Why all the built in java classes are stored in packages? Justify   6M

   b) Identify difference between Interface and Class?   8M

UNIT–III

5. a) Write about Arithmetical exception handling?   7M

   b) Discuss the necessity of nested try blocks in Java?   7M

OR

6. a) Define Multi-threading? Give an example of an application that needs multithreading?   7M

   b) How multithreading is different from single processor to multi-processor?   7M

UNIT–IV

7. a) Explain the set interface and Queue interface?   6M

   b) Describe about the Hashset class and the EnumSet class?   8M

OR

8. a) What is the difference between Applet and Application?   8M

   b) Write about Grid Layout?   6M

UNIT–V

9. a) Write about Adapter classes?   7M

   b) Describe briefly about JFrame, JButtons?   7M

OR

10. a) Explain TCP/IP Client sockets?   8M

    b) What is UDP Datagram?   6M

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