उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

अधिन्यास (Assignment) **2015-2016**

परास्नातक कार्यक्रम
Post Graduate Programme

विषय : सांख्यिकी **विषय कोड** :एम.ए.एस.टी.ए.टी

Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Probability and Distribution **Course Code: MASTAT-01(N)/ MASTAT-02(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. State and prove Linderberg-Levy theorem.
2. Write down the axiomatic definition of probability. Let A, B and C be three events. Prove that -
   (i) $P(A\cup B\cup C) = P(A)+P(B)+P(C)$
   Provided, $A\cap B=\Phi$, $B\cap C=\Phi$, $A\cap C=\Phi$
   (ii) For any event A, $0\le P(A)\le 1$

3. Define characteristic function of qrandom variable. State some of its important properties.

SECTION 'B'

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

4. Does the WLLN holds for the sequence $\{X_k\}$

   Such that $P\{X_k = \pm 2^k\} = \frac{1}{2}$?

5. Let $\{X_n\}$ be a strictly decreasing sequesnce of random variables which assume positive values only and suppose that $X_n \xrightarrow{a.s.} 0$
6. Let X~N(0,1). Obtain the characteristic function of X.
7. Let $X_1, X_2 - - X_n$ be qrandom sample of size n from the Poisson distribution with parameter $\theta = 1$. Show that

$$\lim_{n\to\infty} e^{-n} \sum_{k=1}^{n} \frac{n^k}{k1} = 1$$

8. Let p and q be real numbers such that $\frac{1}{p}+\frac{1}{q}=1$.

   Show that

   $E(1\times Y1) \le (E1\times 1^p)^{1/p}\, E(1\Upsilon 1^q)^{1/q}$

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Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Statistical interence **Course Code: MASTAT-02(N)/ MASTAT-03(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

Note : Long Answer Question. Answer should be given in 800 to 1000 words. Answer all questions. All questions are compulsory.

1. On the basis of random sample of size n from the Pisson distribution with parameter θ, obtain UMVUE of $e^{-5\theta.}$
2. (i) With the help of an example, show that a minimal sufficient statistic need not be complete.
   (ii) With the help of an example, show that a sufficient statistic need not be complete.
3. State and prove Cramer-Rao Inequality.

SECTION 'B'

Minimum Marks : 12

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

4. Write down the general forms of one parameter exponential family of distributions. Give example of two continuous distributions which do not belong to one parameter exponential family of distributions.
5. Let $x_1, x_2 - - x_n$ be a random sample from
   $U[0, \theta]$, $\theta \in (0,\infty)$. Let $x_{(n)} = \text{Max}\ (x_1, x_2 - - x_n)$
   Show that $x_{(n)}$ is not BAN for θ.
6. Consider the family $F = \{p(n, \theta) : 0<\theta<1\}$ of probability mass functions, where
   $p(x_1, \theta) = \{(1-\theta)^x$ if x = 0,1,2.....
   O otherwise
7. On the basis of a random sample of size n from $N(0, \theta)$, obtain Cramer Rao lower bound for the variance of an unbiased estimator of $\sqrt{\theta}$.

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title :Linear models ad designee of experiments **Course Code: MASTAT-03(N)/ MASTAT-04(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. State and prove marker theorem.
2. Discuss about th analysis of covarianee and ANCOVA table.

SECTION 'B'

Minimum Marks : 12

4. Discuss about the layout of split plot design.
   Write short note on -
5. Discuss about the BIBD and its parameters.
6. Partial confounding.

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title :Sampling survery **Course Code: MASTAT-04(N)/ MASTAT-05(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Discuss about the Desraj ordered estimates.
2. Write notes on Non Sampling Errores.
3. Calculate mean and variance of ratio and regression sampling.

ECTION 'B'

Minimum Marks : 12

4. Calculate mean and Nariance of SRS WOR.
5. Discuss about the Narain System of sampling.
6. Prove that - $V(\overline{Y}_{sy}) \leq (\overline{Y}_{sy}) \leq (\overline{Y}_{SRS})$

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Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Stochatic Process **Course Code: MASTAT-05(N)/ MASTAT-08(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Describe the state space and and there one step and two step marunon probability matness for the homogenous markor chain $\{x_n\}$
   A sequence of experiments as performed, in each of which two function are tossed. Let x_n be equal to thrre numbers of heads in a repeanons of the experiments.
2. A markor chain is described its state space S and mananon probability matrix.

$$P = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ \frac{1}{3} & 0 & \frac{2}{3} & 0 & 0 \\ 0 & \frac{1}{3} & 0 & \frac{2}{3} & 0 \\ 0 & 0 & \frac{1}{3} & 0 & \frac{2}{3} \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

   $S = \{0,1,2,3,4\}$
   Find there set of non recurrent states.

3. Show that $\{x(\in), \in \geq 0\}$ is not a poisson process
   $x(\in) = x_1(\in) - x_2(\in), \in \geq 0,$
   where $\{x_1(\in), \in \geq 0\}$ and $\{x_2(\in), \in \geq 0\}$ are independent poisson rocess with mean rates υ_1 and υ_2 respensevely.

SECTION 'B'

Minimum Marks : 12

Note : Short Answer Questions. Answer should be given in 200 to 300 words. All Questions are Compulsory.

4. Define stationary probility distribution
   (a) State limit theorems for eragadic chain.

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5. Find out the probability generanning function of a Simple Brancing Process.
6. State in breif random week and gambler's win problem.
7. State (Do not give the proof) fundamental theorem of probability of extinction in Branching Process.

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Mathematical Analysis **Course Code: MASTAT-07(N)/ MASTAT-01(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. State & Prove Riemann stilettos integrals. 6
2. State & Prove Baire's theorem. 6
3. Define compact spaces & compact sets. 6

Section - B

खण्ड - ब

4. Open & closed sets. 4
5. Continuity & Compactness. 4
6. Fouries Series. 4

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Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Measure Theory **Course Code: MASTAT-08(N)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Define measure space (π, ξ). Also, show that if it is a measure in $\cdot(\pi, \xi)$.
2. Show that if it is a measure on a σ - filled ξ of subsets of π and $\{E_n\}$ is a decreasing sequence of sets in ξ for which at least one has finite measure, then $\lim_n \mu(E_n) = \mu(\lim_n E_n)$.
3. State and prove uniqueness theorem.

SECTION 'B'

4. Define Borel measurable function and it utility in statistics.
5. What do you mean by convergence in measure?
6. State and prove Fatou's lemma.

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Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Survival Analysis **Course Code: MASTAT-09(N)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. What do you mean by censoreal data?

   Also, differentiate it from truncated data (in detail).

2. Define clinical trials. Write a detailed note on case-control study.

3. Write a detailed note on Cox model and its applications

SECTION 'B'

4. Define survial function. Establish its relationship with hazard function.

5. Define any one bivariate shoch model with example.

6. What is accelarated life testing?

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Reliability Theory **Course Code: MASTAT-10(N)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Define reliability. Also, differentiate it from quality, clearly.
2. What are different measures of component reliability? State and prove their relationships.
3. Write note on various system configuration.

SECTION 'B'

4. Define p-p plost with applications.
5. What do mean by a coherent system.
6. Discuss utility of cut and path sets.

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Operation Research **Course Code: MASTAT-11(N)**

अधिकतम अंक	: 30
Maximum Marks:	30

Note: Attempt all questions from each section.

Section – A

खण्ड - अ

अधिकतम अंक	: 18
Maximum Marks:	18

1. State and prove Duality theorem.
2. Discuss about the waiting time distribution for m/m/1 Model.
3. State and prove Kutin Tucker theorem.

Section – B

खण्ड - ब

अधिकतम अंक	: 12
Maximum Marks:	12

4. Discuss in short the n^{th} – Job problem.
5. Write short notes on
   (a) CPM (b) PERT
6. Define machine interference problem.
7. Discuss about the replacement problem.

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Linear algebra **Course Code: MASTAT-12(N)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. State and Prove basis extension theorem for a finite dimentsional vector space V over the field F.
2. State and Prove Cayley-Hamilton theorem.
3. Let f be the bilinear form on R^3 defined by
   $F\{(x_1,x_2,x_3), (y_1,y_2,y_3)\} = 3x_1y_1 - 2x_1y_2 + 5x_2y_1 + 7x_2y_2 - 8x_2y_3 + 4x_3y_2 - x_3y_3$.
   Find matrices of f in the bases
   (i) {(1,0,0), (0,1,0), (0,0,1)}
   (i) {(1,1,0), (1,0,1), (0,0,1)} also verify that they are corgruent.

SECTION 'B'

Minimum Marks : 12

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1. Show that $(Z_1 \times Z_2, +i)$ is a vector space over Z_2.
2. If V is a finite dimensional vector space, then prove that $T^t(B)$ is a subspace of V where T : V $\rightarrow$V is a linear transformation and B is a subspace of V. Also prove that dim $(T^t(B))$ is not less than the nullity T.
3. Let A and B be mxn matrices over a field F then prove that
   (i) $(A+B)^t = A^t+B^t$
   (ii) $(AB)^t = B^t.A^t$ where A^t is transfer of A.
4. State and prove Cauchy - Schwarz in equality.

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कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Decision theory **Course Code: MASTAT-13(N)**
MASTAT-09(O)

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

Note : Long answer question. Answer should be given 800 to 1000 words. Answer all questions All questions are compulsory.

1. What is optional decision rule. Illustrate through an example.
2. State is the basic difference between Bayes and Minimax Principles.
3. Let $x \sim p(\theta)$ and $o \sim G(\alpha,\beta)$. Obtain Bayes estimation of unknown parameter θ under the loss function.

$L(\theta, a) = (\theta - a)^2$

SECTION 'B'

Minimum Marks : 12

Note : Show Answer Question. Answer should be given in 200 to 300 words. All questions are compulsory.

4. What is the critesion of optinal decission rule.
5. (Do not give the proof) seperating hyper plane theorem.
6. Give the difference between Baye rule and extended Bayes rule.
7. What is Minimal Complete class? Illusterate through an example.
8. State and explain (Do not give the proof) Minimax theorem.
9. Describe Multiple Decision problem with example.

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Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Multivariate Analysis **Course Code: MASTAT-14(N)**
MASTAT-10(O)

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

Note : Long answer question. Answer should be given 800 to 1000 words. Answer all questions All questions are compulsory.

1. Define multivariate normal distribution with its properties. Also, show that when x is normally distributed the components are mutually independent if the covriance matrix is diagonal.
2. Write a detailed note on without distribution. Show that if $M \sim W(p,m,\sum)$ then diagonal submatrics of M themselves have a washart distribution.
3. What is T^2 statistic? Discuss its relationship with other distribution (with proof).

SECTION 'B'

Minimum Marks : 12

Note : Short question answers. Answer all questions in about 200 to 300 words.

4. Obtain MLE of mean vector for multivariate normal population.
5. Prove additive property of wishart distribution.
6. Define the concept of Mahalanobis distance with example. Also discuss its applications.
7. Write a detailed note on discriminant analysis.

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अधिन्यास (Assignment) **2015-2016**

परास्नातक कार्यक्रम
Post Graduate Programme

विषय : सांख्यिकी **विषय कोड** :एम.ए.एस.टी.ए.टी

Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Non Pare metrics **Course Code: MASTAT-15(N)**
MASTAT-11(O)

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

Note : Long answer question. Answer should be given 800 to 1000 words. Answer all questions All questions are compulsory.

1. What do you understand by order statistics? Discuss their role in non-paramatric theory. Obtain the joint distribution of maximum and minimum order statistics.
2. What do you mean by two sample location test? Discuss sign test for two sample problem.
3. What is U statistics? Obtain its distribution.

SECTION 'B'

Minimum Marks : 12

Note : Short question answers. Answer all questions in about 200 to 300 words.

4. Write a note on merits and demerits of non-parametric tests.
5. Define sums and their uses in testing randomners.
6. Show that for any absolutely continuous distribution Kolmogorov - Smirnov stastic is distribution free.
7. Prove that the expected area between any two consecutive order statistics is $\frac{1}{(n+1)}$.

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Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Econometrics **Course Code: MASTAT-16(N)/ MASTAT-12(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

1. Define econometrics. What are its limitation.
2. Write a detailed note on “Problem of Identification”.
3. Define Mahalanobis model (with applications).

SECTION ‘B’

Minimum Marks : 12

4. What is multicallinearity?
5. Discuss Durbin-Watson test.
6. State and prove Gauss Markor theorem.

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अधिन्यास (Assignment) **2015-2016**

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विषय : सांख्यिकी **विषय कोड** :एम.ए.एस.टी.ए.टी

Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Demography **Course Code: MASTAT-17(N)/ MASTAT-13(O)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

Note : Attempt all questions from each section.

1. Construct the all steps of abridged life table.
2. Discuss about the migration. Also define estimation of internal migration from duration of residence statistics.
3. Discuss about the Brass P/F ratio for adusting fertility rates.

SECTION 'B'

Minimum Marks : 12

4. Write short notes on TFR and CBE
5. GRR and NRR
6. CDR and STDR
7. IMR and CEB
8. Stable Population and Stationary Population
9. Mean length of generation and intrinsic rate of natural increase.

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अधिन्यास (Assignment) **2015-2016**

परास्नातक कार्यक्रम
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विषय : सांख्यिकी **विषय कोड** :एम.ए.एस.टी.ए.टी

Subject : Statistics **Subject Code : MASTAT**

कोर्स शीर्षक : **कोर्स कोड** : एम.ए.एस.टी.ए.टी

Course Title : Demography **Course Code: MASTAT-21(N)**

अधिकतम अंक : 30
Maximum Marks: 30

नोट : दीर्घ उत्तरीय प्रश्न । प्रश्नों के अपने उत्तर 800 से 1000 शब्दों में लिखें। सभी प्रश्न अनिवार्य हैं ।

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

Section – A

खण्ड - अ

अधिकतम अंक : 18
Maximum Marks: 18

Note : Attempt all questions from each section.

1. Discuss about the Historical evolution of computers and generations of computers.
2. Give the list of Hardware's name and also give the various name of statistical software.
3. Write short notes on
   a) The Task Bar
   b) The Control Panel
   c) The User Interface

SECTION 'B'

Minimum Marks : 12

4. Caculate mean.

x	1	2	3	4	5
f	5	8	12	7	3

5. Explain the use of MS-Excel for statistical data analysis.

   Or

   Give the steps to define the variable in M.S. Excel DecA and how to calculate correlation using M.S. Excel.
6. What is full from of SPSS.
   Write down the steps to plot the histogram by using SPSS or Excel.