	Tota	I No. of Pri	inted Pages : 13
	ARE ASKED TO DO SO) PG-EE-July, 2025	RE TIME O	R UNTIL YOU
	SUBJECT : Statistics	Sr. No.	10057
Time : 1¼ Hours	Max. Marks : 100	т	otal Questions : 100
Roll No. (in figures)	(in words)		
Name	Date of Birth		
Father's Name	Mother's Name		
Date of Examination			
(Signature of the Candidate)		(Signature	of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

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- A
- 1. Which of the following is a condition for a set of vectors to be linearly independent?
 - (1) The determinant of the matrix formed by vectors is zero
 - (2) No vector in the set can be written as a linear combination of the others
 - (3) All vectors lie in the same plane
 - (4) All vectors are unit vectors
- **2.** If a real matrix A satisfies $A^{T}A = 0$, then rank of A is :
 - (1) 0 (2) 1
 - (3) 2 (4) Cannot be determined
- 3. Suppose M is a 4×4 matrix such that $M^3 = 0$. The maximum possible rank of M is : (1) 3 (2) 2 (3) 1 (4) 0
- 4. For Matrix

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & 11 & -6 \end{bmatrix}$$

The eigen values are :

- (1) 1, 2, 3 (2) 0, 1, 2 (3) 1-, -2, -3 (4) 2, 2, 2
- 5. If a vector lies in the null space of a matrix A, then which of the following is true ?
 - (1) It is an eigenvector
 - (2) It is orthogonal to the column space of A
 - (3) It lies in the row space
 - (4) It solves $A^T x = 0$

6. If a matrix A of order 3×3 has rank 2, then the homogeneous system Ax = 0 has :

- (1) Only trivial solution (2) No solution
- (3) Infinite solutions (4) Exactly one non-trivial solution
- 7. Let A be a 2×2 matrix such that $A^2 = I$. Then, which of the following is true about the eigenvalues of A?
 - (1) ± 1 (2) 0 and 1 (3) Any real number (4) Purely imaginary
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8. What is the determinant of the matrix

9. Which of the following matrices is diagonalizable ?

(1) A matrix with repeated eigen values but incomplete eigenvectors

- (2) A matrix with distinct eigen values
- (3) A matrix with determinant 0
- (4) A matrix with complex entries only

10. The set of all solutions of a homogeneous linear system forms a :

(1) Null Space (2) Affine set (3) Convex set (4) Subspace

11. If a function f(x) is one-one and onto, then which of the following must exist?

- (1) Derivative of f(x) (2) Inverse of f(x)
- (3) Limit of f(x) (4) Integral of f(x)
- **12.** If f(x) is defined as

$$f(x) = \begin{cases} x^2, & x \le 1\\ 2x - 1, & x > 1 \end{cases}$$

Then f(x) is :

- (1) Continuous but not differentiable at x = 1
- (2) Differentiable at x = 1
- (3) Discontinuous at x = 1
- (4) None of the above

13. If f(x) is increasing and differentiable in (a, b), which of the following is **true**?

- (1) f'(x) < 0 for all $x \in (a, b)$ (2) f'(x) > 0 for all $x \in (a, b)$
- (3) f'(x) = 0 for all $x \in (a, b)$

(4) $f'(x) \ge 0$ for all $x \in (a, b)$

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14. Which condition must be violated for a removable discontinuity to occur at x = a?

- (1) $\lim_{x \to a^{-}} f(x) = \lim_{x \to a^{+}} f(x)$ (2) $\lim_{x \to a} f(x) = f(a)$
- (3) $\lim_{x\to a} f(x)$ exists (4) f(a) is defined
- **15.** If $f(x) = x^n$, what is the nth derivative of f(x)? (1) 0 (2) n! (3) x (4) $n x^{n-1}$
- **16.** If $f(x, y) = x^2 y + xy^2$, then $\frac{\partial^2 f}{\partial x \partial y} = :$ (1) 2x + 2y (2) 2x (3) 2y (4) x + y
- 17. Euler's theorem for a homogeneous function f(x, y) of degree n is :
 - (1) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = 0$ (2) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = nf$ (3) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = f$ (4) $x^2 + y^2 = nf$

18. If
$$\int_{a}^{b} f(x)dx = I$$
, then $\int_{a}^{b} f(a+b-x)dx =$
(1) $-I$ (2) $a+b$ (3) I (4) $f(b-a)$

- **19.** Which of the following is *not* a property of definite integrals ?
 - (1) Additivity (2) Reversing limits changes the sign
 - (3) Differentiation (4) Linearity

20. Which of the following best describes a saddle point?

- (1) Local minimum (2) Local maximum
- (3) Not an extremum but a stationary point (4) Point of discontinuity

21. The equation
$$\frac{\partial y}{\partial x} = xy$$
 is

(1) Linear and separable

- (2) Non-linear and not separable
- (3) Linear but not separable (4) Separable but not linear
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Which of the following is a necessary condition for a differential equation to be 22. separable ? (1) All terms in x and y can be grouped (2) The equation is linear (3) It contains second-order derivatives (4) Solution involves Laplace transforms The differential equation $\frac{\partial y}{\partial x} + y = e^x$ is : 23. (2) Non-homogeneous linear (1) Homogeneous linear (3) Non-linear (4) Separable only The general solution of y'' - 4y' + 4y = 0 is : 24. (1) $y = C_1 e^{2x} + C_2 e^{-2x}$ (2) $y = (C_1 + C_2 x)e^{2x}$ (4) $y = (C_1 + C_2 x)$ (3) $y = (C_1 x + C_2)x$ A particular integral of $y'' + y = \sin x$ is : 25. (3) $-\frac{1}{2}\cos x$ (4) $\frac{1}{2}x\sin x$ (2) 0(1) $x \cos x$ **26.** If y_1 and y_2 are solutions of a homogeneous linear DE, then $c_1y_1 + c_2y_2$ is also a solution. This is due to : (2) Linearity violation (1) Superposition principle (3) Uniqueness theorem (4) Initial condition A differential equation is said to be homogeneous, if : 27. (1) RHS is 0 (2) All terms are in y only (3) Solution is constant (4) Independent variable is absent The order of differential equation $\frac{\partial^3 y}{\partial r^3} + 3\frac{\partial y}{\partial r} = 0$ is : 28. (1) 1 (2) 2(3) 3 (4) 029. The interior of the set $A = [0, 1] \cup \{2\}$ is : (1) [0, 1](2) (0, 1)(3) {2} $(4) (0, 1) \cup \{2\}$

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30.	The closure of the set $(0, 1) \cup (2, 3)$ is :		9
	(1) $[0, 1) \cup (2, 3)$	$(2) \ (0,1) \cup (2,3]$	
	(3) [0, 1] ∪ [2, 3]	$(4) \ (0, 1) \cup (2, 3)$	
31.	The set of rational numbers \mathbb{Q} and \mathbb{R} is :		
	(1) Open	(2) Closed	
	(3) Neither open nor closed	(4) Compact	
32.	The sequence $a_n = \frac{1}{n}$ is :		
	(1) Increasing and bounded	(2) Decreasing and	unbounded
	(3) Divergent	(4) Convergent	
33.	The function $f(x) = \begin{cases} 1, x \in \mathbb{Q} \\ 0, x \notin \mathbb{Q} \end{cases}$ in [0, 1]	is :	
	(1) Continuous	(2) Riemann integra	ble
	(3) Not Riemann integrable	(4) Constant	
34.	The root test is stronger than the ratio test when :		
	(1) a_n involves powers like n^n	(2) Alternating serie	S
	(3) p-series	(4) Telescoping serie	es
35.	The sequence $a_n = \frac{n+1}{n}$ converges to :		
	(1) 1 (2) 0	(3) ∞	(4) Does not exist
36.	The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ is :		
	(1) Absolutely convergent	(2) Conditionally co	nvergent
	(3) Divergent	(4) Not defined	
37.	The maximum number of corner points i	n a 2-variable LPP de	fined by 3 constraints is :
	(1) 2 (2) 3	(3) 4	(4) 6
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38.				
	(1) Below the line	(2) Above the line		
	(3) Between axes	(4) Unbounded in negative quadrant		
39.	If in the simplex tableau, all $C_j - Z_j$	$_{i} < 0$, then :		
	(1) Problem has no solution	(2) Current solution is optimal		
	(3) Continue iterations	(4) Unbounded solution		
40.	In a transportation problem with 3 must have :	sources and 4 destinations, a basic feasible solution		
	(1) 7 allocations	(2) 12 allocations		
	(3) 6 allocations	(4) 8 allocations		
41.	If a constraint is redundant, then :			
	(1) It defines the boundary	(2) It affects the optimal solution		
	(3) It does not affect the feasible re-	egion (4) It causes degeneracy		
42.	In a 4×4 balanced assignment pro-	blem, the number of possible assignments is :		
	(1) 16 (2) 24	(3) 4 (4) 256		
43.	Minimize $Z = x + y$, subject to :			
		$x + 2y \ge 8$		
		$3x + y \ge 9$		
		$x, y \ge 0$		
	What is the minimum value of Z?			
	(1) 7 (2) 8	(3) 9 (4) 10		
44.	A dummy row/column is added in a	assignment problem when :		
	(1) Matrix is square	(2) Cost is negative		
	(3) Problem is unbalanced	(4) Supply > demand		
45.	The relation between forward different	rence (Δ) and shift operator (E) is :		
		(3) $\Delta = 1 - E$ (4) $\Delta = E^2$		
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- **46.** For interpolation through 3 points, the degree of interpolating polynomial is : (1) 1 (2) 2 (3) 3 (4) 4
- 47. Using Newton-Raphson method, one iteration for $f(x) = x^3 x 2$ starting at $x_0 = 1.5$ gives :
 - (1) 1.45 (2) 1.60 (3) 1.52 (4) 1.30
- 48. Newton-Raphson method formula is :
 - (1) $x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)}$ (2) $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$ (3) $x_{n+1} = x_n + f(x_n) f'(x_n)$ (4) $x_{n+1} = \frac{f(x_n)}{x_n}$
- **49.** Use Newton's forward difference formula to estimate f(2.5) given :

		x	f(x)	
		2	4	
		3	9	
		4	16	
(1) 6.25	(2) 10.25	(3	3) 12.25	(4) 8.25

50. In Lagrange interpolation, find f(2) given :

		f(1) = 2, f(3) = 9, f(4) = 16		
(1) 4	(2) 3	(3) 2	(4) 5	

- **51.** In Newton's divided difference table, the value of $f[x_0, x_1, x_2]$ is :
 - (1) A first divided difference (2) A second divided difference
 - (3) A central difference (4) A backward difference
- 52. The error in interpolation using Newton's forward formula is proportional to :
 - (1) h^2 (2) h^3 (3) h^n (4) $\frac{1}{h}$
- 53. Who is known as the "Father of Computers" ?
 - (1) Alan Turing
 (2) Charles Babbage
 (3) Bill Gates
 (4) John von Neumann
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				11-29		
54.	In MS Word, which	n menu is used for in	sertu	ng tables ?	(1)	Review
	(1) Home	(2) Insert	(3)	Page Layout	(4)	Review
55.	Which symbol is us	sed to end a statemer	nt in (С?		
	(1) .	(2) :	(3)		(4)	#
			~ ^			
56.		used for modulus in ((4)	//
	(1) /	(2) %	(3)		(4)	"
57.	UNIVAC was prim	narily used for :				
	(1) Playing games					
	(2) Word processin	ng				
	(3) Business and g	overnment data proc	essir	ıg		
	(4) Internet browsing					
58.	An example of vol	atile memory is :				
50.	방법 문서 남편 성장 그 것은 것이다.		(2)	DAM	(Λ)	CD DOM
	(1) Hard disk	(2) ROM	(3)	RAM	(4)	CD-ROM
59.	A commonly used	file system in Windo	ows i	s :		
	(1) FAT	(2) NTFS	(3)) ext4	(4)	HFS
60.	What is the purpos	e of task manager?				
	(1) Install softward	지방 전문 전문 관계 전문 것이다.	(2)) Monitor hardw	are	
	(3) View running) Connect intern		
61.		sus in India is conduc	cted l	by:		
	(1) Ministry of Sta	itistics) CSO		
	(3) NSSO		(4)) Registrar Gene	ral o	of India
62.	NSSO is mainly re	sponsible for :				
	(1) Agricultural ce	ensus				
	(2) Population cen	sus				
	(3) Sample survey	s on socio-economic	: issu	es	223 - <u></u>	
	(4) Industrial polic					

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If price of a good in base year is ₹ 50 and in current year is ₹ 75, the simple price index 63. is : (1) 125 (2) 150 (3) 75 (4) 100 The Consumer Price Index (CPI) is mainly used to measure : 64. (1) Agricultural output (2) Industrial production (3) Inflation (4) Imports If prices increased 20% and quantities reduced 10%, what is the approximate change in 65. total value? (1) Increase by 8% (2) Increase by 10% (3) No change (4) Decrease by 8% 66. Crude Birth Rate (CBR) = 500 births and mid-year population = 50,000. What is CBR? (1) 5(2) 10 (3) 15 (4) 20 67. Calculate Infant Mortality Rate (IMR) if Infant deaths = 150 and Live births = 5000 (1) 30(2) 25 (3) 15 (4) 3 If demand increases and supply remains constant, equilibrium price : 68. (2) Doubles (3) Stays same (4) Rises (1) Falls The Law of Demand states : 69. (1) As price increases, demand increases (2) As price increases, demand decreases (3) As income decreases, demand increases (4) Demand is fixed If price rises from ₹ 10 to ₹ 15 and demand falls from 100 to 80, then price elasticity 70. is : (4) -1(3) -2(2) 1.5(1) -0.5A bar diagram is best suited for representing : 71. (2) Discrete variables (1) Continuous variables (4) Time series (3) Interval variables P. T. O. PG-EE-July, 2025/(Statistics)(SET-Y)/(A)

The geometric mean is preferred when dealing with :

(2) 1

If a dataset has 10 observations and all are equal to 5, the variance is :

(2)	Negative values
(4)	Ordinal data

(3) 0

(4) 25

- **74.** The standard measure of kurtosis for a normal distribution is : (1) 0 (2) 1 (3) 3 (4) -1
- 75. When analysing water quality parameters using Karl Pearson's coefficient of skewness, the formula <u>Mean - Mode</u> <u>Standard Deviation</u> yields -0.75. This suggests :
 - (1) Moderate negative skewness (2) Strong negative skewness
 - (3) Moderate positive skewness (4) No skewness
- **76.** In forest biomass estimation, if the third moment about the mean $\mu_3 = 125$ and $\sigma^3 = 64$, the coefficient of skewness is :
 - (1) 1.95 (2) 0.51 (3) 1.25 (4) 2.08
- 77. If Coefficient of Variation of series X is 20% and that of Y is 15%, then :
 - (1) X is more consistent (2) Y is more consistent
 - (3) Both are equally consistent (4) No conclusion
- 78. A positively skewed distribution has:
 - (1) Mean > Median > Mode (2) Mode > Median > Mean
 - (3) Mean = Median = Mode (4) Median > Mode > Mean
- **79.** Correlation coefficient between heights of fathers and sons is 0.8. What is the proportion of explained variation ?
 - (1) 0.64 (2) 0.8 (3) 0.16 (4) 0.96
- 80. If X and Y are independent, their regression coefficients are :
 (1) 1
 (2) 0
 (3) -1
 (4) Undefined

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72.

73.

(1) 5

(1) Time-series data

(3) Ratios or growth rates

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81	In fitting a parabo	ola by least squares, n	umber of normal equ	ations required is :		
	(1) 2	(2) 3	(3) 4	(4) 1		
82	2. The correlation coefficient between X and Y is 0.9, standard deviations of X and Y are 3 and 4 respectively, then Covariance between X and Y is :					
	(1) 10.8	(2) 12	(3) 8	(4) 9		
83	Given $\Sigma x = 15$, Correlation Coeff		$\Sigma x^2 = 55, \ \Sigma y^2 = 102$	k, n = 5. What is Pearson's		
	(1) 0.13	(2) 0.82	(3) 0.93	(4) 0.63		
84.	If $r_{12} = 0.9$, $r_{13} = 0.9$	0.6 and $r_{23} = 0.4$, the j	partial correlation coe	efficient $r_{12.3}$ is :		
	(1) 0.82	(2) 0.85	(3) 0.90	(4) 0.78		
85.	If $b_{yx} = 0.6$ and b_{x}	$y_{y} = 0.4$, then the value	e of correlation coeffi	cient (r) is :		
	(1) 0.5	(2) 0.8	(3) 0.6	(4) 0.3		
86.	A coin is tossed th	nree times. What is th	e probability of getti	ng at least one head ?		
	(1) 1/4	(2) 1/2	(3) 3/4	(4) 7/8		
87.	If $X \sim U(0, 1)$, the	n find $P(0.2 \le X \le 0.6)$	6):			
	(1) 0.4	(2) 0.5	(3) 0.3	(4) 0.6		
88.	If a random variab	ble has PDF $f(x) = 3x^2$	on [0, 1], then the ex	spected value E(X) is :		
	(1) 0.5	(2) 0.75	(3) 0.6	(4) 0.65		
89.	The moment gener	rating function of N()	μ, σ^2) is :			
	(1) $e^{\mu} + \frac{\sigma^2 t^2}{2}$	$(2) e^{\mu} - \frac{\sigma^2 t^2}{2}$	$(3) \mu t + \frac{\sigma^2 t^2}{2}$	$(4) \mu t - \frac{\sigma^2 t^2}{2}$		
90.	For a fair coin, what is the PMF of the number of heads in two tosses?					
	(1) 1/3, 1/3, 1/3	(2) 1/4, 1/2, 1/4	(3) 1/2, 1/4, 1/4	(4) 1/8, 3/8, 4/8		
91.	What is the area ur	der the standard nor	mal curve between µ	$-\sigma$ and $\mu + \sigma$?		
	(1) 50%	(2) 68%	(3) 95%	(4) 99.7%		
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92.	For a binomial distribution with $n = 5$ and $p = 0.4$, what is the probability of getting exactly 2 successes ?				
	(1) 0.38	(2) 0.62	(3) 0.50	(4) 0.35	
93.	Which distribution	models the number	of events in a fixed in	nterval of time or space?	
	(1) Binomial	(2) Normal	(3) Poisson	(4) Geometric	
94.	Which of the follo	wing is NOT a prope	rty of expectation?		
	(1) $E(aX + b) = aF$	E(X) + b	(2) $E(X + Y) = E(X + Y)$	(X) + E(Y)	
	(3) E(XY) = E(X)	E(Y) always	(4) $E(c) = c$		
95.	The expected num	ber of trials to get the	first success in a geo	ometric distribution is:	
	(1) 1/p	(2) $1 - p$	(3) p	(4) log(p)	
96.	For a uniform distr	ibution U(0, 5), the v	variance is :		
	(1) 2.5	(2) 1.25	(3) 25	(4) 2.08	
97.	Find the value of k	so that $f(x) = kx, 0 \le$	$x \le 2$ is a valid PDF.		
	(1) 1	(2) 1/3	(3) 1/2	(4) 1/4	
98.	A random variable	X has the CDF :			
	$\int 0; x < $	< 0			
	$F(x) = \begin{cases} \frac{x}{2}; & 0 \leq x \end{cases}$	$\leq x < 2$			
	$F(x) = \begin{cases} 0; & x < \\ \frac{x}{2}; & 0 \le \\ 1; & x \ge \end{cases}$	≥2			
	What is $P(1 < X < 1)$				
	(1) 0.5	(2) 1	(3) 0.25	(4) 0.75	
99.	The number of customers arriving at a shop per hour follows Poisson ($\lambda = 3$). What's the probability that exactly 5 customers arrive ?				
	(1) 0.111	(2) 0.199	(3) 0.125	(4) 0.101	
100.	In a geometric dist occurs on the third	ribution with $p = 0.2$ trial ?	25, what is the proba	bility that the first success	
	(1) 0.4219	(2) 0.1406	(3) 0.25	(4) 0.1875	

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SUBJECT : Statistics

10058

		Sr. No
Time : 1¼ Hours	Max. Marks : 100	Total Questions : 100
Roll No. (in figures)	(in words)	
Name		
Father's Name	Mother's Name	
Date of Examination		

(Signature of the Candidate)

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В

- 1. If a function f(x) is one-one and onto, then which of the following must exist?
 - (1) Derivative of f(x) (2) Inverse of f(x)
 - (3) Limit of f(x) (4) Integral of f(x)
- **2.** If f(x) is defined as

$$f(x) = \begin{cases} x^2, & x \le 1\\ 2x - 1, & x > 1 \end{cases}$$

Then f(x) is :

- (1) Continuous but not differentiable at x = 1 (2) Differentiable at x = 1
- (3) Discontinuous at x = 1 (4) None of the above
- 3. If f(x) is increasing and differentiable in (a, b), which of the following is *true*?
 - (1) f'(x) < 0 for all $x \in (a, b)$ (2) f'(x) > 0 for all $x \in (a, b)$
 - (3) f'(x) = 0 for all $x \in (a, b)$ (4) $f'(x) \ge 0$ for all $x \in (a, b)$

4. Which condition must be violated for a removable discontinuity to occur at x = a?

- (1) $\lim_{x \to a^{-}} f(x) = \lim_{x \to a^{+}} f(x)$ (2) $\lim_{x \to a} f(x) = f(a)$
- (3) $\lim_{x \to a} f(x)$ exists (4) f(a) is defined
- 5. If $f(x) = x^{n}$, what is the nth derivative of f(x)? (1) 0 (2) n! (3) x (4) $n x^{n-1}$
- 6. If $f(x, y) = x^2 y + xy^2$, then $\frac{\partial^2 f}{\partial x \partial y} = :$ (1) 2x + 2y (2) 2x (3) 2y (4) x + y
- 7. Euler's theorem for a homogeneous function f(x, y) of degree n is :
 - (1) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = 0$ (2) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = nf$ (3) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = f$ (4) $x^2 + y^2 = nf$

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8.	If $\int_{a}^{b} f(x) dx = I$, the function $\int_{a}^{b} f(x) dx = I$.	hen $\int_{a}^{b} f(a+b-b)$	dx =		
	(1) <i>–I</i>	(2) $a + b$	(3) <i>I</i>	(4) $f(b-a)$	
9.	Which of the follo	wing is <i>not</i> a prop	perty of definite integr	als?	
	(1) Additivity		(2) Reversing li	mits changes the sign	
	(3) Differentiation	L	(4) Linearity		
10.	Which of the follo	wing best describ	es a saddle point?		
	(1) Local minimu	m	(2) Local m	aximum	
	(3) Not an extrem	um but a stationa	ry point (4) Point of	discontinuity	
11.	What is the area u	nder the standard	normal curve between	$\mu \mu - \sigma$ and $\mu + \sigma$?	
	(1) 50%	(2) 68%	(3) 95%	(4) 99.7%	
12.	For a binomial distribution with $n = 5$ and $p = 0.4$, what is the probability of getting exactly 2 successes ?				
	(1) 0.38	(2) 0.62	(3) 0.50	(4) 0.35	
13.	Which distribution models the number of events in a fixed interval of time or space ?				
	(1) Binomial		(2) Normal		
	(3) Poisson		(4) Geometric		
14.	Which of the follo	wing is NOT a p	roperty of expectation	?	
	(1) $E(aX + b) = a$	E(X) + b	(2) $E(X + Y) =$	E(X) + E(Y)	
	(3) E(XY) = E(X))E(Y) always	(4) $E(c) = c$		
15.	The expected num	ber of trials to ge	et the first success in a	geometric distribution is:	
	(1) 1/p	(2) $1 - p$	(3) p	(4) log(p)	
16.	For a uniform dist	ribution U(0, 5),	the variance is :		
	(1) 2.5	(2) 1.25	(3) 25	(4) 2.08	
17.	Find the value of	k so that $f(x) = kx$	$x, 0 \le x \le 2$ is a valid F	PDF.	
	(1) 1	(2) 1/3	(3) 1/2	(4) 1/4	
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 $F(x) = \begin{cases} 0, & x < 0 \\ \frac{x}{2}; & 0 \le x < 2 \\ 1; & x \ge 2 \end{cases}$ What is P(1 < X < 2)? (1) 0.5(2) 1 (3) 0.25 (4) 0.75 19. The number of customers arriving at a shop per hour follows Poisson ($\lambda = 3$). What's the probability that exactly 5 customers arrive ? (1) 0.111(2) 0.199(3) 0.125(4) 0.101 **20.** In a geometric distribution with p = 0.25, what is the probability that the first success occurs on the third trial ? (1) 0.4219(2) 0.1406(3) 0.25 (4) 0.1875 21. A bar diagram is best suited for representing : (1) Continuous variables (2) Discrete variables (3) Interval variables (4) Time series 22. If a dataset has 10 observations and all are equal to 5, the variance is : (1) 5(2) 1 (3) 0(4) 25 The geometric mean is preferred when dealing with : 23. (1) Time-series data (2) Negative values (3) Ratios or growth rates (4) Ordinal data 24. The standard measure of kurtosis for a normal distribution is : (1) 0(2) 1 (3) 3 (4) - 125. When analysing water quality parameters using Karl Pearson's coefficient of skewness, the formula $\frac{Mean - Mode}{Standard Deviation}$ yields -0.75. This suggests : (1) Moderate negative skewness (2) Strong negative skewness

- (3) Moderate positive skewness (4) No skewness
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A random variable X has the CDF : 18.

In forest biomass estimation, if the third moment about the mean $\mu_3 = 125$ and $\sigma^3 = 64$, 26. the coefficient of skewness is : (4) 2.08 (3) 1.25 (2) 0.51(1) 1.95 If Coefficient of Variation of series X is 20% and that of Y is 15%, then : 27. (2) Y is more consistent (1) X is more consistent (4) No conclusion (3) Both are equally consistent A positively skewed distribution has: 28. (2) Mode > Median > Mean (1) Mean > Median > Mode (4) Median > Mode > Mean (3) Mean = Median = Mode Correlation coefficient between heights of fathers and sons is 0.8. What is the 29. proportion of explained variation ? (4) 0.96(3) 0.16 (2) 0.8(1) 0.64If X and Y are independent, their regression coefficients are : 30. (4) Undefined (3) -1(2) 0(1) 1In Newton's divided difference table, the value of $f[x_0, x_1, x_2]$ is : 31. (1) A first divided difference (2) A second divided difference (3) A central difference (4) A backward difference The error in interpolation using Newton's forward formula is proportional to : 32. (2) h^3 (4) $\frac{1}{h}$ (1) h^2 (3) h^{n} 33. Who is known as the "Father of Computers"? (1) Alan Turing (2) Charles Babbage (3) Bill Gates (4) John von Neumann In MS Word, which menu is used for inserting tables ? 34. (1) Home (2) Insert (3) Page Layout (4) Review

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35	5. Which symbol is used to end a statement in C?			
	(1).	(2) :	(3);	(4) #
36	. Which operator i	s used for modulu	us in C ?	
	(1) /	(2) %	(3) ^	(4) //
37.	UNIVAC was pri	imarily used for :		
	(1) Playing game	es		
	(2) Word process	sing		
	(3) Business and	government data	processing	
	(4) Internet brow	vsing		
38.	An example of vo	platile memory is	:	
	(1) Hard disk	(2) ROM	(3) RAM	(4) CD-ROM
39.	A commonly used	d file system in W	/indows is :	
	(1) FAT	(2) NTFS	(3) ext4	(4) HFS
40.	What is the purpo	se of task manage	er?	
	(1) Install softwa	re	(2) Monitor ha	rdware
	(3) View running	processes	(4) Connect in	ternet
41.	The set of rational	numbers Q and	R is :	
	(1) Open		(2) Closed	
	(3) Neither open 1	nor closed	(4) Compact	
42.	The sequence $a_n =$	$\frac{1}{n}$ is :		
	(1) Increasing and	l bounded	(2) Decreasing	and unbounded
	(3) Divergent		(4) Convergent	:
43.	The function $f(x) =$	$= \begin{cases} 1, \ x \in \mathbb{Q} \\ 0, \ x \notin \mathbb{Q} \end{cases} \text{ in } [0]$	D, 1] is :	
	(1) Continuous		(2) Riemann in	tegrable
	(3) Not Riemann i	ntegrable	(4) Constant	
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The root test is stronger than the ratio test when : 44. (2) Alternating series (1) a_n involves powers like n^n (4) Telescoping series (3) p-series The sequence $a_n = \frac{n+1}{n}$ converges to : 45. (4) Does not exist (3) ∞ (2) 0(1) 1 46. The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ is : (2) Conditionally convergent (1) Absolutely convergent (4) Not defined (3) Divergent The maximum number of corner points in a 2-variable LPP defined by 3 constraints is : 47. (4) 6(3) 4 (2) 3 (1) 2The constraints $x + 2y \ge 10$ and $x \ge 0$, $y \ge 0$ define a region in which direction ? 48. (2) Above the line (1) Below the line (4) Unbounded in negative quadrant (3) Between axes **49.** If in the simplex tableau, all $C_j - Z_j < 0$, then : (1) Problem has no solution (2) Current solution is optimal (4) Unbounded solution (3) Continue iterations In a transportation problem with 3 sources and 4 destinations, a basic feasible solution 50. must have : (2) 12 allocations (1) 7 allocations (4) 8 allocations (3) 6 allocations **51.** The equation $\frac{\partial y}{\partial x} = xy$ is : (1) Linear and separable (2) Non-linear and not separable (3) Linear but not separable (4) Separable but not linear

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60.	The closure of the	set $(0, 1) \cup (2, 3)$	is :			
	(1) $[0, 1) \cup (2, 3)$		$(2) \ (0,1) \cup (2,3]$			
	(3) $[0, 1] \cup [2, 3]$		$(4) \ (0,1) \cup (2,3)$			
61.	If a constraint is re	dundant, then :				
	(1) It defines the b	ooundary				
	(2) It affects the o	ptimal solution				
	(3) It does not affe	ect the feasible reg	gion			
	(4) It causes degen	neracy				
62.	In a 4×4 balanced	d assignment prob	lem, the number of pos	ssible assignments is :		
	(1) 16	(2) 24	(3) 4	(4) 256		
63.	Minimize $Z = x +$	y, subject to :				
			$x + 2y \ge 8$			
			$3x + y \ge 9$			
	$x, y \ge 0$					
	What is the minin	num value of Z?				
	(1) 7	(2) 8	(3) 9	(4) 10		
64.	A dummy row/co	lumn is added in a	assignment problem wh	nen :		
	(1) Matrix is squ	are	(2) Cost is nega	tive		
	(3) Problem is ur	abalanced	(4) Supply > de	mand		
65.	The relation betw	een forward diffe	rence (Δ) and shift ope	rator (E) is :		
	(1) $\Delta = \mathbf{E} + 1$	(2) $\Delta = E - 1$	$(3) \Delta = 1 - E$	$(4) \Delta = E^2$		
66.	For interpolation	through 3 points,	the degree of interpola	ting polynomial is :		
	(1) 1	(2) 2	(3) 3	(4) 4		
67	 Using Newton-R gives : 	aphson method, c	one iteration for $f(x) =$	$x^3 - x - 2$ starting at $x_0 = 1.5$		
	(1) 1.45	(2) 1.60	(3) 1.52	(4) 1.30		
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68. Newton-Raphson method formula is :

(1)
$$x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)}$$

(2) $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$
(3) $x_{n+1} = x_n + f(x_n) f'(x_n)$
(4) $x_{n+1} = \frac{f(x_n)}{x_n}$

69. Use Newton's forward difference formula to estimate f(2.5) given :

		x	f(x)	
		2	4	
		3	9	
		4	16	
(1) 6.25	(2) 10.25	(3	3) 12.25	(4) 8.25

70. In Lagrange interpolation, find f(2) given :

(1) 4 (2) 3 (3)
$$f(3) = 9, f(4) = 16$$

(4) 5

71. The decennial census in India is conducted by :

- (1) Ministry of Statistics
 (2) CSO
 (3) NSSO
 (4) Registrar General of India
- 72. NSSO is mainly responsible for :
 - (1) Agricultural census
 - (2) Population census
 - (3) Sample surveys on socio-economic issues
 - (4) Industrial policy design
- 73. If price of a good in base year is ₹ 50 and in current year is ₹ 75, the simple price index is :
 - (1) 125 (2) 150 (3) 75 (4) 100
- 74. The Consumer Price Index (CPI) is mainly used to measure :
 - (1) Agricultural output
 (2) Industrial production
 (3) Inflation
 (4) Imports
 - (3) Inflation

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75	 If prices increased total value ? 	1 20% and quantities	reduced 10%, what i	s the approximate change in
	(1) Increase by 89	%	(2) Increase by 10)%
	(3) No change		(4) Decrease by 8	
76.	Crude Birth Rate CBR ?	(CBR) = 500 birth	is and mid-year pop	oulation = $50,000$. What is
	(1) 5	(2) 10	(3) 15	(4) 20
77.	Calculate Infant M (1) 30	Iortality Rate (IMR) (2) 25	if Infant deaths = 15((3) 15) and Live births = 5000 (4) 3
78.	If demand increase (1) Falls	es and supply remains (2) Doubles	s constant, equilibriu (3) Stays same	m price : (4) Rises
79.	Law of Della	nd states :		(4) KISES
	(1) As price increa	ases, demand increase	es	
	(2) As price increa	ases, demand decreas	es	
	(3) As income dec(4) Demand is fixed	creases, demand incre ed	ases	
80.	If price rises from is :	₹ 10 to ₹ 15 and de	mand falls from 100	to 80, then price elasticity
	(1) -0.5	(2) 1.5	(3) -2	(4) -1
81.	Which of the follow	wing is a condition fo	or a set of vectors to h	be linearly independent?
	(1) The determinat	nt of the matrix forme	ed by vectors is zero	se mearly mucpendent?
	(2) No vector in th	e set can be written a	s a linear combination	n of the other
	(3) All vectors lie	in the same plane		on or the others
	(4) All vectors are	영양 가슴 사람이 많은 영향을 보니 다양한 것이다.		
82.	If a real matrix A sa	atisfies $A^{T}A = 0$, then	rank of A is :	
	(1) 0		(2) 1	
	(3) 2		(4) Cannot be dete	
83.	Suppose <i>M</i> is a $4 \times$	4 matrix such that M	$^{3} = 0$ The maximum	possible rank of <i>M</i> is :
	(1) 3	(2) 2	(3) 1	$\begin{array}{l} \text{possible rank of } M \text{ is :} \\ (4) \ 0 \end{array}$
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84. For Matrix

 $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & 11 & -6 \end{bmatrix}$

The eigen values are :

(1) 1, 2, 3 (2) 0, 1, 2 (3) 1-, -2, -3 (4) 2, 2, 2

85. If a vector lies in the null space of a matrix A, then which of the following is true ?

- (1) It is an eigenvector
- (2) It is orthogonal to the column space of A
- (3) It lies in the row space
- (4) It solves $A^T x = 0$

86. If a matrix A of order 3×3 has rank 2, then the homogeneous system Ax = 0 has :

- (1) Only trivial solution (2) No solution
- (3) Infinite solutions (4) Exactly one non-trivial solution
- 87. Let A be a 2×2 matrix such that $A^2 = I$. Then, which of the following is true about the eigenvalues of A?
 - (1) ± 1 (2) 0 and 1 (3) Any real number (4) Purely imaginary
- 88. What is the determinant of the matrix

- 89. Which of the following matrices is diagonalizable ?
 - (1) A matrix with repeated eigen values but incomplete eigenvectors
 - (2) A matrix with distinct eigen values
 - (3) A matrix with determinant 0
 - (4) A matrix with complex entries only

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90.	The set of all solutions of a homogeneous linear system forms a :			
	(1) Null Space	(2) Affine set	(3) Convex set	(4) Subspace
91.	In fitting a parabol	a by least squares, nu	umber of normal equa	ations required is :
	(1) 2	(2) 3	(3) 4	(4) 1
92.	The correlation coo 3 and 4 respectivel	efficient between X a y, then Covariance b	and Y is 0.9, standar etween X and Y is :	d deviations of X and Yare
	(1) 10.8		(3) 8	(4) 9
93.	Given $\Sigma x = 15$, Σ Correlation Coeffic	$y = 20, \Sigma xy = 62, \Sigma$ evient r?	$\Sigma x^2 = 55, \ \Sigma y^2 = 102,$	n = 5. What is Pearson's
	(1) 0.13	(2) 0.82	(3) 0.93	(4) 0.63
94.	If $r_{12} = 0.9$, $r_{13} = 0$.	6 and $r_{23} = 0.4$, the p	artial correlation coef	fficient $r_{12.3}$ is :
	(1) 0.82	(2) 0.85	(3) 0.90	(4) 0.78
95.	If $b_{yx} = 0.6$ and b_{xy}	= 0.4, then the value	of correlation coeffic	tient (r) is :
	(1) 0.5	(2) 0.8	(3) 0.6	(4) 0.3
96.	A coin is tossed thr	ee times. What is the	probability of gettin	g at least one head?
	(1) 1/4	(2) 1/2	(3) 3/4	(4) 7/8
97.	If $X \sim U(0, 1)$, then	find $P(0.2 \le X \le 0.6)$):	
	(1) 0.4	(2) 0.5	(3) 0.3	(4) 0.6
98.	If a random variable	the has PDF $f(x) = 3x^2$	on [0, 1], then the ex	pected value E(X) is :
	(1) 0.5	(2) 0.75	(3) 0.6	(4) 0.65
99.	The moment genera	ting function of N(µ	, σ^2) is :	
	(1) $e^{\mu} + \frac{\sigma^2 t^2}{2}$	(2) $e^{\mu\nu} - \frac{\sigma^2 t^2}{2}$	(3) $\mu t + \frac{\sigma^2 t^2}{2}$	$(4) \mu t - \frac{\sigma^2 t^2}{2}$
100.	For a fair coin, wha	t is the PMF of the m	umber of heads in tw	o tosses ?
	(1) 1/3, 1/3, 1/3	(2) 1/4, 1/2, 1/4	(3) 1/2, 1/4, 1/4	(4) 1/8, 3/8, 4/8
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Date of Examination		

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

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- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
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С

1. If a constraint is redundant, then : (2) It affects the optimal solution (1) It defines the boundary (3) It does not affect the feasible region (4) It causes degeneracy 2. In a 4×4 balanced assignment problem, the number of possible assignments is : (3) 4 (4) 256 (1) 16 (2) 24 3. Minimize Z = x + y, subject to : $x + 2y \ge 8$ $3x + y \ge 9$ $x, y \ge 0$ What is the minimum value of Z? (1) 7(4) 10 (2) 8 (3) 9 A dummy row/column is added in assignment problem when : 4. (1) Matrix is square (2) Cost is negative (3) Problem is unbalanced (4) Supply > demand 5. The relation between forward difference (Δ) and shift operator (E) is : (4) $\Lambda = E^2$ (1) $\Delta = E + 1$ (2) $\Delta = \mathbf{E} - \mathbf{1}$ (3) $\Delta = 1 - E$ For interpolation through 3 points, the degree of interpolating polynomial is : 6. (1) 1(2) 2(3) 3 (4) 4Using Newton-Raphson method, one iteration for $f(x) = x^3 - x - 2$ starting at $x_0 = 1.5$ 7. gives : (1) 1.45(2) 1.60 (3) 1.52(4) 1.308. Newton-Raphson method formula is : (1) $x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)}$ (2) $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$ (4) $x_{n+1} = \frac{f(x_n)}{x}$ (3) $x_{n+1} = x_n + f(x_n) f'(x_n)$ PG-EE-July, 2025/(Statistics)(SET-Y)/(C) P. T. O. 9. Use Newton's forward difference formula to estimate f(2.5) given :

	x	f(x)	
	2	4	승규는 일종 영어가 한
	3	9	
	4	16	
(1) 6.25 (2) 10.25	(3	3) 12.25	(4) 8.25

10. In Lagrange interpolation, find f(2) given :

11. The equation $\frac{\partial y}{\partial x} = xy$ is :

(1) Linear and separable (2) Non-linear and not separable

- (3) Linear but not separable (4) Separable but not linear
- **12.** Which of the following is a necessary condition for a differential equation to be separable ?
 - (1) All terms in x and y can be grouped (2) The equation is linear
 - (3) It contains second-order derivatives (4) Solution involves Laplace transforms

13. The differential equation
$$\frac{\partial y}{\partial x} + y = e^x$$
 is :

(1) Homogeneous linear

- (2) Non-homogeneous linear
- (3) Non-linear (4) Separable only

14. The general solution of y'' - 4y' + 4y = 0 is :

(1) $y = C_1 e^{2x} + C_2 e^{-2x}$ (2) $y = (C_1 + C_2 x) e^{2x}$ (3) $y = (C_1 x + C_2) x$ (4) $y = (C_1 + C_2 x)$

15. A particular integral of $y'' + y = \sin x$ is :

(1) $x \cos x$ (2) 0 (3) $-\frac{1}{2} \cos x$ (4) $\frac{1}{2} x \sin x$

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If y_1 and y_2 are solutions of a homogeneous linear DE, then $c_1y_1 + c_2y_2$ is also a 16. solution. This is due to : (1) Superposition principle (2) Linearity violation (3) Uniqueness theorem (4) Initial condition A differential equation is said to be homogeneous, if : 17. (1) RHS is 0 (2) All terms are in y only (3) Solution is constant (4) Independent variable is absent The order of differential equation $\frac{\partial^3 y}{\partial x^3} + 3\frac{\partial y}{\partial x} = 0$ is : 18. (1) 1 (2) 2(3) 3 (4) 0The interior of the set $A = [0, 1] \cup \{2\}$ is : 19. (1) [0, 1](2) (0, 1)(3) {2} $(4) (0, 1) \cup \{2\}$ 20. The closure of the set $(0, 1) \cup (2, 3)$ is : $(1) [0, 1) \cup (2, 3)$ $(2) (0, 1) \cup (2, 3]$ $(3) [0, 1] \cup [2, 3]$ $(4) (0, 1) \cup (2, 3)$ Which of the following is a condition for a set of vectors to be linearly independent ? 21. (1) The determinant of the matrix formed by vectors is zero (2) No vector in the set can be written as a linear combination of the others (3) All vectors lie in the same plane (4) All vectors are unit vectors If a real matrix A satisfies $A^{T}A = 0$, then rank of A is : 22. (1) 0(2) 1 (3) 2(4) Cannot be determined Suppose M is a 4×4 matrix such that $M^3 = 0$. The maximum possible rank of M is : 23. (1) 3 (2) 2(3) 1 (4) 0

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24. For Matrix

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & 11 & -6 \end{bmatrix}$$

The eigen values are :

(1) 1, 2, 3 (2) 0, 1, 2 (3) 1-, -2, -3 (4) 2, 2, 2

25. If a vector lies in the null space of a matrix A, then which of the following is true ?

- (1) It is an eigenvector
- (2) It is orthogonal to the column space of A
- (3) It lies in the row space
- (4) It solves $A^T x = 0$
- **26.** If a matrix A of order 3×3 has rank 2, then the homogeneous system Ax = 0 has :
 - (1) Only trivial solution (2) No solution
 - (3) Infinite solutions (4) Exactly one non-trivial solution
- 27. Let A be a 2 × 2 matrix such that $A^2 = I$. Then, which of the following is true about the eigenvalues of A?
 - (1) ± 1 (2) 0 and 1 (3) Any real number (4) Purely imaginary
- **28.** What is the determinant of the matrix

- 29. Which of the following matrices is diagonalizable ?
 - (1) A matrix with repeated eigen values but incomplete eigenvectors
 - (2) A matrix with distinct eigen values
 - (3) A matrix with determinant 0
 - (4) A matrix with complex entries only

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30.	The set of all solutions of a homogeneous linear system forms a :				
	(1) Null Space		(3) Convex set		
31.	What is the area un	der the standard nor	mal curve between μ	$-\sigma$ and $\mu + \sigma$?	
	(1) 50%	(2) 68%	(3) 95%	(4) 99.7%	
32.	For a binomial dis exactly 2 successes	tribution with $n = 5$	and $p = 0.4$, what i	s the probability of getting	
	(1) 0.38	(2) 0.62	(3) 0.50	(4) 0.35	
33.	Which distribution	models the number of	of events in a fixed ir	nterval of time or space?	
	(1) Binomial	(2) Normal	(3) Poisson	(4) Geometric	
34.	Which of the follow	wing is NOT a proper	rty of expectation?		
	(1) $E(aX + b) = aE$	$\mathcal{E}(\mathbf{X}) + \mathbf{b}$	(2) $E(X + Y) = E(X +$	X) + E(Y)	
	(3) E(XY) = E(X)I	E(Y) always	(4) $E(c) = c$		
35.	The expected numb	per of trials to get the	first success in a geo	ometric distribution is:	
	(1) 1/p	(2) $1 - p$	(3) p	(4) log(p)	
36.	For a uniform distri	ibution U(0, 5), the v	variance is :		
	(1) 2.5	(2) 1.25	(3) 25	(4) 2.08	
37.	Find the value of k	so that $f(x) = kx, 0 \le$	$x \le 2$ is a valid PDF.		
	(1) 1	(2) 1/3	(3) 1/2	(4) 1/4	
38.	A random variable				
	$\int 0; x < $: 0			
	$F(x) = \begin{cases} 0; & x < x < x < x < x < x < x < x < x < x$	<i>x</i> < 2			
	$(1; x \ge$	2			
	What is $P(1 < X < 2)$				
	(1) 0.5	(2) 1	(3) 0.25	(4) 0.75	
39.	The number of cust the probability that	tomers arriving at a exactly 5 customers	shop per hour follow arrive?	ws Poisson ($\lambda = 3$). What's	
	(1) 0.111	(2) 0.199	(3) 0.125	(4) 0.101	
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40.	In a geometric distr occurs on the third	ribution with p = 0.2 trial ?	25, wl	nat is the proba	bility that the first success
	(1) 0.4219	(2) 0.1406	(3)	0.25	(4) 0.1875
41.	The decennial censu	us in India is conduc	ted by	y:	
	(1) Ministry of Star	tistics	(2)	CSO	
	(3) NSSO		(4)	Registrar Gener	ral of India
42.	NSSO is mainly res	sponsible for .			
	(1) Agricultural ce				
	(2) Population cen				
	(3) Sample survey	s on socio-economic	issue	S	
	(4) Industrial polic	y design			
43.	If price of a good in is :	n base year is ₹ 50 ar	nd in	current year is ₹	75, the simple price index
	(1) 125	(2) 150	(3)	75	(4) 100
44.	The Consumer Price	ce Index (CPI) is mai	nly u	sed to measure :	
	(1) Agricultural or	utput	(2)	Industrial produ	action
	(3) Inflation		(4)	Imports	
45.	If prices increased total value ?	20% and quantities r	reduce	ed 10%, what is	the approximate change in
	(1) Increase by 8%	6	(2)	Increase by 109	%
	(3) No change		(4)	Decrease by 89	К
46.	Crude Birth Rate CBR?	(CBR) = 500 birth	s and	l mid-year pop	ulation = $50,000$. What is
	(1) 5	(2) 10	(3)	15	(4) 20
47.	Calculate Infant M	lortality Rate (IMR)	if Infa	ant deaths $= 150$	and Live births $= 5000$
	(1) 30	(2) 25		15	(4) 3
48.	If demand increase	es and supply remain	s con	stant, equilibriu	m price :
	(1) Falls	(2) Doubles		Stays same	(4) Rises
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- 49. The Law of Demand states :
 - (1) As price increases, demand increases
 - (2) As price increases, demand decreases
 - (3) As income decreases, demand increases
 - (4) Demand is fixed
- 50. If price rises from ₹ 10 to ₹ 15 and demand falls from 100 to 80, then price elasticity is :
 - (1) -0.5 (2) 1.5 (3) -2 (4) -1
- **51.** The set of rational numbers \mathbb{Q} and \mathbb{R} is :
 - (1) Open (2) Closed
 - (3) Neither open nor closed (4) Compact
- **52.** The sequence $a_n = \frac{1}{n}$ is :

(1) Increasing and bounded

(3) Divergent

53.

(2) Decreasing and unbounded

(4) Convergent

- The function $f(x) = \begin{cases} 1, x \in \mathbb{Q} \\ 0, x \notin \mathbb{Q} \end{cases}$ in [0, 1] is :
- (1) Continuous (2) Riemann integrable
- (3) Not Riemann integrable (4) Constant

54. The root test is stronger than the ratio test when :

- (1) a_n involves powers like n^n (2) Alternating series
- (3) p-series (4) Telescoping series
- 55. The sequence $a_n = \frac{n+1}{n}$ converges to : (1) 1 (2) 0 (3) ∞ (4) Does not exist
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56.	The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ is :		
	(1) Absolutely convergent	(2)) Conditionally convergent
	(3) Divergent		Not defined
57	The maximum number of corner points i	in a 2	2-variable LPP defined by 3 constraints is :
57.	(1) 2 (2) 3	(3)) 4 (4) 6
50	The constraints $x + 2y \ge 10$ and $x \ge 0, y \ge 10$	>00	define a region in which direction ?
58.	(1) Below the line	(2)) Above the line
	(1) Between axes) Unbounded in negative quadrant
50	If in the simplex tableau, all $C_j - Z_j < 0$,	then	n:
59.	(1) Problem has no solution	(2)) Current solution is optimal
	(3) Continue iterations) Unbounded solution
60.	그는 것 같은 것 같	ces a	and 4 destinations, a basic feasible solution
	(1) 7 allocations	(2)) 12 allocations
	(3) 6 allocations	(4)) 8 allocations
61.	A bar diagram is best suited for represent	nting	g :
	(1) Continuous variables) Discrete variables
	(3) Interval variables	(4)) Time series
62.	If a dataset has 10 observations and all a	are e	equal to 5, the variance is :
	(1) 5 (2) 1		3) 0 (4) 25
63.	The geometric mean is preferred when	deali	ing with :
	(1) Time-series data		2) Negative values
	(3) Ratios or growth rates	(4) Ordinal data
64.	The standard measure of kurtosis for a	norn	nal distribution is :
	(1) 0 (2) 1		3) 3 (4) -1

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Mean – Mode $\frac{1}{1}$ Standard Deviation yields -0.75. This suggests : the formula -(2) Strong negative skewness (1) Moderate negative skewness (3) Moderate positive skewness (4) No skewness In forest biomass estimation, if the third moment about the mean $\mu_3 = 125$ and $\sigma' = 64$, 66. the coefficient of skewness is : (1) 1.95 (4) 2.08(2) 0.51(3) 1.25If Coefficient of Variation of series X is 20% and that of Y is 15%, then : 67. (1) X is more consistent (2) Y is more consistent (3) Both are equally consistent (4) No conclusion 68. A positively skewed distribution has: (1) Mean > Median > Mode (2) Mode > Median > Mean (3) Mean = Median = Mode (4) Median > Mode > Mean Correlation coefficient between heights of fathers and sons is 0.8. What is the 69. proportion of explained variation? (1) 0.64(2) 0.8(3) 0.16(4) 0.96 70. If X and Y are independent, their regression coefficients are : (1) 1 (2) 0(3) -1(4) Undefined 71. In fitting a parabola by least squares, number of normal equations required is : (1) 2(2) 3 (3) 4(4) 1The correlation coefficient between X and Y is 0.9, standard deviations of X and Yare 72. 3 and 4 respectively, then Covariance between X and Y is : (3) 8 (1) 10.8 (2) 12 (4) 9 73. Given $\Sigma x = 15$, $\Sigma y = 20$, $\Sigma x y = 62$, $\Sigma x^2 = 55$, $\Sigma y^2 = 102$, n = 5. What is Pearson's Correlation Coefficient r?

When analysing water quality parameters using Karl Pearson's coefficient of skewness,

(1) 0.13 (2) 0.82 (3) 0.93 (4) 0.63

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74.	If $r_{12} = 0.9$, $r_{13} = 0.9$	6 and $r_{23} = 0.4$, the p	partial correlation coo	efficient $r_{12.3}$ is :
	(1) 0.82	(2) 0.85	(3) 0.90	(4) 0.78
75.	If $b_{yx} = 0.6$ and $b_{xy} = 0.6$	= 0.4, then the value	of correlation coeff	icient (r) is :
	(1) 0.5	(2) 0.8	(3) 0.6	(4) 0.3
76.	A coin is tossed thr	ee times. What is the	e probability of getti	ng at least one head?
	(1) 1/4	(2) 1/2	(3) 3/4	(4) 7/8
77.	If $X \sim U(0, 1)$, then	find $P(0.2 \le X \le 0.6)$	5) :	
	(1) 0.4	(2) 0.5	(3) 0.3	(4) 0.6
78.	If a random variabl	a has PDE $f(r) = 3r^2$	on $[0, 1]$ then the e	xpected value E(X) is :
		$\int dx = \int dx = \int dx$		
	(1) 0.5	(2) 0.75	(3) 0.6	(4) 0.65
79.	The moment gener	ating function of N(μ, σ^2) is :	
	(1) $e^{\mu} + \frac{\sigma^2 t^2}{2}$	$(2) e^{\mu\nu} - \frac{\sigma^2 t^2}{2}$	$(3) \mu t + \frac{\sigma^2 t^2}{2}$	$(4) \mu t - \frac{\sigma^2 t^2}{2}$
80.	For a fair coin, what	at is the PMF of the	number of heads in t	wo tosses ?
	(1) 1/3, 1/3, 1/3	(2) 1/4, 1/2, 1/4	(3) 1/2, 1/4, 1/4	(4) 1/8, 3/8, 4/8
81.	If a function $f(x)$ is	one-one and onto, th	nen which of the foll	owing must exist?
	(1) Derivative of f		(2) Inverse of $f(x)$	
	(3) Limit of $f(x)$		(4) Integral of $f(x)$	
82.	If $f(x)$ is defined as			
02.	If $f(x)$ is defined as	. 이 가지 않는 것이 가장을 들었다.	2 1	
		$f(x) = \left\{ \right.$	$\begin{array}{ll} x^2, & x \leq 1 \\ 2x-1, & x > 1 \end{array}$	
		Ę.	$2x - 1, \qquad x > 1$	
	Then $f(x)$ is :			
		t not differentiable a	t x = 1	
	(2) Differentiable			
	(3) Discontinuous	at $r = 1$		

(3) Discontinuous at x = 1

(4) None of the above

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(1) f'(x) < 0 for all $x \in (a, b)$ (2) f'(x) > 0 for all $x \in (a, b)$ (3) f'(x) = 0 for all $x \in (a, b)$ (4) $f'(x) \ge 0$ for all $x \in (a, b)$

84. Which condition must be violated for a removable discontinuity to occur at x = a?

- (1) $\lim_{x \to a^{-}} f(x) = \lim_{x \to a^{+}} f(x)$ (2) $\lim_{x \to a} f(x) = f(a)$
- (3) $\lim_{x\to a} f(x)$ exists (4) f(a) is defined
- 85. If $f(x) = x^n$, what is the nth derivative of f(x)? (1) 0 (2) n! (3) x (4) $n x^{n-1}$
- 86. If $f(x, y) = x^2 y + xy^2$, then $\frac{\partial^2 f}{\partial x \partial y} = :$ (1) 2x + 2y (2) 2x (3) 2y (4) x + y

87. Euler's theorem for a homogeneous function f(x, y) of degree n is :

(1) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = 0$ (2) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = nf$ (3) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = f$ (4) $x^2 + y^2 = nf$

88. If $\int_{a}^{b} f(x)dx = I$, then $\int_{a}^{b} f(a+b-x)dx =$ (1) -I (2) a+b (3) I (4) f(b-a)

89. Which of the following is not a property of definite integrals ?

- (1) Additivity (2) Reversing limits changes the sign
- (3) Differentiation (4) Linearity

90. Which of the following best describes a saddle point ?

- (1) Local minimum (2) Local maximum
- (3) Not an extremum but a stationary point (4) Point of discontinuity

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91.	I. In Newton's divided difference table, the value of $f[x_0, x_1, x_2]$ is :			
	(1) A first divid		(2) A second di	
	(3) A central dif		(4) A backward	difference
92.	The error in inte	rpolation using Newt	on's forward formula	is proportional to :
	(1) h^2	(2) h^3	(3) h^{n}	(4) $\frac{1}{h}$
93.	Who is known a	s the "Father of Com	puters"?	
	(1) Alan Turing		(2) Charles Bab	bage
	(3) Bill Gates		(4) John von Ne	umann
94.	In MS Word, wh	hich menu is used for	inserting tables ?	
	(1) Home	(2) Insert	(3) Page Layout	t (4) Review
95.	Which symbol is	used to end a statem	pont in C 2	
33.	(1).	s used to end a statem (2) :	(3);	(4) #
96.	(1) /	is used for modulus in (2) %	n C ? (3) ^	(4) //
			(3)	(4) //
97.		rimarily used for :		
	(1) Playing gam(2) Word process			
		d government data pro	ocessing	
	(4) Internet brow	2017년 - 1917년 - 1917년 - 1917년 -	occusing	
98.	An example of v	olatile memory is :		
50.	(1) Hard disk	(2) ROM	(3) RAM	(1) CD DOM
~				(4) CD-ROM
99.	A commonly use (1) FAT	d file system in Wind (2) NTFS		
	(1) FAI	(2) NIFS	(3) ext4	(4) HFS
100.		ose of task manager '	?	
	(1) Install softwa		(2) Monitor har	
	(3) View runnin	g processes	(4) Connect inte	rnet
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D	IS QUESTION BOOKLET BEFORE ARE ASKED TO DO SO) PG-EE-July, 2025	SET-Y
	SUBJECT : Statistics	10060 Sr. No.
Time : 1¼ Hours	Max. Marks : 100	Total Questions : 100
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	
Date of Examination		

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. All questions are compulsory.

- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

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1.	A bar diagram is best suited for represent	nting :
	(1) Continuous variables	(2) Discrete variables
	(3) Interval variables	(4) Time series
2.	If a dataset has 10 observations and all a	re equal to 5, the variance is :
	(1) 5 (2) 1	(3) 0 (4) 25
3.	The geometric mean is preferred when d	lealing with :
	(1) Time-series data	(2) Negative values
	(3) Ratios or growth rates	(4) Ordinal data
4.	The standard measure of kurtosis for a n	ormal distribution is :
	(1) 0 (2) 1	(3) 3 (4) -1
5.	When analysing water quality parameter the formula $\frac{\text{Mean} - \text{Mode}}{\text{Standard Deviation}}$ yields -	rs using Karl Pearson's coefficient of skewness, 0.75. This suggests :
	(1) Moderate negative skewness	(2) Strong negative skewness
	(3) Moderate positive skewness	(4) No skewness
6.	In forest biomass estimation, if the third the coefficient of skewness is :	moment about the mean $\mu_3 = 125$ and $\sigma^3 = 64$,
	(1) 1.95 (2) 0.51	(3) 1.25 (4) 2.08
7.	If Coefficient of Variation of series X is	20% and that of Y is 15%, then :
	(1) X is more consistent	(2) Y is more consistent
	(3) Both are equally consistent	(4) No conclusion
8.	A positively skewed distribution has:	
	(1) Mean > Median > Mode	(2) Mode > Median > Mean
	(3) Mean = Median = Mode	(4) Median > Mode > Mean
9.	Correlation coefficient between height proportion of explained variation ?	ts of fathers and sons is 0.8. What is the
	(1) 0.64 (2) 0.8	(3) 0.16 (4) 0.96
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10.	If X and Y are inde	pendent, their regre	ession coefficients are	•
	(1) 1	(2) 0	(3) -1	(4) Undefined
11.	In Newton's divide	d difference table, t	the value of $f[x_0, x_1, x_2]$.] is :
	(1) A first divided		(2) A second divid	led difference
	(3) A central differ	rence	(4) A backward di	fference
12.	The error in interpo	olation using Newto	on's forward formula is	s proportional to :
	(1) h^2	(2) h^3	(3) h^{n}	(4) $\frac{1}{h}$
10	¥7		".0	71
13.	Who is known as t (1) Alap Turing	he Father of Comp		ano a
	 (1) Alan Turing (3) Bill Gates 		(2) Charles Babba(4) John von Neur	
	(3) Diff Gales			mann
14.	In MS Word, whic	h menu is used for	경험 가슴 옷이 다니 아님이 여름을 빼야지?	
	(1) Home	(2) Insert	(3) Page Layout	(4) Review
15.	Which symbol is u	used to end a statem	ent in C?	
	(1).	(2) :	(3);	(4) #
16.	Which operator is	used for modulus in	n C ?	
	(1) /	(2) %	(3) ^	(4) //
17.	UNIVAC was prin	marily used for :		
	(1) Playing games			
	(2) Word process	ing		
	(3) Business and	government data pr	rocessing	
	(4) Internet brows	sing		
18.	An example of vo	latile memory is :		
	(1) Hard disk	(2) ROM	(3) RAM	(4) CD-ROM
19.	A commonly used	file system in Win	dows is :	
	(1) FAT	(2) NTFS	(3) ext4	(4) HFS

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What is the purpose of task manager? 20. (1) Install software (2) Monitor hardware (3) View running processes (4) Connect internet 21. The set of rational numbers \mathbb{Q} and \mathbb{R} is : (1) Open (2) Closed (3) Neither open nor closed (4) Compact The sequence $a_n = \frac{1}{n}$ is : 22. (1) Increasing and bounded (2) Decreasing and unbounded (3) Divergent (4) Convergent The function $f(x) = \begin{cases} 1, x \in \mathbb{Q} \\ 0, x \notin \mathbb{Q} \end{cases}$ in [0, 1] is : 23. (1) Continuous (2) Riemann integrable (3) Not Riemann integrable (4) Constant The root test is stronger than the ratio test when : 24. (1) a_n involves powers like n^n (2) Alternating series (4) Telescoping series (3) p-series The sequence $a_n = \frac{n+1}{n}$ converges to : 25. (1) 1(3) ∞ (2) 0(4) Does not exist The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ is : 26. (1) Absolutely convergent (2) Conditionally convergent (3) Divergent (4) Not defined The maximum number of corner points in a 2-variable LPP defined by 3 constraints is : 27. (1) 2(2) 3 (3) 4 (4) 6PG-EE-July, 2025/(Statistics)(SET-Y)/(D) P. T. O.

28.	The constraints $x + 2y \ge 10$ and $x \ge 0$, y (1) Below the line (3) Between axes	 ≥ 0 define a region in which direction ? (2) Above the line (4) Unbounded in negative quadrant
29.	If in the simplex tableau, all $C_j - Z_j < 0$, (1) Problem has no solution (3) Continue iterations	 then : (2) Current solution is optimal (4) Unbounded solution ces and 4 destinations, a basic feasible solution
30. 31.	(1) 7 allocations(3) 6 allocations	 (2) 12 allocations (4) 8 allocations en which of the following must exist ?
32.	 (1) Derivative of f(x) (3) Limit of f(x) If f(x) is defined as 	 (2) Inverse of f(x) (4) Integral of f(x)
	$f(x) = \begin{cases} f(x) = \\ f(x) \\ f(x$	$x^{2}, \qquad x \leq 1$ $2x - 1, \qquad x > 1$ t x = 1
	 (2) Differentiable at x = 1 (3) Discontinuous at x = 1 (4) None of the above 	
33.	If $f(x)$ is increasing and differentiable in (1) $f'(x) < 0$ for all $x \in (a, b)$ (3) $f'(x) = 0$ for all $x \in (a, b)$	(a, b), which of the following is <i>true</i> ? (2) $f'(x) > 0$ for all $x \in (a, b)$ (4) $f'(x) \ge 0$ for all $x \in (a, b)$

34. Which condition must be violated for a removable discontinuity to occur at x = a?

(2) $\lim_{x \to a} f(x) = f(a)$

(4) f(a) is defined

(1) $\lim_{x \to a^{-}} f(x) = \lim_{x \to a^{+}} f(x)$

(3) $\lim_{x \to a} f(x)$ exists

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35. If $f(x) = x^n$, what is the nth derivative of f(x)? (1) 0(2) n! (4) $n.x^{n-1}$ (3) x**36.** If $f(x, y) = x^2 y + xy^2$, then $\frac{\partial^2 f}{\partial x \partial y} = :$ (1) 2x + 2y(2) 2x(3) 2y(4) x + yEuler's theorem for a homogeneous function f(x, y) of degree *n* is : 37. (1) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = 0$ (2) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = nf$ (3) $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = f$ (4) $x^2 + y^2 = nf$ If $\int_{a}^{b} f(x)dx = I$, then $\int_{a}^{b} f(a+b-x)dx =$ 38. (1) - I(2) a + b(3) I(4) f(b-a)Which of the following is not a property of definite integrals ? 39. (1) Additivity (2) Reversing limits changes the sign (3) Differentiation (4) Linearity Which of the following best describes a saddle point ? 40. (1) Local minimum (2) Local maximum (3) Not an extremum but a stationary point (4) Point of discontinuity What is the area under the standard normal curve between $\mu - \sigma$ and $\mu + \sigma$? 41. (1) 50%(2) 68% (3) 95% (4) 99.7% For a binomial distribution with n = 5 and p = 0.4, what is the probability of getting 42. exactly 2 successes ? (1) 0.38(2) 0.62(3) 0.50(4) 0.35 43. Which distribution models the number of events in a fixed interval of time or space ? (1) Binomial (2) Normal (3) Poisson (4) Geometric PG-EE-July, 2025/(Statistics)(SET-Y)/(D)

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44. Which of the following is NOT a property of expectation ?

(1) $E(aX + b) = aE(X) + b$	(2) $E(X + Y) = E(X) + E(Y)$
(1) $E(XY) = E(X)E(Y)$ always	(4) $E(c) = c$

45. The expected number of trials to get the first success in a geometric distribution is:

(1) 1/p (2) 1-p (3) p (4) $\log(p)$

46. For a uniform distribution U(0, 5), the variance is : (1) 2.5 (2) 1.25 (3) 25

47. Find the value of k so that f(x) = kx, $0 \le x \le 2$ is a valid PDF.

- (1) 1 (2) 1/3 (3) 1/2 (4) 1/4
- 48. A random variable X has the CDF :

$$F(x) = \begin{cases} 0; & x < 0\\ \frac{x}{2}; & 0 \le x < 2\\ 1; & x \ge 2 \end{cases}$$

What is P(1 < X < 2)?

- (1) 0.5 (2) 1 (3) 0.25 (4) 0.75
- 49. The number of customers arriving at a shop per hour follows Poisson ($\lambda = 3$). What's the probability that exactly 5 customers arrive ?
 - (1) 0.111(2) 0.199(3) 0.125(4) 0.101
- 50. In a geometric distribution with p = 0.25, what is the probability that the first success occurs on the third trial ?
 - (1) 0.4219 (2) 0.1406
 - (3) 0.25 (4) 0.1875

51. The decennial census in India is conducted by :

- (1) Ministry of Statistics (2) CSO
- (3) NSSO (4) Registrar General of India
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(4) 2.08

52	. NSSO is mainly	responsible for :		
	(1) Agricultura	•		
	(2) Population			
		eys on socio-econor	mic issues	
	(4) Industrial po			
50				
53.	If price of a goo is :	d in base year is ₹ 5	0 and in current year	is ₹ 75, the simple price index
	(1) 125	(2) 150	(3) 75	(4) 100
54.	The Consumer H	Price Index (CPI) is a	mainly used to measu	ire :
	(1) Agricultural		(2) Industrial pr	
	(3) Inflation		(4) Imports	
55.	If prices increase total value ?	ed 20% and quantitie	es reduced 10%, wha	t is the approximate change in
	(1) Increase by	8%	(2) Increase by	10%
	(3) No change		(4) Decrease by	
56.	Crude Birth Ra CBR ?	te (CBR) = 500 bis	rths and mid-year p	opulation = 50,000. What is
	(1) 5	(2) 10	(3) 15	(4) 20
57.	Calculate Infant	Mortality Rate (IMR	R) if Infant deaths $= 1$	50 and Live births = 5000
	(1) 30	(2) 25	(3) 15	(4) 3
	TC 1 11			
58.			ins constant, equilibr	그는 그가 집안 집에 집에 집에 걸려 한다. 것이 것 같은 것이 많은 것이 없다.
	(1) Falls	(2) Doubles	(3) Stays same	(4) Rises
59.	The Law of Dem	and states :		
	(1) As price incr	eases, demand incre	ases	
	이 가지 않는 것 같은 것 같은 것 같은 것 같이 많이 했다.	eases, demand decre		
	가슴 감독에 가지 말 것 같은 것이 같아. 것이 많이	creases, demand inc		
	(4) Demand is fin			
60.	If price rises from is :	n ₹ 10 to ₹ 15 and o	demand falls from 10	00 to 80, then price elasticity
	(1) -0.5	(2) 1.5	(3) -2	(4) -1
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61.	In fitting a parabola	by least squares, nu	mber of normal equa	tions required is :
01.	(1) 2	(2) 3	(3) 4	(4) 1
62.	The second stipp and	ficient between X a	nd Y is 0.9, standar	d deviations of X and Yare
	3 and 4 respectively	y, then Covariance of		(4) 9
	(1) 10.8	(2) 12	(3) 8	the second terms of the second se
63.	Given $\Sigma x = 15$, Σy Correlation Coeffic	$y = 20, \Sigma xy = 62, \Sigma$ tient r?	$\Sigma x^2 = 55, \ \Sigma y^2 = 102,$, $n = 5$. What is Pearson's
	(1) 0.13	(2) 0.82	(3) 0.93	(4) 0.63
64	If $r_{12} = 0.9$, $r_{13} = 0$.	6 and $r_{22} = 0.4$, the p	artial correlation coe	fficient $r_{12.3}$ is :
0	(1) 0.82	(2) 0.85	(3) 0.90	(4) 0.78
65.	If $b = 0.6$ and b	= 0.4, then the value	of correlation coeffic	cient (r) is :
00.	(1) 0.5	(2) 0.8	(3) 0.6	(4) 0.3
66.	A coin is tossed th	ree times. What is the	e probability of gettin	ng at least one head?
00.	(1) 1/4	(2) 1/2	(3) 3/4	(4) 7/8
67.	If $X \sim U(0, 1)$, then	find $P(0.2 \le X \le 0.6)$	5):	
••••	(1) 0.4	(2) 0.5	(3) 0.3	(4) 0.6
68.	If a random variab	le has PDF $f(x) = 3x^2$	on [0, 1], then the e	xpected value E(X) is :
	(1) 0.5	(2) 0.75	(3) 0.6	(4) 0.65
69.	The moment gener	tating function of N(μ, σ^2) is :	
	$(1) e^{\mu} + \frac{\sigma^2 t^2}{2}$	$(2) e^{\mu\nu} - \frac{\sigma^2 t^2}{2}$	$(3) \mu t + \frac{\sigma^2 t^2}{2}$	$(4) \mu t - \frac{\sigma^2 t^2}{2}$
70	For a fair coin, wh	at is the PMF of the	number of heads in t	wo tosses?
			(3) 1/2, 1/4, 1/4	
71				
	(1) It defines the b	ooundary	(2) It affects the	optimal solution
	(3) It does not affe	ect the feasible regio	n (4) It causes dege	eneracy

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72.	In a 4×4 balance	ed assignment proj	hlem the number of a	ossible assignments is :
	(1) 16	(2) 24	(3) 4	(4) 256
73.	Minimize $Z = x +$	v. subject to :		
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	$x + 2y \ge 8$	
			$3x + y \ge 9$	
			$x, y \ge 0$	
	What is the minin (1) 7			
	(1) 7	(2) 8	(3) 9	(4) 10
74.	A dummy row/co	lumn is added in a	assignment problem w	hen ·
	(1) Matrix is squ	are	(2) Cost is nega	
	(3) Problem is ur	balanced	(4) Supply $>$ de	
75.	The relation betw	een forward diffo	rence (Δ) and shift ope	
	(1) $\Delta = E + 1$	$(2) \Lambda - E = 1$	(3) $\Delta = 1 - E$	erator (E) is : -2
76.	For interpolation	through 3 points, t	the degree of interpola	ting polynomial is :
	(1) 1	(2) 2	(3) 3	(4) 4
77.	Using Newton-Ra gives :	aphson method, or	ne iteration for $f(x) =$	$x^{3} - x - 2$ starting at $x_{0} = 1.5$
	(1) 1.45	(2) 1.60	(3) 1.52	(4) 1.30
78.	Newton-Raphson	method formula is	s :	
	(1) $x_{n+1} = x_n + \frac{f(x_n)}{f(x_n)}$	$\frac{(x_n)}{(x_n)}$	(2) $x_{n+1} = x_n - \frac{1}{2}$	$\frac{f(x_n)}{f'(x_n)}$
	(3) $x_{n+1} = x_n + f(x_n)$	$f'(x_n)$	(4) $x_{n+1} = \frac{f(x_n)}{x_n}$	2
79.	Use Newton's forv	ward difference for	rmula to estimate f(2.5	5) given ·
		Г	$x \qquad f(x)$) given :
			$\frac{1}{2}$ $\frac{1}{4}$	
		F	$\frac{2}{3}$ 9	
		la l	4 16	
	(1) 6.25	(2) 10.25	(3) 12.25	(4) 8.25
-		(2) 10.25	(5) 12.25	(+) 0.25

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80. In Lagrange interpolation, find f(2) given : f(1) = 2, f(3) = 9, f(4) = 16(1) 4 (2) 3 (3) 2 (4) 5

81. The equation
$$\frac{\partial y}{\partial x} = xy$$
 is :

(1) Linear and separable

- (2) Non-linear and not separable
- (4) Separable but not linear
- (3) Linear but not separable
- 82. Which of the following is a necessary condition for a differential equation to be separable ?
 - (1) All terms in x and y can be grouped
 - (2) The equation is linear
 - (3) It contains second-order derivatives
 - (4) Solution involves Laplace transforms

83. The differential equation
$$\frac{\partial y}{\partial x} + y = e^x$$
 is :

- (1) Homogeneous linear (2) Non-homogeneous linear
- (3) Non-linear (4) Separable only

84. The general solution of y'' - 4y' + 4y = 0 is :

(1) $y = C_1 e^{2x} + C_2 e^{-2x}$ (2) $y = (C_1 + C_2 x) e^{2x}$ (3) $y = (C_1 x + C_2) x$ (4) $y = (C_1 + C_2 x)$

85. A particular integral of $y'' + y = \sin x$ is :

- (1) $x \cos x$ (2) 0 (3) $-\frac{1}{2} \cos x$ (4) $\frac{1}{2} x \sin x$
- **86.** If y_1 and y_2 are solutions of a homogeneous linear DE, then $c_1y_1 + c_2y_2$ is also a solution. This is due to :
 - (1) Superposition principle (2) Linearity violation
 - (3) Uniqueness theorem (4) Initial condition

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87	. A differential e	quation is said to be	homogeneous, if :	
	(1) RHS is 0		(2) All terms ar	e in y only
	(3) Solution is	constant		variable is absent
		c	1 ³	
88.	The order of di	fferential equation $\frac{\partial}{\partial}$	$\frac{\partial y}{\partial x^3} + 3\frac{\partial y}{\partial x} = 0$ is :	
	(1) 1	(2) 2	(3) 3	(4) 0
89.	The interior of	the set A = $[0, 1] \cup \cdots$	{2} is :	
	(1) [0, 1]	(2) (0, 1)	(3) {2}	$(4) \ (0,1) \cup \{2\}$
90.	The closure of	the set $(0, 1) \cup (2, 3)$	is ·	
	(1) $[0, 1) \cup (2,$			21
	(3) $[0, 1] \cup [2, 1]$		(2) $(0, 1) \cup (2, 1)$	그는 것은 이 없는 것을 같았다. 아버지는 것이 가지 않는 것
	(0) [0, 1] 0 [2,	5]	$(4) \ (0, 1) \cup (2, 2)$	5)
91.	Which of the fo	llowing is a conditic	on for a set of vectors t	o be linearly independent?
	(1) The determ	inant of the matrix for	ormed by vectors is ze	ro
	(2) No vector i	n the set can be writt	en as a linear combina	tion of the others
		lie in the same plane		
	(4) All vectors	are unit vectors		
92.	If a real matrix	A satisfies $A^{T}A = 0$,	then rank of A is :	
	(1) 0		(2) 1	
	(3) 2		(4) Cannot be de	etermined
93.	Suppose M is a	4×4 matrix such the	at $M^3 = 0$. The maxim	Im possible rank of <i>M</i> is :
	(1) 3	(2) 2	(3) 1	(4) 0
94.	For Matrix			
			$\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$	
		Α	= 0 0 1	
			$= \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & 11 & -6 \end{bmatrix}$	
	The eigen values	are :		
	(1) 1, 2, 3	(2) 0, 1, 2	(3) 1-, -2,-3	(4) 2, 2, 2
	, , , -	·····		

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 95. If a vector lies in the null space of a matrix A, then which of the following is *true* 1

 (1) It is an eigenvector

 (2) It is orthogonal to the column space of A

 (3) It lies in the row space

 (4) It solves
$$A^T x = 0$$

 96. If a matrix A of order 3×3 has rank 2, then the homogeneous system $Ax = 0$ has :

 (1) Only trivial solution
 (2) No solution

 (3) Infinite solutions
 (4) Exactly one non-trivial solution

 (3) Infinite solutions
 (4) Exactly one non-trivial solution

 (3) Any real number
 (2) 0 and 1

 (1) ± 1
 (2) 0 and 1

 (3) Any real number
 (4) Purely imaginary

 98. What is the determinant of the matrix
 $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}$

 (1) 3
 (2) -1
 (3) 0
 (4) 1

 99. Which of the following matrices is diagonalizable ?
 (1) A matrix with repeated eigen values but incomplete eigenvectors

 (2) A matrix with distinct eigen values
 (3) A matrix with determinant 0
 (4) A matrix with complex entries only

 100. The set of all solutions of a homogeneous linear system forms a :
 (1) Null Space
 (2) Affine set

(4) Subspace (3) Convex set

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	Answer keys of M.Sc.	1		
Q. NO,	A	В	С	D
1	2	2	3	2
2	1	1	2	3
3	2	4	4	3
4	1	2	3	3
5	2	2	2	1
6	3	1	2	1
7	1	2	3	2
8	4	3	2	1
9	2	3	1	1
10	4	3	1	2
11	2	2	1	2
12	1	4	1	3
13	4	3	2	2
14	2	3	2	2
15	2	1	4	3
16	1	4	1	2
16	2	3	1	3
	3	1	3	3
18	3	4	2	2
19				3
20	3	2	3	
21	1	2	2	3
22	1	3	1	4
23	2	3	2	3
24	2	3	1	1
25	4	1	2	1
26	1	1	3	2
27	1	2	1	3
28	3	1	4	2
29	2	1	2	2
30	3	2	4	1
31	3	2	2	2
32	4	3	4	1
33	3	2	3	4
34	1	2	3	2
35	1	3	1	2
36	2	2	4	1
37	3	3	3	2
38	2	3	1	3
39	2	2	4	3
40	1	3	2	3
41	3	3	4	2
42	2	4	3	4
42	4	3	2	3
43	3	1	3	3
44	2	1	1	1
		2	2	4
46	2			3
47	3	3	1	
48	2	2	4	1
49	1	2	2	4

Q. NO.	A	В	e exam dated 18.07.2025	D
51	2	1	3	4
52	3	1	4	3
53	2	2	3	2
		2		3
54	2		1	
55	3	4	1	1
56	2	1	2	2
57	3	1	3	1
58	3	3	2	4
59	2	2	2	2
60	3	3	1	4
61	4	3	2	2
62	3	2	3	1
63	2	4	3	1
64	3	3	3	3
65	1	2	1	1
66	2	2	1	4
67	1	3	2	1
68	4	2	1	2
69	2	1	1	1
70	4	1	2	2
71	2	4	2	3
72	3	3	1	2
72	3	2	1	4
73	3	3	3	3
			1	2
75	1	1		2
76	1	2	4	
77	2	1	1	3
78	1	4	2	2
79	1	2	1	1
80	2	4	2	1
81	2	2	2	1
82	1	1	1	1
83	1	2	4	2
84	3	1	2	2
85	1	2	2	4
86	4	3	1	1
87	1	1	2	1
88	2	4	3	3
89	1	2	3	2
90	2	4	3	3
91	2	2	2	2
92	4	1	3	1
93	3	1	2	2
94	3	3	2	1
95	1	1	3	2
96	4	4	2	3
96	3	1	3	1
			3	4
98	1	2	2	2
99 100	4	1 2	3	4

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