

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)**

II B.Tech. II Semester Supplementary Examinations Jan/Feb 2014

***Computer Organization*
(CSE)**

Max. Marks: 70**Time: 03 Hours**

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a. Represent 32.75 and 18.125 in single precision IEEE 754 representation? 7M
 b. With the help of a diagram explain how parity generator and parity checker networks are useful in detecting errors, when there is odd parity? 7M
2. a. A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers. 6M
 i) How many selection inputs are there in each multiplexer?
 ii) What size of multiplexers is needed?
 iii) How many multiplexers are there in a bus?
 b. Discuss any four addressing modes with examples? 8M
3. a. Diagrammatically, explain the process of selection of address for control memory? 7M
 b. Distinguish between hardwired control unit and micro programmed control unit? 7M
4. a. Multiply 01011 with 110110 using Booth's algorithm? 8M
 b. How many bits are needed to store the result of add, sub, mul, div of two n-bit unsigned numbers and prove it? 6M
5. a. Elaborate in address translation in virtual memory? 7M
 b. Explain in detail about associative mapping technique? 7M
6. a. Explain asynchronous data transfer modes? 7M
 b. Differentiate between memory mapped and Isolated I/O? 7M
7. a. What is pipelining? Explain with an example? 6M
 b. Explain the following with related to the instruction pipe line. 8M
 i) Hardware Interlocks
 ii) Delayed Load
 iii) Branch target buffer
 iv) loop buffer
8. a. Explain parallel arbitration procedure? 7M
 b. Explain Inter processor synchronization? 7M

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)****II B.Tech. II Semester Supplementary Examinations Jan/Feb 2014*****Database Management Systems*
(Common to CSE & IT)****Max. Marks: 70****Time: 03 Hours**

Answer *any five* questions**All Questions carry equal marks (14 Marks each)**

1. a) What are the types of languages a database system provides? Explain. 7M
b) Give short notes on Transaction management. 7M
2. a) Draw An E-R Diagram motor-vehicle sales company and Design a generalization-specialization hierarchy for a motor-vehicle sales company. 7M
b) Explain the conceptual design of ER model. 7M
3. a) What is a foreign key constraint? Why are such constraints important? What is referential integrity? 7M
b) How can we translate an ER –diagram in to SQL statement to create tables .How are constraints in the ER model, weak entity sets, class hierarchies and aggregation handled. 7M
4. a) Explain SQL join operators. 7M
b) Discuss about aggregation functions with examples. 7M
5. a) What is normalization? Discuss first, second and third normal forms with examples. 7M
b) Explain the need of Schema refinement in detail. 7M
6. a) What are the ACID properties? Illustrate them through examples. 7M
b) Define the terms Transaction, Schedule, Serializable Schedule, recoverable Schedule, Strict Schedule with suitable examples 7M
7. a) Explain Dead lock Prevention Policies employed in databases. 7M
b) Discuss in detail about log based recovery. 7M
8. a) Explain Clustered index organization with an example 7M
b) What is the order of a B+ Tree? Describe the format of nodes in a B+ Tree. Why are the nodes at the leaf level linked? 7M

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
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II B.Tech. II Semester Supplementary Examinations Jan/Feb 2014

***Design and Analysis of Algorithms*
(Common to CSE & IT)**

Max. Marks: 70**Time: 03 Hours**

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Write the non-recursive algorithm for finding the N^{th} Fibonacci number and derive it's time complexity. 7M
 b) Explain in detail about various asymptotic notations used for expressing the time complexity of an algorithm. 7M
2. Write an algorithm to sort N numbers in descending order using quick sort. Trace the algorithm with the numbers 56, 79, 3, 6, 83, 8. Also analyze the time complexity. 14M
3. Explain the general method of greedy strategy. Explain how the single source shortest path can be computed by taking a weighted graph, using greedy method. Write the algorithm and derive the time complexity. 14M
4. a) Explain matrix chain multiplication with an example. 7M
 b) Solve the following 0/1 Knapsack problem using dynamic programming
 $P=(11,21,31,33)$, $W=(2,11,22,15)$, $C=40$, $n=4$. 7M
5. What is backtracking? Explain how the sum of subsets problem can be solved using backtracking, with an example. Write the algorithm and derive the time complexity. 14M
6. What are bi-connected components of a given graph? Give an example graph and it's corresponding bi-connected components. Write an algorithm to find out the bi-connected components of given graph and derive it's time complexity. 14M
7. Explain in detail how you solve the travelling salesperson problem using LC Branch and Bound method. Write the algorithm, derive it's complexity and trace it for the graph with the following cost matrix. Assume that the source is the first vertex.

$$\left\{ \begin{array}{ccccc} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{array} \right\}$$

14M
8. Explain in detail about the cooks theorem. 14

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
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II B.Tech. II Semester Supplementary Examinations Jan/Feb 2014

***Environmental Science*
(Common to ME & CSE)**

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

1. a) Define the multi disciplinary nature of environmental science. 7M
b) Explain the people and organizations related to environment. 7M
2. a) Explain the environmental impacts due to over exploitation of dams. 7M
b) Write about the classification of renewable and non renewable resources. 7M
3. a) Explain the role of individual for the conservation of natural resources. 7M
b) Discuss the mineral reserves of India and suggest some conservation measures. 7M
4. a) What are the major effects and control measures of noise pollution? 7M
b) Give a note on the waste that is classified as hazardous waste. 7M
5. How are carbon fixation and nitrogen fixation important for proper functioning of ecosystem? 14M
6. Give a detailed account of India's biodiversity, substantiating the fact that India is a Mega Diversity Nation. 14M
7. a) Write about resettlement and rehabilitation of dispersed people. 7M
b) What is Acid rain and write the impact of the same on environment? 7M
8. a) What are the factors that affect population growth? 7M
b) Write about the variation of population growth in different nations. 7M

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
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II B.Tech. II Semester Supplementary Examinations Jan/Feb 2014

***Formal Languages and Automata Theory*
(CSE)**

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

1. (a) Find NFA which accepts the set of all strings over $\{0, 1\}$ in which the number of occurrences of 0 is divisible by 3 and the number of occurrences of 1 is divisible by 2. 7M
- (b) Find DFA that accepts set of all strings beginning with a 1 that ,when interpreted as a binary integer ,is a multiple of 5.for example strings 101,1010,1111 are in the language. 7M
2. (a) Find ϵ -NFA accepting the set of all strings in $\{0,1\}$ such that some two 0's are separated by of length $2i, i \geq 0$ and Find NFA without ϵ -transitions. 7M
- (b) Design a Moore Machine to determine the residue mod 4 for each binary string treated as integer. 7M
3. (a) Construct the NFA for the regular expression $((01+10)^*00)^*$ 7M
- (b) Show that the language $L = \{0^i 1^j / \text{GCD}(i,j)=1\}$ is not regular. 7M
4. (a) Construct left-linear and right linear grammars for the language $(0+1)^*00(0+1)^*$. 7M
- (b) Construct ϵ -NFA from Left linear grammar 7M
 $S \rightarrow S10/0$
5. (a) Find reduced grammar for following CFG 7M
 $S \rightarrow AB/CA, A \rightarrow a, B \rightarrow BC/AB, C \rightarrow aB/b$
- (b) Convert the following Context Free Grammar to Greibach Normal Form 7M
 $G = (\{S, A, B\}, \{a, b\}, P, S)$ P is
 $S \rightarrow AB, A \rightarrow BS / a, B \rightarrow SA / b$
6. (a) Design PDA generating $L = \{a^i b^j c^k / i \neq j \text{ or } j \neq k\}$ 7M
- (b) Convert the following Context Free Grammar to Push Down Automata 7M
 $S \rightarrow 0A, A \rightarrow 0ABC \mid 1B \mid 0, B \rightarrow 1$
7. (a) Design Turing Machine for $L = \{a^n b^n c^n \mid n \geq 1\}$. 7M
- (b) Design Turing Machine which do proper subtraction. proper subtraction is defined to the $m-n$ for $m \geq n$ and zero for $m < n$. 7M
8. (a) Construct LR(0) items for the following grammar 7M
 $E \rightarrow E+T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid \text{id}.$
- (b) Write about Universal Turing machine 7M

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)****II B.Tech. II Semester Supplementary Examinations Jan/Feb 2014*****Object Oriented Programming through JAVA*
(Common to CSE & IT)****Max. Marks: 70****Time: 03 Hours**

Answer any five questions**All Questions carry equal marks (14 Marks each)**

1. a) Explain the various OOP paradigms for an example of sending flowers to your friend via a florist. 7M
b) Write a java program to reverse the given number '0123456789' 7M
2. a) Explain with an example when 'a superclass variable can reference a subclass object'. 7M
b) Explain how multiple inheritance is achieved in java with a suitable example 7M
3. Define an interface. How is it different from abstract class? Describe the various ways in which interfaces can be implemented. 14M
4. Explain the following exceptions with suitable example for each 14M
a) Arithmetic exception b) NullPointerException c) FileNotFoundException
5. Explain each of the methods of KeyListener and MouseListener 14M
6. Explain the steps in creating a subclass of frame with the help of examples. 14M
7. Describe the functionality of JComponent with example. Differentiate JComponent and JPanel. 14M
8. Write a program to demonstrate multiple client chat in java 14M
