UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY

SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-211021

ASSIGNMENT QUESTION PAPER

Session: 2026-27 **Max. Marks: 30**

Program Name: B.Sc. (Statistics)

Course Code: UGSTAT 101(N) **Course Name: Statistical Methods**

	Section A	
S.N	**Short answer type question (approx. 200 -300 words)**	**Marks 2*6=12**
1	Explain the main difference between primary data and secondary data. प्राथमिक डेटा और द्वितीयक डेटा के बीच मुख्य अंतर स्पष्ट करें।	2
2	Explain the concept of grouped and ungrouped frequency distribution. समूहीकृत और असमूहीकृत आवृत्ति वितरण की अवधारणा को समझाइए।	2
3	Explain the Ogives curves are drawn for any frequency distribution. Point out the method of finding out the values of (median, mode, quartiles, deciles and percentiles graphically. Also, write down the formula for the computation of each of them for any frequency distribution. समझाइए कि किसी भी आवृत्ति वितरण के लिए ऑगिव्स वक्र खींचे जाते हैं। ग्राफ़िक रूप से माध्यिका), मोड, चतुर्थक, दशमांश और प्रतिशतकके मान (ज्ञात करने की विधि बताइए। किसी भी आवृत्ति वितरण के लिएउनमें से प्रत्येक की गणना के लिए सूत्र भी लिखिए।	2
4	Describe the different measures of central tendency of a frequency distribution, mentioning their merits and demerits. किसी आवृत्ति वितरण की केंद्रीय प्रवृत्ति के विभिन्न मापों का उनके गुणदोषों - का उल्लेख करते हुए वर्णन करें	2
5	Explain the main difference between mean deviation and standard deviation. Show that standard deviation is independent of change of origin and scale. माध्य विचलन और मानक विचलन के बीच मुख्य अंतर स्पष्ट करें। दिखाएँ कि मानक विचलन मूल और पैमाने के परिवर्तन से स्वतंत्र है।	2
6	Describe moments. Establish the relationship between the moments about mean, i.e. Central Moments in terms of moments about any arbitrary point. आघूर्ण का वर्णन करें माध्य के .आघूर्ण के बीच संबंध स्थापित करें।	2

Section B

<table>
<tr><th>S.NO</th><th>Short answer type question (approx. 500 -800 words)</th><th>6*3=18
Marks</th></tr>
<tr><td>1.</td><td>The following table shows the distribution of 100 families according to their expenditure per week. Number of families corresponding to expenditure Groups Rs. (10-20) and Rs (30-40) are missing from the table. The median and mode are given to be RS.25 and 24. Calculate the missing frequencies and then arithmetic mean of the data
Expenditure : 0-10 10-20 20-30 30-40 40--50
No. of /families: 14 ? 27 ? 15
निम्नलिखित तालिका प्रति सप्ताह उनके खर्च के अनुसार परिवारों का 100 टेबल से .वितरण दर्शाती है। व्यय समूहों के अनुरूप परिवारों की संख्या रु .गायब हैं। माध्यिका और मोड रु (40-30) और रुपये (20-10) .और रु 25 दिए 24गए हैं, लुप्त आवृत्तियों और फिर डेटा के अंकगणितीय माध्य की गणना करें
व्यय : 10-0 20-10 30-20 40-30 50–40
परिवारों की संख्या : 14 ? 27 ? 15</td><td>6</td></tr>
<tr><td>2.</td><td>Explain the methods of measuring Skewness and kurtosis' of a frequency Distribution.
किसी आवृत्ति की तिरछापन और कुर्टोसिस मापने की वितरण विधियाँ समझाइए</td><td>6</td></tr>
<tr><td>3.</td><td>Goals scored by two teams A and B in a 'football season were as follows:
<table>
<tr><th rowspan="2">No of goals Scored in a match</th><th colspan="2">No. of Matches</th></tr>
<tr><th>A</th><th>B</th></tr>
<tr><td>0</td><td>27</td><td>17</td></tr>
<tr><td>1</td><td>9</td><td>9</td></tr>
<tr><td>2</td><td>8</td><td>6</td></tr>
<tr><td>3</td><td>5</td><td>5</td></tr>
<tr><td>4</td><td>4</td><td>3</td></tr>
</table>
Find out which team is more consistent.
फुटबॉल सीज़न में दो टीमों ए और बी द्वारा बनाए गए गोल इस प्रकार थे
<table>
<tr><th rowspan="2">एक मैच में बनाए गए गोलों की संख्या</th><th colspan="2">मैचों की संख्या</th></tr>
<tr><th>A</th><th>B</th></tr>
<tr><td>0</td><td>27</td><td>17</td></tr>
<tr><td>1</td><td>9</td><td>9</td></tr>
<tr><td>2</td><td>8</td><td>6</td></tr>
<tr><td>3</td><td>5</td><td>5</td></tr>
<tr><td>4</td><td>4</td><td>3</td></tr>
</table>
पता लगाएं कि कौन सी टीम अधिक सुसंगत है</td><td>6</td></tr>
</table>

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SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-211021

ASSIGNMENT QUESTION PAPER

Session: 2026-27 **Max. Marks: 30**

Program Name: B.Sc. (Statistics)

Course Code: UGSTAT 102(N) **Course Name: Probability Distribution and Statistical Methods**

Section A

S.N	Short answer type question (approx. 200 -300 words)	Marks 6*2=12
1	Describe conditional probability and give its frequency interpretation. Show that conditional probabilities satisfy the axioms of probability. सशर्त संभाव्यता का वर्णन करें और इसकी आवृत्ति व्याख्या दें। दिखाएँ कि सशर्त संभावनाएँ संभाव्यता के सिद्धांतों को संतुष्ट करती हैं	2
2	State and Prove Baye's Theorem. बेयस प्रमेय को बताएं और सिद्ध करें।	2
3	Show that Poission distribution is a limiting case of binomial distribution. दिखाएँ कि पॉज़ियन वितरण द्विपद वितरण का एक सीमित मामला है।	2
4	Describe negative binomial distribution. Give an example in which it occurs: Obtain its moment generating function. Hence or otherwise obtain its mean, variance and third central moment. ऋणात्मक द्विपद बंटन का वर्णन करें। एक उदाहरण दीजिए जिसमें यह घटित होता हैया अन्यथा इसका माध्य :इसका क्षण उत्पन्न करने वाला कार्य प्राप्त करें। अत :, विचरण और तीसरा केंद्रीय क्षण प्राप्त करें	2
5	Describe Continuous Probability density function. सतत संभाव्यता घनत्व फ़ंक्शन का वर्णन करें	2
6	Let X_1 , X_2 ,…., X_n be a random sample from a distribution with density function $f(x) = \frac{1}{\theta} e^{\frac{-X}{\theta}}$ $\theta > 0,\ if\ X > 0$ Calculate the mean and variance of the given distribution. Also show that $\bar{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$ is unbiased for θ. मान लीजिए $X_1, X_2, ..., X_n$ घनत्व फ़ंक्शन वाले वितरण से एक यादृच्छिक नमूना है $f(x) = \frac{1}{\theta} e^{\frac{-X}{\theta}}$ $\theta > 0,\ if\ X > 0$ दिए गए वितरण के माध्य और प्रसरण की गणना करें। वो भी दिखाओ $\bar{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$ is unbiased for θ.	2

Section B

S.NO	Short answer type question (approx. 500 -800 words)	6*3=12 Marks
1.	If a random variable X follows the Poisson distribution such that P(X=1)= P(X =2), find i) the first moment about mean of the distribution, ii) P(X =0), iii) Variance of the distribution. यदि एक यादृच्छिक चर X पॉइसन वितरण का अनुसरण करता है जैसे कि P(X= =(1P(X =(2, खोजें (1)वितरण के माध्य के बारे में पहला आघूर्ण (2)पी(0= एक्स), (3) वितरण का विचरण	6
2.	A factory produces certain type of product by 3 machines. The respective daily production figures are: Machine X: 400 units Machine Y: 350 units Machine Z: 250 units Past experience show that 5% of products produced by machine X, 2% by Machine Y and 4% by machine Z are defective. A product is drawn at random. What is the probability that it has been produced by machine Y, if the drawn item is found to be defective. एक फैक्ट्री 3 मशीनों द्वारा एक निश्चित प्रकार का उत्पाद तैयार करती है। संबंधित दैनिक उत्पादन आंकड़े हैं: मशीन एक्स: 400 इकाइयाँ मशीन Y: 350 इकाइयाँ मशीन Z: 250 इकाइयाँ पिछले अनुभव से पता चलता है कि मशीन X द्वारा उत्पादित 5%, मशीन Y द्वारा 2% और मशीन Z द्वारा 4% उत्पाद दोषपूर्ण हैं। एक उत्पाद यादृच्छिक रूप से निकाला जाता है। यदि निकाली गई वस्तु दोषपूर्ण पाई जाती है, तो इसकी क्या प्रायिकता है कि इसे मशीन Y द्वारा निर्मित किया गया है	6
3.	Let X be a discrete random variable having geometric distribution with parameter p. Obtain its mean and variance. Also, show that for any two positive integer S and t $$P[X > S + t \setminus X > S] = P[X > t]$$ मान लीजिए कि X एक असतत यादृच्छिक चर है जिसका पैरामीटर p के साथ ज्यामितीय वितरण है। इसका माध्य और प्रसरण प्राप्त करें। यह भी दिखाएँ कि किन्हीं दो धनात्मक पूर्णांकों S और t के लिए $$P[X > S + t \setminus X > S] = P[X > t]$$	6

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SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-211021

ASSIGNMENT QUESTION PAPER

Session: 2026-27 **Max. Marks: 30**

Program Name: B.Sc. (Statistics)

Course Code: UGSTAT 103(N) **Course Name: sampling Theory and Design of Experiments**

Section A

S.N	Short answer type question (approx. 200 -300 words)	Marks 6*2=12
1	Explain the different methods for collecting the sample under simple random sampling. (SRS)	2
2	Explain allocation of sample size in Stratified random Sampling	2
3	Compare Systematic Sampling over Stratified Random Sampling.	2
4	Discuss about the basic principle of Design of experiment.	2
5	Write the basic assumptions of RBD. Also discuses its advantages and disadvantages.	2
6	Define Latin square design. Give an example of Latin square of order 4.Mention the advantages and disadvantages of a Latin square design.	2

Section B

S.NO	Short answer type question (approx. 500 -800 words)	6*3=12 Marks
1.	If population consists of a linear trend, than prove that $V(\bar{Y}_{St}) \geq V(\bar{Y}_{Sys}) \geq V(\bar{Y}_{SRSWOR})$	6
2.	Give the complete layout and statistical analysis of RBD. Also give its ANOVA table.	6
3.	Construct a 2^5 design in blocks of 8 plots confounding ABC, ADE and BCDE. Give the analysis of such a design with r replications	6

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SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-211021

ASSIGNMENT QUESTION PAPER

Session: 2026-27 **Max. Marks: 30**

Program Name: B.Sc. (Statistics)

Course Code: UGSTAT 104(N) **Course Name: Applied Statistics**

Section A

S.N	Short answer type question (approx. 200 -300 words)	Marks 6*2=12
1	Explain the problems that arise in connection with the construction of an index number.	**2**
2	Explain Laspeyres' and Paasche's Index Numbers	**2**
3	Explain briefly the additive and multiplicative models of time series. Which of these models is more commonly used and why	**2**
4	Explain briefly the components of time series	**2**
5	Discuss Malthusian theory of demographic change. Can it be applied universally?	**2**
6	A statistical quality controller uses the $\bar{X}$ and R-charts together for monitoring the quality characteristic of a product. Samples of size 5 are taken from the manufacturing process at regular intervals. A normally distributed quality characteristic is measured and the $\bar{X}$ and R are calculated for each sample. After 20 samples have been analyzed, we have $\bar{\bar{X}} = 6.40$ and $\bar{R}$= 0.0877. Compute the centre line and control limits for the $\bar{X}$ and R-charts	**2**

Section B

S.NO	Short answer type question (approx. 500 -800 words)	6*3=12 Marks
1.	Show that fisher is ideal index number.	6
2.	A researcher wants to study the pattern of sales of new single house in a region. She collects the data of the number of new single house sales for 15 months in that region which are given as follows:	6

month	Sales of New Single House	Month	Sales of New Single House
1	116	9	290
2	154	10	300
3	175	11	315
4	207	12	345
5	225	13	353
6	230	14	385
7	245	15	410
8	270		

	For the data: (i) Plot the time series data and comment on any features of the data that you see. (ii) (ii) If the plot will show non-stationarity then transfer the data using first difference and plot new time series data. (iii) (iii) What impact has differencing had on the time series? Is the new time series stationary or nonstationary?	
3.	Explain double sampling plan.	6

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2026.27

Course Code: *DECSTAT-105*	*Course Title-Advance Statistical Inference*	*Maximum Marks : 30*

Section - A

Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. State and prove Crammer - Rao inequality.
2. Distinguish parametric and non parametric test.
3. Prove that the sampling from $N(\mu, \sigma^2)$ population , the sample mean is consistent estimator of μ.
4. Define MVU estimators. Also obtain the MVUE for μ in the normal population $N(\mu, \sigma^2)$, where σ^2 is known.

Section - B

Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words

1. Write short notes on (a) Power of test (b) Level of Significance
2. Discuss about the confidence interval and confidence coefficient.
3. Define Consistent estimator.
4. Let X_1 , X_2 ..... , X_n be a random sample of size n from uniform (O, θ). Then obtain sufficient estimator for θ.
5. What do you mean by Hypothesis? Discuss about its type and also types of error.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2026.27

Course Code:	***Course Title:***	***Maximum Marks : 30***
DECSTAT - 106	***Basic Knowledge of Statistical Software***	

Section- A

Long Answer Questions

Note: Attempt all questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Volcanologist have measured the hydrogen content (in % of total number of atoms) of sample of gases collected from the 1970 and 1971 Mount Etna volcanic eruptions. Values are given in the following table:

1970		1971	
Hydrogen Content (%)		Hydrogen Content(%)	
35.8	38.5	42.0	45.0
45.5	36.0	57.0	44.6
35.5	40.5	42.0	48.5
32.0	35.5	54.5	63.0
50.0	45.5	35.0	55.0
39.0	37.0	52.0	40.0
37.0	36.0	43.5	37.5
47.0	53.0	48.0	53.7

(a) Calculate a mean hydrogen content value for the 1970 eruption and use Student's t-distribution to find the 95% confidence limits for the true value.

2. If the population of shell length to width ratios of a species of bivalve is normally distributed with a mean of 1.65 and a standard deviation of 0.05, what is the probability that any one shell picked at random has a length-to-width ratio: (i) less than 1.65 (ii) within two standard deviations of the mean.
3. 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_O P_1).
4. Stating the underlying assumptions, give the derivation of a Poisson process.

Section - B

Short Answer Questions

Note: Answer all questions. Answer should be given in 200 to 300 Words.

Maximum Marks: 12

1. Briefly explain the use of the following commands in MATLAB:

   a. grid ( )

   b. plot ( )

   c. title ( )

2. Write short notes on SPSS. Also define the Data view and variable view.
3. Find the probability distribution of inter arrival time for a Poisson process.
4. Prove that if a Poisson process has occurred once in time interval (O,a], then the point at which it occurs is distributed uniformly over interval (0,a].
5. Write down the steps to calculate the correlation coefficient.

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सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2026.27

Course Code: *DECSTAT-108*	*Course Title - Official Statistics*	*Maximum Marks : 30*

Section - A

Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Discuss about the use of statistics in different fields.
2. Discuss about the various optical agencies responsible for data Collection.
3. Write an essay on the cost of living index number in India.
4. Write a detailed note on components of time series.

Section - B

Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words

1. Discuss about the GRR and NRR.
2. Discuss about the Hypothesis. Also give its types.
3. What is Census?
4. Define migration how can its effects the population of any area.
5. How can we use the principles of design of experiments in the field of Agriculture?

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,प्रयागराज

सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2026.27

Course Code: *DECSTAT-109*	*Course Title - Operation Research*	*Maximum Marks : 30*

Section - A

Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Discuss about the Linear Programming Also Define the different steps for Graphical solution to LPP.

2. Write a detailed not on classification of models used in operations research.

3. Solve the following LPP :

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

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

   $3x - 4z \leq 3$

   $y + 3z \leq 3$

   and $x, y, z \geq o$

4. Define Vogel's Approximation Method (VAM).

Section - B

Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Discuss in brief about the Hungarian method.

2. Discuss geometric properties of LPP..

3. Soles the following LPP graphically (give all steps).

   Max. $Z = 3x + 2y$, subject to $x-y \leq 1$, $x+ y \geq 3$ and $x, y \geq o$.

4. Write a brief note a various types of variables used in LPP.
5. Discuss about the Pay off matrix.

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सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2026.27

Course Code: SBSSTAT-04	*Course Title: Numerical Methods & Basic Computers Knowledge*	*Maximum Marks : 30*

Section - A

Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Describe (a) Trapezoidal rule (b) Eular- Maculerain Formula

2. What is numerical differentiation? Derive the relationship between differential operator (D) and Shift operator (E).

3. Distinguish between Machine Language and Programming language. Describe high level language.
4. Write a defiled Comparative note on various low-level and high-level programme languages.

Section - B

Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Write short note on Simpson's one third rule
2. Discuss in brief Waddle's rule

3. Discuss about the Stirling's formula and Bessel's formula.

4. Discuss any one method of estimating missing terms with example.

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