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R-11 / R-13

Code: 1G143

II B.Tech. II Semester Supplementary Examinations May 2017

Design and Analysis of Algorithms

(Common to CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer any **Five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Define Time and Space Complexity of an algorithm. Explain how to express the complexity in asymptotic notations. 8M
b) Explain Towers of Hanoi problem with the help of an example. Develop the pseudo code and discuss its time complexity. 6M
2. a) Develop pseudo code to find the minimum and maximum element using divide and conquer algorithm. 6M
b) Explain the merge sort with suitable example. Analyse the best, average, and worst case time complexity of the algorithm. 8M
3. Develop Pseudo code for Dijkstra's algorithm that finds the distances from a given vertex to all the other vertices of a graph represented by its weight matrix. Discuss its complexity. 14M
4. Which is a more efficient way to determine the optimal number of multiplications in a matrix chain multiplication problem enumerating all the ways of parenthesizing the product and computing the number of multiplication for each or running MATRIX CHAIN ORDER? Find an optimal parenthesizing a matrix chain product whose sequence of dimensions are (5, 10, 3, 12, 5). 14M
5. Draw a portion of the state space tree Solve the following 0/1 Knapsack problem using Backtracking $m = 30$, $n = 4$, $(w_1, w_2, w_3, w_4) = (10, 15, 6, 9)$ and $(p_1, p_2, p_3, p_4) = (2, 5, 8, 1)$. 14M
6. a) State Bi-Connected component. Explain the procedure to find Bi-Connected components of a connected graph with an example. 8M
b) Develop an algorithm to find the Bi-Connected components of a connected graph. 6M
7. Solve the following instance of traveling sales person problem using LCBB and draw the corresponding solution state space tree.

	1	2	3	4	5
1		7	3	12	8
2	3		6	14	9
3	5	8		6	18
4	9	3	5		11
5	18	14	9	8	

14M

8. a) What is the relationship between P, NP, NPC classes? What do you understand by Polynomial time reducibility? 8M
b) Explain COOK's Theorem. 6M

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R-11/R-13

Code : 1GC43

II B.Tech. II Semester Supplementary Examinations May 2017

Environmental Science

(Common to CE, ME & CSE)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Define environment. List any five eminent environmentalists. 7M
b) What are the different methods to propagate environment awareness in the society? 7M
2. a) Discuss the advantages and problems associated with dams? Give examples. 7M
b) Comment on the different types of energy harnessed from oceans? 7M
3. a) Explain the environmental implications of mining with a case study? 7M
b) How can you as an individual conserve different natural resources? 7M
4. a) Briefly explain the causes, effects and control measures of noise pollution? 7M
b) Disasters are disastrous. Justify and suggest suitable management strategies? 7M
5. a) With a neat sketch, explain the functioning of hydrological cycle? 7M
b) Discuss the salient features of an estuarine ecosystem? 7M
6. a) Define biodiversity. Classify the types of biodiversity with examples? 7M
b) What is a hotspot? Describe the biodiversity hotspots identified in India? 7M
7. a) Discuss the impact of global warming on ecological system? 7M
b) Explain briefly the objectives and practices of rainwater conservation. 7M
8. a) Describe the problems created by the growing population of the earth. 7M
b) Highlight the role of information technology for environment management. 7M

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R-11 / R-13

Code: 1G144

II B.Tech. II Semester Supplementary Examinations May 2017

Formal Languages and Automata Theory

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

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

1. a) Define DFA. Draw the transition graph of the DFA that accepts the language generated by the regular expression $(a+b)^*ba$. Process the string *abba*. 7M
 b) Explain Chomsky hierarchy of languages with a neat diagram. 7M
2. a) Show the equivalence between NFA with and without ε-transitions. 7M
 b) Construct NFA- ϵ that recognizes the language generated by the regular expression $(11+01)^*10(0+1)^*$. Check the string *111001* is accepted by NFA or not? 7M
3. a) Explain the closure properties of Regular sets? 7M
 b) Construct Finite Automata that accepts the language $(0+1)^*1(0+1)^*$ 7M
4. a) Let G be the Grammar

$$G : \quad S \rightarrow aB \mid bA$$

$$A \rightarrow a \mid aS \mid bAA$$

$$B \rightarrow b \mid bS \mid aBB$$
 for the string $w=aabbabab$
 Find i) Left most derivation ii) Right most derivation iii) Derivation tree 7M
 b) Construct a Finite Automata recognizing $L(G)$ where G is a grammar

$$G : S \rightarrow aS \mid bA \mid b$$

$$A \rightarrow aA \mid bS \mid a$$
 7M
5. a) 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. 7M
 b) Convert the following CGF to Greibach normal form

$$E \rightarrow E + T \mid T$$

$$T \rightarrow T * F \mid F$$

$$F \rightarrow (E) \mid a$$
 7M
6. a) Construct a PDA for recognizing the language of all the 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*. 7M
 b) Explain the procedure of constructing CFG for a given PDA. 7M
7. a) Design a Turing Machine for recognizing $L = \{ wcw/w \in \{a,b\}^* \}$. Show the moves of the TM for the string *abcabb*. 10M
 b) Write short notes on Multi-tape Turing Machine. 4M
8. a) Discuss in detail about Linear Bounded Automata model with an example? 7M
 b) What is undecidability and reducibility about TM? Explain various undecidable problems of Turing Machine? 7M

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R-11/R-13

Code : 1G145

II B.Tech. II Semester Supplementary Examinations May 2017

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) What are the problems with procedure languages? How object oriented languages overcomes the problems of procedural languages? 10M
b) Give a note on type casting in java. 4M
2. What is inheritance? Explain in detail inheritance in java with examples. 14M
3. a) How to create packages and use them in java? 9M
b) How java supports multiple inheritances? 5M
4. a) What happens when there is no suitable try block to handle exception? 5M
b) Write example that uses join () to ensure that the main thread is the last to stop. Use is Alive () in the same program. 9M
5. a) Discuss about one modern mechanism to handle events. 7M
b) Discuss about java.awt.event.KeyEvent class. 7M
6. a) Briefly explain about applet life cycle. 7M
b) Give a note on layouts in AWT. 7M
7. a) Differentiate between AWT controls and Swing controls. 8M
b) Explain about Tabbed Panes 6M
8. a) What are the uses of server/client socket class? Explain each of them with an example. 10M
b) Explain about UDP. 4M
