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उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

अधिन्यास (Assignment) | 2014-2015 |

विज्ञान में स्नातक कार्यक्रम (बी०एस०सी०)

Bachelor of Science Programme (B.Sc.)

विषय	: सांख्यिकी	विषय कोड	: यू.जी.एस.टी.ए.टी.
Subject	: Statistics	Subject Code : UGSTAT
कोर्स शीर्षक :		कोर्स कोड	: यू.जी.एस.टी.ए.टी.-01
Course Title:	Statistical Methods	Course Code : UGSTAT-01

| 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. With the help of an example describe the method of constructing pie chart.　　6

2. Define Arithmetic mean and show that it is dependent of change of origin as well as change of scale.　　6

3. Define Mean Deviation. Show that mean Deviation is minimum when measured about median of the frequency distribution.　　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. Define Harmonic Mean and give its one application.　　3

5. What is the difference between multiple bar diagram and Divided bar diagram.　　3

6. Define coefficient of variation. For what purpose is it used.　　3

7. Define range and write down its merits and demerits.　　3

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Bachelor of Arts Programme (B.Sc.)

विषय : सांख्यिकी   विषय कोड : यू.जी.एस.टी.ए.टी.

Subject : Statistics   **Subject Code** : UPSTAT

कोर्स शीर्षक :   कोर्स कोड : यू.जी.एस.टी.ए.टी.-02

Course Title: Probability and   **Course Code** : UPSTAT-02
Probability
Distribution

अधिकतम अंक : 30
Maximum Marks : 30

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

Note : (i) Answer all questions.

(ii) Question Nos. 1 to 3 are long answer questions. Answer should be given in 800 to 1000 words.

(iii) In the question No. 4 to 9, there are 6 short answer questions and should be given in 200 to 300 words.

1. For three mutually independent events A, B and C, verify if A^c, B^c, C^c are also mutually independent or not? **6**

2. Let one out of 1000 person in a population suffer from a particular disease. Assume that a test wrongly detects the person suffering from disease is 5% and test correctly detects the person suffering from disease is 99%. What is the probability that a randomly selected person tested to have disease actually has the disease? **6**

3. A fair dice is thrown two times. Let X be the number obtained in the first throw and Y be the minimum of two numbers obtained. Obtain joint pmf of (X, Y). Also obtain (i) conditional distribution of Y given X = 4, (ii) E(XY =4) **6**

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. If $A \cap B \cap C = \phi$, $A \Rightarrow B$, then find (P $(A \cap C)$. **3**

5. The pmf of a random variable X is binomial with parameters (n, p). If E[X]=10, E(X(X-1)]=95, then obtain n and p. **3**

6. A fair dice is thrown unless one obtains either 1 or 6. Let X be the number of throws then obtain E(X). **3**

7. The pdf of a random variable is given by **3**

$$f(x) = kx(1-x); 0 < x < 1$$

Find the constant k. Also obtain E(X) and P(X>1/2 | X<1/5).

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Bachelor of Science Programme (B.Sc.)

विषय	:	सांख्यिकी	विषय कोड	:	यू.जी.एस.टी.ए.टी.
Subject	:	Statistics	Subject Code	:	UGSTAT
कोर्स शीर्षक	:		कोर्स कोड	:	यू.जी.एस.टी.ए.टी.-03
Course Title	:	Correlation, Regression & Statistical	Course Code	:	UGSTAT-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. Prove that : with n number of attributes defined over a group of individuals or units, there are 3^n total numbers of classes or class frequencies. 6

2. Prove that : If a sufficient estimator exists, then maximum likelihood estimator is a function of the sufficient estimator. 6

3. (a) Discuss about the Mann-whitney U-test. 6

   (b) Write in short about the wilcoxon signed Rank Test.

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. Write short notes on :

   Goodness of fit. 2

5. Significance test for "equality of means." 2

6. Types of error. 2

7. Properties of good estimator. 2

8. Effect of change of origin and scale on the correlation coefficient. 2

9. Spearman Rank correlation coefficient. 2

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Subject	:	Statistics	Subject Code	:	UGSTAT
कोर्स शीर्षक	:		कोर्स कोड	:	यू.जी.एस.टी.ए०टी०-04
Course Title	:	Sampling Theory & Design of Experiment	Course Code	:	UGSTAT-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. For SRSWOR, Prove that 6

   $\bar{y}$ is an unbiased estimates of $\bar{Y}$ and its variance is

   $$V(\bar{y}) = \frac{N-n}{N} \frac{S^2}{n}$$

2. Prove that, 6

   The first approximation to the variance of the ratio estimator of the population total is given by.

   $$V_1\left(\hat{Y}_R\right) = \left(\frac{N-n}{Nn}\right)N^2\left(Sy^2 + R^2 Sx^2 - 2\int R\,Sy\,Sx\right)$$

3. Prove that

   $$V(\bar{y}st) \le V(\bar{Y}opt) \ge V(\bar{Y}SRSWOR)$$

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. Precision and Efficiency of a design. 2

5. Systematic Sampling. 2

6. Sampling and non sampling errors. 2

7. Sources of non responce errors. 2

8. Linear models. 2

9. Basic Principles of Design of experiment. 2

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Bachelor of Science Programme (B.Sc.)

विषय : सांख्यिकी विषय कोड : यू.जी.एस.टी.ए.टी.

Subject : Statistics   Subject Code : UGSTAT

कोर्स शीर्षक :   कोर्स कोड : यू.जी.एस.टी.ए.टी.-05

Course Title : Numerical   Course Code : UGSTAT-05
Methods & Basic
Computers

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. Differentiate between E and Δ. Also show that   6

$$\left(\frac{\Delta^2}{E}\right)e^x \cdot \frac{Ee^x}{\Delta^2 e^x} = e^x$$, the interval of differencing being h.

2. What do you understand by divided difference? Show that they are symmetrical in all the arguments.   6

3. Derive Bessel's formula in terms of central difference operator (δ) and mean value operator (μ).   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. Discuss any one method of estimating missing terms with example.   4

5. Prove that   4

$$y_x = \sum_{i=1,2,3...} \frac{(-1)^{i+1}}{ih}(Y_{x+ih} - Y_{x-ih})$$

6. Using Simpson's $\left(\frac{1}{3}\right)^{rd}$ formula prove that   4

$$\int_a^b f(x)dx = \frac{b-a}{6n}\left[f(x_0) + 4f(x_1) + 2f(x_2) + ... + f(x_{2n})\right]$$

where $x_o = a$ & $x_{2n} = b$

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Bachelor of Science Programme

विषय   : सांख्यिकी   विषय कोड   : यू.जी.एस.टी.ए.टी.
Subject   : Statistics   Subject Code : UGSTAT
कोर्स शीर्षक :   कोर्स कोड   : यू.जी.एस.टो.ए.टी.-06
Course Title: Applied   Course Code : UGSTAT-06
              Statistics

| 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 criteria of a Good Index Number.   6

2. Explain GRR and NRR. Show that NRR $\leq$ GRR. Why? When GRR will be equal to NRR.   6

3. Discuss about the component of a time series.   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. 3 - σ Central limits.   2

5. Control charts for number of defects.   2

6. Infant mortality rate and maternal mortality rate.   2

7. Total fertility rate.   2

8. Fisher's Index number.   2

9. Fitting of Exponential Trend.   2

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स्नातक विज्ञान कार्यक्रम (बी०एस०सी०)

Bachelor of Science Programme (B.Sc.)

विषय : सांख्यिकी विषय कोड : यू.जी.एस.टी.ए.टी.

Subject : Statistics Subject Code : UGSTAT

कोर्स शीर्षक : कोर्स कोड : यू.जी.एस.टी.ए.टी.-07

Course Title: Operation Research Course Code : UGSTAT-07

अधिकतम अंक : 30
Maximum Marks : 30

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.

Section 'A'

अधिकतम अंक : 18
Maximum Marks : 18

1. "Ram can buy young hens at Rs. 150 each and old hens at Rs. 120 each. The old hens lay 3 eggs per week and the young ones lay 5 eggs per week, each egg being worth Rs. 4. If any hen costs Rs. 10 per week to feed and Ram has only Rs. 3600 to spend for hens, how many of each kind should Ram buy to give a profit of more than Rs. 70 per week, assuming that Ram cannot house more than 25 hens." Formulate this problem and solve graphically. 6

2. Solve the following LPP : 6

Max $Z = 5x - 2y + 3z$

subject to $2x + 2y - z \geq 2$

$3x - 4z \leq 3$

$y + 3z \leq 3$

and $x, y, z \geq o$

3. Find the dual of the following primal problem (mention all steps) : 6

Min $Z = x + y + z$

subject to $x - 3y + 4z = 5$

$x - 2y \leq 3$

$2y - z \geq 4$

and $x, y, z \geq 0$

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. What do you mean by LPP? 2

5. Write a brief note on phases of OR problem. 2

6. Discuss geometric properties of LPP. 2

7. Write a brief note an various types of variables used in LPP. 2

8. Differentiate clearly between primal and its dual problem (with example). 2

9. Explain the following terms. 2

   (i) Feasible solution (FS)

   (ii) Basic solution (BS)

   (iii) Basic feasible solution (BFS).

   (iv) Optimum BFS.

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विषय	:	सांख्यिकी	विषय कोड	: यू.जी.एस.टी.ए.टी.
Subject	:	Statistics	Subject Code	: UGSTAT
कोर्स शीर्षक :			कोर्स कोड	: यू.जी.एस.टी.ए.टी.-08
Course Title:		Advanced Statistical Inference	Course Code	: UGSTAT-08

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. What do you mean by an unbiased estimator? It T is an unbiased estimator of Q, show that $\sqrt{T}$ and T^2 are the biased estimators of $\sqrt{Q}$, and Q^2, respectively. 6

2. What is sufficiency? Let X_1, X_2 be i,i,d. Poisson (Q) variates. Show that $(X_1 + 3X_2)$ is not sufficient for θ_1 but $(X_1 + X_2)$ is sufficient for θ. 6

3. Define UMVUE. Also, derive its uniqueness property (i.e. if T_1 and T_2 are two UMVUEs for a parameter θ then $T_1 = T_2$). 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. Write a brief note on sampling distribution. 2

5. Give an example of unbiased estimator which is not consistent and vice-versa. 2

6. Let X_1 , X_2 .... , X_n be a random sample of size n from uniform (O, θ). Then obtain sufficient estimator for θ. 2

7. Clearly differentiate between parameter and statistic. 2

8. What is C - R inequality? Discuss its importance in brief. 2

9. Compare parametric tests with non-parameteric tests. 2

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