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उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

अधिन्यास (Assignment)

2014-2015

परास्नातक विज्ञान कार्यक्रम (एम०एस०सी०)

Master of Science Programme (M.Sc.)

विषय : सांख्यिकी विषय कोड : पी.जी.एस.टी.ए.टी./
 Subject : Statistics एम.ए.एस.टी.ए.टी.
 कोर्स शीर्षक : Subject Code: PGSTAT/MASTAT
 Course Title: Advanced कोर्स कोड : पी.जी.एस.टी.ए.टी./
 Statistical एम.ए.एस.टी.ए.टी.-01
 Inference Course Code : PGSTAT/MASTAT-01

अधिकतम अंक : 30
 Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
 Maximum Marks : 18

- Note :** 1. Attend all questions.
2. Section 'A' contains 3 long answer type questions. Answer should be given in 800 to 1000 words.
3. Section 'B' contains 3 short answer type questions. Answer should be given in 200 to 300 words.
1. Let $f(x) = x$, $g(x) = x^2$, Does $\int_0^1 f dg$ exist? If yes, solve it. 6
2. Find the Fourier expression of 6
 $f(x) = x + x^2$; $-\pi < x < \pi$.
3. Discuss various modes of convergence in detail. 6

Section - B

अधिकतम अंक : 12
 Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. Prove that a monotonic function on $[a, b]$ has finite variation on $[a, b]$. 2
5. Prove that if g is an increasing function on $[a, b]$ and if f is non-negative and integrable with respect to g on $[a, b]$, then 2
 $\int_0^1 f dg \geq 0$.
6. Evaluate $\int_0^2 [x] dn^2$ 2
7. Obtain the constant term and the coefficient of the first sine and cosine terms in the Fourier series of $f(x)$ such that. 2

X	0	1	2	3	4	5
f(x)	9	18	24	28	26	20

8. Let (x, d) be a metric space and let A and B be arbitrary subsets of X then (i) $A - B = A \cap B^c$ (ii) $\overline{A \cap B} \subseteq \overline{A} \cap \overline{B}$ 2
9. Explain the following terms (with example) 2
 (i) Continuity.
 (ii) Compactness.

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Master of Science Programme (M.Sc.)

विषय : सांख्यिकी विषय कोड : पी.जी.एस.टी.ए.टी./
Subject : Statistics एम.ए.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: PGSTAT/MASTAT
Course Title: Probability and कोर्स कोड : पी.जी.एस.टी.ए.टी.-02/
Distribution एम.ए.एस.टी.ए.टी.-02
Course Code : PGSTAT-02/
MASTAT-02

अधिकतम अंक : 30

Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18

Maximum Marks : 18

Note : 1. Attend all questions.

2. Section 'A' contains 3 long answer type questions. Answer should be given in 800 to 1000 words.
3. Section 'B' contains 3 short answer type questions. Answer should be given in 200 to 300 words.
1. Discuss WLLN. How is it different from SLLN and CLT? 6
2. Write a detailed note on characteristic function. 6
3. Discuss various probability axiom and their consequences in detail. 6

Section - B

अधिकतम अंक : 12

Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. State and prove Jensen's inequality. 2
5. Define probability space of a random experiment. 2
6. Find the characteristic function for 2

$$f(x) = \text{Re}^{-|x|}; -\infty < x < \infty$$

7. Define convergence in probability & prove

$$X_n \xrightarrow{P} R \Rightarrow X_n^2 \xrightarrow{P} R^2 \quad 2$$

8. State Lindeberg - Levy theorem. 2
9. State Holder's inequality and its importance. 2

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Master of Science Programme (M. Sc.)

विषय : सांख्यिकी विषय कोड : एम.ए..एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : सांख्यिकी Subject Code: MASTAT/PGSTAT
Course Title: Statistical Inference कोर्स कोड : एम.ए..एस.टी.ए.टी.-03/
पी.जी.एस.टी.ए.टी.-03
Course Code : MASTAT-03/
PGSTAT-03

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. State and prove Rao Blackwell theorem. 6
2. On the basis of a random sample of size n from the family of normal distributions $\{N[\theta, \theta], 0 < \theta < \infty\}$, obtain a minimal sufficient statistic. 6
3. Derive Chapman, Robbins Kiefer bound. 6

खण्ड - ब
Section - B

अधिकतम अंक : 12
Maximum Marks : 12

नोट : लघु उत्तरीय प्रश्न। प्रश्नों के उत्तर 200 से 300 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं।

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. On the basis of a random sample of size n from the Poisson distribution $P(\theta)$, obtain Cramer Rao lower bound for the variance of unbiased estimator of θ^2 . 3
5. Define BAN and CAN estimators. 3
6. Prove that family of binomial distributions $\{b(n,p); 0 < p < 1\}$, is complete. 3
7. Define exponential family of distributions. 3

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Master of Science Programme (M. Sc.)

विषय : सांख्यिकी विषय कोड : एम.ए.,एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: MASTAT/ PGSTAT
Course Title: Linear Model & कोर्स कोड : एम.ए.,एस.टी.ए.टी.-04/
Designs of पी.जी.एस.टी.ए.टी.-04
Experiment Course Code : MASTAT-04/
PGSTAT-04

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. Explain Analysis of covariance. 6
2. Discuss about the split plot design. 6
3. State and prove markov theorem. 6

खण्ड - ब
Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

Write short notes on :

4. Best linear unbiased estimate (BLUE). 2
5. Turkey's Test. 2
6. Parital Confounding. 2
7. Construction of BIBD. 2
8. Analysis of Two way classified data. 2
9. Analysis of 2^3 factorial experiment. 2

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Master of Science Programme (M. Sc.)

विषय : सांख्यिकी विषय कोड : एम.ए.,एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: MASTAT/ PGSTAT
Course Title: Survey Sampling कोर्स कोड : एम.ए.,एस.टी.ए.टी.-05/
पी.जी.एस.टी.ए.टी.-05
Course Code : MASTAT-05/
PGSTAT-05

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. Discuss about the Midzuno & Narain system of sampling. 6
2. Define multi stage sampling. 6
3. Explain Desraj ordered estimates. 6

खण्ड - ब
Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

Write short notes on :

4. Non sampling errors. 3
5. Varying probability without replacement. 3
6. Two stage sampling. 3
7. Cluster sampling. 3

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2014-2015

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Master of Science Programme (M. Sc.)

विषय : सांख्यिकी विषय कोड : एम.ए..एस.टी.ए.टी./
 Subject : Statistics पी.जी.एस.टी.ए.टी.
 कोर्स शीर्षक : Subject Code: MASTAT/PGSTAT
 Course Title: Stochastic Process कोर्स कोड : एम.ए..एस.टी.ए.टी.-08/
 पी.जी.एस.टी.ए.टी.-08
 Course Code : MASTAT-08/
 PGSTAT-08

अधिकतम अंक : 30
 Maximum Marks : 30

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

Section 'A'

अधिकतम अंक : 18
 Maximum Marks : 18

1. For a two state Markov chain, under suitable assumptions, derive the expression for the probability that the process occupies state 1 at time n given that the initial probability vector is $(P_0 P_1)$. 6
2. State and prove the Chapman Kolmogorov equation for a Markov Chain. Giving some counter example, show that the equations are satisfied by non-Markovian processes also. 6

3. Stating the underlying assumptions, give the derivation of a poisson process. 6

खण्ड - ब
Section - B

अधिकतम अंक : 12
 Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. Define (i) An Ergodic Markov Chain, (ii) Stationary Markov Chain. 3
5. Find the probability distribution of interarrival time for a poisson process. 3
6. Let C_1 and C_2 be two communicative classes of a Markov chain and "S" be a state, which belongs to C_1 but not C_2 . Prove that C_1 and C_2 are disjoint. 3
7. Prove that if a Poisson process has occurred once in time interval $(0,a]$, then the point at which it occurs is distributed uniformly over interval $(0,a]$. 3

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Master of Science Programme

विषय : सांख्यिकी विषय कोड : एम.ए.एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: MASTAT/ PGSTAT
Course Title: Decision Theory कोर्स कोड : एम.ए.एस.टी.ए.टी.-09/
पी.जी.एस.टी.ए.टी.-09
Course Code : MASTAT-09/
PGSTAT-09

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. Let X_1, X_2, \dots, X_n be a random sample of size n , n from the $G(\alpha, \beta)$ distribution, with α known and β unknown. Find the best invariant estimator of β for the loss function. 6

$$L(B, a) = \left(1 - \frac{a}{\beta}\right)^2$$

2. With the help of an example, show that generalized Bayes rules need not be admissible. 6
3. Let $X \sim N(\theta, 1)$ and $\theta \sim N(0, 1)$. Obtain Bayes estimate of θ under the loss function. 6

$$L(\theta, a) = e^{-(3\theta^2/4)} (\theta - a)^2$$

Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. Define invariant decision rule. 2
5. Define extended Bayes rule. 2
6. Give examples of (i) an improper prior distribution and (ii) a proper prior distribution. 2
7. Give an example of an equalizer rule. 2
8. State minimax theorem. 2
9. Define minimal complete class. 2

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Master of Science Programme

विषय : सांख्यिकी विषय कोड : पी.जी.एस.टी.ए.टी./
Subject : Statistics एम.ए.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: PGSTAT/MASTAT
Course Title: Multivariate कोर्स कोड : पी.जी.एस.टी.ए.टी.-10/
Analysis एम.ए.एस.टी.ए.टी.-10
Course Code : PGSTAT-10/
MASTAT-10

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. Discuss about the Hoteing's T^2 distribution and its applications. 6
2. Explain Mahalanobis D^2 distribution and its various applications. 6
3. Discuss about the multiple and partial correlation coefficient. 6

Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. Wishart Distribution. 3
5. Discriminant Analysis. 3
6. Characteristic function of MND. (Multivariate normal distribution). 3
7. Maximum likelihood estimates of mean vector. 3

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2014-2015

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Master of Science Programme

विषय : सांख्यिकी विषय कोड : एम.ए.एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: MASTAT/ PGSTAT
Course Title: Nonparametrics कोर्स कोड : एम.ए.एस.टी.ए.टी./
पी.जी.एस.टी.ए.टी.-11
Course Code : MASTAT/
PGSTAT-11

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. Discuss the meaning and importance of order statistics. Also, prove that the expected area between any two consecutive order statistics is $\frac{1}{(n+1)}$, where n denotes the sample size : 6
2. Derive the distribution of r^{th} order statistics. And hence, obtain the distribution of minimum and maximum order statistics. 6
3. What do you mean by runs? Discuss the run test for randomness. 6

Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. Derive the joint distribution of r^{th} and s^{th} order statistics. 3
5. Discuss the merits and demerits of non-parameteric tests. 3
6. Write a brief note on location based tests. 3
7. Write a brief note on one sample kolmogorov Smirnov test. 3

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2014-2015

परास्नातक विज्ञान कार्यक्रम

Master of Science Programme

विषय : सांख्यिकी विषय कोड : एम.ए.एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: MASTAT/ PGSTAT
Course Title: Econometrics कोर्स कोड : एम.ए.एस.टी.ए.टी./
पी.जी.एस.टी.ए.टी.-12
Course Code : MASTAT/
PGSTAT-12

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

1. Consider the linear model given as follows : 6

$$Y = X\beta + \epsilon$$

Where X is a $n \times p$ matrix, β is a $p \times 1$ parameter vector and $\epsilon \sim N_n(Q, \sigma^2 I_n)$, I_n being identity matrix of order $n \times n$.

Obtain ordinary least square Estimator of β

2. For the model given in question number 1, consider the set of linear hypotheses about β given by $H_0 : R\beta = r$, R being a known matrix of order $a \times p$ with $a \leq p$ and r is a $\delta \times 1$ vector. Write down form of R and r for hypotheses as under : 6
- (i) $H_0 : \beta_3 = 0$
(ii) $\beta_4 + \beta_5 = 2$

3. Consider the linear model as given in question number. Describe the procedure for obtaining confidence interval for β_i , the i-th component of β . 6

Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

4. Describe dummy variable. 3
5. What do you mean by spherical disturbance? 3
6. Write down expression for R^2 . 3
7. Write down structural form of a model. 3

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Master of Science Programme

विषय : सांख्यिकी विषय कोड : एम.ए.एस.टी.ए.टी./
Subject : Statistics पी.जी.एस.टी.ए.टी.
कोर्स शीर्षक : Subject Code: MASTAT/ PGSTAT
Course Title: Demography कोर्स कोड : एम.ए.एस.टी.ए.टी.-13/
पी.जी.एस.टी.ए.टी.-13
Course Code : MASTAT-13/
PGSTAT-13

अधिकतम अंक : 30
Maximum Marks : 30

Note : Long Answer Questions. Answer should be given in 800 to 1000 Words. Answer All questions. All questions are compulsory.

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

1. Discuss about the life time survival ratio method and census survival method. 6
2. Discribe the structure of abridge life table. 6
3. Define GRR and NRR. Prove that $NRR \leq GRR$. Give the reason why NRR is less than GRR. 6

Section - B

अधिकतम अंक : 12
Maximum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 Words. All Questions are compulsory.

Write short notes on.

4. In-migration & immigration. 2
5. Basic concept of stable and stationary population. 2
6. IMR (Infant mortality rate) and CEB (Children ever Born). 2
7. Intrinsic birth rate and intrinsic death rate. 2
8. Intrinsic rate of natural increase and mean length of generation. 2
9. Types of birth intervals. 2