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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 : 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

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R-11 / R-13

Code: 1GC42

II B.Tech. II Semester Supplementary Examinations May 2017

Probability and Statistics

(Common to CE, ME & IT)

Max. Marks: 70

Time: 3 Hours

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

1. a) Find mean, median and mode from following data

X	15	25	35	45	55	65	75	85
f	5	9	13	21	20	15	8	3

7M

b) Calculate the coefficient of correlation between age of cars and annual maintenance cost

Age of cars(years)	2	4	6	7	8	10	12
Annual maintenance cost (Rupees)	1600	1500	1800	1900	1700	2100	2000

7M

2. a) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each draw. Find the probability that (i) both are white (ii) first is red and second is white.

7M

b) Of the three men, the chances that a Politician, a business man or an academician will be appointed as a vice-chancellor (V.C) of a University are 0.5, 0.3, 0.2 respectively. Probability that research is promoted by these persons if they are appointed as V.C are 0.3, 0.7, 0.8 respectively. Determine

(i) The probability that research is promoted.

(ii) If research is promoted, what is the probability that V.C is an academician?

7M

3. a) Find the mean and variance of the uniform probability distribution given by

$$f(x) = \frac{1}{n} \text{ for } x = 1, 2, 3, \dots, n$$

7M

b) A continuous random variable has the probability density function

$$f(x) = \begin{cases} kxe^{-\lambda x}, & \text{for } x \geq 0, \lambda > 0 \\ 0, & \text{otherwise} \end{cases}$$

Determine (i)k (ii)Mean (iii) Variance

7M

4. a) Derive mean and variance of Binomial Distribution

7M

b) If X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that (i) $26 \leq X \leq 40$ (ii) $X \geq 45$

7M

5. A Population consists of five numbers 2,3,6,8 and 11. Consider all possible samples of size two which can be drawn without replacement from this population. Find

(a) The mean of the population.

(b) The standard deviation of the population.

(c) The mean of the sampling distribution of means and

(d) The standard deviation of the sampling distribution of means

14M

6. a) To estimate the average time it takes to assemble a certain computer component, the industrial engineer at an electronics firm timed 40 technicians in the performance of the task, getting a mean of 12.73 minutes and a standard deviation of 2.06 minutes.
- i. What can we say with 99% confidence about the maximum error?
 - ii. Use the given data to construct a 99% confidence interval. 7M

- b) In a random sample of 400 industrial accidents, it was found that 231 are due to unsafe working conditions. Construct a 99% confidence interval for the corresponding true proportions. 7M

7. a) A lady stenographer claims that she can take dictation at the rate of 118 words per minute. Can we reject her claim on the basis of 100 trials in which she demonstrates a mean of 116 words and a standard deviation of 15 words at 5% level of significance? 7M

- b) Two independent samples of 8 and 7 items respectively have the following values.

Sample-1	11	11	13	11	15	9	12	14
Sample-2	9	11	10	13	9	8	10	-

Is the difference between the means of samples significant? 7M

8. a) In a large consignment of oranges, a random sample of 64 oranges revealed that 14 oranges were bad. Is it reasonable to ensure that 20% of the oranges are bad at 5% level of significance? 7M

- b) The following data come from a study in which random samples of the employees of three government agencies were asked about their pension plan. Use .01 level of significance to test the null hypothesis that the actual proportions of the employees favoring the pension plan are same.

	Agency-I	Agency-II	Agency-III
For the Pension Plan	67	84	109
Against the Pension Plan	33	66	41

7M
