1. Let $f(x)=x^2+1 \in R[x]$, then _____

(A) $f(x)$ is reducible over R

(B) $f(x)$ is irreducible over R

(C) $f(x)$ is reducible over Q

(D) $f(x)$ is irreducible over C

(E) Answer not known

2. If R is an integral domain

(i) $R[x]$ is also an integral domain

(ii) $R[x]$ is a field

(iii) $R[x]$ is not an integral domain

(iv) $R[x]$ is not a field

(A) (i) and (ii) only

(B) (i) and (iv) only

(C) (iii) and (ii) only

(D) (iii) and (iv) only

(E) Answer not known

3. If $f(x), g(x) \in F[x]$, where F is a field then which among the following is true?

(i) $\deg(f(x)\,g(x)) = \deg f(x) + \deg g(x)$

(ii) $\deg(f(x)\,g(x)) \leq \deg f(x) + \deg g(x)$

(iii) $\deg(f(x)\,g(x)) = \max(\deg f(x), \deg g(x))$

(A) (i) only
(B) (i) and (ii) only
(C) (ii) and (iii) only
(D) (iii) only
(E) Answer not known

4. If R is a ring in which $px = 0$ for all $x \in R$, where p is a prime number then _____

(A) $x\,T_a^{p^m} \neq x\,a^{p^m} - a^{p^m}.x$

(B) $x\,T_a^{p^m} = x\,a^{p^m} - a^{p^m}.x$

(C) $x\,T_a^{p^m} = 1$

(D) $x\,T_a^{p^m} = x\,a^{p^m} - ax$

(E) Answer not known

5. The polynomial ring $F[x]$ is

(i) Integral Domain

(ii) Not an Integral Domain

(iii) Euclidean Ring

(iv) Non Euclidean Ring

(A) (i) and (iii)
(B) (i) and (iv)
(C) (ii) and (iii)
(D) (ii) and (iv)
(E) Answer not known

6. Which of the following is/are an automorphism?

(i) Let $(I,+)$ be a group of integers, then $f:I\to I$ defined by $f(x)=-x\,\forall\, x\in I$

(ii) Let ($\mathbb{C}$, +) be a additive group of complex numbers $f:\mathbb{C}\to\mathbb{C}$ defined by $f(z)=az$ (where a is any non-zero complex number)

(iii) S_3 be a symmetric group $f:S_3\to S_3$ defined by $f(\alpha)=\alpha^{-1}\,\forall\,\alpha\in S_3$

(A) (i) & (ii)
(B) (i) & (iii)
(C) (ii) & (iii)
(D) (i), (ii) & (iii)
(E) Answer not known

7. Let ϕ be a homomorphism of G onto $\overline{G}$ with kernel K. Then $G/K \approx \overline{G}$.

Match the following statements for the constructed map $\psi : G/K \to \overline{G}$

(a)	$x = y \Rightarrow \psi(x) = \psi(y)$	1.	ψ is one-to-one mapping
(b)	$x, y \in G/K$ such that $\psi(xy) = \psi(x)\psi(y)$	2.	ψ is onto mapping
(c)	If $\overline{g} \in \overline{G}$, there exists $Kg \in G/K$ such that $\overline{g} = \psi(Kg)$	3.	ψ is a homomorphism
(d)	$\psi(x) = \psi(y) \Rightarrow x = y$	4.	ψ is well-defined mapping

	(a)	(b)	(c)	(d)
(A)	4	3	2	1
(B)	3	4	1	2
(C)	4	3	1	2
(D)	3	4	2	1

(E) Answer not known

8. If G be a group of order 99 and suppose H is a subgroup of G of order 11, then

(i) H itself a normal subgroup of G

(ii) H is not a normal subgroup of G

(iii) G is simple

(A) (i) is true

(B) (ii) is true

(C) (iii) is true

(D) (i) and (iii) are true

(E) Answer not known

9. How can we express a prime number P of the form $4n+1$ for some integers a,b? ie, $p =$ _____

(A) a^2+b^2

(B) a^2-b^2

(C) a^3+b^3

(D) a^3-b^3

(E) Answer not known

10. The subgroup N of G is a normal subgroup of G if and only if every left coset of N in G is

(A) A left coset of N in G

(B) A right coset of N in G

(C) A left coset of G in N

(D) A right coset of G in N

(E) Answer not known

11. A subgroup N of G is said to be a normal subgroup then

(A) $g_1 n g_2^{-1} \in N\, g_1,\, g_2 \in G, n \in N$

(B) $g_1\, n\, g_2^{-1} \notin N\, g_1,\, g_2 \in G, n \in N$

(C) $g\, n\, g^{-1} \notin N. \forall\, g \in G, n \in N$

(D) $g\, n\, g^{-1} \in N. \forall\, g \in G, n \in N$

(E) Answer not known

12. Let R be a Euclidean ring, $a, b \in R$ and $b \neq 0$ is not a unit in R, then

(i) $d(a) < d(ab)$

(ii) $d(a) > d(ab)$

(iii) $d(a) = d(ab)$

(iv) $d(a) \neq d(ab)$

(A) (i) and (iii) only
(B) (i) and (iv) only
(C) (ii) and (iii) only
(D) (ii) and (iv) only
(E) Answer not known

13. Suppose m is a prime element in the Euclidean ring and $m \mid ab$ where $a, b \in R$ then m divides

(A) a only
(B) b only
(C) a or b
(D) a and b
(E) Answer not known

14. If $p^m \mid o(G), p^{m+1} \nmid o(G)$, then G has subgroup of order _____

(A) p^2

(B) p^{m-1}

(C) p^m

(D) p^{m+1}

(E) Answer not known

15. An L_p space consists of all measurable functions f defined on a measure space X with measure m which are such that $|f(x)|^p$ is integrable, with the norm defined by $\|f\|_p$ = _____

(A) $\left(\int |f(x)|^p \, dm(x)\right)^p$

(B) $\left(\int |f(x)|^{1/p} \, dm(x)\right)^{1/p}$

(C) $\left(\int |f(x)|^p \, dm(x)\right)^{1/p}$

(D) $\left(\int |f(x)|^{1/p} \, dm(x)\right)^p$

(E) Answer not known

16. Let X be an inner product space then which of the following holds?

(i) If $\{x_1, x_2 \ldots x_n\}$ is an orthogonal set in X then $\|x_1 + x_2 + \ldots + x_n\|^2 = \|x_1\|^2 + \ldots + \|x_n\|^2$

(ii) If E is an orthonormal subset of X then for all $x \neq y$ in E $\|x - y\| = \sqrt{2}$

(A) (i) only
(B) (ii) only
(C) Both (i) and (ii)
(D) Neither (i) nor (ii)
(E) Answer not known

17. Every Hilbert space is

(A) Convex
(B) Uniformly convex
(C) Concave
(D) Uniformly concave
(E) Answer not known

18. A normed linear space is called Banach Space if it is

(A) Compact
(B) Complete
(C) Not complete
(D) Hilbert
(E) Answer not known

19. Two vectors x, y in an inner product space are orthogonal if

(A) $\langle x, y \rangle = 0$

(B) $\|x\| = \|y\| = 1$

(C) $\langle x, y \rangle \neq 0$

(D) $x \neq 0, y \neq 0$

(E) Answer not known

20. Match the following normed linear spaces with their norms defined :

(a)	Spaces R and C	1.	$\|f\|_p = \left(\int \|f(x)\|^p \, dm(x) \right)^{1/p}$
(b)	Spaces R^n and C^n	2.	$\|x\|_p = \left(\sum_{i=1}^{\infty} \|x_i\|^p \right)^{1/p}$
(c)	Spaces $l_p^n, 1 \leq p < \infty$	3.	$\|x\| = \|x\|$
(d)	Spaces $l_p, 1 \leq p < \infty$	4.	$\|x\| = \left(\sum_{i=1}^{n} \|x_i\|^2 \right)^{1/2}$
(e)	Spaces $L_p, 1 \leq p < \infty$	5.	$\|x\|_p = \left(\sum_{i=1}^{n} \|x_i\|^p \right)^{1/p}$

	(a)	(b)	(c)	(d)	(e)
(A)	2	5	4	1	3
(B)	3	4	5	2	1
(C)	3	4	2	5	1
(D)	2	5	3	1	4

(E) Answer not known

21. Which of the following is not a data structure in *R*?

(A) Strings
(B) Matrices
(C) Lists
(D) Floats
(E) Answer not known

22. Which one of the following is used to define y-axis in the syntax of box plot ( ) function of *R*-language?

(A) *Y*
(B) y-axis name
(C) *y*1*ab*
(D) '*y*....'
(E) Answer not known

23. Which of the following built in function that adds straight lines to any type of plot in *R*-language?

(A) curve( )
(B) text( )
(C) abline( )
(D) stline( )
(E) Answer not known

24. Match the *R* constructs with their core structural properties.

(a)	Vector	1.	Heterogeneous, 1D
(b)	List	2.	Heterogeneous, 2D
(c)	Matrix	3.	Homogeneous, 1D
(d)	Data Frame	4.	Homogeneous, 2D

	(a)	(b)	(c)	(d)
(A)	3	4	2	1
(B)	3	1	4	2
(C)	1	3	2	4
(D)	4	1	3	2

(E) Answer not known

25. Match the python libraries with their core functionality

(a)	Pandas	1.	Collection of functioning for scientific computing
(b)	NumPy	2.	The primary scientific plotting library
(c)	SciPy	3.	Fundamental packages for scientific computing
(d)	Matplotlib	4.	Python library for data wrangling and analysis

	(a)	(b)	(c)	(d)
(A)	4	1	2	3
(B)	1	4	3	2
(C)	3	2	4	1
(D)	4	3	1	2

(E) Answer not known

26. In python, to plot the equation which of the following is used

(A) Plot (x, y)
(B) Pyplot.plot (x, y)
(C) Matplotlib.pyplot.plot (x, y)
(D) Matplotlib.plot (x, y)
(E) Answer not known

27. In python match the following outputs.

(a)	10 % 2	1.	1
(b)	10 // 3	2.	10.0
(c)	100 ** 0.5	3.	0
(d)	2 ** 0	4.	3

	(a)	(b)	(c)	(d)
(A)	3	4	1	2
(B)	2	1	4	3
(C)	3	4	2	1
(D)	2	1	3	4

(E) Answer not known

28. Which of the following data types is used to represent an immutable set of values?

(A) List
(B) Tuple
(C) Set
(D) Dict
(E) Answer not known

29. Which of the following is an unsupervised learning, data segmentation, automatic classification method that can be used to detect outliers?

(A) Association Rule Learning

(B) Dimensionality Reduction

(C) K-mean classifier

(D) Clustering

(E) Answer not known

30. The distance between two points that is the sum of the absolute difference of their Cartesian coordinates is called _____

(A) Manhattan distance

(B) Euclidean distance

(C) Minkowski distance

(D) Wards distance

(E) Answer not known

31. The mean of non-central F distribution is _____ ; $m > 2$.

(A) $(m-2)\,(K+\lambda)$

(B) $K\,(m-2)$

(C) $\dfrac{m\,(K+\lambda)}{K\,(m-2)}$

(D) $\dfrac{K\,(m-2)}{m\,(K+\lambda)}$

(E) Answer not known

32. The variance of non-central t distribution is _____ when $\delta = 0$ and $K > 2$.

(A) K

(B) $K-2$

(C) $\dfrac{K}{K-2}$

(D) $\dfrac{K-2}{K}$

(E) Answer not known

33. Let $(x,y) \sim B \vee N(\mu_1,\mu_2,\sigma_1^2,\sigma_2^2,\rho)$. Then x and y are independent if and only if _____

(A) $\mu_1 = 0, \mu_2 = 0, \rho = 0$

(B) $\mu_1 = 0, \mu_2 = 0$

(C) $\rho = 0$

(D) $\mu_1 = 0, \mu_2 = 0, \sigma_1^2 = 1, \sigma_2^2 = 1$

(E) Answer not known

34. The r^{th} cumulant of non-central chi-square distribution with non-centrality parameter 'λ' is

(A) $K_r = (n + \lambda r)\frac{d}{d\lambda}K_{r-1}$

(B) $K_r = (1 + 2\lambda r)\frac{d}{d\lambda}K_{r-1}$

(C) $K_r = (n + 2\lambda r)\frac{d}{d\lambda}(K_{r-1})$

(D) $K_r = (n + 2r)\frac{d}{d\lambda}(K_{r-1})$

(E) Answer not known

35. If (X_1,X_2) follows Bivariate Binomial distribution with parameters n, p_1, p_2 and p_{12} conditional distribution of X_2 given $X_1 = x_1$ is the convolution of two Binomial Distributions namely

(A) $B\left(x_1, \frac{p_2}{q + p_2}\right)$ and $B\left(x_1, \frac{p_{12}}{p_1 + p_{12}}\right)$

(B) $B\left((n - x_1), \frac{p_2}{q + p_2}\right)$ and $B\left(x_1, \frac{p_{12}}{p_1 + p_{12}}\right)$

(C) $B\left((n - x_2), \frac{p_1}{q + p_1}\right)$ and $B\left(x_2, \frac{p_{12}}{p_2 + p_{12}}\right)$

(D) $B\left(x_2, \frac{p_1}{q + p_1}\right)$ and $B\left(x_2, \frac{p_{12}}{p_2 + p_{12}}\right)$

(E) Answer not known

36. Let (x, y) follows bivariate normal distribution with parameters $(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$. Then x and y are independent if and only if _____.

(A) $\rho = 0$ (B) $\rho = 1$

(C) $\rho > 0$ (D) $\rho < 0$

(E) Answer not known

37. The Standard Gamma variates tends to standard normal variate if

(A) $\lambda \to 0$ (B) $\lambda \to -\infty$

(C) $\lambda \to \infty$ (D) $\lambda \to \mu$

(E) Answer not known

38. Identify the correct statements.

Statement 1 : The Cauchy distribution has no mean and variance

Statement 2 : The mode and median of Cauchy distribution well defined

(A) Statement 1 is true and Statement 2 is false

(B) Statement 1 is false and Statement 2 is true

(C) Both statements are false

(D) Both statements are true

(E) Answer not known

39. If X and Y are independent standard normal variates, then $U = X + Y$ and $V = X - Y$ are independently distributed as

(A) $U \sim N(0, \sigma^2), V \sim N(0, \sigma^2)$ (B) $U \sim N(0,1), V \sim N(0, 1)$

(C) $U \sim N(0, 2), V \sim N(0, 2)$ (D) $U \sim N(\mu, \sigma^2), V \sim N(\mu, \sigma^2)$

(E) Answer not known

40. If we let $r = 1$, then the negative binomial distribution will be _____ distribution.

(A) Binomial
(B) Poisson
(C) Geometric
(D) Normal
(E) Answer not known

41. Which of the following statements are correct about negative binomial distribution?

(i) Pascal distribution
(ii) Waiting – Time distribution
(iii) Continuous distribution

(A) (i) only
(B) (i) and (ii) only
(C) (i) and (iii) only
(D) (ii) and (iii) only
(E) Answer not known

42. The Cauchy distribution contradicts which of the following?

(A) Basic integration theorem
(B) Weak law of large numbers
(C) Strong law of large numbers
(D) Central limit theorem
(E) Answer not known

43. If $X \sim N(\mu, \sigma^2)$, state the transformation which becomes lognormal distribution

(A) $\log_{10} x$
(B) $\log_e x$
(C) e^x
(D) $e^{\frac{1}{x}}$
(E) Answer not known

44. Which one of the following distribution does not possesses the additive property?

(A) Negative Binomial distribution

(B) Hyper Geometric distribution

(C) Gamma distribution

(D) Normal distribution

(E) Answer not known

45. If it is known that X has mean of 25 and variance of 16 then the $P(17 < X < 33)$ is

(A) 0.25

(B) 0.50

(C) 0.75

(D) 1

(E) Answer not known

46. Suppose that the number of items produced in a machine per hour is a random variable with mean 200 and variance 25. The lower bound of the probability that the production in an hour lies between 175 and 225 is _____

(A) $\frac{1}{25}$

(B) $\frac{2}{25}$

(C) $\frac{4}{25}$

(D) $\frac{24}{25}$

(E) Answer not known

47. If X and Y are the two random variables having finite means, choose the correct/incorrect statement from the following.

Statement (A) : E[min (X,Y)] $\leq$ min [$E(X)$, $E(Y)$]

Statement (B) : E[min (X,Y) + max (X,Y)] = $E(X) + E(Y)$

(A) Statement (A) is correct and statement (B) is incorrect

(B) Statement (A) is incorrect and statement (B) is correct

(C) Both the statements (A) and (B) are incorrect

(D) Both the statements (A) and (B) are correct

(E) Answer not known

48. Statement (i) : SLLN holds for a sequence $\{X_K, K \geq 1\}$ of iid random variables iff $E(X_K) < \infty$, $K = 1,2,....$

Statement (ii) : SLLN holds for a sequence of independent r.v's with finite common variance

Find out the statements which is/are true?

(A) (i) only

(B) (ii) only

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

(E) Answer not known

49. Which of the following is the correct definition of median of a random variable X?

(A) $P[X \leq med\,(X)] \geq \frac{1}{2}$

(B) $P[X \leq med(X)] = \frac{1}{2}$

(C) $P[X \geq med\,(X)] = \frac{1}{2}$

(D) $P[X = med(X)] = \frac{1}{2}$

(E) Answer not known

50. If $X_1, X_2, ..., X_n$ is a random sample from a normal distribution with mean μ and variance σ^2 then $\sum_{i=1}^{n}(X_i - \mu)^2 / \sigma^2$ becomes

(A) Normal distribution (μ, σ^2)

(B) Normal distribution $\left(n\mu, \frac{\sigma^2}{n}\right)$

(C) Chi-square distribution with n degrees of freedom

(D) Chi-square distribution with 1 degrees of freedom

(E) Answer not known

51. Which of the following relationship are true between CLT and WLLN?

(i) Both CLT ad WLLN hold for a sequence $\{X_n\}$ of i.i.d r.v's with finite mean μ and variance σ^2.

(ii) For the sequence $\{X_n\}$ of independent and uniformly bounded r.v.'s W.L.L.N holds and CLT holds in this case provided $B_n = V(X_1 + X_2 + ...X_n) = \sigma_1^2 + ... + \sigma_n^2 \to \infty$ as $n - \infty$.

(iii) The sequence $\{X_n\}$ of independent r.v's CLT may not hold but the WLLN may hold.

(A) (i) and (ii)

(B) (i) and (iii)

(C) (ii) and (iii)

(D) (i), (ii) and (iii)

(E) Answer not known

52. Let X and Y be two random variables each taking three values -1, 0 and 1 and having joint probability distribution.

Y \ X	-1	0	1	Total
-1	0	0.1	0.1	0.2
0	0.2	0.2	0.2	0.6
1	0	0.1	0.1	0.2
Total	0.2	0.4	0.4	1.0

Then which of the following is not correct?

(A) X and Y have different expectations

(B) X and Y are uncorrelated

(C) $V(Y/X=-1)=0$

(D) $P(X=1/Y=0)=\frac{1}{2}$

(E) Answer not known

53. Which of the following properties are uniquely characterise the distribution function?

(i) $F(x)$ is non-decreasing function of x.

(ii) $F(-\infty)=0,\ F(+\infty)=1 \Rightarrow 0 \le F(x) \le 1$.

(iii) $F(x)$ is a continuous function of x on the right.

(iv) The discontinuities of $F(x)$ are at the most countable.

(A) (i), (iii) and (iv)

(B) (i), (ii) and (iii)

(C) (ii), (iii) and (iv)

(D) (i), (ii) and (iv)

(E) Answer not known

54. Suppose that two-dimensional continuous random (x, y) has joint probability density function

$$f(x,y)=\begin{cases}6x^2y, 0<x<y, 0<y<1\\ 0, \quad \text{otherwise}\end{cases}$$

Find the value of the $P(Y<2)$ is

(A) 8 (B) 6

(C) 4 (D) 1

(E) Answer not known

55. For a continuous random variable X, the conditional probability $P(a \le X \le b / Y = y)$ is meaningless when

(A) $P(Y=y)=0$ (B) $P(Y=x)=0$

(C) $P(Y=y)=1$ (D) $P(Y=x)=1$

(E) Answer not known

56. Which of the following techniques is not used to detect multicollinearity?

(A) Examination of correlation matrix

(B) Variance inflation factor

(C) Eigensystem analysis of $X'X$

(D) Data transformation

(E) Answer not known

57. Under multicollinearity, when there are more than two regressor variables, the diagonal elements of $C = (X'X)^{-1}$ matrix are ————.

(A) $C_{jj} = \dfrac{1}{R_j^2}$

(B) $C_{jj} = R_j^2$

(C) $C_{jj} = \dfrac{1}{R_j}$

(D) $C_{jj} = \dfrac{1}{1 - R_j^2}$, $j = 1, 2, \ldots p$; R_j^2 is the coefficient of multiple determination

(E) Answer not known

58. If $\lambda_{\max} = 4.2048$ and $\lambda_{\min} = 0.0001$ then the condition number of eigen system analysis of $X'X$ is $K =$ ————————

(A) 4.2049

(B) 4.2047

(C) 42048

(D) 0.4208

(E) Answer not known

59. The condition indices of the $(X'X)$ is $K_j =$ ————————, $j = 1, 2 \ldots p$ is a useful measure of finding the near linear dependencies in $(X'X)$.

(A) $\lambda_j / \lambda_{\min}$

(B) $\lambda_j / \lambda_{\max}$

(C) $\lambda_{\min} / \lambda_j$

(D) $\lambda_{\max} / \lambda_j$

(E) Answer not known

60. State which of the following statement(s) is (are) correct?

(i) Examination of the correlation matrix method used for detecting multicollinearity.

(ii) An over defined model has more response variables than observations.

(A) (i) correct, (ii) not correct

(B) (i) not correct, (ii) correct

(C) (i) and (ii) are correct

(D) (i) and (ii) are not correct

(E) Answer not known

61. In linear regression model, $H_0 : \beta_1 = 0$ is rejected find the statement which is true?

Statement (i) : There is no linear relationship between y and x.

Statement (ii) : x is of value in explaining the variability in y.

(A) (i) only

(B) (ii) only

(C) (i) and (ii)

(D) Neither (i) nor (ii)

(E) Answer not known

62. In simple linear regression model, σ^2 is computed from the regression model residuals is called ———————— estimate of σ^2.

(A) Model-Independent

(B) Model-dependent

(C) Biased

(D) Residual mean square

(E) Answer not known

63. The multiple linear regression model is given by $Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \in$ and we wish to test $H_0 : \beta_1 = \beta_3, \beta_2 = 0$ represented by general linear hypothesis as $T = \begin{bmatrix} 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ the reduced model based on general linear hypothesis is

(A) $Y = \beta_0 + \beta_1 (x_1 + x_3) + \beta_2 x_2 + \in$

(B) $Y = \beta_0 + \beta_1 (x_1 + x_2) + \beta_3 x_3$

(C) $Y = \beta_0 + \beta_1 (x_1 + x_3) + \in$

(D) $Y = \beta_1 (x_1 + x_3) + \in$

(E) Answer not known

64. Which of the following is not a property of least square estimators of a linear regression model given by $y_i = \beta_0 + \beta_1 x_i + \in$?

(A) The sum of the residuals in any regression model that contains an intercept β_0 is always 0

(B) The sum of the observed values y_i equals the sum of the fitted values $\hat{y}_i$

(C) The least-squares regression line never passes through the centroid of the data

(D) The sum of the residuals weighted by the corresponding value of the regressor variable always equals zero

(E) Answer not known

65. A non linear model that can be transformed to an equivalent linear form is said to be ————————

(A) Transformed model

(B) Intrinsically linear model

(C) Generalized linear model

(D) Logistic regression model

(E) Answer not known

66. In multiple regression analysis, the ratio MSR/MSE yields the

(A) t-test statistic for testing each individual regression coefficient

(B) F-test statistic for testing the validity of the regression equation

(C) Multiple coefficient of determination

(D) Adjusted multiple coefficient of determination

(E) Answer not known

67. The sum of the residuals in any regression model that contains an intercept β_0 is

(A) Always zero

(B) Always one

(C) Does not exist

(D) Positive value

(E) Answer not known

68. State which of the following statement(s) is (are) correct?

The least square estimators of simple linear regression model are

Statement A : $\hat{\beta}_0 = \overline{Y} - \hat{\beta}, \overline{X}$

Statement B : $\hat{\beta}_1 = \dfrac{\sum_{i=1}^{n} x_i y_i - \left(\sum_{i=1}^{n} y_i\right)\left(\sum_{i=1}^{n} x_i\right)}{\sum_{i=1}^{n} x_i^2 - \dfrac{\left(\sum_{i=1}^{n} x_i\right)^2}{n}}$

(A) A correct, B false

(B) A false, B correct

(C) Both A and B are correct

(D) Both A and B are false

(E) Answer not known

69. The $100(1-\alpha)\%$ confidence interval for σ^2 of simple linear regression model is _____

(A) $\dfrac{nMS_{\text{Res}}}{\chi^2_{\alpha/2,\, n-2}} \le \sigma^2 \le \dfrac{nMS_{\text{Res}}}{\chi^2_{1-\alpha/2,\, n-2}}$

(B) $\dfrac{(n-1)MS_{\text{Res}}}{\chi^2_{\alpha/2,\, n-1}} \le \sigma^2 \le \dfrac{(n-1)MS_{\text{Res}}}{\chi^2_{1-\alpha/2,\, n-1}}$

(C) $\dfrac{(n-2)MS_{\text{Res}}}{\chi^2_{\alpha/2,\, n-2}} \le \sigma^2 \le \dfrac{(n-2)MS_{\text{Res}}}{\chi^2_{1-\alpha/2,\, n-2}}$

(D) $\dfrac{(n-2)MS_{\text{Res}}}{t_{\alpha/2,\, n-2}} \le \sigma^2 \le \dfrac{(n-2)MS_{\text{Res}}}{t_{\alpha/2,\, n-2}}$

(E) Answer not known

70. For multiple linear regression model which of the following statement(s) is (are) correct?

(i) Regression sum of square = $\hat{\beta}' x' y - \frac{\left(\sum_{i=1}^{n} yi\right)^2}{n}$

(ii) Residual sum of square = $y' y + \hat{\beta}\ ' x' y$

(iii) Total sum of square = $y' y + \frac{\left(\sum_{i=1}^{n} yi\right)^2}{n}$

(A) (i) correct, (ii) correct, (iii) false

(B) (i) correct, (ii) false, (iii) false

(C) (i) correct, (ii) false, (iii) correct

(D) (i) false, (ii) correct, (iii) correct

(E) Answer not known

71. In Logistic regression, the deviance statistic can be used in hypothesis testing by

(A) Comparing it to a normal distribution

(B) Converting into an odd ratio

(C) Comparing into F distribution

(D) Comparing into chi square distribution

(E) Answer not known

72. In logistic Regression, the transformation $\eta = \ln \frac{\pi}{1-\pi}$ is called _____ transformation of the probability π and the ratio $\frac{\pi}{1-\pi}$ is called _____.

(A) Probit, Risk
(B) Logit, odds
(C) Probit, odds
(D) Logit, Risk
(E) Answer not known

73. Hypothesis testing in logistic regression is based on _____

(A) Likelihood Ratio tests
(B) Sequential Probability Ratio tests
(C) Uniformly Most Powerful tests
(D) Most Powerful tests
(E) Answer not known

74. In a generalized linear model, the response variable distribution must only be a member of _____.

(A) Scale family
(B) Exponential family
(C) Scale and exponential family
(D) Scale or exponential family
(E) Answer not known

75. _____ is a unification of both linear and nonlinear regression models that allows the incorporation of non normal response function.

(A) OLS (Ordinary Least Square)

(B) GLS (Generalized Least Square)

(C) MLE (Maximum Likelihood Estimation)

(D) GLM (Generalized Linear Models)

(E) Answer not known

76. Cartesian coordinates $P(x, y, z)$ represented by $x = x(u,v,w),\ y = y(u,v,w), z = z(u,v,w)$ or $\vec{x} = \vec{x}(u,v,w)$ gives the surfaces u = constant, v = constant, w = constant subject to $\overrightarrow{x_u}.\overrightarrow{x_v} = \overrightarrow{x_v}.\overrightarrow{x_w} = \overrightarrow{x_w}.\overrightarrow{x_u} = 0$ form a _____ system of surfaces.

(A) triply parallel

(B) twice orthogonal

(C) triply orthogonal

(D) twice parallel

(E) Answer not known

77. Two parametric curves through P are said to be orthogonal if _____

(A) $\overline{r_1} \times \overline{r_2} = 0$ at p

(B) $\overline{r_1} \times \overline{r_2} \neq 0$ *at* p

(C) $\overline{r_1}.\overline{r_2} = 0$ *at* p

(D) $\overline{r_1}\ .\ \overline{r_2} \neq 0$ *at* p

(E) Answer not known

78. A necessary and sufficient condition for a surface to be a developable is that its _____

(A) Gaussian curvature zero

(B) Gaussian curvature should not be zero

(C) Mean curvature zero

(D) Mean curvature not zero

(E) Answer not known

79. If ϕ is the angle between the principal normal n to a curve on a surface and the surface normal N, then K_n is _____

(A) $\cos\phi$ (B) $K\cos\phi$

(C) $K\sin\phi$ (D) $K\tau$

(E) Answer not known

80. First fundamental form of the surface is _____

(A) $E\,du^2 + 2F\,dudv + G\,dv^2$ (B) $E\,du^2 - 2F\,dudv + G\,dv^2$

(C) $E\,du^2 + F\,dudv + G\,dv^2$ (D) $E\,du^2 - F\,dudv + G\,dv^2$

(E) Answer not known

81. The two tangential directions at a point P cut orthogonally if and only if the direction ratios satisfies the equation

(A) $E\lambda\lambda' + F(\lambda\mu' + \lambda'\mu) + G\mu\mu' = 0$

(B) $E\lambda\lambda' - F(\lambda\mu' + \lambda'\mu) - G\mu\mu' = 0$

(C) $E\lambda'' + F(\lambda\mu' + \lambda''\mu) - G\mu\mu' = 0$

(D) $E\lambda\lambda' - F(\lambda\mu' - \lambda'\mu) + G\mu\mu' = 0$

(E) Answer not known

82. The two sheets of a surface meet along the tangent $y = 0, z = 0$, the surface itself can be obtained by unrolling it into a plane without stretching. On account of this reason, the surface is called a _____.

(A) tangential developable
(B) osculating developable
(C) rectifying developable
(D) developable surface
(E) Answer not known

83. The quadratic differential form $Ldu^2 + 2Mdudv + Ndv^2$ is called

(A) first fundamental form
(B) second fundamental form
(C) third fundamental form
(D) right helicoid
(E) Answer not known

84. For a circular helix both K and τ are _____

(A) are not constant
(B) are constants
(C) are functions of x
(D) are functions of y
(E) Answer not known

85. Choose the right answer among the following:

(i) The locus of the centres of spherical curvature is an evolute if and only if the curve is a plane curve

(ii) The locus of the centres of spherical curvature is an evolute iff the curve is a normal curve

(iii) The locus of the centres of the spherical curvature is an evolute if and only if the curve is a parallel

(iv) The locus of the centres of the spherical curvature is an evolute if and only if the curve is a osculating plane

(A) (iv)

(B) (ii)

(C) (i)

(D) (iii)

(E) Answer not known

86. Which among the following are the necessary and sufficient conditions that the surface has a contact of order n at p with the curve at P?

(A) $f(u) = f'(u) = f''(u) = \ldots = f^{(n)}(u) = f^{(n+1)}(u) = 0$

(B) $f(u) = f'(u) = f''(u) = \ldots = f^{(n)}(u) = 0; f^{(n+1)}(u) \neq 0$

(C) $f(u) = f'(u) = f''(u) = \ldots = f^{(n-1)}(u) = 0; f^{(n)}(u) \neq 0$

(D) $f'(u) = f''(u) = \ldots = f^{(n)}(u) = 0; f(u) \neq 0$

(E) Answer not known

87. In the equation of osculating plane, $\left[\vec{R}-\vec{r}(0),\vec{r}'(0),\vec{r}''(0)\right]=0$, where $\bar{r}''\neq 0$ and $\vec{r}$ is the position vector of P, the vectors $\overline{R}-\vec{r}(0),\bar{r}'(0)$ and $\bar{r}(s)-\bar{r}(0)$ are _____

(A) Coplanar vectors
(B) Collinear vectors
(C) Perpendicular vectors
(D) Concurrent vectors
(E) Answer not known

88. Torsion of the plane curve is equal to _____

(A) 1
(B) 0
(C) ∞
(D) Not to be determined
(E) Answer not known

89. The involute of the cubic curve $\bar{r}=(3u,\,3u^2,\,2u^3)$ *is* $\overline{R}=$_____

(A) $(3u,\,3u^2,\,2u^3)+\dfrac{1}{(1+2u^2)}\left[C-(3u+2u^3)\right]\left(1,\,2u,\,2u^2\right)$

(B) $(3u,\,3u^2,\,2u^3)-\dfrac{1}{(1+2u^2)}\left[C-(3u+2u^3)\right]\left(1,\,2u,\,2u^2\right)$

(C) $\left(3u,\,3u^2,\,2u^3\right)+\dfrac{1}{\left(1-2u^2\right)}\left[C-\left(3u+2u^3\right)\right]\left(1,\,2u,\,2u^2\right)$

(D) $\left(3u,\,3u^2,\,2u^3\right)+\dfrac{1}{\left(1+2u^2\right)}\left[C+(3u+2u^3)\right]\left(1,\,2u,\,2u^2\right)$

(E) Answer not known

90. With the curve Atleast how many contact of order does the tangent have?

(A) at least one

(B) no contact

(C) two

(D) at most one

(E) Answer not known

91. The arc rate at which the tangent changes direction as the point P moves along the curve is called the _____ of the curve.

(A) Tangent line

(B) Osculating plane

(C) Curvature

(D) Torsion

(E) Answer not known

92. Serret-Frenet formulas are

(1) $\frac{d\vec{t}}{ds} = k\,\vec{n}$

(2) $\frac{d\vec{n}}{ds} = -k\,\vec{t} + \tau\,\vec{b}$

(3) $\frac{d\vec{n}}{ds} = k\,\vec{t} - \tau\,\vec{b}$

(4) $\frac{d\vec{b}}{ds} = -\tau\,\vec{n}$

(5) $\frac{d\vec{b}}{ds} = \tau\,\vec{n}$

(A) (1), (3) and (5) only
(B) (1), (3) and (4) only
(C) (1), (2) and (4) only
(D) (1), (2) and (5) only
(E) Answer not known

93. The plane that has three point contact at the origin with the curve $x = u^4 - 1$, $y = u^3 - 1$ and $z = u^2 - 1$ is _____.

(A) $3x - 8y + 6z = 0$

(B) $x + \left(\frac{8}{3}\right)y + 2z = 0$

(C) $x - 8y + 2z = 0$

(D) $3x + 8y + 2z = 0$

(E) Answer not known

94. Which of the following statement(s) is/are true?

(i) The evolutes of a circular helix are plane curves

(ii) The locus of the centre of curvature is an evolute only when the curve is plane

(iii) The involutes of a circular helix are plane curves, whose planes are normal to the axis of cylinder

(iv) The principal normal to the evolute is parallel to the tangent to the curve

(A) (i) and (ii) only

(B) (ii) and (iii) only

(C) (i), (ii) and (iv) only

(D) (ii), (iii) and (iv) only

(E) Answer not known

95. Which of the following is/are true results? The equations of the principal normal and of the osculating plane at any point of the curve given by the equations $x = 4a\cos^3 u$, $y = 4a\sin^3 u$, $z = 3c\cos 2u$ are given below :

(i) Equation of the principal normal at the point 'u' are $\frac{x - 4a\cos^3 u}{\sec u} = \frac{y - 4a\sin^3 u}{\text{cosec } u} = \frac{z - 3c\cos 2u}{0}$

(ii) Equation of osculating plane is $(x - 4a\cos^3 u)(+c \text{ cosec } u) - (y - 4a\sin^3 u)(+c\sec u) + (z - 3c\cos 2u)(-a\cos u \text{ cosec } u - a\sin u\sec u) = 0$

(A) (i) is true (ii) is false
(B) (i) is false (ii) is true
(C) Both (i) and (ii) are true
(D) Both (i) and (ii) does not exists
(E) Answer not known

96. The equation $Pp + Qq = R$ is known as

(A) Charpit's equation
(B) Lagrange's equation
(C) Clairaut's equation
(D) Bernoulli's equation
(E) Answer not known

97. If the differential equations $p = x^2 - ay$, $q = y^2 - ax$ are compitible, it possess the common solution as _____.

(A) $z = (x^3 + y^3)/3 - axy + c$
(B) $z = (x^2 + y^2)/2 + ax + c$
(C) $z = (x^3 + y^3)/5 - axy + c$
(D) $z = (x^3 - y^3)/3 + axy + c$
(E) Answer not known

98. Which one of the following is the desired compatibility condition _____

(A) $\frac{\partial(f,g)}{\partial(x,p)} - p\frac{\partial(f,g)}{\partial(z,p)} - \frac{\partial(f,g)}{\partial(y,q)} - q\frac{\partial(f,g)}{\partial(z,q)} = 0$

(B) $\frac{\partial(f,g)}{\partial(x,p)} + p\frac{\partial(f,g)}{\partial(z,p)} - \frac{\partial(f,g)}{\partial(y,q)} + q\frac{\partial(f,g)}{\partial(z,q)} = 0$

(C) $\frac{\partial(f,g)}{\partial(x,p)} + p\frac{\partial(f,g)}{\partial(z,p)} + \frac{\partial(f,g)}{\partial(y,q)} + q\frac{\partial(f,g)}{\partial(z,q)} = 0$

(D) $\frac{\partial(f,g)}{\partial(x,p)} - p\frac{\partial(f,g)}{\partial(z,p)} - \frac{\partial(f,g)}{\partial(y,q)} + q\frac{\partial(f,g)}{\partial(z,q)} = 0$

(E) Answer not known

99. The general solution of $p+q = x+y+z$ is

(A) $\phi\left(x-y, e^{x}(2-x-y-z)\right) = 0$

(B) $\phi\left(x+y, e^{x}(2-x-y-z)\right) = 0$

(C) $\phi\left(x-y, e^{x}(2+x+y+z)\right) = 0$

(D) $\phi\left(x-y, e^{-x}(2+x+y+z)\right) = 0$

(E) Answer not known

100. Lagrange's equation is $Pp + Qq = R$ when $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$, P, Q, R are functions of x, y, z.

Assertion [A] : $F(u, v) = 0$ is the general solution when $u(x, y, z) = c_1$ and $v(x, y, z) = c_2$.

Reason [R] : $u(x, y, z) = c_1$ and $v(x, y, z) = c_2$ are solutions of $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

(A) [A] is correct [R] is incorrect
(B) Both [A] and [R] are correct
(C) [A] is incorrect but [R] is correct
(D) Both [A] and [R] are incorrect
(E) Answer not known

101. The complete integral of $2xz - px^2 - 2qxy + pq = 0$ is

(A) $z = ay + b\left(x^2 - a^2\right)$
(B) $z = ay - b\left(x^2 - a^2\right)$
(C) $z = ay + b\left(x^2 - a\right)$
(D) $z = ay - b\left(x^2 - a\right)$
(E) Answer not known

102. Which of the following is/are true?

The complete integral of $pq = x^m y^n z^{2l}$ is _____.

(i) $\dfrac{z^{1-l}}{1-l} = a\dfrac{x^{m+1}}{m+1} + \dfrac{y^{n+1}}{a(n+1)} + c$

(ii) $\dfrac{z^{1-l}}{1-l} = a\dfrac{x^{m+1}}{m+1} + \dfrac{y^{n+1}}{n+1} + c$

(iii) $z = ax + \left(\dfrac{1}{a}\right)y + c$

(iv) $z = ax + \left(1 - a^m\right)y + c$

(A) (i) only

(B) (ii) and (iii) only

(C) (i) and (iii) only

(D) (ii) and (iv) only

(E) Answer not known

103. If the Bessel's equation is $x^2y'' + xy' + \left(x^2 - p^2\right)y = 0$, then find $p(x) = 2$.

(A) x

(B) $\dfrac{x^2 - p^2}{x^2}$

(C) $\dfrac{1}{x}$

(D) $\dfrac{x^2}{x^2 - p^2}$

(E) Answer not known

104. Assertion [A] : Solution of the Bessel equation of order α is denoted by J_α and is called Bessel function of order α of the first kind $J_\alpha(x) = \left(\frac{x}{2}\right)^\alpha \sum_{m=0}^{\infty} \frac{(-1)^m}{m!\,\Gamma(m+\alpha+1)} \left(\frac{x}{2}\right)^{2m}$.

Deduction [D] : J_α reduces to J_0 when $\alpha = 0$, where $J_0(x) = \sum_{m=0}^{\infty} \frac{(-1)^m}{(m!)^2} \left(\frac{x}{2}\right)^{2m}$.

(A) [A] is correct [D] is false
(B) [A] is false [D] is correct
(C) Both [A] and [D] are correct; [D] is deduced from [A]
(D) Both [A] and [D] are not correct
(E) Answer not known

105. Which of the following is/are incorrect Bessel functions?

(i) $J_0' = -J_1$

(ii) $2J_n' = J_{n-1} - J_{n+1}$

(iii) $J_n(x) = 0$ has no repeated roots except at $x = 0$

(iv) $J_2 = J_0''' - \left(\frac{1}{x}\right) J_0''$

(A) Both (i) and (ii) only
(B) (ii) only
(C) (iii) only
(D) (iv) only
(E) Answer not known

106. Identify the incorrect statement.

(1) The Euler's equation $x^2y'' + axy' + by = 0$ have a regular singular point at the origin.

(2) The solution of $x^2y'' + 2xy' - 6y = 0$ is $\phi(x) = c_1x^{-2} + c_2x^2$, c_1, c_2 any constants.

(3) The solution of $x^2y'' + xy' - 4y = x$ is $\phi(x) = c_1x^2 + c_2x^{-2} + \frac{x}{3}$, c_1, c_2 any constants.

(4) The solution of $x^2y'' - (2+i)xy' + 3iy = 0$ is $\phi(x) = c_1|x|^i + c_2|x|^3$.

(A) (1) only
(B) (2) only
(C) (3) only
(D) (4) only
(E) Answer not known

107. The value of $\int_{-1}^{1} xp_n(x)p_{n-1}(x)dx$ is

(A) $\frac{2n(n+1)}{2n+1}$

(B) $\frac{2n\ (n+1)}{(2n-1)\ (2n+1)\ (2n+3)}$

(C) $\frac{2n}{4n^2-1}$

(D) 0

(E) Answer not known

108. Let $P_n(x)$ be the Legendre polynomial of degree $n \geq 0$, If $1 + x^{10} = \sum_{n=0}^{10} C_n P_n(x)$ then c_5 equals _____.

(A) 0 (B) $\frac{2}{11}$

(C) 1 (D) $\frac{11}{2}$

(E) Answer not known

109. If $P_n(x) = \frac{1}{2^n n!} \frac{d^n}{dx^n}\left(x^2 - 1\right)^n$ then the coefficient of x^n is

(A) $(2n+1)!/2^n(n!)^2$ (B) $(2n)!/2^{n+1}(n!)^2$

(C) $(2n)!/2^n(n!)$ (D) $(2n)!/2^n(n!)^2$

(E) Answer not known

110. $y = c_1 x + c_2 x^{-2}$ is the general solution of the differential equation _____.

(A) $x^2 y'' - 2xy' + 2y = 0$ (B) $x^2 y'' - 2xy' - 2y = 0$

(C) $x^2 y'' + 2xy' - 2y = 0$ (D) $y'' + 2xy' + 2y = 0$

(E) Answer not known

111. The general solution of homogenous linear differential equation $\frac{d^n y}{dx^n} + p_1 \frac{d^{n-1} y}{dx^{n-1}} + p_2 \frac{d^{n-2} y}{dx^{n-2}} + \ldots + p_n y = 0$ is _____.

(A) Complementary function with $n - 1$ arbitrary constants

(B) Complementary function with n arbitrary constants

(C) Particular integral with n arbitrary constants

(D) Particular integral free from arbitrary constants

(E) Answer not known

112. The equation $y'' + e^x y = 0$ has a solution $\phi(x) = \sum_{k=0}^{\infty} c_k x^k$ satisfying $\phi(0) = 1, \phi'(0) = 0$. Then the values of $c_0, c_1, c_2, c_3, c_4, c_5$ are _____.

(A) $1, 0, \frac{1}{2}, \frac{-1}{6}, 0, \frac{-1}{40}$

(B) $1, 0, \frac{-1}{2}, \frac{-1}{6}, 0, \frac{1}{40}$

(C) $0, 1, \frac{-1}{2}, \frac{-1}{6}, 0, \frac{1}{40}$

(D) $0, 1, \frac{1}{2}, \frac{1}{6}, 0, \frac{-1}{40}$

(E) Answer not known

113. Identify the linearly dependent set of functions defined on $-\infty < x < \infty$.

(1) $\phi_1(x) = 1,\ \phi_2(x) = x,\ \phi_3(x) = x^3$

(2) $\phi_1(x) = e^{ix},\ \phi_2(x) = \sin x,\ \phi_3(x) = 2\cos x$

(3) $\phi_1(x) = e^x,\ \phi_2(x) = xe^x,\ \phi_3(x) = e^{-2x}$

(A) (1) only
(B) (2) only
(C) (3) only
(D) (1) and (3) only
(E) Answer not known

114. The particular integral of the differential equation $(D^2 - 6D + 9)y = \dfrac{e^{3x}}{x^2}$ is

(A) $e^{3x}(\log x)$
(B) $e^{3x}(\log x + 1)$
(C) $-e^{3x}(\log x + 1)$
(D) $e^{3x}(\log 3x)$
(E) Answer not known

115. Any point that is not an ordinary point of $y'' + P(x)y' + Q(x)y = 0$ is called a

(A) Limit point
(B) Singular point
(C) Non-singular point
(D) Regular singular point
(E) Answer not known

116. Choose the right statements from the following.

In a metric space (M,d)

(i) Every convergent sequence is a Cauchy sequence

(ii) Every Cauchy sequence is a convergent sequence

(iii) A sequence is convergent iff it is a Cauchy sequence

(iv) A sequence is convergent in R^k if and only if it is a Cauchy sequence

(A) (i), (ii) and (iii) are true
(B) (iv) alone is true
(C) (i) and (iv) are true
(D) (i) alone is true
(E) Answer not known

117. Which of the following statements are true, about functions of bounded variation?

(i) A bounded monotonic function is a function of bounded variation

(ii) Every continuous function is a function of bounded variation

(iii) A function of bounded variation is necessarily bounded

(iv) The product of two functions of bounded variation is also of bounded variation

(A) (i), (ii) and (iii) are true
(B) (i), (iii) and (iv) are true
(C) (ii), (iii) and (iv) are true
(D) All the statements are true
(E) Answer not known

118. Let f be a real function defined on E. $f(t) \to A$ as $t \to x$ where A and x are in the extended real number system, if for every neighbourhood U of A there is a neighbourhood of V of x such that _____

(A) $V \cap E$ is an empty
(B) $V \cap E$ is non-empty
(C) $V \cup E$ is V itself
(D) $V \subset E$
(E) Answer not known

119. The total variation $v_f(a,b) = 0$ if and only if f is _____ on $[a,b]$

(A) Constant
(B) Variable
(C) Equal
(D) Ten
(E) Answer not known

120. For a Riemann integral of f over $[a,b]$ and for a partition P on $[a,b]$ with two numbers m, M such that $m \le f(x) \le M$ then

(i) $m(b-a) \le U(p,f) \le L(p,f) \le M(b-a)$

(ii) $m(b-a) \le L(p,f) \le U(p,f) \le M(b-a)$

(iii) $M(b-a) \le U(p,f) \le L(p,f) \le m(b-a)$

(iv) $M(b-a) \le L(p,f) \le U(p,f) \le m(b-a)$

Which is true?

(A) (i)
(B) (ii)
(C) (iii)
(D) (iv)
(E) Answer not known

121. Let $\mathbb{R}_\infty$ be the extended set of real numbers. The function d defined by

$d(x,y) = |f(x) - f(y)| \ \forall x, y \in \mathbb{R}_\infty$

Where $f(x) = \begin{cases} \dfrac{x}{1+|x|} & -\infty < x < \infty \\ 1 & when\ x = \infty \\ -1 & when\ x = -\infty \end{cases}$

Then ($\mathbb{R}_\infty$, d) is a

(A) Metric space
(B) Not a metric space
(C) Bounded metric space
(D) Both (A) and (C)
(E) Answer not known

122. If $f(x)$ is everywhere continuous and differentiable such that $f'(x) \geq 6 \forall x \in [2, 4]$ and $f(2) = -4$ then $f(4) = ?$

(A) $f(4) < 8$
(B) $f(4) \geq 8$
(C) $f(4) \geq 2$
(D) $f(4) < 2$
(E) Answer not known

123. Let $f \in R(\alpha)$ on $[a,b]$ and P be any partition of $[a,b]$ then

(A) $\sup L(p,f,\alpha) = \sup U(p,f,\alpha)$
(B) $\inf L(p,f,\alpha) = \inf U(p,f,\alpha)$
(C) $\sup L(p,f,\alpha) = \inf U(p,f,\alpha)$
(D) $\inf L(p,f,\alpha) = \sup U(p,f,\alpha)$
(E) Answer not known

124. Let $I = [1, 13]$ be a closed and bounded interval in R, Let $P = (1, 2, 5, 9, 12, 13)$ be any partition of I, then $\|P\|$ is

(A) 3 (B) 4

(C) 2 (D) 1

(E) Answer not known

125. Which of the following is false?

If X is a metric space and $E \subset X$, then

(i) $\overline{E}$ is closed.

(ii) $\overline{E} = E$ if and only if E is closed

(iii) $E = \overline{E}$ if and only if E is open

(iv) $\overline{E} \subset F$ for every closed set $F \subset X$ such that $E \subset F$

(A) (i) only (B) (i) and (ii) only

(C) (iii) only (D) (i) and (iv) only

(E) Answer not known

126. The value of m so that $2x - x^2 + my^2$ may be harmonic is

(A) 0 (B) 1

(C) –2 (D) 3

(E) Answer not known

127. If the function $f_n(z)$ are analytic and $\neq 0$ in a region Ω, and if $f_n(z)$ converges to $f(z)$, uniformly on every compact subset of Ω, then $f(z)$ is ———————— in Ω.

(A) either identically non zero or never equal to zero
(B) either identically zero or never equal to zero
(C) either identically non zero or equal to zero
(D) either identically zero or equal to zero
(E) Answer not known

128. $z = a$ is a pole of order m for $f(z)$ if and only if $z = a$ is a zero of order m for

(A) $f'(z)$
(B) $-f(z)$
(C) $\dfrac{1}{f(z)}$
(D) $f''(z)$
(E) Answer not known

129. The function $f(x) = \begin{cases} 1 & x \text{ rational} \\ 0 & x \text{ irrational} \end{cases}$ then f is

(A) continuous
(B) discontinuous of first kind
(C) discontinuous of second kind
(D) monotonically increasing
(E) Answer not known

130. The radius of convergence of the power series $\sum_{n=1}^{\infty} a_n (z - z_o)^n$ where $a_n = \frac{(-1)^{n+1} n}{5n^2 + 3}$ is

(A) 1 (B) 8

(C) $\frac{1}{8}$ (D) 0

(E) Answer not known

131. If $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ and this equation is called

(A) Harmonic (B) Analytic

(C) Laplace's (D) Conjugate

(E) Answer not known

132. The singular point $z = 0$ of the function $f(z) = \frac{e^z}{z + \sin z}$ is

(A) a pole of order 2

(B) a simple pole

(C) a Essential singularity

(D) an isolated singular point

(E) Answer not known

133. If $f(z)$ is analytic in a circular domain D with centre a, then for every $z \in D$,

$$f(z) = f(a) + (z-a)\frac{f'(a)}{1!} + (z-a)^2\frac{f''(a)}{2!} + \cdots + \frac{(z-a)^n}{n!}f^n(a) + \cdots$$ is _____.

(A) Laurent series
(B) Taylors theorem
(C) Liouvilles theorem
(D) Fundamental theorem of Algebra
(E) Answer not known

134. Evaluate $\lim_{z \to i} \frac{z^{10}+1}{z^6+1}$.

(A) $\frac{5}{2}$
(B) $\frac{5}{3}$
(C) $\frac{10}{3}$
(D) Indeterminate form
(E) Answer not known

135. The removable singular point of the function $f(z) = \frac{1-\cos z}{z^2}$ is at $z_0 = ?$

(A) 3
(B) 2
(C) 1
(D) 0
(E) Answer not known

136. Which one of the following is true about double sampling plan?

(i) In double sampling plan, the decision is taken on the basis of first sample

(ii) Average total inspection is minimum

(iii) The probability of acceptance on the basis of first sample is same as the probability of acceptance on the basis of second sample

(A) (i) only

(B) (i) and (ii) only

(C) (ii) and (iii) only

(D) (i) and (iii) only

(E) Answer not known

137. In an acceptance-rejection double sampling plan, the number of items inspected for a lot is either n, on the basis of the first sample or $(n_1 + n_2)$ when a second sample of size n_2 is drawn in which rejected lots are inspected 100%, the Average Total Inspection (ATI) per lot is _____

(A) $n_1 P_{a_1} + (n_1 + n_2) P_{a_2}$

(B) $n_1 P_{a_1} + n_2 P_{a_2} + N(1 - P_a)$

(C) $n_1 P_{a_1} + (n_1 + n_2) P_{a_2} + N(1 - P_a)$

(D) $n_1 P_{a_1} + n_2 P_{a_2}$

(E) Answer not known

138. Which one of the following is the advantages of double sampling plan compare with the single sampling plan?

(i) In double sampling no lot can be rejected without finding at least two defectives in the sample

(ii) The double sampling scheme is more costlier than single sampling plan

(iii) The discriminatory power of double sampling procedure is a bit higher than that of single sampling procedure

(A) (i) only

(B) (i) and (ii) only

(C) (i) and (iii) only

(D) (ii) and (iii) only

(E) Answer not known

139. Single sampling plan is employed in evaluating the proportion defective from processes or large lots. In this situation, which of the following probability distribution is used?

(A) Binomial distribution

(B) Poisson distribution

(C) Hyper Geometric distribution

(D) Normal distribution

(E) Answer not known

140. The _____ is used to calculate probabilities of acceptance for an isolated lot of finite size.

(A) Type A OC curve

(B) Type B OC curve

(C) ASN curve

(D) ATI curve

(E) Answer not known

141. If the process Average fraction defective is $\overline{P}$ as claimed by the producer, then the average amount of total inspection per lot is

(A) $ATI = n_1 P_{\alpha_1} + (n_1 + n_2) P_{\alpha_2}$

(B) $ATI = n + (N - n) P_p$

(C) $ATI = n_1 + n_2 (1 - P_1)$

(D) $ATI = n + (1 - P_1)$

(E) Answer not known

142. The purpose of the _____ step in DMAIC problem solving process associated with six sigma activities is to evaluate and understand the current state of the process

(A) Define

(B) Measure

(C) Analyze

(D) Control

(E) Answer not known

143. The _____ curve plots the probability of accepting the lot versus the lot fraction defective.

(A) Average Total Inspection

(B) Average Outgoing Quality

(C) Operation characteristic

(D) Average Sample Number

(E) Answer not known

144. In a type - B OC curve, the _____ distribution is the exact probability distribution for calculating the probability of lot acceptance.

(A) Binomial

(B) Hypergeometric

(C) Poisson

(D) Normal

(E) Answer not known

145. Which of the following statement is/are correct/incorrect in eliminating the trend?

Statement 1 : In a multiplicative model, the trend values are eliminated on dividing the given values (y_t) by the corresponding trend values (y_e)

Statement 2 : In an additive model, the trend values are eliminated by ($y_t - y_e$)

(A) Statement 1 is incorrect and Statement 2 is correct

(B) Statement 1 is correct and Statement 2 is incorrect

(C) Both the Statements are incorrect

(D) Both the Statements are correct

(E) Answer not known

146. In a set of time series observations, the Covariance between y_t and its value at another time period y_{t+k} is called _____.

(A) Variance at lag k
(B) Covariance at lag k
(C) Autocovariance at lag k
(D) Autocorrelation at lag k
(E) Answer not known

147. Correctly order the basic steps in modeling a time series data :

(i) Eliminate any trend or seasonal components
(ii) Plot the series and determine its basic features
(iii) Develop a forecasting model for the residuals
(iv) Validate the performance of the model

(A) (ii) → (i) → (iii) → (iv)
(B) (i) → (ii) → (iii) → (iv)
(C) (iii) → (i) → (iv) → (ii)
(D) (ii) → (iii) → (i) → (iv)
(E) Answer not known

148. Which among the following was the first order auto-regression series?

(A) $y_{t+1} = a_1 y_{t-1} + a_2 y_{t-2} + \ldots + a_k y_{t-k} + \varepsilon_i$
(B) $y_{t+1} = a y_t + b + \varepsilon_{t+1}$
(C) $y_{t+1} = a y_t + \varepsilon_{t+1} + b y_t$
(D) $y_{t+1} = a y_{t+1} + b y_t$
(E) Answer not known

149. What will be the output of the following Python program if n = 15?

```
n = int (input ("enter n :"))
sum = 0
for i in range (1, n + 1) :
sum = sum + i
print (sum)
```

(A) 15
(B) 160
(C) 120
(D) 100
(E) Answer not known

150. The first order moving average process $y_t = c + e_t - \theta_1 e_{t-1}$. Where the coefficient θ_1 values lies between

(A) 0 and +1
(B) –1 and 0
(C) –1 and +1
(D) 0 and ∞
(E) Answer not known

151. In 2^3 design, the main effect of A is

(A) $\frac{1}{2}(a-1)(b+1)(c+1)$

(B) $\frac{1}{4}(a-1)(b+1)(c+1)$

(C) $\frac{1}{4}(a+1)(b-1)(c-1)$

(D) $\frac{1}{2}(a+1)(b-1)(c-1)$

(E) Answer not known

152. In the analysis of BIBD, if block differences are eliminated and all contrasts in the treatment effects can be expressed as comparisons between observations in the same block, it is called _____.

(A) inter block analysis

(B) intra block analysis

(C) both (A) and (B)

(D) neither (A) nor (B)

(E) Answer not known

153. If the 100 $(1 - \alpha)$ percent confidence interval on the contrast $\sum_{i=1}^{a} c_i t_i$ includes _____, we would be unable to reject the null hypothesis, $H_0 : \sum_{i=1}^{a} c_i t_i = 0$.

(A) 0
(B) negative values
(C) positive values
(D) ∞
(E) Answer not known

154. If different effects are confounded in different blocks, it is said to be

(A) complete confounding
(B) partial confounding
(C) balanced confounding
(D) unbalanced confounding
(E) Answer not known

155. A linear combination $\sum_{i=1}^{k} c_i t_i$ of k treatment means $t_i \, (i = 1,2,...k)$ is called a contrast of treatment means if $\sum_{i=1}^{k} c_i =$

(A) 0
(B) 1
(C) ∞
(D) n
(E) Answer not known

156. Assertion [A] : The contrasts are orthogonal

Reason [R] : The sum of the product of the co-efficients of corresponding treatment means is unity.

(A) [A] is true but [R] is false

(B) [A] is false, [R] is true

(C) Both [A] and [R] are true and [R] is the correct explanation of [A]

(D) Both [A] and [R] are true but [R] is not the correct explanation of [A]

(E) Answer not known

157. The method of confounding is a device used to reduce the size of _____

(A) Treatments

(B) Blocks

(C) Replications

(D) Experiment

(E) Answer not known

158. In a block, the number of experimental units or plots is smaller than the number of treatments, then the block is

(A) Incomplete block design

(B) Balanced incomplete block design

(C) Split plot design

(D) Strip plot design

(E) Answer not known

159. Testing hypotheses involving contrasts can be done by using _____

(A) chi square test
(B) t test
(C) F test
(D) t and F test
(E) Answer not known

160. In a BIBD with parameter $v = 7$, $b = 7$ $r = 3$, $k = 3$, $\lambda = 1$. Identify the variance of the difference between treatment contrast $t_i - t_p$

(A) $\frac{4\sigma^2}{7}$
(B) $\frac{3\sigma^2}{7}$
(C) $\frac{2\sigma^2}{7}$
(D) $\frac{6\sigma^2}{7}$
(E) Answer not known

161. The sum of squares due to a set of mutually orthogonal contrast has _____ with as many degrees of freedom as the number of contrast in the set.

(A) χ^2 distribution
(B) $\sigma^2 \chi^2$ distribution
(C) $\frac{\chi^2}{\sigma^2}$ distribution
(D) $\frac{\sigma^2}{n}\chi^2$ distribution
(E) Answer not known

162. If s_1^2 and s_2^2 are the variances of the design 1 and design 2 respectively then the condition for design 1 is more efficient than design 2 is

(A) $s_1^2 = s_2^2$ (B) $s_1^2 < s_2^2$

(C) $s_1^2 > s_2^2$ (D) $s_1^2 \geq s_2^2$

(E) Answer not known

163. Two contrasts z_1 and z_2 are said to be orthogonal if the sum of the product of the corresponding co-efficient is

(A) zero (B) one

(C) two (D) three

(E) Answer not known

164. Randomization and replication are necessary to obtain a valid estimate of

(A) Error variation (B) Treatment difference

(C) Sample variance (D) Standard error

(E) Answer not known

165. Double sampling with a regression estimate is more precise than single simple random sampling with no regression adjustment with same cost $c = cn + c'n'$ if

(A) $\rho^2 > \frac{(c+c')^2}{cc'}$ (B) $\rho^2 > \frac{4cc'}{(c+c')^2}$

(C) $\rho^2 > \frac{4c'}{(c+c')^2}$ (D) $\rho > \frac{4cc'}{(c+c')^2}$

(E) Answer not known

166. If $\hat{R}$ is the ratio estimator then choose the correct statements among the following :

(i) The bias of the ratio estimator is $\frac{\text{cov}(\hat{R}, \bar{x})}{\bar{x}}$

(ii) $\hat{R}$ is unbiased if $\rho_{(\hat{R},\bar{x})} = 0$

(iii) $\frac{|B(\hat{R})|}{\sigma_{\hat{R}}} \leq$ C.V. of $(\bar{x})$

(A) (i) only
(B) (i) and (ii) only
(C) (ii) and (iii) only
(D) (i) and (iii) only
(E) Answer not known

167. If the 'n' first stage units (f s u) and 'm' second stage units (s s u) from each chosen unit are selected by srswr, s_b^2 is the true variance between f s u means and s_w^2 is the true variance within f s u means and $\bar{y}$ is an unbiased estimator of $\bar{Y}$ then its variance $v(\bar{y})$ is

(A) $(s_b^2 / n) + (s_w^2 / m)$
(B) $(s_b^2 / n) + (s_w^2 / mn)$
(C) $(s_b^2 / m) + (s_w^2 / n)$
(D) $[(1 - b_1) s_b^2 / n] + (s_w^2 / mn)$
(E) Answer not known

168. If the n first stage units and the m second stage units from each chosen first stage unit are selected by simple random sampling, without replacement, $\bar{y}$ is an unbiased estimator of $\bar{y}$ with sampling variance $v(\bar{y}) =$ _____

(A) $\frac{(N-n)}{N}\frac{s_b^2}{n}+\frac{(M-m)}{M}\frac{s_w^2}{mn}$

(B) $\frac{(M-m)}{N}\frac{s_b^2}{n}+\frac{(N-n)}{N}\frac{s_w^2}{mn}$

(C) $\frac{(M-n)}{N}\frac{s_w^2}{n}+\frac{(M-n)}{M}\frac{s_b^2}{mn}$

(D) $\frac{(M-1)}{N}\frac{s_b^2}{n}+\frac{(M-n)}{M}\frac{s_w^2}{mn}$

(E) Answer not known

169. The difference of the expected value of the estimator from its true value will be termed as _____

(A) sampling bias
(B) non sampling bias
(C) total bias
(D) expected bias
(E) Answer not known

170. The bias of $\hat{R}$ is _____

(A) $\text{cov}(\hat{R}, \bar{x})$
(B) $-\frac{\text{cov}(\hat{R}, \bar{x})}{\bar{X}}$
(C) $\frac{\text{cov}(\hat{R}, \bar{X})}{\bar{x}}$
(D) $\frac{\text{cov}(\bar{x}, \bar{X})}{\hat{R}}$
(E) Answer not known

171. If $\hat{Y}$ and $\hat{X}$ are unbiased for the population totals Y and X of the study and auxiliary variable respectively. Then an estimator $\hat{Y}_* = \frac{\hat{Y}}{\hat{X}} X$ of the population total is called _____

(A) Ratio estimator
(B) Regression estimator
(C) Product estimator
(D) Difference estimator
(E) Answer not known

172. If in simple random sampling with replacement, the cluster mean $\overline{y}_n$ is an unbiased estimator of $\overline{Y}$ then its variance is

(A) s_b^2, the mean square between cluster means in the population
(B) s_b^2 / n, where s_b^2 is the mean square between cluster means in the population
(C) $\frac{1}{n}$
(D) s_w^2 / n, when s_w^2 is the mean square within cluster means in the population
(E) Answer not known

173. The ratio estimate has the smaller variance if $s_y^2 + R^2 s_x^2 - 2R\rho s_y s_x$ is

(A) Less than s_y^2
(B) Less than s_x^2
(C) Less than ρ
(D) Less than $s_y s_x$
(E) Answer not known

174. The linear regression estimator of $\bar{y}$ in simple random sample is $\bar{y}_{lr}$ = _____

(A) $\bar{y} + b(\bar{X} - \bar{x})$ (B) $\bar{y} - b(\bar{X} - \bar{x})$

(C) $\bar{x} + b(\bar{X} - \bar{x})$ (D) $\bar{X} - b(\bar{X} - \bar{x})$

(E) Answer not known

175. Which of the following is true about the cluster sampling?

(i) The sampling unit consists of a group of smaller units is called cluster.

(ii) In cluster sampling the elements is taken as sampling units.

(iii) In cluster sampling, every cluster contains same number of elements or subunits.

(A) (i) only

(B) (i) and (ii) only

(C) (ii) and (iii) only

(D) (i) and (iii) only

(E) Answer not known

176. In what condition Bhattacharyya inequality of order k will become Cramer Rao inequality

(A) $k = \infty$ (B) $k = 1$

(C) $k = 0$ (D) k is any number

(E) Answer not known

177. The estimators obtained by the method of moments one identical with the method of maximum likelihood. If the probability mass function is of the form

(A) $f(x, \theta) = b_0 + b_1 x + b_2 x^2 + \ldots$

(B) $f(x, \theta) = \exp(b_0 + b_1 x + b_2 x^2 + \ldots)$

(C) $f(x, \theta) = \log(b_0 + b_1 x + b_2 x^2 + \ldots)$

(D) $f(x, \theta) = (b_0 + b_1 x + b_2 x^2 + \ldots)^2$

(E) Answer not known

178. The necessary and sufficient condition for a sufficient statistic to be complete in the exponential families is that the dimension of the statistic must be _____ the dimension of the parameter.

(A) the same as
(B) only greater than
(C) only lesser than
(D) greater than or lesser than
(E) Answer not known

179. Which one of the following is true about the assumption on regularity conditions of Cramer-Rao Lower bound?

(i) $\frac{\partial}{\partial \theta} L(x; \theta)$ exists $\forall \theta \in (H)$

(ii) $\int L(x; \theta) dx$ cannot be differentiated with respect to θ under the integral sign

(iii) $E_\theta \left[\frac{\partial \ln L}{\partial \theta} \right]^2$ exists and it is positive $\forall \theta \in (H)$

(A) (i) only
(B) (i) & (ii) only
(C) (ii) & (iii) only
(D) (i) & (iii) only
(E) Answer not known

180. If X is a random variable follows Poisson distribution (θ) then the sufficient statistic for θ is

(A) $\overline{X}$ (B) $\sum X_i$

(C) $2\overline{X}$ (D) $(1+\overline{X})$

(E) Answer not known

181. Which of the following is depends on the choice of the critical region w and both null and alternative hypothesis?

(A) Type I error (B) Type II error

(C) P[Type I error] (D) P[Type II error]

(E) Answer not known

182. If $l(x)$ is the LR for testing $H:\theta=\theta_0$ against $K:\theta\neq\theta_0$ where θ is a scalar then the asymptotic distribution of $-2\ln l(x)$ is

(A) χ^2 distribution with 1 d.f

(B) χ^2 distribution with n d.f

(C) χ^2 distribution with $n-1$ d.f

(D) χ^2 distribution with $n-2$ d.f

(E) Answer not known

183. In Bayesian estimation, if the noninformative prior pdf is not a pdf at all then it is called

(A) Informative priors (B) Conjugate priors

(C) Jefreys priors (D) Improper prior

(E) Answer not known

184. If X is a χ^2 distribution with ndf which of the following statement is incorrect?

(i) $\frac{X}{2}$ is a Gamma distribution with the parameter $\frac{n}{2}$

(ii) X is positively skewed distribution

(iii) Mode of the X is $n-2$

(iv) X rapidly tends to symmetry as the d.f is decreases

(A) (i) only
(B) (ii) only
(C) (iii) only
(D) (iv) only
(E) Answer not known

185. A statistical procedure which is used for testing if two independent ordered samples differ in their central tendencies is

(A) Run test
(B) Mann-Whitney U-test
(C) Median test
(D) Kruskal-Wallis test
(E) Answer not known

186. For calculating Kolmogorov-Smirnov-Statistic random sample taken from

(A) Discrete distribution
(B) Continuous distribution
(C) Both (A) and (B)
(D) Neither (A) nor (B)
(E) Answer not known

187. Which of the following is a characteristic of non-parametric tests?

(A) They require data to be normally distributed
(B) They can be used with ordinal data
(C) They are more powerful than parametric test
(D) They are less flexible than parametric tests
(E) Answer not known

188. Kruskal – Wallis test is used for which of the following?

(A) Comparing means of two independent groups
(B) Comparing means of three or more independent groups
(C) Comparing proportions
(D) Testing for correlation
(E) Answer not known

189. Non-parametric test used to compare the distribution of the number of hours per week spent on Facebook for male and female students at a place, based on random samples of 10 students. There was an outlier in one of the groups

(A) Wilcoxon Rank – Sum test
(B) Kruskal – Wallis test
(C) Run test
(D) Sign test
(E) Answer not known

190. Which non-parametric test is most widely used test as an alternative to the t-test when we do not make t-test assumptions about the parent population?

(A) Run test
(B) Sign test
(C) Mann – Whitney U-test
(D) Median test
(E) Answer not known

191. The mean and variance of Mann – Whitney – Wilcoxon U-test for two samples is

(A) $\frac{n_1}{2}$ and $\frac{2n_1n_2 + n_2 + 1}{12}$
(B) $\frac{n_2}{2}$ and $\frac{n_1n_2(n_1 + n_2)}{12}$
(C) $\frac{n_1n_2}{2}$ and $\frac{n_1 + n_2}{12}$
(D) $\frac{n_1n_2}{2}$ and $\frac{n_1n_2(n_1 + n_2 + 1)}{12}$
(E) Answer not known

192. Let $m = 4, n = 3$ and suppose that the combined sample when ordered is as follows

$x_2 < x_1 < y_3 < y_2 < x_4 < y_1 < x_3$

The Mann Whitney U statistics is given by

(A) $U = 11$
(B) $U = 13$
(C) $U = 7$
(D) $U = 8$
(E) Answer not known

193. In Kruskal-Wallis test, test statistic H is distributed asymtotically as a _____ with df$(k-1)$.

(A) Chi square
(B) t
(C) F
(D) H
(E) Answer not known

194. Kolmogorov – Smirnov test based on

(A) Randomness Test

(B) Glivenko – Cantelli theorem

(C) Factorization theorem

(D) Likelihood ratio test

(E) Answer not known

195. Asymptotic relative efficiency of the Kruskal Wallis test relative to one way ANOVA, F is approximate

(A) $\frac{3}{\pi}$ (B) $\frac{1}{\pi}$

(C) $\frac{2}{\pi}$ (D) $\frac{4}{\pi}$

(E) Answer not known

196. For testing $H_0 : \theta = \theta_0$ against $\theta = \theta_1$, the W is said to be unbiased if _____

(A) $P_{\theta_1}(W) \leq P_{\theta_0}(W),\ \forall \theta (\neq \theta_0)$ (B) $P_{\theta_1}(W) \geq P_{\theta_0}(W),\ \forall \theta (\neq \theta_0)$

(C) $P_{\theta_0}(W) < 0$ (D) $P_{\theta_1}(W) < 0$

(E) Answer not known

197. The likelihood ratio test is a function of every _____ statistics for θ if it exists.

(A) Efficient (B) Unbiased

(C) Sufficient (D) Consistent

(E) Answer not known

198. In the context of Neyman – Pearson theorem, the most powerful test for testing a simple hypothesis against a simple alternative hypothesis is strictly unbiased if

(A) $\alpha < 0.5$ (B) $\alpha = 0.5$

(C) $0.5 < \alpha < 1$ (D) $0 < \alpha < 1$

(E) Answer not known

199. Match the following correctly :

(a)	Type I – Error	1.	$P(X \in w / H_0 = \alpha)$ and $P(X \in w / H_1) \geq P(X \in w_1 / H_1)$
(b)	Type II – Error	2.	$P(X \in w / H_0)$
(c)	Power of the test	3.	$P(X \in \overline{w} / H_1)$
(d)	Most powerful test	4.	$P(X \in w / H_1)$

	(a)	(b)	(c)	(d)
(A)	2	3	4	1
(B)	1	2	3	4
(C)	3	4	1	2
(D)	4	1	2	3

(E) Answer not known

200. Power of the test is the probability of _____

(A) Rejecting H_0 when it is true

(B) Not Rejecting H_0 when it is false

(C) Rejecting H_0 when it is false

(D) Accepting H_0 when it is true

(E) Answer not known
