**Model Question Paper**

M.Sc. DEGREE EXAMINATION

First Semester

**Statistics with Computer Science**

**Paper – 1.1: PROBABILITY AND DISTRIBUTIONS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

 **UNIT- I**

1. (a) Define :
2. Field
3. Minimal field and
4. Borel Field

Give one example for each. Show that the intersection of an arbitrary number of - fields is a

 - field.

 (b) Define limit supremum and limit infimum of a sequence of sets. Give example.

1. (a) Define convergence in distribution and convergence in probability. Show that the former

 implies the later if converges to a constant.

(b) State and prove Inversion Theorem on characteristic functions.

**UNIT- II**

1. (a) State Levy’s continuity theorem and give an example.

(b) Write short notes on convergence of sequence random variables. Is it true that a sequence of

 random variables necessary converge to a random variable only.

1. (a) Discuss the role of central limit theorem in Statistics.

(b) State and prove Levy and Lindeberg form of central limit theorem.

**UNIT- III**

1. (a) Define mathematical expectation of a random variable and discuss its properties.

(b) State and prove Markov’s inequality.

1. (a) State and prove Holder’s inequality. Hence obtain Minkowski inequality.

(b) State and prove Kinchin’s theorem of weak law of large numbers.

**UNIT- IV**

1. (a) Define Weibull distribution. Obtain its characteristic function and hence find its mean.

(b) Define Laplace distribution. Obtain its moment generating function and hence find its mean

 and variance.

1. (a) Derive the density of non-central chi-square distribution.

(b) Define non-central F-distribution and establish the relation between F and chi-square

 distributions.

**UNIT- V**

1. (a) In the case of bivariate normal distribution derive the conditional distribution of one variable

 given the other variable.

(b) Define multivariate normal distribution. Derive its characteristics function.

1. (a) Define empirical distribution function. Derive the distribution of sample correlation

 coefficient.

(b) Find the joint density of two order statistics if ‘n’ independent observations are drawn from a

 distribution having distribution function F.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

First Semester

**Statistics with Computer Science**

**Paper – 1.2: ESTIMATION THEORY**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Let be a random sample from Poisson distribution. Obtain minimum variance

 unbiased estimator of .

 (b) State and prove Cramer-Rao inequality.

1. (a) Explain the concepts
2. Consistency
3. Efficiency of an estimator and CAN estimator.

(b) Derive Bhattacharya’s inequality.

**UNIT- II**

1. (a) State and prove Fisher-Neyman criterion for sufficiency of an estimator.

 (b) Let be a sample from

 Obtain Sufficient statistic of .

1. (a) Explain the concept of several parameter Pitman family of distributions.

(b) Show that the normal distribution with mean and variance is an exponential family.

**UNIT- III**

1. (a) Explain the general form of distributions admitting sufficient statistic.

 (b) State and prove Rao-Blackwell theorem.

1. (a) Explain the concept of completeness with examples.

 (b) State and prove Lehman – Scheffe theorem.

**UNIT- IV**

1. (a) Describe the method of maximum likelihood estimation and give its properties.

 (b) State and prove Cramer-Huzurbazer theorem.

1. (a) Prove that maximum likelihood estimators are consistent and asymptotically normally

 distributed.

 (b) Explain the method of scoring and state its properties.

**UNIT- V**

1. (a) Obtain the ML estimator of normal mean under type 2 censoring scheme.

 (b) Obtain the ML estimator for the exponential parameter in type -1 censoring.

1. (a) Define the concept of shortest confidence interval. Obtain the shortest confidence interval for

 the

1. Mean of normal population with unknown variance and
2. Variance of normal population when mean is unknown.

 (b) Obtain confidence limits for the parameter µ in with confidence coefficient

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

First Semester

**Statistics with Computer Science**

**Paper – 1.3: SAMPLING**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain PPS sampling with replacements (wr-pps). Obtain an unbiased estimator of the

 population total and variance of the estimator under wr-pps. Also derive the estimator for the

 variance.

 (b) Derive an expression for the gain due to wr-pps over wr-srs.

1. (a) Explain a method of selecting a without replacement pps sample and obtain the expressions for

 inclusion probabilities associated with it.

 (b) Derive the Horvitz Thompson estimator for the population total and obtain its variance. Also

 obtain the estimator for as given by Horvitz Thompson.

**UNIT- II**

1. (a) Distinguish between linear and circular systematic sampling.

 (b) Assuming linear systematic sample with where the symbols have their usual notation,

 show that the variance of the systematic mean is given by

 where is the correlation coefficient between pairs of units that are in the same systematic

 sample.

1. (a) Compare the precision of systematic sampling with that of a wor-srs and stratified random

 sampling.

 (b) Explain Centrally Located Systematic sampling. Illustrate with an example.

**UNIT- III**

1. (a) Define single-stage cluster sampling. Assuming clusters of equal size, suggest an unbiased

 estimator for the population mean and obtain its variance.

 (b) Assuming clusters of equal size, estimate the relative efficiency of single-stage cluster sampling

 over wor-srs, in estimating the population mean.

1. (a) Define two-stage cluster sampling. Assuming clusters of equal size and wor-srs sample

 selection at both the stages, suggest an unbiased estimator for the population mean and obtain

 its variance.

 (b) Discuss the estimation of population mean under two-stage pps sampling assuming a wr- pps

 sample at the first stage and wor-srs sampling at the second stage.

**UNIT- IV**

1. (a) Explain the ratio method of estimation. Assume an wor-srs sample, and let is the

 estimator of the population ratio. Obtain an exact expression for the and an upper

 bound for the

 (b) Show that the large sample variance of the ratio estimator under wor-srs is given by

 Interpret the above equation.

1. (a) Explain difference estimation. Define a separate difference estimator for population mean and

 obtain its variance.

 (b) Discuss Separate Ratio Estimation. If an independent wor-srs sample is drawn from each

 stratum, and the sample sizes are large in all the strata, prove that.

 where is the true ratio in the stratum and is the corresponding correlation

 coefficient between the auxiliary and study variables in the stratum.

**UNIT- V**

1. (a) What is double sampling? In case of double sampling for difference estimation, propose an

 estimator for the population mean and derive its variance, stating the necessary assumptions,

 if any.

 (b) Distinguish between multistage sampling and multiphase sampling.

1. (a) What are the various sources of non-sampling errors? Explain.

 (b) Explain Deming’s model for the effect of call-backs.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

First Semester

**Statistics with Computer Science**

**Paper – 1.4: C - PROGRAMMING**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) What are the constants? Explain various types of constants in ‘C’ and give examples. Explain

 the use of constants.

 (b) Explain the variables in C. Explain the unary operators with suitable examples. What is their

 relative precedence and associativity?

1. (a) What are the library functions? List and explain their use in C programming.

(b) What are the commonly used input-output functions in C? Explain them with suitable

 examples.

**UNIT- II**

1. (a) Explain ‘for’ statement. How does it differ from ‘while’ and ‘do’ while statements.

(b) What are the selection control statements? Explain any two of them with an example.

1. (a) What is recursion? Write a recursion function to calculate the factorial of a given positive

 integer.

(b) Explain static and external storage classes.

**UNIT- III**

1. Define arrays? What are the types of arrays? How character strings can be defined? Write a C program to fit a straight line using arrays.

1. Explain how are multidimensional arrays declared, initialized and processed.

**UNIT- IV**

1. What are pointers? Mention their advantages. Explain about multidimensional arrays and arrays of pointers.
2. Write a program for multiplication of two matrices using pointers.

**UNIT- V**

1. Distinguish between structures and unions. Explain their use with examples.

1. Write are data files? Explain how to perform I/O operations using files.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Second Semester

**Statistics with Computer Science**

**Paper – 2.1: MULTIVARIATE ANALYSIS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) What is a Wishart distribution? Deduce chi-square distribution as its special case.

 (b) Derive the null distribution of Hotelling’s statistic.

1. (a) Establish the relationship between Hotelling’s and Mahalanobis statistic.

 (b) Show that Hotelling’s statistic can be used to test for the equality of mean vectors of two

 multivariate normal populations having the same dispersion matrix.

**UNIT- II**

1. (a) What is meant by discriminant analysis? Derive the discrimination rule in the case of two

 multivariate normal populations having unknown means and an unknown but the same

 covariance matrix.

 (b) Explain the problem of classification into one of the two known multivariate normal

 populations.

1. (a) Explain the k-nearest neighbor classification rule.

 (b) Let Derive the optimal classification rule when is known. Also

 obtain the probabilities of misclassifications.

**UNIT- III**

1. (a) What are the principal components and explain the method of obtaining them.

 (b) Suppose the random variables and have the covariance matrix

 The corresponding eigen values are 5.8285, 2.0, 0.1716. Obtain the three principal components.

1. (a) What are canonical variables? Explain how these are useful in the analysis of multivariate data?

 (b) For the following covariance matrix

 obtain the first pair of canonical variables and the canonical correlation between them.

**UNIT- IV**

1. (a) Discuss the concept of factor analysis. What are its applications.

 (b) Explain principal factor method and maximum likelihood method of estimation for estimating

 factor loadings.

1. (a) Explain indetail about factor scores.

 (b) Explain orthogonal factor rotation and quartimax rotation and explain why we perform factor

 rotation.

**UNIT- V**

1. (a) Explain the importance of cluster analysis and describe briefly the non-hierarchical methods of

 clustering.

 (b) What is multi-dimensional scaling? Explain.

1. (a) Summarize the various steps in the algorithm for classical scaling.

 (b) Consider the following hypothetical data:

 Subject Id:

 Income (1000 $ ) 6 7 16 17 26 31

 Education Year : 7 7 15 16 21 20

1. Compute the similarity matrix using squared Euclidian distance.
2. Use centroid method to perform hierarchical clustering.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Second Semester

**Statistics with Computer Science**

**Paper – 2.2: TESTING OF HYPOTHESIS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain
2. Type-I and Type-II errors
3. Simple and composite hypothesis with suitable example

 (b) State and prove Neyman-Pearson lemma and explain its role in obtaining UMP tests.

 2. (a) Define uniformly most powerful test. How do you ensure their existence? Give examples.

(b) Let be independent and identically distributed ) random variables, both

 and are unknown. Test the null hypothesis : = , = against : = , = .

**UNIT- II**

1. (a) Show that for the one-parameter exponential family there exists a UMP test of hypothesis or () against .

(b) What is monotone likelihood ratio? Verify whether the family of

 admit monotone likelihood ratio or not.

1. (a) Explain Type- and Type- regions with suitable examples.

(b) Distinguish the difference between unbiased and uniformly most powerful unbiased tests with

 suitable examples.

**UNIT- III**

1. (a) Describe the likelihood ratio method for constructing tests for composite hypothesis.

(b) Apply the likelihood ratio criterion to obtain a test for equality of variances in two normal

 populations.

1. (a) Explain the Sequential Probability Ratio Test (SPRT).

(b) With usual notation, show that SPRT terminates with probability one.

**UNIT- IV**

1. (a) What do you mean by non-parametric testing? Discuss its merits and limitations.

(b) Explain the sign test and its importance in testing of hypothesis.

1. (a) Describe the median test procedure.

(b) Define a Run. Describe the Wald-Wolfowitz two sample run test.

**UNIT- V**

1. (a) Define Kendal’s tau statistic. Find its mean and variance for large

(b) Test the null hypothesis that the two judges are independent in ranking the 4 competitors in a

 singing competition.

Competitor

 1 2 3 4

 Judge 1 3 4 2 1

 Judge 2 3 1 4 2

1. (a) Explain the test for goodness of lit. Derive the asymptotic distribution of .

(b) Describe the Kolmogrov - Simrnov one sample and two sample tests.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Second Semester

**Statistics with Computer Science**

**Paper – 2.3: STOCHASTIC PROCESSES**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Define a stochastic Process. Explain the classification of stochastic processes according to state

 space and time domain, giving an example for each type.

 (b) What is a transition probability matrix (TPM). State the properties of TPM. Detail the

 importance of TPM in the study of Markov Chains.

1. (a) Define an irreducible Markov Chain. Show that the states of an irreducible Markov Chain are

 all of the same type.

 (b) Define stationary distribution of a Markov Chain. Show that an irreducible Markov Chain has

 a stationary distribution if and only if it is positive recurrent.

**UNIT- II**

1. (a) Explain the gambler’s ruin problem and derive the expression for the probability of ultimate

 ruin of a gambler.

 (b) Define stopping time. Let ………, be a sequence of independent and identically distributed

 random variables with finite expected value and a stopping time with Then

1. (a) Briefly describe random walk in one-dimension and two-dimensions with examples.

 (b) Show that in a simple random walk with two reflecting barriers at 0 and K, the stationary

 distribution is given by

 where

**UNIT- III**

1. (a) Define Poisson Process. State and prove any two properties of the Poisson process.

 (b) Derive the probability function of the Poisson process.

1. (a) Define birth and death process and obtain its differential-difference equations.

 (b) State the postulates of a pure birth process and show that for such a process the duration of

 stay in any given state is exponentially distributed.

**UNIT- IV**

1. (a) Derive the Wiener process as a limit of a random walk.

 (b) Discuss the various simple properties of Wiener process.

1. (a) Define Galton-Watson Discrete branching process. With the usual notation show that

 (b) State and prove fundamental theorem of branching process.

**UNIT- V**

1. (a) Define renewal function. Show that the renewal function and the underlying renewal

 distribution can be determined from one another.

 (b) Show that the renewal function satisfies the renewal equation

1. (a) Define residual lifetime and obtain the distribution.

 (b) State and prove elementary renewal theorem.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Second Semester

**Statistics with Computer Science**

**Paper – 2.4: DESIGN OF EXPERIMENTS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain the role of randomization, replication and local control in designing an experiment.

 (b) Detail the analysis of a two way classified data.

1. (a) What do you understand by Analysis of Covariance? When do you propose this technique?

(b) Distinguish between random and fixed effect models. Explain the importance of these models

 play in analysis of variance.

**UNIT- II**

1. (a) When do you say RBD is an orthogonal design? Give analysis of such RBD.

(b) Describe the effects of errors in the assumptions underlying the analysis of variance.

1. (a) Determine the efficiency of RBD over CRD.

(b) Describe Fisher’s least significant difference method.

**UNIT- III**

1. (a) What are Orthogonal Latin Square Designs? Describe the procedure of construction of

 these designs.

(b) What are the column and row efficiencies and actual efficiency of LSD over RBD.

1. (a) Outline the analysis of split plot design.

(b) Explain the analysis of LSD with a missing row or missing column.

**UNIT- IV**

1. (a) Explain what is partial confounding with the help of a suitable example.

(b) How do you represent main effect and interaction contrasts in a design? Describe its

 analysis.

1. (a) Explain the Yates method of analysis of factorial design.

(b) Outline the analysis of a design. Write down all the linear and quadratic contrasts in this

 design.

**UNIT- V**

1. (a) Explain in detail incomplete block design.

(b) What is a symmetric BIBD? In a BIBD prove that .

1. (a) Distinguish between BIBD and PBIBD.

(b) Obtain the three parametric relations in the case of PBIBD.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Third Semester

**Statistics with Computer Science**

**Paper – 3.1: COMPUTER ORGANIZATION AND ARCHITECTURE**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Convert into binary form using two’s compliment (i) 255 (ii) 165.

 (b) What is r’s compliment and compliment.

1. (a) Describe character codes.

 (b) Explain associative and de-Morghains laws with truth table.

**UNIT- II**

1. (a) Explain error detector code.

 (b) Construct the half adder sum, carry Boolean function.

1. (a) Explain (i) Full adder circuit with truth table.

 (b) Simplify the Boolean expression

**UNIT- III**

1. (a) Describe 4x1 multiplication.

 (b) Explain 3x8 decoder.

1. (a) Describe S-R flip-flop.

 (b) Explain CPU organization.

**UNIT- IV**

1. (a) Explain I/o Architecture.

 (b) Describe program controller.

1. (a) Explain DMA transfers.

 (b) Explain priority interrupt.

**UNIT- V**

1. (a) Explain cache memory.

(b) Describe associative memory.

1. (a) Explain virtual memory.

 (b) Explain Demand paging.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Third Semester

**Statistics with Computer Science**

**Paper – 3.2: DATA STRUCTURES USING C**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) What is an algorithm? Compare and contrast various types of algorithms.

(b) Explain top down approach and bottom up approach algorithm design.

1. (a) Differentiate deterministic and non-deterministic algorithms

(b) What is meant by structured programming? Explain principles with examples.

**UNIT- II**

1. (a) Explain doubled linked list and operations with example.

(b) What is a data structure and explain different types of data structures with example

1. (a) What is Single linked list and explain the operations on single linked list.

(b) Write a C Program for binary search.

**UNIT- III**

1. (a) Explain evaluation of postfix expression using stack. Solve expression “456\*+7-“ using stack.

(b) Explain Hashing and collision resolution methods.

1. (a) Explain recursion. Write a recursive function to for factorial of a given number.

(b) Write a C program to implement queue using linked list.

**UNIT- IV**

1. (a) Explain binary search tree and its operations.

(b) Write algorithms for insert and traverse in pre order.

1. (a) Explain a graph. Explain three most used representations for graphs.

(b) Explain Kruskal algorithm for minimum spanning tree

**UNIT- V**

1. (a) Explain merge sort and discuss it’s time complexity.

(b) Write a C program to implement bubble sort.

1. (a) Explain quick sort with example.

(b) Explain selection sort with example.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Third Semester

**Statistics with Computer Science**

**Papers 3.3 and 3.4**

**Optional Paper (a): CLIENT SERVER TECHNOLOGY AND APPLICATIONS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain the Client Server Computing model.

(b) What are the advantages and pitfalls of Client Server Computing model?

1. (a) Explain the basic components of Client Server Model.

(b) Explain in brief about the evolution and advantages of corporate computing model.

**UNIT- II**

1. (a) What is data integrity?

(b) How to enforce data integrity in Oracle?

1. (a) Explain the relational database model.

(b) How to ensure data security in Oracle?

**UNIT- III**

1. (a) Explain in brief about (a) CUI and GUI, (b) OOP and (c) Client Server processes.

(b) Explain the basic statements of DML and DDL in SQL with examples from HR tables.

1. (a) What is Network in Client Server Model?

(b) Write the syntax of basic SQL statements with example from HR tables.

**EMPLOYEES**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| EMPLOYEE\_ID | FIRST\_NAME | LAST\_NAME | SALARY | JOB\_ID | DEPARTMENT\_ID |

**JOBS**

|  |  |  |  |
| --- | --- | --- | --- |
| JOB\_ID | JOB\_TITLE | MIN\_SALARY | MAX\_SALARY |

**DEPARTMENTS**

|  |  |
| --- | --- |
| DEPARTMENT\_ID | DEPARTMENT\_NAME |

**UNIT- IV**

1. (a) Write about ER modeling with example.

(b) Illustrate the structure of PL/SQL program with example.

1. (a) Explain normalization principles with examples.

(b) Write about PL/SQL block structure with example.

**UNIT- V**

1. (a) How to design a form from single table in Oracle?

(b) How to prepare a report from single table in Oracle?

1. (a) Explain master detail form in Oracle forms.

(b) Explain master detail report in Oracle reports.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Third Semester

**Statistics with Computer Science**

**Papers 3.3 and 3.4**

**Optional Paper (b): OBJECT ORIENTED PROGRAMMING IN C++**

**AND UNIFIED MODELLING LANGUAGE**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain the object oriented programming concepts with suitable examples.

(b) Explain the friend function with example.

1. (a) What is a constructor? Explain the types of constructors with example.

(b) What is this pointer? Explain about inline functions.

**UNIT- II**

1. (a) What is inheritance? Explain about multiple inheritance with suitable examples.

(b) Explain in detail about virtual base class and container class.

1. (a) What is overloading. Explain about function overloading with example.

(b) Explain about ambiguity in inheritance. Give example.

**UNIT- III**

1. (a) What is Polymorphism? How the Polymorphism is achieved at compile time and run time.

(b) What is an exception? Explain the mechanism of exception handling.

1. (a) Explain the class templates and function templates with example.

(b) Explain about virtual functions and pure virtual functions with example.

**UNIT- IV**

1. (a) Describe aggregations and interfaces in UML.

(b) Explain about sequence diagrams and collaboration diagrams with examples.

1. (a) Explain about component and deployment diagrams with example.

(b) Explain about modeling tools for UML.

**UNIT- V**

1. (a) What do you understand by design patterns?

(b) Give an outline of system requirement analysis.

1. (a) Explain how to perform domain analysis?

(b) Give the detailed account of system measurement analysis.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Third Semester

**Statistics with Computer Science**

**Papers 3.3 and 3.4**

**Optional Paper (c): KNOWLEDGE DISCOVERY AND DATA MINING**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain the classification problem involving two multivariate normal populations.

(b) Explain how a classification tree is constructed.

1. (a) Explain ID3 algorithm. What are the merits and demerits of this algorithm?

(b) Explain the pessimistic error pruning method.

**UNIT- II**

1. (a) Explain clustering. What are its merits and demerits?

(b) Describe vector quantization. Distinguish between clustering and vector quantization.

1. (a) Explain the density based clustering method DBSCAN. What are its strengths and weaknesses?

(b) Explain vector quantization as a method of dimension reduction.

**UNIT- III**

1. (a) What are principal curves? Define principal curve of a p – dimensional distribution function.

 Give an algorithm for constructing principal curves.

(b) What is feature selection? Distinguish between filter, wrapper and embedded feature selection

 methods.

1. (a) Give a brief account of projection pursuit.

(b) Explain the following in the context of feature selection:

 Subset Generation Evaluation of Subset

 Stopping Criteria Result Validation

**UNIT- IV**

1. (a) Describe the steps in building a regression tree. Explain the splitting criteria used in growing

 regression trees.

(b) Explain the cost-complexity minimization method of pruning.

1. (a) Explain the stopping criteria used in growing a regression tree.

(b) Explain the following pruning methods:

 (i) reduced error pruning and (ii) Minimum error pruning.

**UNIT- V**

1. (a) What are the differences between OLTP and OLAP?

(b) What is association rule mining? Explain.

1. (a) Describe the steps for the design and construction of data warehouses.

(b) Describe Apriori Algorithm for mining frequent itemsets for Boolean Association rules.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Third Semester

**Statistics with Computer Science**

**Papers 3.3 and 3.4**

**Optional Paper (d): INDUSTRIAL STATISTICS AND QUALITY CONTROL**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain the role of normal distribution in control charts and how the control chart will be

 treated as statistical tool of testing?

 (b) Derive the OC function and ARL of control chart.

1. (a) Discuss control by Gauging with an example.

 (b) Derive the properties of an exponentially weighted moving average chart and explain the

 procedure of using it.

**UNIT- II**

1. (a) Distinguish between and with examples.

 (b) Obtain the % confidence units of and explain its importance in process capability

 analysis.

1. (a) What is a Cu-sum chart? Explain how it differs from Shewhart control chart. Also explain the

 procedure table Cu-sum chart for one sided decision.

 (b) How do you design V -masks of a Cu-sum chart for a two sided decision? Explain its importance.

**UNIT- IIi**

1. (a) Discuss the relative merits of single and double sampling plan. Obtain the AOQL of a double

 sampling plan.

 (b) Derive the OC function and ASN for double sampling plan.

1. (a) Distinguish between sampling plan for attributes and sampling plan for variables.

 (b) What is a sequential sampling plan. Derive the ASN function of it.

**UNIT- IV**

1. (a) Distinguish between CSP-I and CSP-II.

 (b) Derive the properties of CSP-III.

1. (a) Derive the properties Wald Wolfwitz sampling plan.

 (b) Explain the procedures associated with any two military standard plans.

**UNIT- V**

1. (a) Explain the role of Industrial experimentation in process improvement with an example.

 (b) What is a transfer function? How it is useful for industrial experimentation?

1. (a) What is a quadratic loss function? Give an example.

 (b) Explain the half factorial design in industrial experimentation with an illustration.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Fourth Semester

**Statistics with Computer Science**

**Paper – 4.1: FORECASTING METHODS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain exponential smoothing method. Mention some general aspects of smoothing methods.

(b) How exponential smoothing is different from average smoothing?

1. (a) Explain various forecasting methods.

(b) Explain the technique of double exponential smoothing.

**UNIT- II**

1. (a) Explain the method of Double Moving Average method of forecasting.

(b) What is meant by decomposition of a time series? How does trend fitting helps in this process?

1. (a) Describe the ratio to moving average method of determining trend. How trend is eliminated?

(b) Distinguish between the ratio to trend and the ratio to moving average methods of measuring

 seasonal variation. Which method is more general and why?

**UNIT- III**

1. (a) Define Auto-correlation function. What is a white noise process? What are its characteristics?

 Give any two applications of white noise process.

(b) Explain MA and AR processes and their interrelation slips.

1. (a) Explain a stationary process. Define a covariance stationary process.

(b) Explain ARMA and ARIMA processes with suitable examples.

**UNIT- IV**

1. (a) Explain Box-Jenkins model and its importance.

(b) Discuss the need of diagnostic checking for Box-Jenkins model

1. (a) Describe the estimation and procedure of diagnostic checking for time series data models.

(b) What is simulation and explain Monto-Carlo method.

**UNIT- V**

1. (a) Explain how to determine randomness of data.

(b) Describe the procedure of recognising seasonality in a time series data.

1. (a) Describe the procedure of removing non-stationarity in a Time Series data.

(b) Explain variate difference method and its uses.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Fourth Semester

**Statistics with Computer Science**

**Paper – 4.2: VISUAL APPLICATION DEVELOPMENT**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Describe the basic features of Visual Basic.

(b) Explain about understanding the scope and life of variables.

1. (a) What do you mean by event driven code and event driven programming.

(b) Explain Visual programming advantages.

**UNIT- II**

1. (a) Explain about various Visual Basic tools.

(b) Describe about mouse event.

1. (a) Describe Visual Basic debugging tools.

(b) Explain about frames and frame controls.

**UNIT- III**

1. (a) Explain briefly about COM component software architecture.

(b) Write about component object servers.

1. (a) Describe crystal reports.

(b) Explain about reading, writing and copying the text files in Visual Basic.

**UNIT- IV**

1. (a) Describe object linking and embedding.

(b) Explain about navigating the data control.

1. (a) Explain OLE Drag and Drop and how it is applicable for Visual programming.

(b) What is RDO? Write a small V.B program to illustrate the concept of RDO’s.

**UNIT- V**

1. (a) Explain how we can create the intranet application in system.

(b) What do you meant by server side scripting?

1. (a) Explain how to create ASP pages and give its objects.

(b) What do you meant by scripting and client side scripting?

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Fourth Semester

**Statistics with Computer Science**

**Papers 4.3 and 4.4**

**Optional Paper (a): DISTRIBUTED JAVA OBJECTS**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain about the objectives of distributed computing using Java objects.

(b) Explain briefly communication using TCP/IP.

1. (a) Distinguish between Procedure Oriented and Object Oriented Programming languages.

(b) What is Design Pattern? Explain.

**UNIT- II**

1. (a) Explain about various components of AWT.

(b) Discuss about multithreading.

1. (a) Explain about Servlet-Applet communication.

(b) Explain about components of swing.

**UNIT- III**

1. (a) What is JDBC? Explain.

(b) Explain about Datagram.

1. (a) Write about Java’s security model and explain about security policies.

(b) Explain about socket based client Applet.

**UNIT- IV**

1. (a) Explain RMI architecture.

(b) Explain broad features of Internet access capability and distributed computing with JAVA.

1. (a) Write about JAVA mail API.

(b) What do you meant by RMI? Write pros and cons of RMI.

**UNIT- V**

1. (a) What is CORBA? Explain.

(b) Explain briefly about COM.

1. (a) Explain about CORBA IDL.

(b) Briefly explain distributed component object model with architecture.

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Fourth Semester

**Statistics with Computer Science**

**Papers 4.3 and 4.4**

**Optional Paper (b): V.B.NET**

(Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain about the Oracle database files.

(b) What is normalization? Explain 1st, 2nd and 3rd normal forms briefly.

1. (a) Explain about different types of databases in writing a database application.

(b) Explain about SQL server database files.

**UNIT- II**

1. (a) Explain about the components of ADO.Net architecture.

(b) What is the main purpose of Data Adapter and Data Reader components?

1. (a) Explain about connection class and common constructors in ADO.Net.

(b) Explain about various options in connection string SQL and Oracle.

**UNIT- III**

1. (a) Explain about OLEDB with example.

(b) Explain about data set component and data files.

1. (a) Explain about Oracle Data Adapter wizard.

(b) How do you create an ODBE connection using ODBE data adapter wizard and how do you

 generate a dataset using this?

**UNIT- IV**

1. (a) Explain about in-line SQL and Access queries.

(b) Create a query in Access that accepts a parameter as input and only returns the data requested.

1. (a) Explain different ways to creating a table in MS-acess.

(b) Write the steps for connect with Access database using Dynamic Connections.

**UNIT- V**

1. (a) Explain about the stored procedure and views in Oracle.

(b) Explain the difference between ASP and ASP.Net.

1. (a) Explain about stored procedures and packages in SQL server.

(b) How does a Data Grid Control on a web form behaves?

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**Model Question Paper**

M.Sc. DEGREE EXAMINATION

Fourth Semester

**Statistics with Computer Science**

**Papers 4.3 and 4.4**

**Optional Paper (d): COMPUTER INTENSIVE STATISTICAL METHODS**

 (Effective from the admitted batch of 2016-2017)

Time: Three hours Maximum: 80 marks

Answer any **FIVE** questions, choosing **ONE** from each unit.

All questions carry equal marks.

**UNIT- I**

1. (a) Explain the following methods of generating non-uniform random variates:
2. Composition method
3. Convolution method.

 (b) Explain the Linear Transformation method of generating a multivariate normal random vector.

1. (a) State and prove the Acceptance/Rejection algorithm for generating continuous non-uniform

 random variates . What are the assumptions needed to improve the efficiency of the method.

 (b) Explain how to simulate a homogeneous Poisson process.

**UNIT- II**

1. (a) What are the Antithetic Variables? How are they useful in the reduction of Variance of a

 Monte Carlo estimator? Using Uniform random variables, devise an antithetic variate estimator

 for estimating , where is a monotonic function.

 (b) Explain Control Variate Method of reducing the variance of a Monte Carlo estimator.

1. (a) Describe Importance Sampling. Explain how an instrumental distribution is selected. What are

 the applications of importance sampling.

 (b) How is Monte Carlo Integration useful? Give Crude Monte Carlo Algorithm for estimating the

 integral

**UNIT- III**

1. (a) Explain Metropolis-Hastings Algorithm for generating random samples from a density.

(b) Explain the permutation test for a two-sample location problem.

1. (a) Explain Gibbs Sampling for multivariate simulation.

(b) Explain Simulated Annealing Algorithm. Mention some of its applications.

**UNIT- IV**

1. (a) Outline the parametric and non-parametric bootstrapping methods.

(b) Explain the bootstrap percentile confidence intervals.

1. (a) Describe the process of obtaining the bootstrap estimate of the standard error of an estimator.

(b) Explain the use of bootstrapping to estimate the sampling distribution of the regression

 coefficient in simple linear regression.

**UNIT- V**

1. (a) Describe the procedure for Jackkinifing a plug-in estimator. Show that the Jackknife bias-

 corrected estimator of the parameter is the usual unbiased estimator of .

(b) Describe the Jackknife bias estimation procedure for the ratio method of estimation in sample

 surveys.

1. (a) Define Cross-Validation (CV). Explain how to asses the performance of a predictive model using

 CV

(b) Explain the Leave-One-Out Cross-Validation and K-fold Cross-Validation.

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