Hall Ticket No | | | | | | | | | | | Question Paper Code: BCSB01

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER

M.Tech I Semester End Examinations, January- 2020

Regulations: IARE-R18

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

(CSE)

Time: 3 hours **Max. Marks: 70**

Answer ONE Question from each
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT– I

1. a) Illustrate the parametric families of distributions and discuss Location-Scale Families briefly? **[7M]**
   b) Explain the applications of the univariate and multivariate Central Limit Theorem? **[7M]**
2. a) Discuss the following? **[7M]**
      i. Probability mass functions
      ii. Density, and cumulative distribution functions
   b) List the Probabilistic inequalities and Explain in detail about the Gaussian Tail Inequality? **[7M]**

UNIT – II

3. a) Discuss sampling distributions of estimators? Explain sampling distributions of sample size and precision? **[7M]**
   b) What is Methods of Moments and Maximum Likelihood and discuss its advantages and disadvantages? **[7M]**
4. a) What is Random samples and list the types and methods of random sampling? **[7M]**
   b) Discuss simple random sampling and its techniques with an example? **[7M]**

UNIT – III

5. a) Discuss multivariate statistical models and list its uses? **[7M]**
   b) Explain briefly the problem of over fitting model assessment? **[7M]**
6. a) Explain in detail about regression and classification problems? **[7M]**
   b) What is Statistical inference? Explain various modes of inference for making info informed choices in analyzing data? **[7M]**

UNIT – IV

7. a) Discuss Isomorphism graphs, planar graphs, Hamilton circuits and Euler cycles? **[7M]**
   b) Explain Permutations and Combinations with and without repetition? **[7M]**
8. a) Discuss graph coloring and its applications? Explain about vertex coloring and region coloring? **[7M]**
   b) Discuss Specialized techniques to solve combinatorial enumeration problems? **[7M]**

UNIT – V

9.	a)	Explain the need of process models. Discuss about the risk management phase in spiral with the help of a neat diagram?	**[7M]**
	b)	Explain Data mining applications for banking industry?	**[7M]**
10.	a)	Describe briefly about ISO/OSI modes with neat diagram?	**[7M]**
	b)	List any five major activities of an operating system with regard to process management and three major activities with regard to memory management?	**[7M]**

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COURSE OBJECTIVES:

The course should enable the students to:

I	Understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.
II	Understand and apply the mathematical logics to many modern techniques in information technology like machine learning, programming language design, and concurrency.
III	Studying of various sampling and classification problems

COURSE OUTCOMES (COs):

CO 1	Describe various concepts of probability theory and Distributions
CO 2	Demonstrate sampling distributions of estimators and methods of moments.
CO 3	Explore statistical inference techniques and apply regression, PCA etc. for classification problems.
CO 4	Enrich the knowledge on applications of graph theory and combinatorial problems.
CO 5	Identify the applications of mathematical and statistical techniques to emerging areas of Information Technology.

COURSE LEARNING OUTCOMES (CLOs):

BCSB01.01	Understand basic concepts probability theory, mass, density etc.
BCSB01.02	Analyze various Distribution Functions and apply to real world problems.
BCSB01.03	Identify importance of the Central Limit Theorem, Markov chains
BCSB01.04	Apply random sampling theory and distribution of estimators to various computer science applications
BCSB01.05	Describe Methods of Moments and Maximum Likelihood to solve problems
BCSB01.06	Construct and evaluate Regression models for classification problems
BCSB01.07	Analyze importance of Principal component analysis in developing predictive models and exploratory data analysis.
BCSB01.08	Understand problem of over fitting model and choose correct model.
BCSB01.09	Analyze Euler's and Hamilton rule for a simple connected graph in NP-complete problems.
BCSB01.10	Solve discrete probability and set problems using permutations and combination.
BCSB01.11	Identify the solution for various combinatorial enumeration problems
BCSB01.12	Apply various graph theory concepts in Network protocol design, web traffic analysis and distributed systems
BCSB01.13	Understand the basic concepts of Software Engineering, Computer Architecture
BCSB01.14	Analyze applications of Statistics in Data mining , machine learning and Bioinformatics
BCSB01 .15	Understand operating system and distributed system concepts principles.

MAPPING OF SEMESTER END EXAMINATION TO COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	BCSB01.01	Understand basic concepts probability theory, mass, density etc.	CO 1	Remember
	b	BCSB01.02	Analyse various Distribution Functions and apply to real world problems.	CO 1	Understand
2	a	BCSB01.03	Identify importance of the Central Limit Theorem, Markov chains	CO 1	Remember
	b	BCSB01.03	Identify importance of the Central Limit Theorem, Markov chains	CO 1	Understand
3	a	BCSB01.04	Apply random sampling theory and distribution of estimators to various computer science applications	CO 2	Understand
	b	BCSB01.05	Describe Methods of Moments and Maximum Likelihood to solve problems	CO 2	Understand
4	a	BCSB01.04	Apply random sampling theory and distribution of estimators to various computer science applications	CO 2	Understand
	b	BCSB01.05	Describe Methods of Moments and Maximum Likelihood to solve problems	CO 2	Understand
5	a	BCSB01.06	Construct and evaluate Regression models for classification problems	CO 3	Understand
	b	BCSB01.07	Analyse importance of Principal component analysis in developing predictive models and exploratory data analysis.	CO 3	Understand
6	a	BCSB01.06	Construct and evaluate Regression models for classification problems	CO 3	Understand
	b	BCSB01.08	Understand problem of over fitting model and choose correct model.	CO 3	Understand
7	a	BCSB01.09	Analyze Euler's and Hamilton rule for a simple connected graph in NP-complete problems.	CO 4	Understand
	b	BCSB01.10	Solve discrete probability and set problems using permutations and combination.	CO 4	Understand
8	a	BCSB01.10	Solve discrete probability and set problems using permutations and combination.	CO 4	Understand
	b	BCSB01.11	Identify the solution for various combinatorial enumeration problems	CO 4	Understand
9	a	BCSB01.12	Apply various graph theory concepts in network protocol design, web traffic analysis and distributed systems	CO 5	Understand
	b	BCSB01.13	Understand the basic concepts of Software Engineering, Computer Architecture	CO 5	Remember
10	a	BCSB01.14	Analyze applications of Statistics in Data mining , machine learning and Bioinformatics	CO 5	Understand
	b	BCSB01.15	Understand operating system and distributed system concepts principles.	CO 5	Understand

Signature of Course Coordinator **HOD, CSE**