

Sr No.	PhD Statistics
1	In the series 357,363,369,..... What will be the 10th term?
Alt1	405
Alt2	411
Alt3	413
Alt4	417

2	Choose word from the given options which bears the same relationship to the third word, as the first two bears: Moon: Satellite :: Earth : ?
Alt1	Sun
Alt2	Planet
Alt3	Solar System
Alt4	Asteroid

3	Door is related to Bang in the same way as Chain is related to?.....
Alt1	Thunder
Alt2	Clinch
Alt3	Tinkle
Alt4	Clank

4	Select the lettered pair that has the same relationship as the original pair of words: Emollient: Soothe
Alt1	Dynamo: Generate
Alt2	Elevation: Level
Alt3	Hurricane: Track
Alt4	Precipitation: Fall

5	Which of the following is the same as Count, List, Weight?
Alt1	Compare
Alt2	Sequence
Alt3	Number
Alt4	Measure

6	Spot the defective segment from the following:
Alt1	The downtrodden
Alt2	needs
Alt3	to be uplifted
Alt4	on a war footing

7	Choose the meaning of the idiom/phrase from among the options given: A close shave
Alt1	a nice glance
Alt2	a narrow escape
Alt3	an intimate
Alt4	a triviality

8	Lightning ----- in the same place twice.
Alt1	doesn't hit
Alt2	never strikes
Alt3	never attacks
Alt4	never falls

9	Choose the option closest in meaning to the given word: FLIPPANT
Alt1	serious
Alt2	unsteady
Alt3	irreverent
Alt4	caustic

10	Choose the antonymous option you consider the best: OBSOLETE
Alt1	obscure
Alt2	hackneyed
Alt3	current
Alt4	grasp

11	Akash scored 73 marks in subject A. He scored 56% marks in subject B and X marks in subject C. Maximum marks in each subject were 150. The overall percentage marks obtained by Akash in all the three subjects were 54%. How many marks did he score in subject C ?
Alt1	84
Alt2	86
Alt3	79
Alt4	73

12	A person starts from his house and travels 6 Km towards the West, he then travelled 4 Km towards his left and then travels 8 Km towards west and 3 Km towards South. Finally he turns right and travels 5 Km. What is the horizontal distance he has travelled from his house ?
Alt1	7 Km
Alt2	15 Km
Alt3	23 Km
Alt4	19 Km

13	If 1st Jan 2012 is a Tuesday then on which day of the week will 1st Jan 2013 fall ?
Alt1	Wednesday
Alt2	Thursday
Alt3	Friday
Alt4	Saturday

14	One morning after sunrise, Reeta and Kavita were talking to each other face to face at University. If Kavita's shadow was exactly to the right of Reeta, which direction was Kavita facing ?
Alt1	North
Alt2	South
Alt3	East

Alt4	West
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15	In an exam every candidate took History (or)Geography(or)both. 74.8%took History and 50.2% took Geography. If the Total number of candidates is 1500,how many took History and Geography both?
Alt1	400
Alt2	350
Alt3	750
Alt4	375

16	Which word includes the larger % of Vowels?
Alt1	GOOGLE
Alt2	AMAZON
Alt3	FACE BOOK
Alt4	DOE

17	A= Least prime >24; B=Greatest prime <28; Then
Alt1	A>B
Alt2	A<B
Alt3	A=B
Alt4	None

18	CL X VIII refers
Alt1	861
Alt2	701
Alt3	168
Alt4	107

19	Which of the following is larger than $\frac{3}{5}$?
Alt1	$\frac{1}{2}$
Alt2	$\frac{39}{50}$
Alt3	$\frac{7}{25}$
Alt4	$\frac{59}{100}$

20	Mr. Babu travelled 1200 km by air which formed $\frac{2}{5}$ of his trip. One third of the whole trip, he travelled by car and the rest of the journey was by train. What was the distance travelled by train?
Alt1	600km
Alt2	700 km
Alt3	800 km
Alt4	900 km

21	<p>If we have a sample of size n from a population of N units, the finite population correction is</p> <p>(a) $\frac{N-1}{N}$</p> <p>(b) $\frac{n-1}{N}$</p> <p>(c) $\frac{N-n}{N}$</p> <p>(d) $\frac{N-n}{n}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

22	<p>Under the proportional allocation, the size of the sample from each stratum is inversely proportional to</p> <p>A: total sample size</p> <p>B: size of the stratum</p> <p>C: population size</p> <p>D: population mean</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

23	<p>Which of the following basis distinguishes cluster sampling from stratified sampling?</p> <p>(i) Clusters are preferably heterogeneous whereas strata are taken as homogeneous as possible</p> <p>(ii) A sample is always drawn from each stratum whereas no sample of elementary units is drawn from clusters</p> <p>(iii) Small size clusters are better whereas there is no such restriction for stratum size</p> <p>A: (i) & (ii) are True, but (iii) is False</p> <p>B: (i) & (iii) are True, but (ii) is False</p> <p>C: (i) is True, but (ii) & (iii) is False</p> <p>D: (i), (ii) & (iii) are True</p>
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Alt1	A
Alt2	B
Alt3	C
Alt4	D

24	<p>Classification is applicable in case of</p> <p>(i) Quantitative characters (ii) Qualitative characters</p> <p>A: Both (i) & (ii) are True B: Both (i) & (ii) are False C: (i) is True, (ii) is False D: (i) is False, (ii) is True</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

25	<p>A semi-logarithmic graph of a series increasing by a constant amount will be</p> <p>(a) a straight line at angle of 45° (b) a convex upward curve (c) a concave upward curve (d) a convex downward curve</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

26	<p>The estimate of β in the regression equation $Y = \alpha + \beta X + e$ by the method of least squares is</p> <p>(a) biased (b) unbiased (c) consistent (d) efficient</p>
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Alt1	A
Alt2	B
Alt3	C
Alt4	D

27	<p>Given $r_{12} = 0.6$, $r_{13} = 0.5$ and $r_{23} = 0.8$, the value of $r_{12.3}$ is</p> <p>(a) 0.4</p> <p>(b) 0.72</p> <p>(c) 0.38</p> <p>(d) 0.47</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

28	<p>Let the equations of the regression lines be expressed as $2X - 3Y = 0$ and $4Y - 5X = 8$. Then the correlation between X and Y is</p> <p>(a) $\sqrt{\frac{15}{8}}$</p> <p>(b) $\sqrt{\frac{8}{15}}$</p> <p>(c) $\sqrt{\frac{6}{15}}$</p> <p>(d) $\sqrt{\frac{1}{15}}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

29	<p>The test statistic for testing $H_0 : \rho = \rho_0$ with usual notations is</p> <p>(a) $Z = \frac{Z_r - Z_{\rho_0}}{1/(n-3)}$</p> <p>(b) $Z = \frac{Z_r - Z_0}{1/(n-3)}$</p> <p>(c) $Z = \frac{Z_r - Z_{\rho_0}}{1/\sqrt{(n-3)}}$</p> <p>(d) none of the above</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

30	<p>If there are k groups and each group consists on n observations, the limits of intraclass correlation are</p> <p>(a) 0 to 1</p> <p>(b) $\frac{1}{n-1}$ to 1</p> <p>(c) $-\frac{1}{n-1}$ to 1</p> <p>(d) -1 to 1</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

31	<p>Comment on an Array of void data type</p> <p>(a) it can store any data type</p> <p>(b) it only stores element of similar data type to first element</p> <p>(c) it acquires the data type with the highest precision in it</p> <p>(d) you cannot have an array of void data type</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

32	<p>The elements in the array of the following code are</p> <pre>int array[5]={5}</pre> <p>(a) 5, 5, 5, 5, 5</p> <p>(b) 5, 0, 0, 0, 0</p> <p>(c) 5, (garbage), (garbage), (garbage), (garbage)</p> <p>(d) (garbage), (garbage), (garbage), (garbage), 5</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

33	<p>Which of the following compute proportions from a contingency table?</p> <p>(a) par()</p> <p>(b) prop.table()</p> <p>(c) anova()</p> <p>(d) all of the above</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

34	<p>Which of the following evaluate the Normal probability density (with a given mean/SD) at a point?</p> <p>(a) dnorm</p> <p>(b) rnorm</p> <p>(c) pnorm</p> <p>(d) rpois</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

35	Consider the problem of testing $H_0 : \theta = 0$ against $H_1 : \theta = \frac{1}{2}$ based on a single observation X from $U(\theta, \theta + 1)$ population. The power of the test "Reject H_0 if $X > \frac{2}{3}$ " is
	(a) $\frac{1}{6}$
	(b) $\frac{5}{6}$
	(c) $\frac{1}{3}$
	(d) $\frac{2}{3}$
Alt1	A
Alt2	B
Alt3	C
Alt4	D

36	Let X_1, X_2, \dots, X_n be a random sample from a $Gamma(\alpha, \beta)$ population, where $\beta > 0$ is a known constant. The rejection region of the most powerful test for $H_0 : \alpha = 1$ against $H_1 : \alpha = 2$ is of the form
	(a) $\prod_{i=1}^n X_i > K$
	(b) $\sum_{i=1}^n X_i > K$
	(c) $\prod_{i=1}^n X_i < K$
	(d) $\sum_{i=1}^n X_i < K$
Alt1	A
Alt2	B
Alt3	C
Alt4	D

37	<p>Suppose person A and person B draw random sample of sizes 15 and 20 respectively from $N(\mu, \sigma^2)$ for testing $H_0 : \mu = 2$ against $H_1 : \mu > 2$. In both the cases the observed sample mean and sample variances are same with the values $\bar{x}_1 = \bar{x}_2 = 1.8$, $s_1 = s_2 = s$. Both of them use usual t-test and state the p-values as p_A and p_B. Then which of the following is correct?</p> <p>(a) $p_A > p_B$</p> <p>(b) $p_A = p_B$</p> <p>(c) $p_A < p_B$</p> <p>(d) can not infer anything</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

38	<p>Let X be a single observation from a population having an exponential distribution with mean $\frac{1}{\lambda}$. Consider the problem of testing $H_0 : \lambda = 2$ against $H_1 : \lambda = 4$. For the test with rejection region $X \geq 3$, let α and β denote the probabilities of Type-I and Type-II error respectively. Then</p> <p>(a) $\alpha = e^{-6}$ and $\beta = 1 - e^{-12}$</p> <p>(b) $\alpha = e^{-12}$ and $\beta = 1 - e^{-6}$</p> <p>(c) $\alpha = 1 - e^{-12}$ and $\beta = e^{-6}$</p> <p>(d) $\alpha = e^{-6}$ and $\beta = e^{-12}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

39	<p>The standard chi-squared test for a 2 by 2 contingency table is valid only if</p> <p>A: all the expected frequencies are greater than five</p> <p>B: both variables are continuous</p> <p>C: at least one variable is from a Normal distribution</p> <p>D: all the frequencies total will be less than five</p>
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Alt1	A
Alt2	B
Alt3	C
Alt4	D

40	<p>If n_1 and n_2 are large in Mann-Whitney test, the variable U is distributed with variance equal to</p> <p>(a) $\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}$</p> <p>(b) $\frac{n_1 n_2 (n_1 + n_2 - 1)}{12}$</p> <p>(c) $\frac{n_1 n_2 (n_1 + n_2)}{12}$</p> <p>(d) $\frac{n_1 n_2 (n_1 n_2 + 1)}{12}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

41	<p>Let X be a discrete random variable with moment generating function $M_X(t) = e^{0.5(e^t - 1)}, t \in \mathbb{R}$. Then $P(X \leq 1)$ equals</p> <p>(a) $e^{-\frac{1}{2}}$</p> <p>(b) $\frac{3}{2}e^{-\frac{1}{2}}$</p> <p>(c) $\frac{1}{2}e^{-\frac{1}{2}}$</p> <p>(d) $e^{-\frac{(e-1)}{2}}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

42	Let E and F be two independent events with $P(E F) + P(F E) = 1$, $P(E \cap F) = \frac{2}{9}$ and $P(F) < P(E)$. Then $P(E)$ equals
	(a) $\frac{1}{3}$
	(b) $\frac{1}{2}$
	(c) $\frac{2}{3}$
	(d) $\frac{3}{4}$
Alt1	A
Alt2	B
Alt3	C
Alt4	D

43	X and Y be two independent random variables with $X \sim U(0, 2)$ and $Y \sim U(1, 3)$. Then $P(X < Y)$ equals
	(a) $\frac{1}{2}$
	(b) $\frac{3}{4}$
	(c) $\frac{7}{8}$
	(d) 1
Alt1	A
Alt2	B
Alt3	C
Alt4	D

44	<p>The probability mass function of a random variable X is given by $P(X = x) = k \binom{n}{x}, x = 0, 1, \dots, n$, where k is a constant. The moment generating function $M_X(t)$ is</p> <p>(a) $\frac{(1 + e^t)^n}{2^n}$</p> <p>(b) $\frac{2^n}{(1 + e^t)^n}$</p> <p>(c) $\frac{1}{2^n(1 + e^t)^n}$</p> <p>(d) $2^n(1 + e^t)^n$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

45	<p>Let the probability density function of a random variable X be given by $f(x) = \alpha e^{-x^2 - \beta x}, -\infty < x < \infty$. If $E(X) = -\frac{1}{2}$, then</p> <p>(a) $\alpha = \frac{1}{\sqrt{\pi}} e^{-\frac{1}{4}}; \beta = 1$</p> <p>(b) $\alpha = \frac{1}{\sqrt{\pi}} e^{-\frac{1}{4}}; \beta = -1$</p> <p>(c) $\alpha = \sqrt{\pi} e^{-\frac{1}{4}}; \beta = 1$</p> <p>(d) $\alpha = \sqrt{\pi} e^{-\frac{1}{4}}; \beta = -1$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

46	<p>Let X_1, X_2, \dots, X_n be a random sample from a population with the probability density function $f_\theta(x) = 4e^{-4(x-\theta)}, x > \theta, \theta \in \mathbb{R}$. If $T_n = \min(X_1, X_2, \dots, X_n)$, then</p> <p>(a) T_n is unbiased and consistent estimator of θ</p> <p>(b) T_n is biased and consistent estimator of θ</p> <p>(c) T_n is biased but not consistent estimator of θ</p> <p>(d) T_n is neither unbiased nor consistent estimator of θ.</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

47	<p>Let $X_1, X_2, \dots, X_n (n > 1)$ be a random sample from a Poisson (θ) population, $\theta > 0$ and $T = \sum_{i=1}^n X_i$. Then the UMVUE of θ^2 is</p> <p>(a) $\frac{T(T-1)}{n^2}$</p> <p>(b) $\frac{T(T-1)}{n(n-1)}$</p> <p>(c) $\frac{T(T-1)}{n(n+1)}$</p> <p>(d) $\frac{T^2}{n^2}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

48	Let $\underline{X} = (X_1, X_2)$ have a bivariate normal distribution with $E(X_1) = E(X_2) = 0$; $E(X_1^2) = E(X_2^2) = 1$ and $E(X_1 X_2) = \frac{1}{2}$. Then $P(X_1 + 2X_2 > \sqrt{7})$ equals
	(a) 0.1587
	(b) 0.5
	(c) 0.7612
	(d) 0.8413
Alt1	A
Alt2	B
Alt3	C
Alt4	D

49	The pdf of a random variable X is given by $f(x) = \alpha x^{\alpha-1}$, $0 < x < 1$, $\alpha > 0$. Then the distribution of the random variable $Y = \ln X^{-2\alpha}$ is
	(a) χ_2^2
	(b) $\frac{1}{2}\chi_2^2$
	(c) $2\chi_2^2$
	(d) χ_1^2
Alt1	A
Alt2	B
Alt3	C
Alt4	D

50	From the data on marks it is observed that only 25% students got marks less than or equal to 35, 50% students got marks upto 50, but only 25% got marks above 75. Then the marks distribution should be
	(a) symmetric
	(b) negatively skewed
	(c) positively skewed
	(d) information is insufficient.
Alt1	A
Alt2	B

Alt3	C
Alt4	D

51	<p>If the two regression lines between the variables X and Y are perpendicular to each other, then their correlation coefficient is</p> <p>(a) -1</p> <p>(b) i</p> <p>(c) 0</p> <p>(d) 1</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

52	<p>If the regression line of Y on X is $Y = 23 - 2X$ and the coefficient of determination is 0.49, then the correlation coefficient is</p> <p>(a) -0.7</p> <p>(b) -0.49</p> <p>(c) 0.49</p> <p>(d) 0.7</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

53

Let X be a random variable whose probability mass functions $f_0(x)$ (under the null hypothesis H_0) and $f_1(x)$ (under the alternative hypothesis) are given by

$X = x$	0	1	2	3
$f_0(x)$	0.4	0.3	0.2	0.1
$f_1(x)$	0.1	0.2	0.3	0.4

For testing the null hypothesis $H_0 : X \sim f_0$ against the alternative $H_1 : X \sim f_1$, consider the test given by: Reject H_0 if $X > \frac{3}{2}$. If α = size of the test and β = power of the test, then

- (a) $\alpha = 0.3; \beta = 0.3$
- (b) $\alpha = 0.3; \beta = 0.7$
- (c) $\alpha = 0.7; \beta = 0.3$
- (d) $\alpha = 0.7; \beta = 0.7$

Alt1 A

Alt2 B

Alt3 C

Alt4 D

54

Let $X \sim N(0, 1)$, then the distribution of X^2 is

- A: Cauchy
- B: Normal
- C: t
- D: Chi-Square

Alt1 A

Alt2 B

Alt3 C

Alt4 D

55	<p>Suppose that $\begin{pmatrix} X_1 \\ X_2 \end{pmatrix}$ has normal with $(\mu_{2 \times 1}, \Sigma_{2 \times 2})$ distribution where $\Sigma_{2 \times 2}$ is nonsingular. Let $X_3 = -2X_2$. Then which of the following has a singular normal distribution.</p> <p>(a) $\begin{pmatrix} X_1 - 2X_2 \\ X_2 - 2X_3 \end{pmatrix}$</p> <p>(b) $\begin{pmatrix} X_1 - X_2 - X_3 \\ 2X_1 + 2X_2 \end{pmatrix}$</p> <p>(c) $\begin{pmatrix} X_1 + X_2 \\ 2X_1 + 2X_3 \end{pmatrix}$</p> <p>(d) $\begin{pmatrix} X_1 + X_2 + X_3 \\ X_1 + X_2 \end{pmatrix}$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

56	<p>Let \bar{X} and S be the sample mean vector and sample variance covariance matrix for a random sample of size N drawn from $N_p(\mu, \Sigma), \Sigma > 0$. Then a Hotelling T^2 statistic may be constructed as</p> <p>(a) $(N - 1)(\bar{X} - \mu)' S^{-1} (\bar{X} - \mu)$</p> <p>(b) $N(\bar{X} - \mu)' S^{-1} (\bar{X} - \mu)$</p> <p>(c) $\frac{1}{N-1}(\bar{X} - \mu)' S^{-1} (\bar{X} - \mu)$</p> <p>(d) $\frac{1}{N}(\bar{X} - \mu)' S^{-1} (\bar{X} - \mu)$</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

57	<p>$\mathbf{A} \sim \text{Wishart}_p(n, I_p)$ and \mathbf{Y} is a p-component random vector. Then $\frac{\mathbf{Y}'\mathbf{Y}}{\mathbf{Y}'\mathbf{A}^{-1}\mathbf{Y}}$ follows</p> <p>(a) $\chi^2(n - p + 1)$</p> <p>(b) $\frac{p}{n-p+1} F_{p, n-p+1}$</p> <p>(c) $\text{Beta}\left(\frac{n-p+1}{2}, \frac{p}{2}\right)$</p> <p>(d) None of the above</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

58	<p>Principal Component Analysis aims at deriving a new set of linearly combined measurements possessing the following properties. Detect which one does not hold.</p> <p>(a) Their loading vectors are normalized each.</p> <p>(b) Their loading vectors are orthogonal to each other.</p> <p>(c) Their variances are in a nondecreasing order.</p> <p>(d) Their covariances are negative.</p>
Alt1	A
Alt2	B
Alt3	C
Alt4	D

59	If X and Y are two random variables, then
Alt1	$E\{(XY)^2\} = E(X^2) E(Y^2)$
Alt2	$E\{(XY)^2\} = E(X^2 Y^2)$
Alt3	$E\{(XY)^2\} \geq E(X^2) E(Y^2)$
Alt4	$E\{(XY)^2\} \leq E(X^2) E(Y^2)$

60	If $X \sim b(n, p)$ then $Y = (n-X)$ is
Alt1	$b(2n, p)$
Alt2	$b(n, 1-p)$
Alt3	$b(n, p)$
Alt4	$b(2n, 1-p)$

61	In SRSWOR, the probability that a specified unit is selected at the second draw from a population of size N is
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Alt1	$\frac{1}{N}$
Alt2	$\frac{1}{N}$
Alt3	$\frac{1}{N - 2}$
Alt4	$\frac{1}{\{N(N - 1)\}}$

62	T1 and T2 are two most efficient estimators with the same variance S ² and the correlation between them is ρ, the variance of (T1 + T2)/2 is equal to
Alt1	S ²
Alt2	ρ S ²
Alt3	(1+ρ)S ² /4
Alt4	(1+ρ)S ² /2

63	For the distribution f(x; θ) = 1/θ ; 0 ≤ x ≤ θ. A sufficient estimator for θ, based on a sample X ₁ , X ₂ , ..., X _n is
Alt1	$\frac{\sum_{i=1}^n X_i}{n}$
Alt2	$\frac{\sum_{i=1}^n X_i}{n}$
Alt3	Max (X ₁ , X ₂ , ..., X _n)
Alt4	Min (X ₁ , X ₂ , ..., X _n)

64	If the sample size is large in Wilcoxon's Signed rank test, the statistic T* is distributed with variance
Alt1	n(n-1)(2n-1)/24
Alt2	n(n+1)(2n+1)/24
Alt3	n(2n+1)/12
Alt4	n(n-1)(2n+1)/12

65	In a (23, 22) experiment with 3 replications, the interaction ABC is confounded. The error degrees of freedom in the analysis of variance will be
Alt1	16
Alt2	14

Alt3	12
Alt4	10

66	The total number of Latin squares that can be obtained of order are
Alt1	16
Alt2	12
Alt3	9
Alt4	3

67	Let $S \sim W_p(K, \Sigma)$, be a p-variate Wishart distribution. For $p=1$, $W1(K, \sigma^2)$ follows
Alt1	χ^2_k distribution
Alt2	$[(\sigma^2 \chi)]_k$ distribution
Alt3	Snedecor's F-distribution with 1, p degrees of freedom
Alt4	Non-central χ^2_k distribution

68	The regression line of Y on X is $Y = 0.95X + 7.25$ and $\bar{Y} = 13.14$, the value of \bar{X} is
Alt1	5.9
Alt2	6.2
Alt3	12.5
Alt4	21.5

69	On the basis of one observation drawn from a distribution with probability density function as $f(x; \theta) = \theta \exp(-\theta x)$, if $0 \leq x \leq \infty$. The critical region defined by $x \geq 1$ for testing $H_0: \theta=1$ against $H_1: \theta=2$. The probability of type II error, β , is given by
Alt1	$\int_1^{\infty} \exp(-x) dx$
Alt2	$\int_1^{\infty} 2 \exp(-2x) dx$
Alt3	$\int_0^1 \exp(-x) dx$
Alt4	$\int_0^1 2 \exp(-2x) dx$

70	If $X \sim N(0,1)$ and $Y \sim N(5,4)$ are two independent random variables, then the variance of the random variable $Z = 2X + Y$ is
Alt1	4
Alt2	6
Alt3	8
Alt4	9

71	A random sample of five observations (3.5, 0.6, 2.7, 0.9, 1.8) drawn from a population with probability density function as $f(x) = 1/(b-a)$, $a < x < b$. Then the maximum likelihood estimates of a and b are
Alt1	(0.6, 3.5)
Alt2	(0.6, 0.9)
Alt3	(1.9, 3.5)
Alt4	(2.7, 3.5)

72	Suppose that $u \sim N_p(\mu, \Sigma)$, where μ and Σ are unknown. For testing the null hypothesis $H_0: \mu = \mu_0$ (specified) against $H_1: \mu \neq \mu_0$, the test statistic used is
Alt1	Student's t
Alt2	Hotelling T^2
Alt3	Mahalanobis D
Alt4	χ^2

73	. Let $S_1 \sim W_p(k_1, \Sigma)$ and $S_2 \sim W_p(k_2, \Sigma)$ be independent, where W_p denotes a wishart distribution. Then the distribution of $S_1 + S_2$ is
Alt1	$W_p(K_1+K_2, \Sigma)$
Alt2	$W_p(K_1+K_2, 2\Sigma)$
Alt3	$W_{2p}(K_1+K_2, \Sigma)$
Alt4	The distribution cannot be defined

74	Let $X \sim N_3(\mu, \Sigma)$ with $\mu' = [-3, 1, 4]$ and $\Sigma = \begin{bmatrix} 1 & -2 & 0 \\ 0 & 2 & 5 \\ 0 & 0 & 2 \end{bmatrix}$ which of the following random variables are independent?
Alt1	X_1 and X_2
Alt2	(X_1, X_2) and X_3
Alt3	(X_2, X_3) and X_1
Alt4	X_2 and X_3

75	If in a Latin square design with " t " treatments, such that row degrees of freedom = column degrees of freedom = treatment degrees of freedom = error degrees of freedom, then t is equal to
Alt1	3
Alt2	8
Alt3	9
Alt4	16

76	In a (35, 32) experiment the total number of interactions that can be confounded are
Alt1	3

Alt2	10
Alt3	13
Alt4	26

77	If a stratified random sample of size 45 is to be selected by Neyman allocation from a population with $N_1=150$, $N_2=350$, $S_1^2=4$, $S_2^2=9$, then the number of units to be selected from the first stratum is
Alt1	10
Alt2	20
Alt3	25
Alt4	35

78	In simple random sampling, the bias of the ratio estimator $\bar{R} = \bar{Y}/\bar{X}$ is given by
Alt1	$\frac{\text{cor}(\bar{Y}, \bar{X})}{E(\bar{X})}$
Alt2	$-\frac{\text{cor}(\bar{R}, \bar{X})}{E(\bar{X})}$
Alt3	$\frac{\text{cor}(\bar{R}, \bar{Y})}{E(\bar{X})}$
Alt4	$-\frac{\text{cor}(\bar{Y}, \bar{X})}{E(\bar{X})}$

79	The family of parametric distribution which has mean always less than variance
Alt1	Beta distribution
Alt2	Log normal distribution
Alt3	Weibull distribution
Alt4	Negative binomial distribution

80	Kruskal wallis test with the k treatment and n blocks, which is approximated to chi-square with degrees of freedom equal to
Alt1	n-1
Alt2	n-k
Alt3	k-1
Alt4	(n-1) (k-1)

81	Let X be a random variable with mean μ and variance σ^2 , the lower bound to $P[X - \mu \leq 4\sigma]$ is
Alt1	0.0625
Alt2	0.9375
Alt3	1
Alt4	0.2500

82	If (4.5, 7, 2.3, 3, 8, 7.4, 2, 5) is a random sample of size 8 from a population with probability density function as $f(x, \theta) = 1/2 e^{- x-\theta }$; $-\infty < x < \infty$, then the maximum likelihood estimate of θ is
Alt1	4.50
Alt2	4.75
Alt3	8.00
Alt4	4.90

83	Let X_1, X_2, \dots, X_n be independently and identically distributed random variables with common Uniform distribution $U(0,1)$. Then the distribution of $-2 \sum_{i=1}^n \log[X_i]$ is
Alt1	$\chi^2_{(2n)}$
Alt2	$\chi^2_{(n)}$
Alt3	t_{2n-1}
Alt4	$F_{n,n}$

84	Let x_1, x_2, \dots, x_n be a random sample of size n from $N(\mu, \sigma^2)$ and n is large. The relative efficiency of the sample median as compared to sample mean is
Alt1	$3/\pi$
Alt2	$2/\pi^2$
Alt3	$1/\pi$
Alt4	$2/\pi$

85	If all frequencies of classes are same, the value of χ^2 is
Alt1	1
Alt2	Zero
Alt3	∞
Alt4	None of the above

86	The probability mass function of a random variable X is $\begin{array}{ccc} x & : & -1 \quad 0 \quad 1 \\ p(x) & : & k \quad 2k \quad 2k. \end{array}$ The value of k is
Alt1	1/10
Alt2	1/5
Alt3	1/2
Alt4	1/3

87	While performing analysis of variance, if 10 is added to each of the observation, then the various sum of squares
Alt1	Increased by 10
Alt2	Decreased by 10
Alt3	Remains the same

Alt4	Multiplied by 10
------	------------------

88	In a spit plot design, more precision is attained for
Alt1	Main plot treatments
Alt2	Sub plot treatments
Alt3	Block differences
Alt4	All of the above

89	In simple random sampling with replacement, the same sample sampling unit may be included in the sample
Alt1	Only once
Alt2	Only twice
Alt3	More than once
Alt4	None of the above

90	Let X and Y are two independent random variables and follow the Poisson distribution with means λ_1 and λ_2 respectively, where $\lambda_1 \neq \lambda_2$. Then the conditional distribution of $[X/X+Y]$ is
Alt1	Binomial
Alt2	Poisson
Alt3	Discrete Uniform
Alt4	Negative Binomial

91	Let p be the probability that a coin will fall head in a single toss in order to test the hypothesis $H_0: p = \frac{1}{2}$ against $H_1: p = \frac{3}{4}$. The coin is tossed five times and H_0 is rejected if more than three heads are obtained. The probability of type I error is
Alt1	$\frac{3}{16}$
Alt2	$\frac{47}{128}$
Alt3	$\frac{81}{128}$
Alt4	$\frac{13}{16}$

92	From a population of size 5, the total number of possible sample of size 3 using simple random sample with replacement is
Alt1	15
Alt2	60
Alt3	250
Alt4	125

93	The difference in the mortality experiences of two communities can be done by comparing the values of
Alt1	Crude death rate
Alt2	Age specific death rate
Alt3	Standardised death rate
Alt4	Infant mortality rate

94	If $Y = 3.2X + 58$ and $X = 0.2Y - 8$ are the lines of regression of Y on X and X on Y respectively, then the value of correlation coefficient between X and Y is
Alt1	0.6

Alt2	0.7
Alt3	0.8
Alt4	0.9

95	In 1993, the sex ratio at birth was 105 males to 100 females in India. Total fertility rate was 3.54. The value of Gross reproduction rate is approximately
Alt1	1.73
Alt2	1.81
Alt3	3.37
Alt4	3.85

96	Homogeneity of several variances can be tested by
Alt1	Bartlett's test
Alt2	Fisher's exact test
Alt3	F test
Alt4	t test

97	Generally the estimators obtained by the method of moments as compared to ML estimators are
Alt1	Less efficient
Alt2	More efficient
Alt3	Equally efficient
Alt4	None of the above

98	In 2n factorial experiment conducted in RBD with r replications the error degrees of freedom would be
Alt1	$(2n-1)(r-1)$
Alt2	$2n(r-1)$
Alt3	$(2n-1-1)(r-1)$
Alt4	$(2n-1)(2n-2)$

99	The additivity of analysis of variance model is tested by
Alt1	Wilk's λ criterion
Alt2	Tukey's test
Alt3	Fisher's test
Alt4	Duncan's test

100	In a 25 factorial experiment the number of 3 factor interactions are
Alt1	10
Alt2	20
Alt3	5
Alt4	32

PU Ph D Statistics

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160 PU_2015_149

The pdf of the three-parameter Weibull reduces to that of the two parameter exponential distributon, when β takes the value:-

- ☐ $\beta = 1$
- ☐ $\beta > 1$
- ☐ $\beta < 1$
- ☐ $\beta = 0$

2 of 100

162 PU_2015_149

A one year guarantee is given based on assumption that no more than 10% of the items will be returned. Assuming an exponential distribution, what is the maximum failure rate that can be tolerated?

- ☐ 0.1054 per year
- ☐ 0.2312 per year
- ☐ 0.1465 per year
- ☐ 0.1271 per year

3 of 100

130 PU_2015_149

If X_1, X_2, \dots, X_n is a random sample from a Uniform distribution over the interval $(0, \theta)$, $\theta > 0$ then the maximum likelihood estimator of θ is the:-

- ☐ Median of the sample
- ☐ Mean of the sample
- ☐ Biggest sample observation
- ☐ Smallest sample observation

4 of 100

190 PU_2015_149

If $Y = X\beta + \varepsilon$ where X is $n \times k+1$ matrix of rank $(k+1) < n$, then $\hat{\beta} =$

- ☐ $(X'X)^{-1} \sigma^2$
- ☐ $(X'X)^{-1} X'Y$
- ☐ $(X'X)$
- ☐ $(X'X)^{-1}$

5 of 100

109 PU_2015_149

Chi-square distribution is the special type of:-

- ☐ Pareto distribution
- ☐ Weibull distribution
- ☐ Erlang distribution
- ☐ Rayleigh distribution

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208 PU_2015_149

The indirect least square method is applied to estimate the coefficients of the:-

- ☐ simultaneous equations
- ☐ reduced form equations
- ☐ structural equations
- ☐ linear equations

7 of 100

106 PU_2015_149

$$A = \begin{bmatrix} 1 & 2 & -3 & -2 \\ 1 & 3 & -2 & 0 \\ 3 & 8 & -7 & -2 \\ 2 & 1 & -9 & -10 \end{bmatrix}$$

The rank of the matrix is:-

- ☐ 4
- ☐ 3
- ☐ 2
- ☐ 1

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128 PU_2015_149

A valid t-test to assess an observed difference between two sample mean value requires:-

- (i) Both populations are independent.
- (ii) the observations to be sampled from normally distributed parent population.
- (iii) the variance to be the same for both populations.

- ☐ (i) and (ii)
- ☐ (ii) and (iii)
- ☐ (i) and (iii)
- ☐ all the three conditions

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205 PU_2015_149

Which model leads to get BLUE in estimating the regression model in the presence of heteroscedasticity?

- ☐ Two stage regression estimation
- ☐ GLS
- ☐ MLE
- ☐ OLS

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126 PU_2015_149

A hypothesis is rejected at the level of significance $\alpha = 5\%$ by a test. Then which one of the following statements is true regarding the p-value of the test.

- ☐ $p < 5\%$
- ☐ $p > 5\%$
- ☐ $p = 5\%$
- ☐ Any one of the above three can be true

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171 PU_2015_149

Let $y'_{.j}$ be the Total of known values of j^{th} column; $y'_{i.}$ be the Total of known values of i^{th} row; $y'_{..}$ be the Total of all $(rt-1)$ known values; 'r' be the number of blocks and 't' be the number of treatments, then the missing plot in R.B.D is x=

- ☐
$$\frac{r.y'_{.j} + t.y'_{i.} - y'_{..}}{(r-1)(t-1)}$$
- ☐
$$\frac{r.y'_{.j} - t.y'_{i.} + y'_{..}}{(r-1)(t-1)}$$
- ☐
$$\frac{r.y'_{.j} + t.y'_{i.} - y'_{..}}{(2r-1)(2t-1)}$$
- ☐
$$\frac{r.y'_{.j} + t.y'_{i.} - y'_{..}}{(r+1)(t+1)}$$

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123 PU_2015_149

Let $\{X_n\}$ be a sequence of random variables. X_n converges almost surely if and only if:-

- ☐ $P(\lim_{n \rightarrow \infty} X_n = X) = 1$
- ☐ $P(\lim_{n \rightarrow \infty} X_n = X) = 0$
- ☐ $P(\lim_{n \rightarrow \infty} X_n \neq X) = \alpha; 0 < \alpha < 1$
- ☐ $P(\lim_{n \rightarrow \infty} X_n \neq X) = 1$

13 of 100

127 PU_2015_149

If Type-I and Type-II errors are kept fixed, then the power of the test increases:-

- ☐ if there is an increase of sample size
- ☐ if the test is unbiased
- ☐ if sample size remains unchanged
- ☐ if there is a decrease of sample size

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204 PU_2015_149

In Koyck model, the closer the value of λ is to 1, the rate of decline in β_k :-

- ☐ depends on β_k
- ☐ depends on k
- ☐ is faster
- ☐ is slower

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154 PU_2015_149

In M/M/1: ∞ /FIFO model, the Average number of customers in the system including the service is equal to:-

- ☐ $\rho / (1-\rho)^2$
- ☐ $\rho / (1-\rho)$
- ☐ $(1-\rho) / \rho$
- ☐ $\rho^2 / (1-\rho)$

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149 PU_2015_149

In the Usual Queue model (A/B/C: E/F), F stands for:-

- ☐ Number of Service Channels
- ☐ Input/output Processes
- ☐ Queue Capacity
- ☐ Queue Discipline

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206 PU_2015_149

The Almon technique of estimating distributed lag model is better than Koyck model because in Koyck model:-

- ☐ explanatory variables exhibit multicollinearity
- ☐ the lagged explanatory variable form part of the set of explanatory variables creating estimation problem
- ☐ the number of lags is decided subjectively
- ☐ it is assumed that the beta parameter values decline geometrically

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132 PU_2015_149

The symmetric variance covariance matrix Σ will have _____ number of distinct covariances.

- ☐ $\frac{p(p+1)}{2}$
- ☐ $\frac{(p+1)}{2}$
- ☐ $\frac{(p-1)}{2}$
- ☐ $\frac{p(p-1)}{2}$

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209 PU_2015_149

The linearization of a non linear equation is based on the technique of:-

- ☐ Hit or miss method
- ☐ Taylor's series expansion
- ☐ Method of steepest descent
- ☐ Direct search method

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125 PU_2015_149

Critical region of size α which minimizes β amongst all critical regions of size α is called:-

- ☐ powerful critical region
- ☐ best critical region
- ☐ minimum critical region
- ☐ worst critical region

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147 PU_2015_149

If the upper and lower control limits of a process are changed from 3-Sigma units to 2-Sigma units, then:-

- ☐ Probability of Type I error will remain constant

- ☐ Nothing related with probability of Type I error
- ☐ Probability of Type I error will decrease
- ☐ Probability of Type I error will increase

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133 PU_2015_149

Let X_1, X_2, \dots, X_n be a random sample from a Multivariate Normal Population with mean μ and covariance matrix Σ .

- ☐ efficient statistics
- ☐ consistent estimates
- ☐ sufficient statistics
- ☐ unbiased estimates

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163 PU_2015_149

The survival function of Gamma distribution with shape parameter γ is:-

- ☐ $S(x) = \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)}; \gamma > 0, x \geq 0$
- ☐ $S(x) = 1 + \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)}; \gamma > 0, x \geq 0$
- ☐ $S(x) = \Gamma(\gamma)\Gamma_x(\gamma); \gamma > 0, x \geq 0$
- ☐ $S(x) = 1 - \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)}; \gamma > 0, x \geq 0$

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146 PU_2015_149

The control limits of a standardized fraction defectives(p) –chart:-

- ☐ does not vary with samples
- ☐ is a function of the median sample size
- ☐ is a function of the mean sample size
- ☐ varies with samples

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201 PU_2015_149

How many rows and columns are available in MS Excel 2007?

- ☐ 256 Columns & 65536 Rows
- ☐ 16834 Columns & 1045876 Rows
- ☐ 265 Columns & 66536 Rows

☐ 16384 Columns & 1048576 Rows

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210 PU_2015_149

If the central line of a c-chart is at 4, then the values of the warning limits are:-

- ☐ 0 and 8
- ☐ 3 and 5
- ☐ -2 and 10
- ☐ 2 and 6

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107 PU_2015_149

If $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1+a & 1 & 1 \\ 1 & 1 & 1+b & 1 \\ 1 & 1 & 1 & 1+c \end{bmatrix}$ then $|A|$ is equal to:-

- ☐ $(1+a)(1+b)(1+c)$
- ☐ abc
- ☐ $(1+a)(1+bc)$
- ☐ $1+abc$

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172 PU_2015_149

If population size is infinite, then sample size is:-

- ☐ necessarily finite
- ☐ un countable
- ☐ not necessarily finite
- ☐ Un restricted

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198 PU_2015_149

Which of the following is an Operating system?

- ☐ Windows 8
- ☐ SPSS
- ☐ MS Office
- ☐ STATA

30 of 100

207 PU_2015_149

In Simultaneous Equation Model (SEM), the endogenous variable in one equation may appear as:-

- ☐ dependent variable in other equation
- ☐ regressand in other equation
- ☐ parameter in other equation
- ☐ regressor in other equation

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150 PU_2015_149

If the frequency of placing order to an item is more, then the risk of running out of stock is:-

- ☐ not effected
- ☐ Equal
- ☐ less
- ☐ more

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188 PU_2015_149

Which of the following is Mallows's p statistic?

- ☐ $RSS_p / (s^2 - n - 2p)$
- ☐ $RSS_p / s^2 - n + 2p$
- ☐ $RSS_p / (n - 2p)$
- ☐ $RSS_p / s^2 - (n - 2p)$

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153 PU_2015_149

Balking, Reneging, Priority and Jockeying in Queuing systems refers to:-

- ☐ Service Patterns
- ☐ Input Mechanisms
- ☐ Queue Operational models
- ☐ Customer Behaviour in the queue

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195 PU_2015_149

For what purpose the 'variable view' in IBM SPSS's data editor is used?

- ☐ Defining characteristics of variables.
- ☐ Viewing output from data analysis.
- ☐ Entering data.
- ☐ Writing syntax.

35 of 100

161 PU_2015_149

Two parallel, identical and independent components have constant failure rate. If it is desired $R(1000)=0.95$, find the system MTTF.

- ☐ 456.3
- ☐ 546.7
- ☐ 1784.9
- ☐ 5926.5

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134 PU_2015_149

Out of the following statements which one is true for a random variable X which has a multivariate normal distribution:-

- ☐ a) Linear combination of the components of X are not normally distributed
- ☐ b) All subsets of the components of X have a Multivariate Normal distribution
- ☐ c) The conditional distributions of the components are multivariate normal
- ☐ d) The above statements (b) and (c) both are true

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189 PU_2015_149

If $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$ then $E(Y)$, $V(Y)$ are :-

- ☐ $0, \sigma^2 I$
- ☐ $\beta_0 + \beta_1 \bar{X}, 0$
- ☐ $\beta_0, 0$
- ☐ $\beta_1 \bar{X}, 0$

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197 PU_2015_149

What is the extension for an SPSS data file?

- ☐ .sov
- ☐ .sav
- ☐ .spv
- ☐ .ssv

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165 PU_2015_149

Which of the following designs are based on the mathematical models of one way and two way classifications respectively?

- ☐ LSD,CRD
- ☐ RBD,LSD
- ☐ CRD,RBD
- ☐ RBD,CRD

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131 PU_2015_149

A sufficient condition for an estimator T_n to be consistent for θ is that:-

- ☐ $\text{Var}(T_n) / E(T_n) \rightarrow 0$ as $n \rightarrow \infty$
- ☐ $E(T_n) \rightarrow \theta$ & $\text{Var}(T_n) \rightarrow 0$ as $n \rightarrow \infty$
- ☐ $\text{Var}(T_n) \rightarrow 0$ as $n \rightarrow \infty$
- ☐ $E(T_n) \rightarrow \theta$ as $n \rightarrow \infty$

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152 PU_2015_149

The Term EOQ model in the context of Inventory Modeling is related to:-

- ☐ Economic Organizational Quality
- ☐ Economic Order Quality
- ☐ Equal Optimal Quantity
- ☐ Economic Order Quantity

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175 PU_2015_149

If the population of 100 size is divided in to two stratums with sizes 60 and 40 respectively. If a sample of 20 observations to be drawn from the total population, then what are the sizes of samples from the first and second stratums respectively?

- ☐ 15,5
- ☐ 16,4
- ☐ 14,6
- ☐ 12,8

43 of 100

174 PU_2015_149

In simple random sampling with replacement variance of sample mean is equal to:-

- ☐ $\left(\frac{1}{n+1} - \frac{1}{N-1} \right) S^2$
- ☐ $\left(\frac{1}{n} - \frac{1}{N} \right) S^2$
- ☐ $\left(\frac{1}{n} - \frac{1}{N+1} \right) S^2$

☐ $\left(\frac{1}{N} - \frac{1}{n}\right) S^2$

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122 PU_2015_149

If X has probability density function (p.d.f.) $f(x) = e^{-x}; x > 0$ and $Y = \begin{cases} X & \text{if } X \geq 3 \\ 2X + 3 & \text{if } X < 3 \end{cases}$, then the expected value of Y is:-

☐ $7 - 5e^{-3}$

☐ $5 - 7e^{-3}$

☐ $5 - 7e^{-5}$

☐ $7 - 5e^{-5}$

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164 PU_2015_149

In 2^2 factorial design, the interaction effect AB is defined as:-

☐ $\frac{1}{2} [[ab] - [a] - [b] - [1]]$

☐ $\frac{1}{2} [[ab] - [a] - [b] + [1]]$

☐ $\frac{1}{2} [(ab) + (a) + (b) + (1)]$

☐ $\frac{1}{2} [(ab) - (a) - (b) + (1)]$

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129 PU_2015_149

If T_n is unbiased and consistent for θ then:-

☐ T_n^2 is unbiased and consistent for θ^2 .

☐ T_n^2 is biased but consistent for θ^2 .

☐ T_n^2 is unbiased but not consistent for θ^2 .

☐ T_n^2 is biased and not consistent for θ_2 .

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203 PU_2015_149

According to Akaike's Information Criterion (AIC) while comparing two or more models, that model is selected which has:-

☐ AIC value > 1

☐ AIC value < 1

- ☐ highest AIC value
- ☐ lowest AIC value

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148 PU_2015_149

Which of the following are relevant with respect to convex sets?

- (1) Union of Two Convex Sets;
- (2) Intersection of two convex sets;
- (3) Convex Hull

- ☐ One and Three are true
- ☐ Two and Three are true
- ☐ One and Two are True
- ☐ One, Two and Three are True

49 of 100

187 PU_2015_149

Let $\{X(t)=n\}$ be a stochastic process such that $\Pr\{X(t) = n\} = \frac{(at)^{n-1}}{(1+at)^{n+1}}, n = 1, 2, \dots$

$\Pr\{X(t) = n\} = \frac{at}{1+at}$; for $n=0$, with $E\{X(t)\}=1$ and $V\{X(t)\}=2at+1$, then $\{X(t)\}$ is:-

- ☐ Evolutionary Process
- ☐ Markov Process
- ☐ Stationary Process
- ☐ Logarithmic Process

50 of 100

105 PU_2015_149

$$2x + y - z = 3$$

$$x + y + z = 1$$

$$x - 2y - 3z = 4$$

The solution of

- ☐ (0,1,2)
- ☐ (-2,1,0)
- ☐ (2,1,0)
- ☐ (2,-1,0)

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120 PU_2015_149

The connection between almost sure convergence (a.s), convergence in probability (p) and convergence in r^{th} mean (m) is:-



a.s \Rightarrow m \Rightarrow p



a.s \Rightarrow p; p \Rightarrow m



a.s \Rightarrow p; m \Rightarrow p



m \Rightarrow a.s \Rightarrow p

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121 PU_2015_149

A non-empty class of subsets of Ω that is closed under countable unions and compliments containing the null set Φ is known as:-



Probability Space



Sigma Field



Field



Sample Space

53 of 100

108 PU_2015_149

Which of the following distributions are having the moments without moment generating function?



Pareto, Exponential and F-distributions



Pareto, Student-t and F-distributions



Pareto, Chi square and F-distributions



Pareto, Weibull and F-distributions

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124 PU_2015_149

A test T for which maximum risk under H_0 and H_1 is not more than the maximum risk of any other test T^* under H_0 and H_1 is called:-



an unbiased test



an admissible test



uniformly most powerful test



minimax test

55 of 100

196 PU_2015_149

In SPSS, how many cases need to appear in one category for chi-square?



2



1



5

☐ 6

56 of 100

199 PU_2015_149

Which of the following is a programming language?

- ☐ C & C++
- ☐ MS Excel
- ☐ SPSS
- ☐ Windows 98

57 of 100

202 PU_2015_149

The range of Durbin-Watson test statistic is:-

- ☐ 0 to 4
- ☐ 2 to 4
- ☐ 0 to 2
- ☐ 4 ± 2

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200 PU_2015_149

What is the wizard used to create the tabulation reports in MS EXCEL?

- ☐ Pivot Table
- ☐ Function
- ☐ Cross Tabulation
- ☐ All the above

59 of 100

110 PU_2015_149

If the distribution of a random variable X is symmetric about origin, then the characteristic

function $\phi_X(t)$ is:-

- ☐ Real
- ☐ One
- ☐ Zero
- ☐ Complex

60 of 100

173 PU_2015_149

To collect the data from Indian professors settled in various parts of world, the following method of data collection is more optimal in all respects:-

- ☐ placing questionnaire in website
- ☐ direct observation method
- ☐ data collection through email questionnaire
- ☐ direct interview method

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243 PU_2015_149

Let X_{ij} be the sample observation belong to i^{th} treatment and j^{th} in an experiment of 'k' treatments and 'r' blocks

analysis of variance, $\bar{X}_{..} = \sum_{i=1}^k \sum_{j=1}^r x_{ij} / rk$, $\bar{X}_{.j} = \sum_{i=1}^k x_{ij} / k$ and $\bar{X}_{i.} = \sum_{j=1}^r x_{ij} / r$ then $\sum_{i=1}^k \sum_{j=1}^r (x_{ij} - \bar{X}_{..})^2$;
 $\sum_{i=1}^k (\bar{X}_{i.} - \bar{X}_{..})^2$; $\sum_{j=1}^r (\bar{X}_{.j} - \bar{X}_{..})^2$ and $\sum_{i=1}^k \sum_{j=1}^r (x_{ij} - \bar{X}_{i.} - \bar{X}_{.j} + \bar{X}_{..})^2$ are respectively:-

- ☐ Treatment Sum of squares, Error sum of squares, Blocks sum of squares and Total sum of squares
- ☐ Total sum of squares, Treatment Sum of squares, Blocks sum of squares and Error sum of squares
- ☐ Error sum of squares, Total sum of squares, Blocks sum of squares and Treatment Sum of squares
- ☐ Blocks sum of squares, Treatment Sum of squares, Total sum of squares and Error sum of squares

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246 PU_2015_149

If $V(\bar{y}_{st})$ is minimum for fixed total size of the sample size (n) and If $n_i = n$

$$n(N_i S_i) / \sum_{i=1}^k N_i S_i^2 ; P_i = (N_i / N) \text{ then } V(\bar{y}_{st})_{Opt} =$$

- ☐ $\left(\sum_{i=1}^k p_i S_i \right)^2 - \left(\sum_{i=1}^k p_i S_i^2 \right)$
- ☐ $\frac{1}{N} \left(\sum_{i=1}^k p_i S_i \right)^2 - \frac{1}{N} \left(\sum_{i=1}^k p_i S_i^2 \right)$
- ☐ $\frac{1}{n} \left(\sum_{i=1}^k p_i S_i \right)^2 - \frac{1}{N} \left(\sum_{i=1}^k p_i S_i^2 \right)$

☐ $\frac{1}{N} \left(\sum_{i=1}^k p_i S_i \right) + \frac{1}{n} \left(\sum_{i=1}^k p_i S_i^2 \right)$

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252 PU_2015_149

What is the wizard used to create the tabulation reports in excel?

- ☐ Pivot Table Wizard
- ☐ Function Wizard
- ☐ Cross Tabulation Wizard
- ☐ Conditional Formatting

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224 PU_2015_149

The mean of non-central F distribution with n_1 and n_2 degrees of freedom and non-centrality parameter λ_1 is:-

☐ $\frac{n_1}{n_2} \frac{n_2 - 2}{n_1 + \lambda_1}$

☐ $\frac{n_1 + \lambda_1}{n_2 - 2}$

☐ $\frac{n_2}{n_1} \frac{n_1 + \lambda_1}{n_2 - 2}$

☐ $\frac{n_1}{n_2} \frac{n_2 - 2}{n_1}$

65 of 100

250 PU_2015_149

The unbiased Estimator of σ^2 for the model, If $Y = X\beta + \varepsilon$ where X is $n \times k + 1$ matrix of rank $(k + 1) < n$.

☐ $\hat{\sigma}^2 = \frac{E(SSE)}{n - k - 1}$

☐ $\hat{\sigma}^2 = \frac{E(SSE)}{k - 1}$

☐ $\hat{\sigma}^2 = \frac{E(SSE)}{n - 1}$

☐ $\hat{\sigma}^2 = \frac{E(SSE)}{n - k + 1}$

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251 PU_2015_149

Which function is used to compute the compound growth rate using MS EXCEL?

- ☐ LOGEST
- ☐ TREND
- ☐ FORECAST
- ☐ LINEST

67 of 100

225 PU_2015_149

$$\frac{1}{\pi} e^{-\frac{x^2}{4} + \frac{x}{2} - 1}$$

If the pdf of Normal distribution is given by $f(x) = \frac{1}{\pi} e^{-\frac{x^2}{4} + \frac{x}{2} - 1}$, then the mean and variance are:-

- ☐ $\frac{1}{\sqrt{2}}, 2$
- ☐ $(\sqrt{2}, \sqrt{2})$
- ☐ $\left(2, \frac{1}{\sqrt{2}}\right)$
- ☐ $\left(\sqrt{2}, \frac{1}{\sqrt{2}}\right)$

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237 PU_2015_149

Rejectable quality level denotes:-

- ☐ the best level of in-coming lot quality that consumer is willing to reject
- ☐ the worst level of in-coming lot quality that consumer is willing to reject
- ☐ the worst level of in-coming lot quality that consumer is willing to accept
- ☐ the best level of in-coming lot quality that consumer is willing to accept

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245 PU_2015_149

If the population size is 'N' and sample size is 'n', then total number of possible samples that can be obtained through SRSWR and SRSWOR respectively are:-

- ☐ $n^N; \binom{N}{n+1}$
- ☐ $N^{n+1}; \binom{N}{n+1}$
- ☐ $N^n; \binom{N}{n}$

☐ $N^{n+1}, \binom{N}{n}$

70 of 100

244 PU_2015_149

Complete the following ANOVA table :

Source of	D.F.	S.S.	M.S.
Blocks	$x - 1$	90	30
Treatments	4	y	25
Error	Z	120	10
Total	19	--	--

☐ $x=4; y=100; z=10$

☐ $x=4; y=100; z=12$

☐ $x=3; y=100; z=12$

☐ $x=4; y=90; z=12$

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241 PU_2015_149

The exponential failure rates of three components are 0.065×10^{-3} , 0.18×10^{-3} and 0.96×10^{-3} per hours. The reliability at 500 hours if these components are connected in series (parallel).

☐ $R(500) = 0.9989$ (0.5474)

☐ $R(500) = 0.4412$ (0.6342)

☐ $R(500) = 0.6342$ (0.4412)

☐ $R(500) = 0.5474$ (0.9989)

72 of 100

223 PU_2015_149

If the joint P.M.F. of (X, Y) is $P(x, y) = \frac{e^{-\lambda} \lambda^x p^y (1-p)^{x-y}}{y!(x-y)!}$; $x = 0, 1, \dots$; $y = 0, 1, 2, 3, \dots, x$;

then the probability mass functions of X given Y and Y given X $P_{Y/X}(y/x)$ and $P_{X/Y}(x/y)$ correspond to:-

☐ Poisson and Poisson

☐ Binomial and Binomial

- ☐ Binomial and Poisson
- ☐ Poisson and Binomial

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242 PU_2015_149

The exponential failure rates of three components are 0.065×10^{-3} , 0.18×10^{-3} and 0.96×10^{-3} per hours. MTTF of a system if these components are connected in series is:-

- ☐ 350 hrs.
- ☐ 230 hrs.
- ☐ 550 hrs.
- ☐ 830 hrs.

74 of 100

247 PU_2015_149

Let $\Pr\{X_n=j/X_{n-1}=j-1\}=p$; $\Pr\{X_n=j/X_{n-1}=j+1\}=q$; where $0 < p, q < 1$; $\Pr\{X_n=0/X_{n-1}=0\}=1$; $\Pr\{X_n=k/X_{n-1}=k\}=1$; then the above transitions represent:-

- ☐ Bivariate random walk of a gambler's ruin problem
- ☐ Bivariate random walk of a drunkard
- ☐ Univariate random walk of a drunkard
- ☐ Univariate random walk of a gambler's ruin problem

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248 PU_2015_149

Let 'a' and 'b' be two extreme barriers such that $\Pr\{X_n=a/X_{n-1}=a\}=1$; $\Pr\{X_n=b/X_{n-1}=b\}=0$ then:-

- ☐ 'a' is absorbing barrier, 'b' is Elastic barrier
- ☐ 'a' is Elastic barrier, 'b' is Reflecting barrier
- ☐ 'b' is Absorbing barrier, 'a' is Reflecting barrier
- ☐ 'a' is Absorbing barrier, 'b' is Reflecting barrier

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249 PU_2015_149

Test for randomness can be handling with:-

- ☐ Durbin-Watson Test
- ☐ Bon-Ferromi Test
- ☐ Brensen-Pagen test

☐ Jensen's test

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238 PU_2015_149

Let the given LPP has two variable objective function with Maximization type; All the constraints are \leq type; variables under study are ≥ 0 ; all constraints are having the non negative sign on its right hand side, then:-

- ☐ The Convex region is bounded, and optimal basic feasible solution does exist in the first quadrant of the graph.
- ☐ The Convex region is Unbounded, and it exists in the First quadrant of the graph
- ☐ The Convex region does not exist in any quadrant of the graph.
- ☐ The Convex region is bounded, and it exists in the second quadrant of the graph.

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236 PU_2015_149

Identify the wrong statement associated with Shewhart control charts.

- ☐ It can provide warning signals for impending trouble
- ☐ It can detect shift in process variation
- ☐ It can detect large shift in process mean
- ☐ It can detect small shift in process mean

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221 PU_2015_149

A set of linear equations in the matrix form $AX=B$ if:-

- ☐ A is invertible & its inverse is known.
- ☐ A is non-invertible & its inverse is not known
- ☐ A is non-invertible & its inverse is known.
- ☐ A is invertible & its inverse is not known.

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222 PU_2015_149

Let $M = \begin{pmatrix} 3 & 4 & 0 & 0 & 0 \\ 2 & 5 & 0 & 0 & 0 \\ 0 & 9 & 2 & 0 & 0 \\ 0 & 5 & 0 & 6 & 7 \\ 0 & 0 & 4 & 3 & 4 \end{pmatrix}$ then $|M|$ is:-

- ☐ 42
- ☐ 40

- ☐ 60
- ☐ 64

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295 PU_2015_149

Robust regression gives an improvement to the least square estimation in the presence of:-

- ☐ without outliers
- ☐ Censored observation
- ☐ truncated observations
- ☐ Outliers

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275 PU_2015_149

Which of the following is not true for variable control chart?

- ☐ It can be used only for quality characteristics that are measurable
- ☐ It is assumed that the underlying quality characteristic is normally distributed
- ☐ It can be used even for quality characteristics that are not measurable
- ☐ It requires smaller samples to detect an out of control signal

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277 PU_2015_149

Which of the following statement is true in the case of Pareto chart?

- ☐ It helps in identifying assignable causes that contributes to total 20% of the variation in the process
- ☐ It is symmetric in shape
- ☐ It helps in identifying assignable causes that contributes to total 80% of the variation in the process
- ☐ It is not a useful tool in process control

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263 PU_2015_149

The characteristic function of the Gamma distribution with parameters α and n is:-

- ☐ $\left(\frac{1}{\alpha - it}\right)^n$
- ☐ $(1 - \alpha it)^n$
- ☐ $\left(1 - \frac{it}{\alpha}\right)^n$
- ☐ $\left(1 - \frac{it}{\alpha}\right)^{-n}$

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297 PU_2015_149

If a fair coin is tossed 4 times, then the Mean deviation about Mean of the related probability distribution is:-

- ☐ 1/4
- ☐ 1
- ☐ 2/4
- ☐ 3/4

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291 PU_2015_149

Let a linear model $Y_i = X + \sum_{j=1}^k \beta_j X_{ij} + \varepsilon_i$ for $i=1,2,\dots,m$ then $\varepsilon_i \sim$

- ☐ $N(x\hat{\beta}, \sigma^2 I)$
- ☐ $N(0, \sigma^2 I)$
- ☐ $N(\mu, \sigma^2)$
- ☐ $N(0,1)$

87 of 100

293 PU_2015_149

What is the shortcut button used to close a excel worksheet?

- ☐ Ctrl + X
- ☐ Ctrl + W
- ☐ Ctrl + F4
- ☐ Alt + F4

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272 PU_2015_149

If A_1, A_2, \dots, A_q are independently distributed with A_i distributed according to $W(\Sigma, n_i)$ then $A = \sum_{i=1}^q A_i$ is distributed according to:-

- ☐ $W(\Sigma, \sum n_i)$
- ☐ $W(\Sigma/n_i, n_i)$
- ☐ $W(\Sigma, 1/n_i)$
- ☐ $W(\Sigma n_i, 1/n_i)$

89 of 100

271 PU_2015_149

Which of the following criteria is considered for finding the sufficient statistic using the Maximum Likelihood Estimator (MLE)?

- ☐ Rao & Blackwell
- ☐ Chapman & Kolmogorov
- ☐ Fisher & Neyman
- ☐ Rao & Cramer

90 of 100

290 PU_2015_149

The F-Statistic for $H_0: \beta_1 = 0$, in a linear model of regression in terms of R^2 is:-

- ☐ $\frac{R^2/n-k-1}{(1-R^2)/k}$
- ☐ $\frac{R^2/k}{(1-R^2)/n-k-1}$
- ☐ $\left(\frac{R}{1-R}\right)^2 \frac{(n-k-1)}{k}$
- ☐ $\frac{R^2}{1-R^2}$

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261 PU_2015_149

If $A = \begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{bmatrix}$ then $|A|$ is equal to:-

- ☐ $(a-b)(b-c)(c-a)(a+b+c)$
- ☐ $(a-b)(b-c)(c+a)$
- ☐ $(a-b)(b+c)(c-a)$

☐ $(a-b)(b-c)(c-a)$

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276 PU_2015_149

Which among the following is true for Average Outgoing Quality curve?

- ☐ It initially decreases, reaches a minimum and then increases
- ☐ It initially increases, reaches a maximum and then decreases
- ☐ It is always increasing
- ☐ It is always decreasing

93 of 100

296 PU_2015_149

If Mean and Variance of Binomial distribution are 4 and 3 respectively, then the mode of the distribution is equal to:-

- ☐ 1
- ☐ 4 and 3
- ☐ 4
- ☐ 3

94 of 100

274 PU_2015_149

The linear combination of $C^T X = C_1 X_1 + C_2 X_2 + C_3 X_3 + \dots + C_p X_p$ has mean and variance respectively are:-

- ☐ $c\mu$ and $\sum |c|$
- ☐ $c^1\mu$ and $c^1\sum c$
- ☐ $c\mu$ and $c^1\mu c$
- ☐ $|c|\mu$ and $c^1\sum c$

95 of 100

280 PU_2015_149

If the primal problem has 'm' constraints and 'n' unknown variables, all the constraints are \leq type, It has finite optimum basic feasible solution, then:-

- ☐ The dual problem has 'm' Constraints and 'n' unknown variables, the constraints are of \geq type, the dual problem has Infeasible solution
- ☐ The dual problem has 'n' Constraints and 'm' unknown variables, the constraints are of \geq type, the dual problem has finite optimum basic feasible solution
- ☐ The dual problem has 'n' Constraints and 'm' unknown variables, the constraints are of \leq type, the dual problem has Infeasible solution
- ☐ The dual problem has 'm' Constraints and 'n' unknown variables, the constraints are of \leq type, the dual problem has Infeasible solution

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273 PU_2015_149

What is the total sample variance for the following sample variance covariance matrix?

$$S = \begin{bmatrix} 3 & -3/2 & 0 \\ -3/2 & 1 & 1/2 \\ 0 & 1/2 & 1 \end{bmatrix}$$

- ☐ 5
- ☐ 1/5
- ☐ 4/3
- ☐ 2

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262 PU_2015_149

$$B = \begin{bmatrix} 5 & 2 & 2 \\ 3 & 6 & 3 \\ 6 & 6 & 9 \end{bmatrix}$$

The eigen values of the matrix are:-

- ☐ (3,3,10)
- ☐ (3,3,14)
- ☐ (3,2,10)
- ☐ (2,3,14)

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270 PU_2015_149

Which of the following distributions have involvement in median test?

- ☐ Lognormal, Binomial and Normal
- ☐ Geometric, Exponential and Normal
- ☐ Hypergeometric, Normal and Chi square
- ☐ Poisson, Beta and Power series

99 of 100

292 PU_2015_149

From which Excel ribbon, we can place header and footer for a excel document?

- ☐ Data
- ☐ View
- ☐ Insert
- ☐ Page Layout

100 of 100

294 PU_2015_149

When error terms across time series data are inter-correlated, it is known as:-

- ☐ cross correlation
- ☐ spatial auto correlation
- ☐ serial correlation
- ☐ cross autocorrelation

Examination: Ph.D. Statistics

Section 1 - Section 1

Question No.1

4.00

Bookmark ☐

Let $\{X_n\}$ be a strictly decreasing sequence of positive random variables, and suppose that X_n converges to zero in probability. Which of the following are also true:

- ☐ X_n converges to some positive quantity
- ☐ X_n converges almost surely
- ☐ X_n converges everywhere
- ☐ X_n converges in distribution

Question No.2

4.00

Bookmark ☒

Let $N(t)$ be a Poisson process with constant intensity function on \mathbb{R} . What is the covariance of $N(s)$ and $N(t)$?

- ☐ $\lambda(s-t)$, if $(t < s)$
- ☐ λs , if $s < t$
- ☐ $\lambda(t-s)$, if $s < t$
- ☐ $\lambda(s+t)$

Question No.3

4.00

Bookmark ☒

The trend equation correspond to 1981 as the origin is $Y = 148.8 + 7.2 X$. The monthly trend equation if X unit = 1 year and Y = annual demand is

- ☐ $Y = 148.8 + 0.6X$
- ☐ $Y = 148.8 + 0.05X$
- ☐ $Y = 12.4 + 0.05X$
- ☐ $Y = 12.4 + 0.6X$

Question No.4

4.00

Bookmark ☐

The following statements given in respect of Maximum Likelihood Estimation (MLE):

- I. MLE's are always unique.
- II. MLE's are not necessarily unbiased.
- III. MLE's satisfies invariance property, provided the transformation is one-to-one.

Which of the above are correct?

- ☐ Only II and III are correct
- ☐ All are correct
- ☐ Only I and III are correct
- ☐ Only I and II are correct

Question No.5

4.00

Bookmark ☐

If the percent of trend for a year in a time series is greater than 100%, it indicates that

- ☐ The actual time series value lies above the trend line and the relative cyclical residual is positive
- ☐ The actual time series value lies above the trend line and the relative cyclical residual is negative
- ☐ The actual time series value lies below the trend line and the relative cyclical residual is positive
- ☐ The actual time series value lies below the trend line and the relative cyclical residual is negative

Question No.6

4.00

Bookmark ☒

Regression modelling is a statistical framework for developing a mathematical equation that describes how

- ☐ One response and one or more explanatory variables are related
- ☐ One explanatory and one or more response variables are related
- ☐ Several explanatory and several response variables response are related
- ☐ All of these are correct.

Question No.7

4.00

Bookmark ☐

Choose the best synonym of the italicized word

Choose the best synonym of the underlined word.

Dr. Elango is in the habit of using *obsolete* words.

- ☐ simple
- ☐ difficult
- ☐ wrong
- ☐ outdated

Question No.8

4.00

Bookmark ☐

Let θ be an unknown parameter and T_1 be an unbiased estimator of θ . If $V(T_1) \leq V(T_2)$, where T_2 to be any other unbiased estimator, then T_1 is known as:

- ☐ Minimum variance unbiased estimator
- ☐ Unbiased, consistent and minimum variance estimator
- ☐ Consistent and efficient estimator
- ☐ Unbiased and efficient estimator

Question No.9

4.00

Bookmark ☒

Cpk value of 1.67 means

- ☐ process is not capable and needs improvement
- ☐ process is capable and repeatable
- ☐ process is capable but may not be repeatable
- ☐ none of the above

Question No.10

4.00

Bookmark ☐

Study the following information carefully and answer the question below it

Lakshman passes through seven lanes to reach his school. He finds that 'Truth lane' is between his house and 'Lie lane'. The third lane from his school is 'Karma lane'. 'Dharma lane' is immediately before the 'Yog lane'. He passes 'Salvation lane' at the end, 'Lie lane' is between 'Truth lane' and 'Dharma lane', the sixth lane from his house is 'Devotion lane'.

If Lakshman's house, each lane and his school are equidistant and he takes 2 minutes to pass one lane, then how long will he take to reach school from his house?

- ☐ 13 minutes
- ☐ 14 minutes
- ☐ 16 minutes
- ☐ 15 minutes

Question No.11

4.00

Bookmark ☐

When their father died, their elder brother sold the old house and _____ in a small flat in a far-off suburb

- ☐ set them down
- ☐ put them down
- ☐ put them up
- ☐ set them up

Question No.12

4.00

Bookmark ☒

This is the school where I studied till class 5.

The underlined word is a

- ☐ adjective
- ☐ pronoun
- ☐ adverb
- ☐ preposition

Question No.13

4.00

Bookmark ☐

A single equation econometric model of the demand for a product is a _____ equation in which the quantity demanded of the product is an _____ variable

- ☐ definitional, endogeneous
- ☐ structural, endogeneous
- ☐ definitional, exogeneous
- ☐ structural, exogeneous

Question No.14

4.00

Question No.14 4.00
Bookmark ☐

A pessimistic decision making criterion is

- ☐ Equally likely
- ☐ Maximax
- ☐ Maximin
- ☐ Decision making under certainty

Question No.15

4.00

Bookmark ☐The special case of Birth-Death process with $\lambda_n = n\lambda$ is called the _____ process

- ☐ Poisson
- ☐ Yule-Furry
- ☐ Immigration
- ☐ Linear growth

Question No.16

4.00

Bookmark ☒If $n=15$, $\sum x = 480$, $\sum x^2$, then the standard deviation of $y=5x-10$ is

- ☐ 112.88
- ☐ 47.56
- ☐ 100
- ☐ 96.82

Question No.17

4.00

Bookmark ☒Let X_1, X_2, \dots be iid Poisson (λ) random variables. If $S_n = \sum_{k=1}^n X_k$. If $\lambda=1$ and $n=64$, thenThe value of $P\{50 < S_n < 80\}$ is approximately

- ☐ 0.9348
- ☐ 0.7884
- ☐ 0.7329
- ☐ 0.8321

Question No.18

4.00

Bookmark ☐

Let N be number of units in a population. After the selection of one unit from the population, every k^{th} ($k < n$) unit is selected to obtain a sample of size n . Let ρ be the interclass correlation between the units of the same systematic sample. If $\rho = 1$, then the relative precision of the systematic sample with simple random sampling is:

- ☐ a function of N only
- ☐ a function of N and k only
- ☐ a function of N and n only
- ☐ a function of N, n and k

Question No.19

4.00

Bookmark ☐

Given the following statements about a one parameter exponential family of distribution:

- I. It always admits sufficient statistics.
- II. The moment estimator $\hat{\theta}$ based on sufficient statistics is CAN for θ .
- III. The asymptotic variance attains CRLB.

Which of the above are correct:

- ☐ Only I and II are correct
- ☐ Only II and III are correct
- ☐ Only I and III are correct
- ☐ All are correct

Question No.20

4.00

Bookmark ☒

If V be a collection of vectors, then V is said to be subspace, if

- ☐ V is closed under scalar multiplication
- ☐ V is closed under multiplication
- ☐ V is closed under multiplication and addition
- ☐ V is closed under addition and scalar multiplication

Question No.21

4.00

Bookmark ☒

The probability of extinction for a linear growth process with birth rate equal to death rate is

- ☐ 0
- ☐ 1
- ☐ $1/2$
- ☐ less than one

Question No.22

4.00

Bookmark ☐

Let X and Y be two random variables having a joint density function $f(x, y)$. Then to obtain the density of $U = X+Y$, the Jacobian of transformation is :

- ☐ Either -1 or 1
- ☐ 0.5
- ☐ 1
- ☐ -1

Question No.23

4.00

Bookmark ☒

The test for variance which is not robust against deviations from normality

- ☐ Chi-Square test
- ☐ Z-test
- ☐ Bartlett's test
- ☐ F-test

Question No.24

4.00

Bookmark ☐

In a design of experiments with 5 factors each considered at 2 levels, the key block is given as: (1), BC, DE, BCDE, ABD, ACD, ABE, ACE. Which one of the following gives confounded interactions?

- ☐ ADE, ABCD, BCE
- ☐ ABC, ADE, DCBE
- ☐ ACE, ABD, BCDE
- ☐ ABC, ACE, BCDE

Question No.25

4.00

Bookmark ☐

If regression analysis is used to estimate the linear relationship between the natural logarithm of the variables to be forecast and time, then the slope estimate is equal to:

- ☐ the natural logarithm of the square root of the rate of growth
- ☐ the natural logarithm of the rate of growth
- ☐ the linear trend
- ☐ the natural logarithm of one plus the rate of growth

Question No.26

4.00

Bookmark ☐

Being awarded the Best Singer in 2010 marked a _____ in her life.

- ☐ milestone
- ☐ yardstick
- ☐ sign-post
- ☐ memorial

Question No.27

4.00

Bookmark ☒

- ☐ 1
☐ 4
☐ 3
☐ 2

Question No.28

4.00

Bookmark ☐

Statement: Apart from its entertainment value of Television, its educational value cannot be ignored

Assumptions:

I. People take Television to be the means of entertainment only.

II. The educational value of Television is not realized properly

- ☐ If only assumption I is implicit
☐ If neither I nor II is implicit
☐ If only assumption II is implicit
☐ If both I and II are implicit

Question No.29

4.00

Bookmark ☐

The measure of Kurtosis of t-distribution is

- ☐ $\frac{3(n-2)}{n+4}$
☐ $\frac{n-2}{n-3}$
☐ $\frac{3(n-2)}{n-4}$
☐ $\frac{n+2}{n+4}$

Question No.30

4.00

Bookmark ☐

Economic forecasts require

- ☐ Accurate estimates of the coefficients of structural coefficients
☐ forecasts of future values of exogeneous variables
☐ appropriate theoretical models
☐ all of the above

Question No.31

4.00

Bookmark ☒

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.

- (i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
 (ii) Motivation should be organised immediately after Assessment Centre.
 (iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
 (iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

Which of the following information is not required for the above lecture arrangements?

- ☐ Only (i)
☐ Only (ii)
☐ Only (iii)
☐ All are required

Question No.32

4.00

Bookmark ☐

The goodness of fit of the fitted regression model can be checked from the value of

- ☐ Residual sum of squares.
- ☐ Coefficient of determination
- ☐ Regression coefficient
- ☐ Coefficient of correlation

Question No.33

4.00

Bookmark ☐

If $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & x \end{bmatrix}$ is an idempotent matrix, then the value of x is

- ☐ -1
- ☐ -3
- ☐ -5
- ☐ 3

Question No.34

4.00

Bookmark ☐

In many situations managers resort to sampling to draw some conclusions about a population. Which of the following is not an advantage of sampling over a census?

- ☐ Sampling usually provides information quicker than a census
- ☐ A study of sample is usually cheaper than a census
- ☐ The conclusions obtained from sampling are more accurate than census.
- ☐ In destructive testing sampling is the only available course

Question No.35

4.00

Bookmark ☐

Correct the error in the italicized part of the sentence by choosing the most appropriate options

Job was a tiny man, barely five feet tall, with a *spright walk*

- ☐ spright walk
- ☐ a sprightly walking
- ☐ spright walkingly
- ☐ a sprightly walk

Question No.36

4.00

Bookmark ☐

In decision making under _____ there are several possible outcomes for each alternative, and the decision maker knows the probability occurrence of each outcome:

- ☐ Risk
- ☐ Probability
- ☐ Certainty
- ☐ Utility

Question No.37

4.00

Bookmark ☐

The equations $2x+5=5$, $x+3y=5$, $x-2y=0$ have _____ number of solutions

- ☐ one
- ☐ zero
- ☐ two
- ☐ many

Question No.38

4.00

Bookmark ☐

Select the Pair that best represents the relationship that is given in the question:

Explore : Discover

- ☐ Tree : Wood
- ☐ Think : Relate
- ☐ Research : Learn
- ☐ Books : Knowledge

Question No.39

4.00

Bookmark ☒

If X and Y are 2 Gamma Variates $\Gamma(n_1)$ and $\Gamma(n_2)$ then the distribution of X/Y is

- $\beta_{11}(n_1 + n_2)$
- $F_{(n_1, n_2)}$
- $\Gamma(n_1 + n_2)$
- $\beta_1(n_1 + n_2)$

Question No.40

4.00

Bookmark ☐

Let X be a random variable with probability generating function (pgf), P(S). Then the pgf of 2X+1 is

- SP(S)
- P(S)/S
- S/P(S)
- SP(S²)

Question No.41

4.00

Bookmark ☒

The UCL and LCL of a basic mean chart is given as 12 and 8 respectively. If variance of the process is given as 16, then what is the sample size of the process?

- 28
- 18
- 36
- 25

Question No.42

4.00

Bookmark ☐

Given that a and b are real numbers, let $f(a, b) = ab$ and let $g(a) = a^2 + 2$. What is $f(3, g(3))$?

- 33
- 38
- 27
- 30

Question No.43

4.00

Bookmark ☐

Crumb : Bread ::

- Tea : Cup
- Flower : Vase
- Splinter : Wood
- Water : Bucket

Question No.44

4.00

Bookmark ☐

Suppose an absent minded officer puts four letters in 4 addressed envelopes. What is the probability that he will misplace every letter?

- 19/24
- 3/8
- 5/24
- 5/8

Question No.45

4.00

Bookmark ☐

For a single sampling inspection plan, it is given that $N=100, n=20$ and $p=0.02$.

If $P_a = 0.64$, then what is the value of ATI?

- 45
- 38
- 40

- 49
○ 30

Question No.46

4.00

Bookmark ☐

Choose the best synonym of the italicized word.

Children of excessively indulgent parents often become very *recalcitrant*.

- insolent
○ indolent
○ disobedient
○ dependent

Question No.47

4.00

Bookmark ☐

The ratio of number of replication required in CRD and RBD for the same amount of information is

- 5:4
○ 3:5
○ 5:3
○ 3:2

Question No.48

4.00

Bookmark ☐

Let X_1, X_2, \dots, X_n be iid with $f(x) = \theta x^{\theta-1}, 0 < x < 1, \theta > 0$. Then the Cramer-Rao Lower Bound for estimating θ is

- $n\theta$
○ $\frac{\theta^2}{n}$
○ $\frac{\theta}{n}$
○ $\frac{\theta^2}{n^2}$

Question No.49

4.00

Bookmark ☐

Let T be CAN for θ so that $T \sim AN(\theta, \sigma_T^2(\theta)/a_n^2)$ and let Ψ be a differentiable function such

that $\frac{d\Psi}{d\theta}$ is continuous and non vanishing then $\Psi(T)$ is CAN for $\Psi(\theta)$ with asymptotic variance:

- $\left(\frac{d\Psi}{d\theta}\right)^2 \frac{\sigma_T^4(\theta)}{a_n^4}$
○ $\left(\frac{d\Psi}{d\theta}\right)^2 a_n^2 \sigma_T^2(\theta)$
○ $\left(\frac{d\Psi}{d\theta}\right)^2 \frac{\sigma_T^2(\theta)}{a_n^2}$
○ $\left(\frac{d\Psi}{d\theta}\right)^2 \sigma_T^2(\theta)$

Question No.50

4.00

Rectified sampling plans are designed to answer

Bookmark ☐

- ☐ Rejected lots
- ☐ Small lots
- ☐ Accepted lots
- ☐ Subgroup lots

Question No.51

4.00

Bookmark ☒

If $X \sim \text{Poisson}(4)$ and $Y \sim \text{Poisson}(3)$, and X and Y are independent. What is the value of $E[X|(X+Y)]$, if $n = 10$?

- ☐ 6.23
- ☐ 4.23
- ☐ 5.71
- ☐ 5.32

Question No.52

4.00

Bookmark ☒

The quadratic form $6x_1^2 + 3x_2^2 + 14x_3^2 + 4x_2x_3 + 18x_1x_3 + 4x_1x_2$ is

- ☐ Positive semi definite
- ☐ Negative semi definite
- ☐ Negative definite
- ☐ Positive definite

Question No.53

4.00

Bookmark ☐

Based on the information given answer the following question.

1. In a family of six persons, there are people from three generations. Each has separate professions and they like different colours. There are two couples.
2. Shyam is an Engineer and his wife is not a doctor and she does not like Red colour.
3. Chartered Accountant likes green colour and his wife is a teacher.
4. Manisha is the mother-in-law of Sunita and she likes orange colour.
5. Vimal is the grand father of Tarun and tarun is the Principal and likes black colour.
6. Nyna is the grand daughter of Manisha and she likes blue colour. Nyna's Mother likes white colour.

What is the profession of Sunita?

- ☐ Teacher
- ☐ Principal
- ☐ Chartered Accountant
- ☐ Cannot be determined

Question No.54

4.00

Bookmark ☐

What assumptions does ANCOVA have that ANOVA does not?

- ☐ Homoscedasticity
- ☐ Homogeneity of variance
- ☐ Homogeneity of regression slopes
- ☐ Homogeneity of sample size

Question No.55

4.00

Bookmark ☐

A set of logical and mathematical operations performed in a specific sequence is called:

- ☐ Complete enumeration
- ☐ Algorithm
- ☐ Objective
- ☐ Diagnostic analysis

Question No.56

4.00

Bookmark ☐

Consider the following statements:

- I. A complete class of decision rules contains only admissible decision rules
 - II. A minimal complete class of decision rule contains only admissible decision rules
 - III. A minimal complete class of decision rule is always complete
- Which of the above is correct?

- ☐ Only I is correct
- ☐ Both II and III is correct
- ☐ only II is correct
- ☐ Both I and II is correct.

Question No.57

4.00

Bookmark ☐

The probability distribution function which is not a member of exponential family but satisfies monotonic likelihood ratio property is

- ☐ Hypergeometric
- ☐ Poisson
- ☐ Binomial
- ☐ Normal

Question No.58

4.00

Bookmark ☐

Lots are defined as bad quality, if the proportion of defectives are greater than a specified number known as

- ☐ AOQ
- ☐ LTPD
- ☐ AOQL
- ☐ ATI

Question No.59

4.00

Bookmark ☐

Statement: Ten Candidates, who were on the waiting list could finally be admitted to the course.

Assumptions:

- I. A large number of candidates were on the waiting list.
- II. Wait listed candidates do not ordinarily get admission.

- ☐ If neither I nor II is implicit
- ☐ If only assumption I is implicit
- ☐ If only assumption II is implicit
- ☐ If both I and II are implicit

Question No.60

4.00

Bookmark ☐

If X and Y are two independent non negative integer valued random variables such that $P(X=k)>0$ & $P(Y=k)>0$ for $k=0, 1, 2, \dots$ and the conditional distribution of $X/X+Y$ is binomial, then

- ☐ X is Binomial and Y is Poisson
- ☐ Both X and Y are Binomial
- ☐ Both X and Y are Poisson
- ☐ X is Poisson and Y is Binomial

Question No.61

4.00

Bookmark ☐

Wishart distribution is a generalization of

- ☐ t-distribution
- ☐ Normal distribution
- ☐ Beta distribution
- ☐ Chi-square distribution

Question No.62

4.00

Bookmark ☐

Which of the following techniques yields a simple random sample?

- ☐ Choosing volunteers from an introductory psychology class to participate
- ☐ Numbering all the elements of a sampling frame and then using a random number table to pick cases from the table.
- ☐ Listing the individuals by ethnic group and choosing a proportion from within each ethnic group at random.
- ☐ Randomly selecting schools, and then sampling everyone within the school.

Question No.63

4.00

Bookmark ☐

Let T be an estimator based on a sample X_1, X_2, \dots, X_n from a distribution with parameter θ .

Then T is a consistent estimator of θ if :

- ☐ $P\{T - \theta > \epsilon\} = 0$, for all $\epsilon > 0$
- ☐ $P\{|T - \theta| > \epsilon\} = 0$
- ☐ $\lim_{n \rightarrow \infty} P\{T - \theta < \epsilon\} = 0$, for all $\epsilon > 0$
- ☐ $\lim_{n \rightarrow \infty} P\{|T - \theta| > \epsilon\} = 0$, for all $\epsilon > 0$

Question No.64

4.00

Bookmark ☐

Suppose X is a Gamma distribution with pdf:

$$f(x) = \frac{1}{\theta^\beta \Gamma(\beta)} x^{\beta-1} e^{-x/\theta}, x \geq 0, \theta, \beta > 0$$

The moment estimator of β is

- ☐ $\frac{m_1'^2}{m_2' - m_1'}$
- ☐ $\frac{m_1'}{m_2' - m_1'}$
- ☐ $\frac{m_1'^2}{m_2' - m_1'^2}$
- ☐ $\frac{m_1'}{m_2' - m_1'^2}$

Question No.65

4.00

Bookmark ☐

Every sequence $\{X_n\}$ of independent random variables with uniformly bounded variances obeys

- ☐ SLLN
- ☐ WLLN
- ☐ Borel-Cantelli lemma
- ☐ Cauchy's criterion

Question No.66

4.00

Bookmark ☐

Let X_1, X_2, \dots, X_n be 'n' independent random variables. Let a_1, a_2, \dots, a_n and b_1, b_2, \dots, b_n be real numbers such that none of which equals zero. If $\sum_{i=1}^n a_i X_i$ and $\sum_{i=1}^n b_i X_i$ are independent, then

- ☐ all the variables are normally distributed
- ☐ the variables need not be normally distributed
- ☐ some of the variables are normally distributed
- ☐ all the variables are uniformly distributed

Question No.67

4.00

Bookmark ☐

In the following Transition Probability Matrix, identify the closed class, when the state

space is $S = \{1, 2, 3, 4\}$ and $P = \begin{bmatrix} 1/3 & 1/3 & 0 & 1/3 \\ 0 & 1/2 & 1/2 & 0 \\ 0 & 1/3 & 2/3 & 0 \\ 1/6 & 3/6 & 2/6 & 0 \end{bmatrix}$

- ☐ {2,3}
- ☐ {1,2}
- ☐ {1,4}
- ☐ {2,4}

Question No.68

4.00

Bookmark ☐

An inspection of 10 samples of size 400 each from 10 lots revealed the following defective units: 17, 15, 14, 26, 9, 4, 19, 12, 9, 15 The upper control limit for number of defective is:

- ☐ 23.32
- ☐ 25.03
- ☐ 21.45
- ☐ 18.95

Question No.69

4.00

Bookmark ☐

If $\{N(t), t \geq 0\}$ is a Poisson process, then $X(t) = N(t+L) - N(t)$, where L is positive constant is _____ stationary.

- ☐ evolutionary
- ☐ covariance
- ☐ strongly
- ☐ weakly

Question No.70

4.00

Bookmark ☐

The AQL of a process is

- ☐ the highest fraction defective that is unacceptable to the customer
- ☐ the lowest fraction defective that is unacceptable to the customer
- ☐ the lowest fraction defective that is acceptable to the customer
- ☐ the highest fraction defective that is acceptable to the customer

Question No.71

4.00

Bookmark ☐

Let $\{X_n\}$ be any sequence of random variables, then for the sequence of $\{X_n\}$ to satisfy the Weak Law of Large Numbers, the condition for $Y_n = \frac{1}{n} \sum_k X_k$ that $E \left\{ \frac{Y_n^2}{1+Y_n^2} \right\} \rightarrow 0$ as

- ☐ Neither necessary nor Sufficient condition
- ☐ Necessary and sufficient condition
- ☐ Necessary condition
- ☐ Sufficient condition

Question No.72

4.00

Bookmark ☐

If the responses for treatments in a factorial experiment with factors A and B each at 2 levels from 3 replications are $a_0b_0 = 18$, $a_1b_0 = 17$, $a_0b_1 = 25$ and $a_1b_1 = 30$, the sum of squares for interaction AB equal to

- ☐ 675
- ☐ 3
- ☐ 4
- ☐ 6

Question No.73

4.00

Bookmark ☐

If the periodicity of the state J, $d_J = \text{GCD} \{n: p_{JJ}^{(n)} > 0\}$ is equal to unity then state J is known as:

- ☐ Absorbing
- ☐ Periodic
- ☐ Aperiodic
- ☐ Closed

Question No.74

4.00

Bookmark ☐

If after performing a student-test for comparison of means, we obtain $p=0.0256$, then

- ☐ we reject H_0 and accept H_1
- ☐ we cannot decide
- ☐ we accept H_0
- ☐ we reject H_1

Question No.75

4.00

Bookmark ☐

If for a bivariate data the correlation coefficient is 0.8, the percentage of variation in the response variable explained by the variation in the explanatory variable is

- ☐ 64%
- ☐ 0.80%
- ☐ 80%
- ☐ 0.64%

Question No.76

4.00

Bookmark ☐

Which one of the following allocation procedures can be used when no other information except the total number of units in the stratum is given?

- ☐ Equal Allocation
- ☐ Proportional Allocation
- ☐ Optimum Allocation
- ☐ Neyman Allocation

Question No.77

4.00

Bookmark ☐

Given that X_1, X_2, \dots, X_n be iid with $U(0, \theta)$ and $\hat{\theta} = X_{(n)}$. Which of the following is TRUE?

- ☐ $\hat{\theta}$ is consistent and not Asymptotically Normal

- ☐ $\hat{\theta}$ is consistent and Asymptotically Normal
- ☐ $\hat{\theta}$ is not consistent and unbiased
- ☐ $\hat{\theta}$ is consistent and unbiased

Question No.78

4.00

Bookmark ☐

If (X, Y) has a Bivariate Normal with parameters $\mu_1, \mu_2, \sigma_1^2, \sigma_2^2$ and ρ , then $\text{Var}(Y/X=x)$ is

- ☐ $\sigma_2^2(1 - \rho^2)$
- ☐ $\sigma_2^2\rho^2$
- ☐ $\sigma_1^2(1 - \rho^2)$
- ☐ $\sigma_1^2\rho^2$

Question No.79

4.00

Bookmark ☐

For $S^2 = \frac{\sum_{i=1}^n (y_i - \bar{y})^2}{(n-1)}$, an unbiased estimate of the variance of the sample mean in random sampling with replacement is given by

- ☐ $\frac{s^2}{n}$
- ☐ $\frac{s^2(N-n)}{N}$
- ☐ $\frac{s^2}{n-1}$
- ☐ $\frac{S^2}{N}$

Question No.80

4.00

Bookmark ☐

Variance of the estimate of the population mean (\bar{y}_{st}) is minimum for fixed total size of the sample 'n' if :

- ☐ $n_i \propto N_i S_i$
- ☐ $n_i \propto N_i$
- ☐ $n_i \propto N_i / S_i$
- ☐ $n_i \propto n_i S_i$

Question No.81

4.00

Bookmark ☐

With the usual notations, find p for a binomial random variable X, if $n = 6$ and if $9 P(X=1) = P(X=2)$.

- ☐ 18/23
- ☐ 9/14
- ☐ 19/27
- ☐ 12/15

Question No.82

4.00

Bookmark ☐

In the analysis of RBD with b blocks and v treatments, the error degrees of freedom are

- ☐ $v(b-1)$
- ☐ $b(v-1)$
- ☐ $b(v+1)$
- ☐ $(b-1)(v-1)$

Question No.83

4.00

Bookmark ☐

Let X be a random variable having the probability function:

$$f(x, \theta) = \binom{n}{x} \theta^x (1-\theta)^{n-x}, x = 0, 1, 2, \dots, n.$$

If $d(x) = \frac{x}{n}$, then the risk function $R(\theta, d)$ under squared error loss function is:

- ☐ $\frac{\theta^2}{n}$
- ☐ $\frac{\theta(1-\theta)}{n}$
- ☐ $\frac{\theta(\theta+1)}{n}$
- ☐ $\frac{\theta(\theta-1)}{n}$

Question No.84

4.00

Bookmark ☐

What can be said about the following data? 15, 17, 21, 25, 30, 36, 41

- ☐ No such statement can be made
- ☐ Data is positively skewed
- ☐ Data is negatively skewed
- ☐ Data is symmetric

Question No.85

4.00

Bookmark ☐

Which of the following is an example of ordinal variable?

- ☐ Nationality
- ☐ Caste
- ☐ Date of Birth
- ☐ Annual income

Question No.86

4.00

Bookmark ☐

Let there be 'n' pedestrians on the side walk at time 't', then the probability of any one of them would leave in the interval (t, t+h) is given by

- ☐ $O(h)$
- ☐ $n\mu h + O(h)$
- ☐ $n\mu h$

○ μh

Question No.87

4.00

Bookmark ☐

Let $\{X_n, Y_n\}$, $n=1,2,\dots$, be a sequence of random variables. Then $|X_n - Y_n| \xrightarrow{p} 0$ and

$Y_n \xrightarrow{L} Y$ implies

○ $Y_n \xrightarrow{L} X$

○ $X_n \xrightarrow{L} X$

○ $X_n Y_n \xrightarrow{L} Y$

○ $X_n \xrightarrow{L} Y$

Question No.88

4.00

Bookmark ☐

Consider the following statements:

I. Least square estimators are unbiased for all general linear models

II. Under fairly general conditions, the estimates obtained by method of moments will have asymptotically normal distribution for large n .

III. The minimum chi-square estimators are not necessarily consistent.

Which of the above are correct?

○ Only I and II are correct

○ Only II and III are correct

○ All are correct

○ Only I and III are correct

Question No.89

4.00

Bookmark ☐

She studies very hard for the exams, _____?

○ does she?

○ doesn't she?

○ is it?

○ isn't it?

Question No.90

4.00

Bookmark ☐

If $A+B$ means A is daughter of B,

$A-B$ means A is husband of B

$A \times B$ means A is brother of B

From the statement $A \times B \times C \times D$, which of the following statement is not necessarily true?

○ D is brother of C

○ A, B, C are male

○ B is the brother of A

○ C is the brother of A

Question No.91

4.00

Bookmark ☐

Nidhi walks 10 metres in front and 10 metres to the right. Then every time turning to her left, she walks 5, 15 and 15 metres respectively. How far is Nidhi now from her starting point?

○ 10 metres

○ 5 metres

○ 15 metres

○ None of the above

Question No.92

4.00

Bookmark ☐

A can finish a work in 18 days and B can do the same work in half the time taken by A. Then, working together, what part of the same work they can finish in a day?

- ☐ 0 1/6
- ☐ 0 1/2
- ☐ 0 1/8
- ☐ 0 1/4

Question No.93

4.00

Bookmark ☐

Choose the best antonym of the italicized word.

The deliberate *suavity* of Olaf's behavior made the emotions of the audience volatile.

- ☐ politeness
- ☐ stupidity
- ☐ impetuosity
- ☐ pleasantness

Question No.94

4.00

Bookmark ☐

Let X_1, X_2, \dots, X_n be a random sample from a density $f(x; \theta)$. If $T = t(X_1, X_2, \dots, X_n)$ is a complete sufficient statistic and $S' = s(t)$, a function of T , is an unbiased estimator of $\tau(\theta)$, S' is an UMVUE of $\tau(\theta)$. The above result is due to

- ☐ Rao-blackwell Theorem
- ☐ Basu's Theorem
- ☐ Lehmann-Scheffe Theorem
- ☐ Neyman Factorization Theorem

Question No.95

4.00

Bookmark ☐

Suppose a random variable U has a Uniform distribution in the interval $(0, 1)$ and let $X = -2 \log U$. Then the probability density function of X is

- ☐ $f(x) = 1/2$, if $x \in (0, 2)$
- ☐ $f(x) = \exp(-x)$, if $x > 0$
- ☐ $f(x) = 2\exp(-2x)$, if $x > 0$
- ☐ $f(x) = 1/2 \exp(-x/2)$, if $x > 0$

Question No.96

4.00

Bookmark ☐

Which of the following is false with regard to the Simplex method of solving Linear Programming problems?

- ☐ It involves an iterative procedure for arriving at the optimal solution
- ☐ Slack variables are used to represent the unused resources
- ☐ Slack variables make zero contribution towards the objective to be achieved
- ☐ The $Z_j - C_j$ values indicate the variable to leave solution

Question No.97

4.00

Bookmark ☐

Let $X_{(1)}, X_{(2)}, \dots, X_{(r)}$ be a Type-II censored sample when n independent and identical items are put on life test. Define $D_i = (n - i + 1)(X_{(i)} - X_{(i-1)})$, $X_{(0)} = 0$, $i = 1, 2, \dots, r$. Then which of the following is TRUE?

- ☐ D_i 's are dependant exponential random variables
- ☐ D_i 's are independent exponential random variables
- ☐ D_i 's are dependant random variables
- ☐ D_i 's are iid life time random variables

Question No.98

4.00

Bookmark ☐

The distribution of test scores in a class is given as follows:

Number of students	Number of correct answers
10	36 to 40
16	32 to 35
12	28 to 31
14	26 to 27
8	00 to 25

What percentage of the class answered 32 or more questions correctly?

- ☐ 43.3
☐ 26
☐ 20
☐ 32.5

Question No.99

4.00

Bookmark ☐

In calculation of control limits 'σ' can be estimated in 2 ways as

- ☐ $\hat{\sigma} = \frac{\sigma}{c_2}, \hat{\sigma} = \frac{\bar{X}}{d_2}$
☐ $\hat{\sigma} = \frac{\bar{R}}{d_1}, \hat{\sigma} = \frac{\bar{\sigma}}{c_1}$
☐ $\hat{\sigma} = \frac{\bar{R}}{d_2}, \hat{\sigma} = \frac{\bar{\sigma}}{c_2}$
☐ $\hat{\sigma} = \frac{d_2}{\bar{R}}, \hat{\sigma} = \frac{c_2}{\sigma}$

Question No.100

4.00

Bookmark ☐

Find the odd one out?

- ☐ Deduction
☐ Deposit
☐ Withdrawal
☐ Debit