National Testing Agency

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Computational Mathematics and Statistics with Data integration and Analysis

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Computational Mathematics and Statistics with Data integration and Analysis

Section Id :	90958249
Section Number :	1
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Sub-Section Number:	1
Sub-Section Id:	90958252
Question Shuffling Allowed :	Yes

Question Number : 1 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Pearson's product moment correlation coefficient measures

A. Linear relation
B. Quadratic relation
C. Exponential relation
D. Cubic relation

Options :

1. A

2. B

3. C

4. D

Question Number : 2 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For logistic regression, the response variable is

A. Continuous
B. Continuous with positive values
C. Discrete
D. Binary

Options :

1. A

2. B

3. C

4. D

Question Number : 3 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For Poisson distribution

A. Mean= variance
B. Mean> variance
C. Mean< variance
D. Mean≠ variance

Options :

1. A

2. B

3. C

4. D

Question Number : 4 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The measure of central tendency not affected by outliers is

A. Arithmetic mean
B. Median
C. Geometric mean
D. Harmonic mean

Options :

1. A

2. B

3. C

4. D

Question Number : 5 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Graphical presentation of frequency distribution is

A. Bar chart
B. Pie chart
C. Box plot
D. Histogram

Options :

1. A
2. B
3. C
4. D

Question Number : 6 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The book "The Elements" was written by

A. Euler
B. Euclid
C. Hausdorff
D. Leibnitz

Options :

1. A
2. B
3. C
4. D

Question Number : 7 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a twin prime?

A. (3, 5)
B. (11, 13)
C. (109, 111)
D. (137, 139)

Options :

1. A
2. B
3. C
4. D

Question Number : 8 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let f be a function defined on [0, 1] such that

$$f(x) = 0 \text{ if } 0 \le x \le 1, x \ne 0.5$$
$$= 1 \text{ if } x = 0.5$$

Then which of the following is true?

A. f is continuous on [0, 1]
B. f is differentiable on [0, 1]
C. f is Riemann integrable on [0, 1]
D. f is not Riemann integrable on [0, 1]

Options :

1. A
2. B
3. C
4. D

Question Number : 9 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following curves just touches the x-axis?

A. $x^2 - 3x + 2$
B. $x^2 - x + 2$
C. $x^2 - 3x + 1$
D. $x^2 - 2x + 1$

Options :

1. A
2. B
3. C
4. D

Question Number : 10 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The number $\sqrt{3} \cdot e^{2i\pi}$ is

A. an integer
B. a rational number but not an integer
C. an irrational number
D. an imaginary number

Options :

1. A
2. B
3. C
4. D

Question Number : 11 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A perfect fluid is that where,

A. Density is constant.
B. Pressure is isotropic.
C. Density is constant and pressure is isotropic.
D. Density is constant but pressure is not isotropic.

Options :

1. A
2. B
3. C
4. D

Question Number : 12 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A fluid flow is turbulent when,

A. Reynolds number is greater than 4000.
B. Reynolds number is less than 2000.
C. Froude number is less than 1.
D. Froude number is greater than 1.

Options :

1. A
2. B
3. C
4. D

Question Number : 13 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a conservative field of forces

A. Lagrangian is constant.
B. Hamiltonian is constant.
C. Kinetic energy is constant.
D. Internal energy is constant.

Options :

1. A
2. B
3. C
4. D

Question Number : 14 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The integral $\int_0^1 \frac{1}{\sqrt{x}}\,dx$ can be determined by,

A. Simpson's 1/3 rule.
B. Gaussian quadrature.
C. Trapezoidal rule.
D. Boole's rule.

Options :

1. A
2. B
3. C
4. D

Question Number : 15 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Green's function is used for,

A. A first order nonlinear differential equation.
B. For a partial differential equation.
C. For inhomogeneous differential equation.
D. For inhomogeneous linear differential equation with initial/boundary conditions.

Options :

1. A
2. B
3. C
4. D

Question Number : 16 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The radius of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{n!}{n^n} z^n$$

Is

A. 1
B. 0
C. e
D. 1/e

Options :

1. A
2. B
3. C
4. D

Question Number : 17 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The function f(z)=cos z is analytical on

A. C U {∞}
B. C except on the positive real axis
C. C \ {∞}
D. C

Options :

1. A
2. B
3. C
4. D

Question Number : 18 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let f be an entire function. If $Im\, f(z) > 0$ for all $z \in C$ then

A. $Re\ f$ is non-constant
B. f is constant
C. $f \equiv 0$
D. f' is a non zero constant

Options :

1. A
2. B
3. C
4. D

Question Number : 19 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $S=\{0\} \cup \{(2n+3)^{-1} : n=1,2,.....\}$ Then the number of analytic functions which vanish only on S is :

A. 0
B. 1
C. 2
D. Infinite

Options :

1. A
2. B
3. C
4. D

Question Number : 20 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let f be analytic on D = {z ϵ C : |z| < 2} such that $f(0) = 1$ and $\int_{|z|=1} \frac{f(z)}{((n+1)z-1)^2} dz$ for all n ϵ N. Then

A. there is a point α ϵ D such that f(α) = 0
B. $f = 0$ on D
C. f is constant on D
D. f' never vanishes on D

Options :

1. A
2. B
3. C
4. D

Question Number : 21 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement is true?

a. The word "Cryptography" was originated from the two Greek words "kruptos" and "graphia".
b. The word "Cryptography" was originated from the two French words "kruptos" and "graphia".
c. The meaning of the Latin word "kruptos" is "writing".
d. The meaning of the Greek word "graphia" is "hidden".

Options :

1. A
2. B
3. C
4. D

Question Number : 22 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement is true?

a. RSA Cryptosystem is a Symmetric Key Cryptosystem.
b. RSA Cryptosystem is a Public Key Cryptosystem.
c. The acronym RSA is made of the initial letters of the surnames of Ron Raner, Adi Shamar, and Leonard Adman.
d. The Cesarean Cipher is an example of Public Key Cryptosystem.

Options :

1. A
2. B
3. C
4. D

Question Number : 23 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement is false?

a. Naor and Shamir invented visual cryptography.
b. If we consider the visual cryptographic scheme with the basis matrix S^1 as the identity matrix of order 4, then the pixel expansion of the resulting (2, 4)-VCS will be 4.
c. If we consider the visual cryptographic scheme with the basis matrix S^1 as the identity matrix of order 4, then the relative contrast of the resulting (2, 4)-VCS will be 1/2.
d. The visual cryptographic scheme invented by Naor and Shamir is an example of perfect secret sharing scheme.

Options :

1. A
2. B
3. C
4. D

Question Number : 24 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If we consider the (2, 7)-visual cryptographic scheme with the basis matrix S^1 as the incidence matrix of a (7, 3, 1)-BIBD, then which of the following statement is true.

a. The pixel expansion of the resulting (2, 7)-VCS will be 3.
b. The relative contrast of the resulting (2, 7)-VCS will be 1/7.
c. The pixel expansion of the resulting (2, 7)-VCS will be 10.
d. The relative contrast of the resulting (2, 7)-VCS will be 2/7.

Options :

1. A
2. B
3. C
4. D

Question Number : 25 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Suppose Julius Caesar wants to send the message "FUN" to one of his subordinates using the Cesarean Cipher with key k = 11, assuming the plain texts are in upper case English letters only. Then which of the following statement is true.

a. The encryption of "FUN" will be "QFY".
b. The encryption of "FUN" will be "RGZ".
c. The encryption of "FUN" will be "PEX".
d. The encryption of "FUN" will be "QFZ".

Options :

1. A
2. B
3. C

4. D

Question Number : 26 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let M(m, n, C) be the space of all m x n matrices with entries in C, then M(m, n, C) is a smooth manifold of dimension

A. mn
B. m + n
C. m - n
D. 2mn

Options :

1. A
2. B
3. C
4. D

Question Number : 27 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The function $f : R \rightarrow R$ defined by

$$f(x)=e^{-1/x} \text{ for } x > 0 \text{ and } f(x)=0 \text{ for } x \leq 0$$

Is

A. C^0 but not C^1 on R
B. C^1 but not C^2 on R
C. C^2 but not C^3 on R
D. C^∞ on R.

Options :

1. A
2. B
3. C
4. D

Question Number : 28 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let R and N be the sets of all real numbers and natural numbers respectively. A relation ~ is defined on the power set of R as follows:

For any two sets A and B (both subsets of R),

$A \sim B$ if and only if $A \cap N = B \cap N$.

If [A] denotes the set $\{B : B \sim A\}$ then

A. $Q \in [N]$, where Q is the set of all rational numbers.
B. The set of all roots of the equation $x^n = 1$, $(n \in N)$ is in $[2N + 1]$.
C. $[\phi] = \{\phi\}$.
D. A finite set cannot be related to an infinite set.

Options :

1. A
2. B

3. C

4. D

Question Number : 29 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let R be the set of all real numbers. Define a relation ~ on R as follows:

$x \sim y$ if and only if $y = x + n$ for some integer n:
Then the set $\{[x]: x \in R\}$ topologically represents

A. A line segment.
B. A ray.
C. A circle.
D. A family of circles.

Options :

1. A

2. B

3. C

4. D

Question Number : 30 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one is a valid UPC?

A. 131313-131313
B. 121212-121212
C. 212121-212121
D. 141414-141414

Options :

1. A

2. B

3. C

4. D

Question Number : 31 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let S denote the collection of all straight lines drawn on a plane. Define a relation ~ on S as follows:

L ~ M if and only if L is perpendicular to M
Then ~ is

A. An equivalence relation.
B. Reflexive and transitive but not symmetric.
C. Reflexive and symmetric but not transitive.
D. Neither reflexive nor transitive but symmetric.

Options :

1. A

2. B

3. C

4. D

Question Number : 32 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which is not a valid ISBN?

A. 81-7756-142-3
B. 81-7756-344-0
C. 81-7756-141-3
D. 81-7756-343-2

Options :

1. A
2. B
3. C
4. D

Question Number : 33 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The particle motion in P-wave is

A. parallel to the direction of wave propagation
B. perpendicular to the direction of wave propagation
C. parallel to the direction of the S-wave propagation
D. oblique to the direction of the S-wave propagation

Options :

1. A
2. B
3. C
4. D

Question Number : 34 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A liquid will

A. Not support the transmission (propagation) of an S- wave and a P-wave will slow down in a liquid.
B. Support the transmission (propagation) of an S- wave and a P-wave will slow down in a liquid.
C. Not support the transmission (propagation) of an S- wave and a P-wave will propagates fast in a liquid.
D. Support the transmission (propagation) of an S- wave and a P-wave will propagates fast in a liquid.

Options :

1. A
2. B
3. C
4. D

Question Number : 35 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not true:

A. Quantum mechanics deals with the systems in small dimension.
B. The significance of relativity theory would be observed when the speeds of the systems are large enough.
C. In computer science parallel processing is an essential ingredient.
D. Reliable transmission is not at all required for transmitting information or data.

Options :

1. A
2. B
3. C
4. D

Question Number : 36 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under non parametric methods we assume that

A. Random variable is normal
B. Random variable is binary
C. Random variable is continuous
D. Random variable is gamma

Options :

1. A
2. B
3. C
4. D

Question Number : 37 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When a star becomes a red giant?

A. When the hydrogen fuel gets exhausted
B. When the helium fuel gets exhausted
C. If the star is bigger than Sun
D. If the carbon fuel gets exhausted.

Options :

1. A
2. B
3. C
4. D

Question Number : 38 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the reason for variation of light curve of eclipsing binary?

A. Due to changes in the intrinsic property of the primary.
B. Due to changes in the intrinsic property of the secondary.
C. Due to change in the position of the primary.
D. Due to the change in the position of the secondary.

Options :

1. A
2. B
3. C
4. D

Question Number : 39 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the form of Initial Mass function of stars?

A. A logarithmic law.
B. An exponential form.
C. Gaussian distribution.
D. Truncated exponential form.

Options :

1. A
2. B
3. C
4. D

Question Number : 40 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements is incorrect

A. Seiche waves are rarely harmful.
B. Storm surge is a coastal flood.
C. Tidal waves are formed due to the gravitational pull of the sun and the moon on the water body.
D. Tsunami is a series of waves that balances the earth's Coriolis force against a topographic boundary.

Options :

1. A
2. B
3. C
4. D

Question Number : 41 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider

$$dy/dx=y^n ,$$

For what values of n; does the equation have infinitely many solutions?

A. $n \in R$
B. $n \in Z$
C. $n \in [0,1]$
D. $n \in (0,1)$

Options :

1. A
2. B
3. C
4. D

Question Number : 42 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider

$$dy/dx=y^n ,$$

Does the equation have unique solution for?

A. $n = 2$
B. $n = 0.5$
C. $n = 3/5$
D. $n = -2$

Options :

1. A
2. B
3. C
4. D

Question Number : 43 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In Deutsch-Jozsa algorithm for determine, a n-bit Boolean function to be constant or balanced, the oracle needs to run

A. 1
B. $\sqrt{n}$
C. $n/2$
D. $2^{n-1}+1$

Options :

1. A
2. B
3. C
4. D

Question Number : 44 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Phase velocity of Dust Acoustic Wave

A. is greater than electron thermal velocity
B. lies between electron and ion thermal velocities
C. is less than both electron and ion thermal velocities
D. has no connection with electron and ion thermal velocities

Options :

1. A
2. B
3. C
4. D

Question Number : 45 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Phase velocity of Dust Ion Acoustic Wave

A. is greater than electron thermal velocity
B. lies between electron and ion thermal velocities
C. is less than both electron and ion thermal velocities
D. has no connection with electron and ion thermal velocities

Options :

1. A
2. B
3. C
4. D

Question Number : 46 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the study of Dust Acoustic Wave propagation

A. only electron inertia is important, ions and dust grains are non inertial
B. both electron and ion inertia are important, dust grains are non inertial
C. only dust inertia is important, electrons and ions are non inertial
D. electrons, ions and dust grains are all inertia less

Options :

1. A
2. B
3. C
4. D

Question Number : 47 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

How many stable equilibrium dust charge state exists in case of dust charging by secondary electron emission process?

A. 1
B. 2
C. 3
D. 4

Options :

1. A
2. B
3. C
4. D

Question Number : 48 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following is the fourth state of matter?

A. Plasma
B. Solid
C. Liquid
D. Gas

Options :

1. A
2. B
3. C
4. D

Question Number : 49 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Equation of motion comes from conservation of

A. mass
B. charge
C. momentum
D. energy

Options :

1. A
2. B
3. C
4. D

Question Number : 50 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Second order velocity space moment of Vlasov equation gives

A. continuity equation
B. equation of motion
C. equation of energy
D. Maxwell equations

Options :

1. A
2. B
3. C
4. D

Question Number : 51 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which one of the following is transverse wave?

A. Langmuir wave
B. Ion acoustic wave
C. Magnetosonic wave
D. Alfven wave

Options :

1. A
2. B
3. C
4. D

Question Number : 52 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which layer of the ionosphere disappears at night?

A. D
B. E
C. F1
D. F2

Options :

1. A
2. B
3. C
4. D

Question Number : 53 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The linear regression model is fitted to a set of bivariate observations by two methods; (i) the least squares method and (ii) a robust method. Which of the following statements is true?

A. In case of residual plots, the extreme outliers will be highlighted by the fit of the robust regression but not by the least squares fit.
B. In case of residual plots, the extreme outliers will be highlighted by the least squares fit, but not by the fit of the robust regression.
C. Both residual plots will highlight the extreme outliers.
D. Neither residual plot will highlight the extreme outliers.

Options :

1. A
2. B
3. C
4. D

Question Number : 54 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A sample of 20 observations is generated from a $N(\mu, \sigma^2)$ distribution. The statistician wants to estimate the scale parameter by the median absolute deviation (MAD). The true parameters (unknown to the statistician), are $\mu = 0$ and $\sigma = 1$. The 20 observations are ordered. The m largest observations are replaced by 1000. What must be the values of m for the MAD to break down for the first time as an estimate of the scale?

A. $m=5$
B. $m=9$
C. $m=10$
D. $m=12$

Options :

1. A
2. B
3. C
4. D

Question Number : 55 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

You have paired data on two variables Y and X, where each value of X recurs a few times. Suppose you compute the sample mean of Y for every distinct value of X, and describe the fitted value of Y for any given X by linear interpolation between these sample means. Identify which of the following statements is incorrect.

A. The fitted values described above can tell us how appropriate the linear regression model is for the data at hand.
B. The locus of fitted values is generally not a straight line,
C. Suppose x is one of the values of X appearing in the data set. If the regression of Y on X is $a + bX$, then the sample mean of all Y'swith$X = x$ is an unbiased estimator of $a + bx$,
D. Suppose x is one of the values of X appearing in the data set. If the least squares fitted straight line is $Y = a + bX$,then $a + bx$ fits the Y values at x better (in the sense of sum of squared distances from the Y's) than the sample mean of Y's at x.

Options :

1. A
2. B
3. C
4. D

Question Number : 56 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the linear regression model with Y as response variable and X as explanatory variable

A. $E(Y|X)$ is linear in X and $Var(Y|X)$ is less than $Var(Y)$,
B. $E(Y|X)$ and $Var(Y|X)$ are both linear in X,
C. $E(Y|X)$ is linear in X but $Var(Y|X)$ is nonlinear in X,
D. $Var(Y|X)$ is linear in X but $E(Y|X)$ is nonlinear in X.

Options :

1. A
2. B
3. C
4. D

Question Number : 57 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The primary objective of MDS is

A. dimension reduction
B. convenient visualization of data
C. convenient display of relative distances among units
D. convenient grouping of features of units

Options :

1. A

2. B

3. C

4. D

Question Number : 58 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ultimate number of dimensions used in MDS is determined by

A. number of units
B. number of features possessed by each unit
C. maximum distance between any two units
D. Scree plot of Stress versus number of dimensions

Options :

1. A

2. B

3. C

4. D

Question Number : 59 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Stress in MDS is defined in terms of

A. squares of standardized difference between original and reproduced distances
B. squared differences between original and reproduced distances
C. absolute differences between original and reproduced distances
D. Standardized differences between original and reproduced distances.

Options :

1. A

2. B

3. C

4. D

Question Number : 60 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the p-values $p_1, p_2, \ldots p_m$ are independent under global null hypothesis H_0 and $p_i \sim$ Uniform(0, 1) for all i=1,2,… m under H_0 and if we reject H_0 iff $p_i \leq \alpha_0$ for some i=1, 2,.. ,m, then P_{H_0}(Reject H_0) is

A. α_0^m
B. $1-(1-\alpha_0)^m$
C. $1-\alpha_0^m$
D. $(1-\alpha_0)^m$

Options :

1. A

2. B

3. C

4. D

Question Number : 61 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under global null, which of the following is true?

A. FWER > 2. FDR
B. FDR < FWER ≤ 2. FDR
C. FWER = FDR
D. FWER < FDR

Options :

1. A
2. B
3. C
4. D

Question Number : 62 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The spectral distribution of non-symmetric matrices are bivariate because

A. matrices have rows and columns and they may be unequal
B. entries can be bivariate
C. non-symmetric matrices have complex eigenvalues
D. All matrices have bivariate spectral distributions, nothing special about non-symmetric matrices.

Options :

1. A
2. B
3. C
4. D

Question Number : 63 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The limit spectral distribution of the sample auto-covariance matrix for one dimensional linear time series model

A. exists but not known in closed form
B. chi-square
C. is known in closed form but is not normal or chi-square
D. is normal

Options :

1. A
2. B
3. C
4. D

Question Number : 64 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. Under Principal Component Analysis with p variables the components are

A. Independent
B. Uncorrelated
C. Pairwise independent
D. First k (≤p) are independent.

Options :

1. A
2. B
3. C
4. D

Question Number : 65 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under Principal Component Analysis the variances of the principal components are

A. Variances of original variables
B. Elements of some eigen vector of Covariance matrix
C. Eigen values of Covariance matrix
D. Eigen values of the data matrix

Options :

1. A
2. B
3. C
4. D

Question Number : 66 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Independent Component Analysis cannot be used if the joint distribution of the variables is

A. Multivariate Normal
B. Multivariate Gamma
C. Multivariate Exponential
D. Wishart

Options :

1. A
2. B
3. C
4. D

Question Number : 67 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under factor analysis rotation is used to

A. Compute the loadings
B. Compute the factor scores
C. Extract the factors
D. Estimate the specific variances

Options :

1. A
2. B
3. C
4. D

Question Number : 68 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not true:

A. The BB84 protocol is a quantum cryptographic protocol.
B. Sharing of a key is an important issue in a cryptographic protocol.
C. Security analysis is not an important issue in cryptographic protocol.
D. Using the existence of non-orthogonal states Bennett et al proved BB84 protocol.

Options :

1. A
2. B
3. C
4. D

Question Number : 69 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The chance of burglary in Mr Pundarikaxa Purkayastha's pallacial abode is 0.1. In case of a burglary his dog, a German Dashhound, has 90% chance of barking. However, it has some sleeping disorder, and has a 50% chance of barking during a bad dream when there is no burglar around. In the night before Dec 12, 2018, the maid servant of Mr Purkayastha's wife heard the dog bark. What is the probability that there was a burglary afoot on that fateful night in Mr Pundarikaxa Purkayastha's house?

A. 1/6
B. 2/5
C. 1/2
D. 5/6

Options :

1. A
2. B
3. C
4. D

Question Number : 70 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Poor Jai had only one trouser with just two pockets, each pocket containing one coin. One coin was a fair one and the other was the famous Sholay coin (double headed). Jai took out a coin at random and said, "Veeru, I shall toss this coin 5 times and shall die if the coin shows heads all the 5 times." Veeru was much moved, but agreed to the arrangement. If Jai had to die, then what is the chance that he had picked the Sholay coin?

A. 1
B. 31/33
C. 32/33
D. 1/5

Options :

1. A
2. B
3. C
4. D

Question Number : 71 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a MCMC sampler the burn in period is 1000 and the gap is 100. Then how many steps will be needed to generate a sample of size 13?

A. Less than 1014.
B. At least 1014 but less than 1100.
C. At least 1100 but less than 2000.
D. More than 2000.

Options :

1. A
2. B
3. C
4. D

Question Number : 72 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A mobile phone makes 3 attempts to connect to a tower, and says "No network" if all the attempts fail. Each attempt fails with 5% probability. If the mobile succeeds in connecting to the tower, then what is the chance that it did so in the very first attempt?

A. 4/7
B. 3/7
C. 2/7
D. 1/7

Options :

1. A
2. B
3. C
4. D

Question Number : 73 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

That the hitting times of x and $-x$ by a Brownian motion (B_t) have the same distributions for every $x \in \mathrm{R}$ is a consequence of

A. the stationarity of increments property
B. the Markov property
C. the reflection principle
D. the quadratic variation

Options :

1. A
2. B
3. C
4. D

Question Number : 74 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $(B_t)_{t \geq 0}$ is a standard Brownian motion, then an example of a martingale $(X_t)_{t \geq 0}$ is provided by

A. $(\mathrm{Exp}\,(B_t - t^2))_{t \geq 0}$
B. $(\mathrm{Exp}\,(B_t - t))_{t \geq 0}$
C. $(\mathrm{Exp}\,(B_t - 2\,t))_{t \geq 0}$
D. $(\mathrm{Exp}\,(B_t - t/2))_{t \geq 0}$

Options :

1. A
2. B
3. C
4. D

Question Number : 75 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

First equivalence theorem due to Kiefer and Wolfowitz (1960) for optimum design is established for

A. A-optimality criterion only
B. D-optimality criterion only
C. E-optimality criterion only
D. All the three criteria above

Options :

1. A
2. B
3. C
4. D

Question Number : 76 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Latin square design (LSD) falls under

A. Factorial design set-up
B. Block-design set-up
C. Row-column design set-up
D. Both regression and block design set-up

Options :

1. A
2. B
3. C
4. D

Question Number : 77 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

We generally use a simplex lattice design when

A. There are constraints on one or more components apart from the natural constraint
B. The number of components is not large, but a high order polynomial defines the response
C. There are many components, and the first choice is to screen out the most important ones
D. The number of components is large.

Options :

1. A
2. B
3. C
4. D

Question Number : 78 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. In a (3,3) simplex lattice design, the number of design points is

A. 6
B. 8
C. 10
D. 12

Options :

1. A
2. B
3. C
4. D

Question Number : 79 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a 3-component mixture experiment, which of the following will not be a design point of a simplex centroid design:

A. (1,0,0)
B. (1/2, 1/2, 0)
C. (1/3, 2/3, 0)
D. (1/3, 1/3, 1/3)

Options :

1. A
2. B
3. C
4. D

Question Number : 80 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For comparing two exact designs in a meaningful way, we use

A. The information matrix
B. The information matrix on per observation basis
C. The dispersion matrix
D. The dispersion matrix on per observation basis

Options :

1. A
2. B
3. C
4. D

Question Number : 81 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In testing a simple null against a simple alternative, what happens to the critical region when the level of significance is reduced?

A. Depends on the concerned testing problem
B. The rejection region is always reduced if the test is most powerful
C. The rejection region is always increased
D. The rejection region is always unaltered if the test is most powerful

Options :

1. A
2. B
3. C
4. D

Question Number : 82 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 99% t distribution based confidence interval for the mean price for a liter of petrol is calculated using a simple random sample of petrol prices for 171 petrol pumps. Given that the 97.9% confidence interval is [3.32, 3.98], what is the sample mean price for a liter of petrol?

A. 0.33
B. 3.65
C. Not Enough Information; we would need to know the variation in the sample of petrol prices
D. Not Enough Information; we would need to know the variation in the population of petrol prices

Options :

1. A
2. B
3. C
4. D

Question Number : 83 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. All of the following increase the width of a confidence interval except:

A. Increased confidence level
B. Increased variability
C. Increased sample size
D. Decreased sample size

Options :

1. A
2. B
3. C
4. D

Question Number : 84 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following represents the p value in hypothesis testing?

A. The probability of failing to reject the null hypothesis, given the observed results
B. The probability that the null hypothesis is true, given the observed results
C. The probability that the observed results are statistically significant, given that the null hypothesis is true
D. The probability of observing results as extreme as or more extreme than currently observed, given that the null hypothesis is true

Options :

1. A
2. B
3. C
4. D

Question Number : 85 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The average growth of a certain variety of pine tree is 10.51 inches in three years. A biologist claims that a new variety will have a greater three-year growth. A random sample of 250 of the new variety has an average three-year growth of 11.8 inches and a standard deviation of 3.2 inches. If μ is the concerned mean value in the population, the appropriate null and alternate hypotheses to test the biologist's claim are:

A. H0: μ=11.8 against Ha: μ>11.8
B. B. H0: μ=10.51against Ha: μ≠10.51
C. C. H0: μ=10.51 against Ha: μ>10.51
D. D. H0: μ=10.51 against Ha: μ=11.8I

Options :

1. A
2. B
3. C
4. D

Question Number : 86 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements is not correct?

A. Endogenous variables are developed within the system.
B. Exogenous variables can depend on other variables in the system
C. The output variable could be an endogenous variable.
D. An endogenous variable can depend on other endogenous variables.

Options :

1. A
2. B
3. C
4. D

Question Number : 87 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following can be regarded as particular cases of SEM?

A. Path Analysis only
B. Path Analysis and Linear Regression Analysis
C. Regression Analysis only
D. Linear regression Analysis, path analysis and factor analysis

Options :

1. A
2. B
3. C
4. D

Question Number : 88 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Are input variables in SEM

A. all exogenous
B. some exogenous
C. all endogenous
D. neither exogenous nor exogenous

Options :

1. A
2. B
3. C
4. D

Question Number : 89 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The following is not a metaheuristic optimization procedure:

A. Simulated annealing
B. Variable neighborhood search procedure
C. Genetic algorithm
D. Simplex algorithm

Options :

1. A
2. B
3. C
4. D

Question Number : 90 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The metaheuristic procedure that uses the Metropolis-Hastings's MCMC method is:

A. Genetic Algorithm
B. Variable neighborhood search procedure
C. Simulated annealing
D. Ant colony optimization

Options :

1. A
2. B
3. C
4. D

Question Number : 91 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements is incorrect?

A. Accuracy has nothing to with equipment calibration.
B. Accuracy and Precision are different concepts.
C. To calculate Precision, we require repeat measurements.
D. A set of measurements can be inaccurate as also imprecise.

Options :

1. A
2. B
3. C
4. D

Question Number : 92 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

How is Reproducibility calculated?

A. by taking into account the equipment calibration certificate
B. by considering repeat measurements from the same laboratory
C. by considering repeat measurements from different laboratories
D. by taking measurements repeated in the same laboratory with different operators

Options :

1. A
2. B
3. C
4. D

Question Number : 93 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the statements below is correct?

A. $R < r$
B. $R > r$
C. R and r are not related
D. $R = r$

Where R and r stands for reproducibility and repeatability of measurements.

Options :

1. A
2. B
3. C
4. D

Question Number : 94 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

How does Uncertainty differ from Inaccuracy?

A. Uncertainty is based only on Precision.
B. Uncertainty takes into account both lack of accuracy as also lack of precision.
C. Uncertainty estimation does not require repeat measurements.
D. Uncertainty estimation does not require a calibration certificate.

Options :

1. A
2. B
3. C
4. D

Question Number : 95 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Given a collection of news articles related to India, for which of the following tasks would text analytics techniques be most appropriate?

A. Finding news related to Indian elections from the collection.
B. Constructing a list of names of Indian film stars.
C. Estimating what proportion of the news articles cover sports.
D. All of the above.

Options :

1. A
2. B
3. C
4. D

Question Number : 96 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A stop word is

A. A word that is used to end sentences.
B. A command used at the end of indexing.
C. A word that does not generally convey information about the subject of a document.
D. An abbreviation / acronym used in Tweets.

Options :

1. A
2. B
3. C
4. D

Question Number : 97 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is ETL stand for?

A. Execute tramit and load
B. Extract transform and load
C. Excute Transform and load
D. All the above

Options :

1. A
2. B
3. C
4. D

Question Number : 98 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The data is stored, retrieved & updated in _____.

A. OLAP
B. OLTP
C. SMTP
D. FTP

Options :

1. A
2. B
3. C
4. D

Question Number : 99 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A solid donut is not topologically equivalent to a hollow sphere. The two surfaces differ in terms of

A. number of connected components
B. number of tunnels
C. number of voids
D. number of tunnels and voids

Options :

1. A
2. B
3. C
4. D

Question Number : 100 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the level sets of the height function defined on the torus. What is largest number of connected components in any given level set of this function?

A. 1
B. 2
C. 3
D. 4

Options :

1. A
2. B
3. C
4. D