

TELANGANA RESIDENTIAL EDUCATIONAL INSTITUTIONS RECRUITMENT BOARD TREI-RB

Notations :

- 1.Options shown in green color and with ✓ icon are correct.
- 2.Options shown in red color and with ✗ icon are incorrect.

Question Paper Name :	Statistics 16th Aug 2023 Shift 2
Subject Name :	Statistics
Creation Date :	2023-08-16 15:35:15
Duration :	120
Total Marks :	100
Display Marks:	Yes
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Statistics

Group Number :	1
Group Id :	594253100
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	100

Is this Group for Examiner? : No
Examiner permission : Cant View
Show Progress Bar? : No

Statistics

Section Id : 594253116
Section Number : 1
Section type : Online
Mandatory or Optional : Mandatory
Number of Questions : 100
Number of Questions to be attempted : 100
Section Marks : 100
Enable Mark as Answered Mark for Review and Clear Response : Yes
Maximum Instruction Time : 0
Sub-Section Number : 1
Sub-Section Id : 594253147
Question Shuffling Allowed : Yes
Is Section Default? : null

Question Number : 1 Question Id : 5942539924 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If $P(a)$ is the probability of 'a' and 'n' is the number of trails, then $P(a) = \lim_{n \rightarrow \infty} \frac{a}{n}$ is a definition of Probability not by:

Options :

1. ✘ frequency approach
2. ✘ a posterior approach
3. ✘ an empirical (or) statistical approach
4. ✔ apriori approach

Question Number : 2 Question Id : 5942539925 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

For any two events A and B, the inequality $P(A \cap B) \geq 1 - P(A^c) - P(B^c)$ is known as

Options :

1. ✘ Rao's inequality
2. ✘ Blackwell inequality
3. ✔ Boole's inequality
4. ✘ Birbaum inequality

Question Number : 3 Question Id : 5942539926 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

A fair dice is tossed twice, then the probability that the sum is neither 8 nor 10 is

Options :

1. ✔ $1 - \left(\frac{1}{12} + \frac{5}{36}\right)$
2. ✘ $\frac{8}{36}$
3. ✘ $1 - \frac{8}{36}$
4. ✘ $\frac{49}{81}$

Question Number : 4 Question Id : 5942539927 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The probability that C and D won a game are 0.5 and 0.3 respectively. The probability of draw of 2 games in 3 matches is

Options :

1. ✓ $3(0.2)^2 * (0.8)$

2. ✗ $3(0.20)$

3. ✗ $3(0.2) * (0.8)$

4. ✗ $3(0.2)^2 * (0.5) * (0.3)$

Question Number : 5 Question Id : 5942539928 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If X = the number of days of sick leave taken by a randomly selected employee of a large company during a particular year. If the maximum number of allowable sick days per year is 14, possible values of X are 0, 1,14 with $f(0) = 0.58$, $f(1) = 0.72$, $f(2) = 0.76$, $f(3) = 0.81$, $f(4) = 0.88$ and $f(5) = 0.94$ then what are the values of $P(2 \leq X \leq 5)$ and $P(X=3)$?

Options :

1. ✗ 0.24 & 0.15

2. ✓ 0.22 & 0.05

3. ✗ 0.23 & 0.016

4. ✗ 0.25 & 0.005

Question Number : 6 Question Id : 5942539929 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

A medical treatment has a success rate of 0.8. Two patients will be treated with this treatment. Assuming the results are independent for the 2 patients, what is the probability that neither one of them will be successfully cured?

Options :

1. ✓ 0.04

2. ✗ 0.5

3. ✗ 0.36

4. ✗ 0.2

Question Number : 7 Question Id : 5942539930 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let $\{X_n\}$ be any sequence of random variables. Then for the sequence $\{X_n\}$ will satisfy the weak law of large numbers, then the condition, for $Y_n = n^{-1} \sum_k X_k$ that $E \left\{ \frac{Y_n^2}{1+Y_n^2} \right\} \rightarrow 0$ as $n \rightarrow \infty$ is :

Options :

1. ✗ sufficient condition

2. ✗ neither necessary nor sufficient condition

3. ✗ necessary condition

4. ✓ necessary and sufficient condition

Question Number : 8 Question Id : 5942539931 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which one of the following inequalities is a very strong tool for showing weak convergence?

Options :

1. ✗ Chebychev's theorem

2. ✓ Khintchine's theorem

3. ✘ Borel Cantelli theorem

4. ✘ Markov's Theorem

Question Number : 9 Question Id : 5942539932 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

A Markov chain or Transition matrix P is said to be irreducible if $i \leftrightarrow j, j \in S$. That is, the chain is irreducible if the state space S is a :

Options :

1. ✘ not a communicating class

2. ✘ two communicating class

3. ✔ single communicating class

4. ✘ n communicating classes

Question Number : 10 Question Id : 5942539933 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Given the transition probability matrix $P = \begin{bmatrix} 0.6 & 0.2 & 0.2 \\ 0.4 & 0 & 0.6 \\ 0 & 0.8 & 0.2 \end{bmatrix}$ then find the value of $(X_2=3/X_0=1)$?

Options :

1. ✘ 0.29

2. ✔ 0.28

3. ✘ 0.10

4. ✘ 0.8

Question Number : 11 Question Id : 5942539934 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let X and Y are two random variables. Their joint probability density function has shown below:

$$f_{xy}(x,y) = \begin{cases} K(x - \frac{1}{4}), & (x \geq 0) \cap (y \geq 0) \cap (x + y \leq 1) \\ 0; & \text{O.W.} \end{cases}$$

Find the value of K?

Options :

1. ✘ 25

2. ✘ 23

3. ✔ 24

4. ✘ 26

Question Number : 12 Question Id : 5942539935 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The p.d.f of a random variable X is $f(X) = f(x) = \begin{cases} \frac{1}{2} \sin x; & 0 \leq x \leq \pi \\ 0; & \text{O.W} \end{cases}$ then the mode of the distribution is

Options :

1. ✘ $\frac{\pi}{6}$

2. ✘ $\frac{\pi}{4}$

3. ✘ 0

4. ✓ $\frac{\pi}{2}$

Question Number : 13 Question Id : 5942539936 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The variable X takes a value between 0 and 10 with uniform probability distribution. The variable Y takes a value between 0 and 20 with uniform probability of the sum of variables (X+Y) being greater than 20 is :

Options :

1. ✓ 0.25

2. ✗ 0

3. ✗ 0.5

4. ✗ 0.33

Question Number : 14 Question Id : 5942539937 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

let X be a continuous random variable denoting the temperature measured. The range of temperature is [0,100] degree Celsius and let the p.d.f of X be $f(X) = 0.01$ for $0 \leq x \leq 100$. The mean of X is

Options :

1. ✗ 2.5

2. ✗ 5

3. ✗ 25

4. ✓ 50

Question Number : 15 Question Id : 5942539938 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum

Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Consider two identically distributed zero mean random variable U and V. Let the cumulative distribution function of U and 2V be F(X) and G(X) respectively. Then for all values of X

Options :

1. ✘ $F(X) - G(X) \leq 0$
2. ✔ $(F(X) - G(X)) \cdot X \geq 0$
3. ✘ $F(X) - G(X) \geq 0$
4. ✘ $(F(X) - G(X)) \cdot X \leq 0$

Question Number : 16 Question Id : 5942539939 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Jobs arrive at a facility at an average rate of 5 in an 8 hour shift. The arrival of the Jobs follow Poisson distribution. The average service time of a Job on the facility is 40 minutes. The service time follows exponential distribution, then Idle time (in hrs) at the facility per shift will be

Options :

1. ✔ $\frac{14}{3}$
2. ✘ $\frac{5}{7}$
3. ✘ $\frac{10}{3}$
4. ✘ $\frac{7}{5}$

Question Number : 17 Question Id : 5942539940 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If X_1 and X_2 are independent and are distributed as $N_{q_1}(\mu_1, \Sigma_{11})$ and $N_{q_2}(\mu_2, \Sigma_{22})$ respectively, then $\begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$ has the multivariate Normal distribution has the following:

Options :

1. ✓ $N_{q_1+q_2} \left(\begin{bmatrix} \mu_1 \\ \mu_2 \end{bmatrix}, \begin{bmatrix} \Sigma_{11} & 0 \\ 0 & \Sigma_{22} \end{bmatrix} \right)$

2. ✗ $N_{q_1+q_2} \left(\begin{bmatrix} \mu_1 \\ \mu_2 \end{bmatrix}, \begin{bmatrix} \Sigma_{11} & \Sigma_{12} \\ \Sigma_{21} & \Sigma_{22} \end{bmatrix} \right)$

3. ✗ $N_{x_1+x_2} \left(\begin{bmatrix} X_1 \\ X_2 \end{bmatrix}, \begin{bmatrix} \Sigma_{11} & \Sigma_{13} \\ \Sigma_{31} & \Sigma_{22} \end{bmatrix} \right)$

4. ✗ $\begin{bmatrix} X_1 - X_2 \\ X_2 - X_3 \end{bmatrix} \left(\begin{bmatrix} \mu_1 \\ \mu_2 \end{bmatrix}, \begin{bmatrix} \Sigma_{11} & \Sigma_{12} \\ \Sigma_{21} & \Sigma_{22} \end{bmatrix} \right)$

Question Number : 18 Question Id : 5942539941 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Given $X = 2Y + 4$ and $Y = KX + 6$ are the lines of regression of X on Y and Y on X respectively. Find the value of K, if value of 'r' is 0.5

Options :

1. ✗ $\frac{1}{3}$

2. ✗ $\frac{1}{2}$

3. ✓ $\frac{1}{8}$

4. ✗ $\frac{1}{4}$

Question Number : 19 Question Id : 5942539942 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum

Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If X and Y be independent variables with s.d. σ_1 and σ_2 respectively, then the correlation coefficient between X and (X + Y) is

Options :

1. ✘ $\frac{\sigma_2}{(\sigma_1^2 + \sigma_2^2)}$

2. ✘ $\frac{\sigma_1}{(\sigma_1^2 + \sigma_2^2)}$

3. ✔ $\frac{\sigma_1}{\sqrt{\sigma_1^2 + \sigma_2^2}}$

4. ✘ $\frac{\sigma_2}{\sqrt{\sigma_1^2 + \sigma_2^2}}$

Question Number : 20 Question Id : 5942539943 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If X_1, X_2, \dots, X_n are independent random variables following Negative Binomial

distribution, then the distribution of $S_k = \sum_{i=1}^n X_i$ is:

Options :

1. ✘ Uniform

2. ✘ Poisson

3. ✘ Exponential

4. ✔ Negative Binomial

Question Number : 21 Question Id : 5942539944 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Rao Blackwell theorem enables us to obtain Minimum Variance Unbiased estimator through :

Options :

1. ✘ Efficient statistics
2. ✔ Sufficient statistics
3. ✘ Complete statistics
4. ✘ Unbiased Estimators

Question Number : 22 Question Id : 5942539945 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let T be the Minimum Variance Unbiased estimator then

Options :

1. ✘ $V(T) < \text{Cramer Rao lower bound}$
2. ✘ $V(T) > \text{Cramer Rao lower bound}$
3. ✘ $V(T) = \text{Cramer Rao lower bound}$
4. ✔ $V(T) \geq \text{Cramer Rao lower bound}$

Question Number : 23 Question Id : 5942539946 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Maximum likelihood estimator need not be always :

Options :

1. ✔ Unbiased

2. ✘ Consistent
3. ✘ Efficient
4. ✘ Asymptotically Normal

Question Number : 24 Question Id : 5942539947 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The Maximum likelihood estimator, which are obtained by maximising the function of Joint density of random variables, are generally

Options :

1. ✘ unbiased and inconsistent
2. ✘ unbiased and consistent
3. ✔ consistent and invariant
4. ✘ invariant and unbiased

Question Number : 25 Question Id : 5942539948 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The level of significance is precisely

Options :

1. ✘ 50% or 10%
2. ✘ The probability of Type I error
3. ✘ level at which the H_0 is accepted when it is false

4. ✓ The max probability with which we would be willing to risk a type I error

Question Number : 26 Question Id : 5942539949 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

During the attempt of testing, a critical region is defined to indicate

Options :

1. ✗ A region in which a null hypothesis is rejected when it is false.
2. ✓ A region in the sample space which amounts to the rejection of null hypothesis.
3. ✗ A region in the sample space which leads to the rejection of sample survey.
4. ✗ A region in the sample space which a critical decision about the rejection or acceptance of null

Question Number : 27 Question Id : 5942539950 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

After obtaining the value of statistics from a sample, we try to make some probability statements about the unknown parameters by using the technique of confidence intervals. Let X_1, X_2, \dots, X_n be a random sample drawn from a continuous population with probability function $p(x, \theta)$ involving a simple unknown parameter θ . Let 't' be a function of sample values and for some small value of α , C_1 and C_2 are determined such that $p(C_1 < \theta < \frac{C_2}{t}) = 1 - \alpha$, then it is not true to say that

Options :

1. ✗ α is usually taken to be 0.05 & 0.01
2. ✗ $(1 - \alpha)$ is called confidence level
3. ✗ C_1 & C_2 are known as confidence limits

4. ✓ Confidence interval is the open interval C_1 & C_2 within which an unknown value of parameter shall lie.

Question Number : 28 Question Id : 5942539951 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let x_1, x_2, \dots, x_n be a random sample from a gamma distribution with parameters α and β . Given $E(X) = \alpha\beta$ and $E(X^2) = \alpha(\alpha + 1)\beta^2$, then moment estimators $\hat{\alpha}$ and $\hat{\beta}$ for the data are :

152 115 109 94 88 137 152 77 160 165

125 40 128 123 136 101 62 153 83 69

Options :

1. ✗ $\hat{\alpha} = 10.1, \hat{\beta} = 10.2$
2. ✓ $\hat{\alpha} = 10.7, \hat{\beta} = 10.6$
3. ✗ $\hat{\alpha} = 10.8, \hat{\beta} = 10.78$
4. ✗ $\hat{\alpha} = 9.8, \hat{\beta} = 10$

Question Number : 29 Question Id : 5942539952 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

For a random sample x_1, x_2, \dots, x_n from exponential distribution with parameter ' λ ' the maximum likelihood estimator is

Options :

1. ✗ $\hat{\lambda} = \bar{X}$
2. ✗ $\hat{\lambda} = X$
3. ✓ $\frac{1}{\bar{X}}$

4. ✘ $\frac{1}{\sum X_i}$

Question Number : 30 Question Id : 5942539953 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Uniformly minimum – variance unbiased estimator (UMVE) or Minimum variance unbiased estimator is an unbiased estimator that has _____ than any other unbiased estimator for all possible values of the parameter for :

Options :

1. ✘ Maximum variance
2. ✔ Lower variance
3. ✘ Zero variance
4. ✘ Question does not provide sufficient data & is vague

Question Number : 31 Question Id : 5942539954 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Arrange the following steps in the process of hypothesis testing in proper sequence

- A) Select the level of significance
- B) Setup null and alternative hypothesis
- C) Establish the decision rule
- D) Performance computations
- E) Select test statistics
- F) Draw conclusions

Choose the correct sequence:

Options :

1. ✘ A, B, C, D, E, F
2. ✔ B, A, E, C, D, F

3. ✘ A, B, E, D, C, F

4. ✘ B, A, C, D, E, F

Question Number : 32 Question Id : 5942539955 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which of the following statements will be considered true in the case of good hypothesis?

- A) It should be derived from the existing theory of knowledge.
- B) It should clearly indicate the relation between variables postulated.
- C) It should test a theory
- D) It should be related to a current issue.
- E) It should be stated in a concise and lucid manner

Choose the correct answer:

Options :

1. ✘ A, D and E only

2. ✘ B, C and D only

3. ✔ A, B and E only

4. ✘ C, D and E only

Question Number : 33 Question Id : 5942539956 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Given the random sample from p.d.f $f(x, \alpha) = \frac{2}{\alpha^2} * (\alpha - x)$, $0 < x < \alpha$, then what is the maximum likelihood estimator for α

Options :

1. ✘ x

2. ✘ $\frac{x}{2}$

3. ✔ $2x$

4. ✘ $2x^2$

Question Number : 34 Question Id : 5942539957 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Consider the function $f(x) = \begin{cases} \frac{|x|}{x}, & \text{when } x \neq 0 \\ 1, & \text{when } x = 0 \end{cases}$. The left hand limit of $f(x)$ at 0 is

Options :

1. ✘ 1

2. ✔ -1

3. ✘ 0

4. ✘ 2

Question Number : 35 Question Id : 5942539958 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

For SPRT, which of the following statements is/are true

- A) The sample size n is a random variable
- B) The SRPT terminates with probability 1

Options :

1. ✘ A only

2. ✘ B only

3. ✓ Both A and B

4. ✗ Neither A nor B

Question Number : 36 Question Id : 5942539959 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Cramer Rao lower bound of variance for the parameter ' θ ' of the distribution with p.d.f is $f(x, \theta) = \frac{1}{\pi} \frac{1}{1+(x-\theta)^2}$ where $-\infty < x < \infty$ is :

Options :

1. ✓ $\frac{2}{n}$

2. ✗ $\frac{1}{n}$

3. ✗ $\frac{1}{n^2}$

4. ✗ $\frac{2}{n^2}$

Question Number : 37 Question Id : 5942539960 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Given the p.d.f of a random variable X as $f(x, \theta) = 1 - \theta^2$; $0 \leq x \leq \frac{1}{(1-\theta)^2}$ and if we reject $H_0 : \theta = \frac{1}{2}$ against $H_1 : \theta = \frac{3}{4}$, whenever $x \geq 1$, then what is the power of the test?

Options :

1. ✓ $\frac{9}{16}$

2. ✗ $\frac{15}{16}$

3. ✘ $\frac{1}{2}$

4. ✘ $\frac{7}{16}$

Question Number : 38 Question Id : 5942539961 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Assume that the daily sales of petrol follows exponential distribution. The hypothesis H_0 that the sales of petrol is 1000 litres per day is tested against the hypothesis that it is 1500 litres per day. If the sales on a day is 1200 litres or more, H_0 is rejected, then the size of type I error is :

Options :

1. ✘ $1 - \exp(-1.2)$

2. ✔ $\exp(-1.2)$

3. ✘ $\exp(1.2)$

4. ✘ $\exp(1.25)$

Question Number : 39 Question Id : 5942539962 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In comparing the quality of LED TV's of brand 'A' and brand 'B' a statistician collects the following data: X_1, X_2, \dots, X_n are the number of dead pixels in a random sample of 'n' brand 'A' TV's and Y_1, Y_2, \dots, Y_m are the dead pixels in a random sample of 'm' brand 'B' TV's. Now, assuming that the X_i 's and Y_j 's are independent Poisson random variables with means λ_1 and λ_2 for both the brand TV's respectively be follow :

Options :

1. ✘ Simple & Simple

2. ✘ Simple & Composite

3. ✓ Composite & Composite

4. ✗ Composite & Simple

Question Number : 40 Question Id : 5942539963 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let $\{X_n\}$ be a sequence of i.i.d random variables and for $n \geq 1$, let $S_n = \sum_{k=1}^n X_k$. Then $\frac{S_n}{n} \xrightarrow{\text{A.S.}} \mu$ if and only if $E|X| < \infty$, then $\mu = E(X)$. This law of large numbers is known as:

Options :

1. ✓ Kolmogorov's law

2. ✗ Khintchin's law

3. ✗ Bernouli's law

4. ✗ Chebychev's law

Question Number : 41 Question Id : 5942539964 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Comparing the times – to – failure of radar transponders made by firms A, B and C based on an airlines sample experience with the 3 types of instruments, one may well call for :

Options :

1. ✗ A Kolmogorov test

2. ✗ A Wilcoxon Rank – sum test

3. ✓ A Kruskal – Wallis test

4. ✖ A Spearman Rank test

Question Number : 42 Question Id : 5942539965 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The sign test is

Options :

1. ✔ less powerful than that of the Wilcoxon signed rank test.
2. ✖ more powerful than the paired sample t-test.
3. ✖ more powerful than the Wilcoxon signed rank test.
4. ✖ equivalent to the Mann – Whilney test.

Question Number : 43 Question Id : 5942539966 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If the level α Wilcoxon signed rank test for $H_0 : \mu = \mu_0$ (vs) $H_1 : \mu \neq \mu_0$ is to reject H_0 if either $S_+ \geq C$ or $S_+ \leq \left\{ \frac{n(n+1)}{2} - C \right\}$, then a $100(1-\alpha)\%$ C.I for μ is :

Options :

1. ✔ $(\bar{X}_{(\frac{n}{2}-c+1)}, \bar{X}_{(c)})$
2. ✖ $(\bar{X}_{(\frac{n(n+1)}{2}-c+1)}, \bar{X}_{(c+1)})$
3. ✖ $(\bar{X}_{(\frac{n(n+1)}{2}-c+1)}, \bar{X}_{(c)})$
4. ✖ $(\bar{X}_{(\frac{n(n-1)}{2}-c)}, \bar{X}_{(c-1)})$

Question Number : 44 Question Id : 5942539967 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum

Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Friedman's test statistic is :

Options :

1. ✓ $\frac{12}{I(J+1)} \sum R_i^2 - 3J(I+1)$

2. ✗ $\frac{12}{(I+1)} \sum R_i^2 - 3J(I+1)$

3. ✗ $\frac{12}{I(J+1)} \sum R_i^2 - 3J(I-1)$

4. ✗ $\frac{12}{I(I+1)} \sum R_i^2 - J(I+1)$

Question Number : 45 Question Id : 5942539968 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Given $n_1 = 12$, $n_2 = 8$ with $N = 20$ observations in all. The sum of ranks for the 12 used Auto consumers then what are the mean and standard deviation using the Wilcoxon rank sum test

Options :

1. ✗ (120, 12)

2. ✗ (122, 12.5)

3. ✓ (126, 12.961)

4. ✗ (125, 12.561)

Question Number : 46 Question Id : 5942539969 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

A number of Non-Parametric tests are based on the concept of ranks, where

Options :

1. ✘ by using ranks no information in the data is lost.
2. ✘ taking mid ranks is the only way to check to problem of ties
3. ✔ the problem of ties can be checked by randomisation
4. ✘ This does not apply for Non-Parametric tests

Question Number : 47 Question Id : 5942539970 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

_____ is a non-zero vector that stays parallel after matrix multiplication.

Options :

1. ✘ Eigen value
2. ✔ Eigen vector
3. ✘ Linear value
4. ✘ Regression value

Question Number : 48 Question Id : 5942539971 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

_____ is a dimensionality reduction technique which is commonly used for the supervised classification problems

Options :

1. ✔ Functional values
2. ✘ Value analysis
3. ✘ Pure analysis

4. ✘ Gaussian

Question Number : 49 Question Id : 5942539972 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Read the following statements regarding latent variable

- A) It is a variable that cannot be measured directly
- B) It is another name for a factor
- C) Latent variables represent clusters of variables that correlate highly with each other

Choose the correct statements represent a latent variable

Options :

- 1. ✘ A and B only
- 2. ✘ B and C only
- 3. ✘ A and C only
- 4. ✔ A, B and C

Question Number : 50 Question Id : 5942539973 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Varimax Rotation should be used when

Options :

- 1. ✘ You believe that the underlying factors will be correlate
- 2. ✘ You believe that the underlying factors are non-orthogonal
- 3. ✘ Kaiser's criterion is met

4. ✓ You believe that the underlying factors are independent

Question Number : 51 Question Id : 5942539974 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

What Multivariate technique is used to test the independence between two sets of variables?

Options :

1. ✗ Mahalanobis D^2
2. ✗ Hotellings T^2
3. ✗ Factor Analysis
4. ✓ Canonical correlations

Question Number : 52 Question Id : 5942539975 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

For large n , hotellings T^2 is approximately distributed as

Options :

1. ✗ Chi - square with $(n-p-1)$ d.f.
2. ✓ Chi - square with ' p ' d.f.
3. ✗ Chi - square with $(p+1)$ d.f.
4. ✗ only Chi - square

Question Number : 53 Question Id : 5942539976 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Assume that we have measurements x_{ik} , $i = 1, \dots, N$, on variables $k = 1, \dots, p$ (also called attributes). The Euclidean distance between the i^{th} and J^{th} objects is

Options :

1. ✓
$$d_E(i, J) = \left(\sum_{k=1}^p (x_{ik} - x_{Jk})^2 \right)^{\frac{1}{2}}$$

2. ✗
$$d_E(i, J) = \left(\sum_{k=1}^p (x_{ik} - x_{Jk} + 1)^2 \right)^{\frac{1}{2}}$$

3. ✗
$$d_E(i, J) = \left(\sum_{k=1}^p (x_{ik} - x_{Jk}) \right)^{\frac{1}{2}}$$

4. ✗
$$d_E(i, J) = \left(\sum_{k=1}^p (x_{ik} - x_{Jk}) w_k \right)^{\frac{1}{2}}$$

Question Number : 54 Question Id : 5942539977 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let $X_{(n \times p)}$ be a data matrix from $N_p(0, I)$ then $A = X'X \sim W_p(I, N)$. The distributions of X and A are independent, the Hotelling's T^2 - statistic is represented by

Options :

1. ✗
$$\frac{1}{n} X'A^{-1}X \sim T^2(p, n)$$

2. ✗
$$\frac{n}{N} X'A^{-1}X \sim T^2(p, n)$$

3. ✓
$$n X'A^{-1}X \sim T^2(p, n)$$

4. ✘ $X^T A^{-1} X \sim T^2(p, n)$

Question Number : 55 Question Id : 5942539978 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

K means clustering frequently referred as

Options :

1. ✘ Divisive Clustering
2. ✘ Agglomerative Clustering
3. ✘ Optimising Partitioning
4. ✔ Non – hierarchical Clustering

Question Number : 56 Question Id : 5942539979 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Fisher's linear Discriminant Technique falls under

Options :

1. ✘ Unsupervised learning
2. ✘ Semi Supervised learning
3. ✔ Supervised learning
4. ✘ Cannot be used for classification

Question Number : 57 Question Id : 5942539980 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The assumptions in discriminant analysis are that each of the groups is a sample from a _____ population and all of the populations have the same

Options :

1. ✘ Multivariate Normal; Standard Deviation
2. ✔ Multivariate Normal; Covariance matrix
3. ✘ Multivariate Normal; Standard error
4. ✘ Multivariate Normal; Variance

Question Number : 58 Question Id : 5942539981 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If there are 10 groups and 8 predictors, how many discriminant functions can be estimated?

Options :

1. ✘ 10
2. ✔ 9
3. ✘ 8
4. ✘ 7

Question Number : 59 Question Id : 5942539982 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Let μ be the population mean and σ^2 be the population variance. Let a sample x_1, x_2, \dots, x_n of size n is drawn by SRSWR from a population of size N .

If $Y = \sum_{i=1}^n \lambda_i x_i$ be the best linear unbiased estimator, then the variance of

Y is equal to

Options :

1. ✘ $\frac{\sigma^2}{(n-1)} \sum_{i=1}^n \lambda_i^2$

2. ✘ $\frac{\sigma^2}{(N-1)} \sum_{i=1}^n \lambda_i^2$

3. ✔ $\sigma^2 \sum_{i=1}^n \lambda_i^2$

4. ✘ $\frac{\sigma^2}{n} \sum_{i=1}^n \lambda_i^2$

Question Number : 60 Question Id : 5942539983 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

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

Options :

1. ✘ Optimum allocation

2. ✘ Equal allocation

3. ✘ Neyman allocation

4. ✔ Proportional allocation

Question Number : 61 Question Id : 5942539984 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Suppose in a population the event in which we are interested consists of proportion as 0.5 and we required for this population n is (given $Z=1.96$ & error $e=0.05$) :

Options :

1. ✘ 380

2. ✘ 381

3. ✔ 384

4. ✘ 386

Question Number : 62 Question Id : 5942539985 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The variance of the ratio estimator is given by

Options :

1. ✔ $\frac{(N-n)}{Nn} (S_y^2 + R^2 S_x^2 - 2R\rho S_x S_y)$

2. ✘ $\frac{(N-n)}{Nn} (S_y^2 + R^2 S_x^2 - 2RS_x S_y)$

3. ✘ $\frac{1}{(N-n)} (S_y^2 + R^2 S_x^2 - R\rho S_x S_y)$

4. ✘ $\frac{1}{(N-n)} (S_y^2 + R^2 S_x^2 - 2RS_x - S_y)$

Question Number : 63 Question Id : 5942539986 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In cluster Sampling the elements of selected clusters are classified as

Options :

1. ✘ Primary units
2. ✔ Elementary units
3. ✘ Proportional units
4. ✘ Secondary units

Question Number : 64 Question Id : 5942539987 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

$\pi_i, i = 1, 2, \dots, N$ are given positive numbers that represent the probability that unit 'i' is included in the sample under a given sampling scheme. The Horvitz Thompson estimator is

Options :

1. ✔
$$\hat{t}_{\pi} = \sum_{i=1}^r \frac{y_i}{\pi_i}$$

2. ✘
$$\hat{t}_{\pi} = \frac{y_i}{\pi_i}$$

3. ✘
$$\hat{t}_{\pi} = \frac{1 - y_i}{1 - \pi_i}$$

4. ✘
$$\hat{t}_{\pi} = \sum_{i=1}^r \frac{(1 - y_i)}{\pi_i}$$

Question Number : 65 Question Id : 5942539988 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The systematic sampling and SRS shall give estimates of equal precisions if the interclass correlation between the units of the same systematic sample, from a population of size N and a sample of size n, is equal to :

Options :

1. ✓ $\frac{-1}{(N-1)}$

2. ✗ $\frac{1}{(N-n)}$

3. ✗ $\frac{-1}{(n-1)}$

4. ✗ $\frac{-1}{(N-n)}$

Question Number : 66 Question Id : 5942539989 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a two stage sampling plan, let x is to be estimated by y which follows a relationship $x_i = Ry_i + e_i$, where e_i is residual. If e_i is Normally distributed with mean zero and the variance proportional to y_i , then the MLE of R is $\frac{\sum x_i}{\sum y_i}$ from the first sample is

Options :

1. ✓ Not unbiased but consistent

2. ✗ Unbiased and inconsistent

3. ✗ Not unbiased and inconsistent

4. ✗ Unbiased and consistent

Question Number : 67 Question Id : 5942539990 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which of these statements is NOT a Gauss Markov assumption?

Options :

1. ✘ That the error term has a conditional mean of zero.
2. ✘ That the errors are uncorrelated.
3. ✔ Absence of influential observations.
4. ✘ That the error term has constant variance.

Question Number : 68 Question Id : 5942539991 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which of the following assumptions are required to show the consistency, Unbiasedness and efficiency of the OLS estimator?

- A) $E(U_t) = 0$
- B) $\text{Var}(U_t) = \sigma^2$
- C) $\text{Cov}(U_t, U_{t-j}) = 0 \forall j$
- D) $U_t \sim N(0, \sigma^2)$

Options :

1. ✘ B and D only
2. ✘ A and C only
3. ✘ A, B, C and D
4. ✔ A, B and C only

Question Number : 69 Question Id : 5942539992 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Suppose that the Durbin Watson test is applied to a Regression containing two explanatory variables plus a constant with 50 data points. The test statistic takes a value of 1.53 what is the appropriate conclusion?

Options :

1. ✓ The test is inconclusive
2. ✘ Residuals appear to be auto correlated
3. ✘ Residuals appear to be negatively auto correlated
4. ✘ Residuals appear not to be auto correlated

Question Number : 70 Question Id : 5942539993 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If the residuals from a regression estimated using a small sample of data are not normally distributed, which one of the following consequences may arise?

Options :

1. ✘ The coefficient estimates will be unbiased but inconsistent
2. ✓ Tests statistics concerning the parameters will not follow their assumed distributions
3. ✘ The coefficient estimates will be biased but consistent
4. ✘ The coefficient estimates will be biased and inconsistent

Question Number : 71 Question Id : 5942539994 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Logistic regression assumes a

Options :

1. ✘ Linear relationship between continuous predictor variables and the outcome variable.

2. ✓ Linear relationship between continuous predictor variables and the logit of the outcome variable.
3. ✗ Linear relationship between observations.
4. ✗ Linear relationship between continuous predictor variables.

Question Number : 72 Question Id : 5942539995 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The transformed data model for the stress – strain curve $\sigma = K_1 \epsilon e^{-K_2 \epsilon}$ for concrete in compression, where σ is the stress and ϵ is the strain, is

Options :

1. ✗ $\ln(\sigma) = \ln(K_1) + \ln(\epsilon) - K_2 \epsilon$
2. ✓ $\ln\left(\frac{\sigma}{\epsilon}\right) = \ln(K_1) - K_2 \epsilon$
3. ✗ $\ln\left(\frac{\sigma}{\epsilon}\right) = \ln(K_1) + K_2 \epsilon$
4. ✗ $\ln(\sigma) = \ln(K_1 \epsilon) - K_2 \epsilon$

Question Number : 73 Question Id : 5942539996 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which of the following is not a condition for a given real non- singular quadratic form?

Options :

1. ✗ The number of positive square term in the quadratic form is equal to zero.
2. ✗ The rank of the matrix A is equal to the number of variables in the quadratic form(Index).

3. ✘ All the eigen values of A are negative.

4. ✔ The rank and index are equal.

Question Number : 74 Question Id : 5942539997 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Assume that there is no overlap between the box and whisker plots for 3 drug treatments where each drug was administered to 35 individuals. The box plots for these data:

Options :

1. ✔ Represent evidence against the null hypothesis of ANOVA

2. ✘ Provide no evidence for, or against, the null hypothesis of ANOVA

3. ✘ Represent evidence for the null hypothesis of ANOVA

4. ✘ Error sum of squares

Question Number : 75 Question Id : 5942539998 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Imagine we conducted a study that found that pedestrians were more likely to give money to a street beggar if the beggar had a cute and hungry looking dog with them, and this effect was identical for both male and female pedestrians. If we calculated the difference between man and women in the no dog condition and plotted this value against the difference between men and women in the dog condition, which of the following values is most likely to represent the gradient of our graph?

Options :

1. ✘ 22.7

2. ✘ 33.8

3. ✘ 1

4. ✔ 0

Question Number : 76 Question Id : 5942539999 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which of the following provides the most powerful information?

Options :

1. ✘ Partial factorial design

2. ✘ One factor at a time

3. ✔ Full factorial design

4. ✘ Plackett – Burman design

Question Number : 77 Question Id : 59425310000 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Select the most appropriate design when all factors are not of equal importance in experimentation?

Options :

1. ✘ Strip plot design

2. ✘ Augmented

3. ✔ Split plot design

4. ✘ LS design

Question Number : 78 Question Id : 59425310001 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a repeated measures factorial design,

Options :

1. ✘ There must be at least 2 independent groups.
2. ✘ Participants must be matched on at least two potentially confounding variables.
3. ✘ There is no problem of sequence effects.
4. ✔ Sequence effects must be controlled.

Question Number : 79 Question Id : 59425310002 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

For a BIBD with parameters $u = b = 7$, $r = k = 4$ and $\lambda = 2$, the number of treatments common between any 2 blocks is

Options :

1. ✘ 1
2. ✔ 2
3. ✘ 3
4. ✘ 5

Question Number : 80 Question Id : 59425310003 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If all effects of the same order are confounded with incomplete block differences it is said to be :

Options :

1. ✘ A factorial experiment
2. ✘ Complete confounding
3. ✘ Partial confounding
4. ✔ Balanced confounding

Question Number : 81 Question Id : 59425310004 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

A split block experiment is conducted with 5 level of Irrigation(I) and 4 levels of an Insecticide(M) in spray. The experiment contained 3 replications, for this the error degrees of freedom for the interaction effect will be :

Options :

1. ✔ 24
2. ✘ 30
3. ✘ 32
4. ✘ 35

Question Number : 82 Question Id : 59425310005 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a All Possible Regression if we have $r = 10$, then we can have _____ Regression equations to be examined are :

Options :

1. ✘ 925

2. ✔ 1025

3. ✘ 1040

4. ✘ 1205

Question Number : 83 Question Id : 59425310006 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a LPP with 4 constraints and 6 variables which of the following is equal to the maximum number of Basic solutions?

Options :

1. ✘ 4

2. ✘ 10

3. ✔ 15

4. ✘ 24

Question Number : 84 Question Id : 59425310007 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Simplex problem is considered as infeasible when :

Options :

1. ✘ All the variables in entering column are negative

2. ✘ Variables in the basis are negative

3. ✘ Pivotal value is negative

4. ✓ Artificial variable is present in Basis

Question Number : 85 Question Id : 59425310008 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Consider the linear programming problem

Max $Z = 7X_1 + 6X_2 + 4X_3$; Subject to,

$X_1 + X_2 + X_3 \leq 5$; $2X_1 + X_2 + 3X_3 \leq 10$;

$X_1, X_2, X_3 \geq 0$ (If solved by algebraic method) then

The number of basic solutions are :

Options :

1. ✗ 7

2. ✗ 8

3. ✗ 9

4. ✓ 10

Question Number : 86 Question Id : 59425310009 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

A company manufactures products P and Q in quantities x_1 & x_2 respectively, using two resources. The following LPP is formulated to maximise the profit Z,

Max $Z = 3x_1 + 2x_2$

Subject to $x_1 + 2x_2 \leq 2$ (for resource 1)

$2x_1 + x_2 \leq 2$ (for resource 2) and

$x_1, x_2 \geq 0$; The shadow price for resource 2 is : (Shadow price is the value assigned to one unit of capacity)

Options :

1. ✗ 0

2. ✘ $\frac{2}{3}$

3. ✘ 1

4. ✔ $\frac{4}{3}$

Question Number : 87 Question Id : 59425310010 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Which of the following method is used for obtaining an IBFS to the transportation problem is :

- A) NW- corner method
- B) VAM
- C) Modi method
- D) Least cost method

Options :

1. ✘ A, B only

2. ✘ A, B, C only

3. ✘ B, C only

4. ✔ A, B, D only

Question Number : 88 Question Id : 59425310011 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The minimum number of lines covering all zeroes in a reduced cost matrix of order 'n' can be

Options :

1. ✘ (n - 1)

2. ✘ $(n + 1)$

3. ✔ At the most n

4. ✘ $(n - 2)$

Question Number : 89 Question Id : 59425310012 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

The Hungarian method for solving an assignment problem can also be used to solve

Options :

1. ✔ A travelling sales problem

2. ✘ A transportation problem

3. ✘ A L.P. problem

4. ✘ Both a travelling sales problem and a transportation problem

Question Number : 90 Question Id : 59425310013 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

An initial transportation appears in the table:

	C	D	Factory Capacity
A	10	0	10
B	15	25	40
Ware house demand	25	25	50

Can this solution be improved if it costs ₹5 per unit to ship from A to C; ₹7 per unit to ship from A to D; ₹8 to ship from B to C; and ₹9 to ship from B to D?

Options :

- ✘ Yes, this solution can be improved by ₹50.
- ✘ Yes, this solution can be improved by ₹100.
- ✔ No, this solution is optimal.
- ✘ Yes, the initial solution can be improved by ₹10.

Question Number : 91 Question Id : 59425310014 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Gantt chart is applicable for :

Options :

- ✘ Time study
- ✘ Sales forecasting
- ✔ Production scheduling

4. ✖ Expediting

Question Number : 92 Question Id : 59425310015 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a non-linear programming problem, if, $g(x) \leq c$ is a constraint, then $h(x)$ is defined as

Options :

1. ✖ $h(x) \leq g(x) - c$

2. ✖ $h(x) \geq g(x) - c$

3. ✖ $h(x) = g(x) + c$

4. ✔ $h(x) = g(x) - c$

Question Number : 93 Question Id : 59425310016 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a game without saddle point the value of the game V is

Options :

1. ✔ $\frac{a_{11}a_{22} - a_{21}a_{12}}{a_{11} + a_{22} - (a_{12} + a_{21})}$

2. ✖ $\frac{a_{21}a_{12} - a_{22}a_{11}}{a_{11} + a_{22} - (a_{21} + a_{12})}$

3. ✖ $\frac{a_{22} * a_{11} - a_{21} * a_{12}}{a_{11} + a_{22} - (a_{21} + a_{12})}$

4. ✖ $\frac{a_{11} a_{22}}{a_{11} + a_{22} - (a_{12} + a_{21})}$

Question Number : 94 Question Id : 59425310017 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

Given the following payoff. Find the saddle point:

		Player B	
		B ₁	B ₂
Player A	A ₁	12	18
	A ₂	6	-8

The saddle point is:

Options :

- ✘ -8
- ✘ 6
- ✘ 18
- ✔ 12

Question Number : 95 Question Id : 59425310018 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

While assigning random numbers in Monte Carlo Simulation, it is

Options :

- ✘ Not necessary to assign the exact range of random number intervals as the probability
- ✔ Necessary to develop a Cumulative probability distribution
- ✘ Necessary to assign the particular appropriate random numbers

4. ✘ Necessary to develop CDF and assign an appropriate random number

Question Number : 96 Question Id : 59425310019 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In simulating random numbers the modulo arithmetic method uses the formulae $X_{i+1} = X_i a |m|$ then the numbers generated by this will lie between

Options :

1. ✘ (0, 1)

2. ✘ (0, m)

3. ✔ (0, (m - 1))

4. ✘ (m, (m - 1))

Question Number : 97 Question Id : 59425310020 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

On an average, 20 persons are coming at a shop per hour, and on an average the shopkeeper can handle 25 persons per hour. What will be the proportion of time shopkeeper is idle?

Options :

1. ✘ 0.1

2. ✘ 0.6

3. ✔ 0.2

4. ✘ 0.8

Question Number : 98 Question Id : 59425310021 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum

Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

In a car washing shop, car arrives according to the Poisson's distribution with a mean rate of 5 cars per hour. Washing time per car is exponential with a mean of 10 minutes. At steady state average waiting time in a queue is

Options :

1. ✓ 50 minutes
2. ✗ 10 minutes
3. ✗ 40 minutes
4. ✗ 5 minutes

Question Number : 99 Question Id : 59425310022 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

For the single server with Poisson arrival, with the decrease in the mean of exponential service times, the average waiting time is going to reduce

Options :

1. ✗ At an increasing rate
2. ✗ In a positive exponential manner
3. ✗ At a decreasing rate
4. ✓ In a negative exponential manner

Question Number : 100 Question Id : 59425310023 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0.25

If $X(t)$ is the number of customers in an $M|M|1$ queueing system with arrival rate $\lambda > 0$ and service rate $\mu > 0$, then what will be the $\{X(t), t \geq 0\}$ process is

Options :

1. ✘ Birth process with $(\lambda - \mu)$
2. ✘ Poisson process with rate $(\lambda - \mu)$
3. ✔ Markov process
4. ✘ Birth and death process