CUET PG 2019

PART-A

1. If the difference between simple interests for 3 years and 4 years at 5% annual rate is 42, then the amount will be,
(A) Rs.210
(B) Rs.280
(C) Rs.750
(D) Rs.840

2. The sum of three consecutive even integer is 54. What is the smallest number?
(A) 18
(B) 14
(C) 16
(D) 12

3. Area of circle and a square is equal. Ratio of one side of the square to radius of the circle will be,
(A) $1:\sqrt{\pi}$
(B) $\sqrt{\pi}:1$
(C) $1:\pi$
(D) $\pi:1$

4. Fill in the blank to complete the series: 181, 174, 178,____,175, 182.
(A) 174
(B) 176
(C) 178
(D) 180

5. 'Tree' is related to 'Forest' in the same way as 'Soldier' is related to
(A) Battle
(B) Army
(C) Gun
(D) General

6. Pointing to a gentleman, Deepak said. "His only brother is the father of my daughter's father." How is that gentleman related to Deepak?
(A) Father
(B) Grandfather
(C) Brother-in-law
(D) Uncle

7. Complete the series BEP, CIQ, DOR, FUS, GAT,.....?
(A) HEV
(B) HIT
(C) IET
(D) IEU

8. Convert 36 km/hr into meters per second.
(A) 10
(B) 12
(C) 15
(D) 20

9. 'Wings of Fire' was written by_____.
(A) APJ Abdul Kalam
(B) Salman Rushdie
(C) Amitav Ghosh
(D) Shashi Tharoor

10. 'Chhau' dance is associated with which of the following states?
(A) Punjab
(B) Maharashtra
(C) Jammu Kashmir
(D) Jharkhand

11. Mineral rich 'Jharia' is located in which of the following states?
(A) Bihar
(B) West Bengal
(C) Utter Pradesh
(D) Gujrat

12. Jhansi was annexed by which of the following Governor General?
(A) Lord Bentinck
(B) Lord Dalhausie
(C) Lord Cornwalis
(D) Lord Clive

13. Who among the following personalities stated "Swaraj is my birth right and I am going to have it."
(A) Bal Gangadhar Tilak
(B) Subhas Chandra Bose
(C) Mahatma Gandhi
(D) Jawahar Lal Nehru

14. Choose the correct word to fill in the blank. The students_____ the teacher on teacher's day for twenty years of dedicated teaching.
(A) Facilitated
(B) Felicitated
(C) Fantasized
(D) Facillitated

15. Choose the correct word to fill in the blank. Dhoni as well as the other team members of Indian team____present on the occasion

(A) were
(B) was
(C) has
(D) have

16. Choose the word most similar in meaning: Awkward
(A) Inept
(B) Careful
(C) Suitable
(D) Dread full

17. Choose the correct verb to fill in the blank below
Let us_____
(A) Introvent
(B) Alternate
(C) Atheist
(D) Altruist

18. Select the most suitable Synonym for the word 'RESILIENT'.
(A) Stretchable
(B) Spirited
(C) Rigid
(D) Buoyant

19. Select the most suitable Synonym for the word 'ZEST'.
(A) Humour
(B) Keen Interest
(C) Attitude
(D) Liking

20. Select the most suitable Antonym for the word 'ROBUST'.
(A) Sturdy
(B) Ridiculous
(C) Muscular
(D) Feeble

21. Select the most suitable Antonym for the word 'DULL'.
(A) Monstrous
(B) Horrid
(C) fascinating
(D) Ghastly

22. Select the pair which shows the same relationship as CANE: BAMBOO
(A) Wood : Woodpecker
(B) Timber : Tree

(C) Rubber : Malaysia
(D) South Africa: Apartheid

23. Why were you absent_____ your dance classes yesterday?
(A) for
(B) from
(C) in
(D) to

24. A man is facing towards South. He take 135° anticlock wise, 180° clockwise rotation then what was facing side of the man?
(A) North-East
(B) North-West
(C) South-East
(D) South-West

25. If the value of "x" is 25% less than the value of "y". How much % y's is more than that of x's?
(A) $33\frac{1}{3}\%$
(B) 25%
(C) 75%
(D) $66\frac{2}{3}\%$

26. Solution of the differential equation $\frac{dy}{dx} = e^{x-y} + x^2e^{-y}$ is
(A) $e^y = x + e^x + c$
(B) $e^y = x^2/2 + e^x + c$
(C) $e^y = x^3/3 + e^x + c$
(D) $e^y = x^4/4 + e^x + c$
=

27. The integrating factor of the differential equation $(1 - x^2)dy/dx + 2xy = x\sqrt{1 - x^2}$ is
(A) $\frac{1}{1-x}$
(B) $\frac{1}{1-x^2}$
(C) $1 - x^2$
(D) $1 - x$

28. The solution of differential equation $\frac{d^2y}{dx^2} + 4y = 0$ with initial conditions $y = 2$ and dy/dx when $x = 0$ is
(A) $y = 2\ sin\ 2x$
(B) $y = 2\ cos\ 2x$
(C) $y = \sin 4x$
(D) $y = \tan x$

29. Which of the following is a particular integral of $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = e^{5x}$?

(A) $\frac{1}{12}e^{5x}$

(B) e^{-5x}

(C) e^{x}

(D) e^{x^2}

30. Let $D =: d/dx$. Then the value of $\left\{\frac{1}{xD+1}\right\}x^{-1}$ is

(A) $\log x$

(B) $\frac{\log x}{x}$

(C) $\frac{\log x}{x^2}$

(D) $\frac{\log x}{x^3}$

31. If $y_1(x)$ and $y_2(x)$ are two solutions of $\frac{d^2y}{dx^2} + 4y = 0$, then the value of Wronskian is

(A) 0

(B) 1

(C) 2

(D) 3

32. Differential equation of the family of parabola $y^2 = 4ax$, where α is an arbitrary constant is

(A) $y = 2x(dy/dx)$

(B) $y = dy/dx$

(C) $y = 2x + dy/dx$

(D) $\frac{dy}{dx} + y^2 = x^2$

33. The orthogonal trajectory of the hyperbola $xy = a$ is

(A) $x^2 - y^2 = a$

(B) $x^2 = ay^2$

(C) $x^2 + y^2 = a$

(D) $x = ay^2$

34. The order of differential equation $\frac{dy}{dx} = \sqrt{x} + \sqrt{y}$ is

(A) 1

(B) 2

(C) 3

(D) 4

35. Solution of the initial value problem $e^x(\cos y\, dx - \sin y\, dy) = 0$ with $y(0) = 0$ is

(A) $e^x \cos y + 1 = 0$

(B) $e^x \cos y - 1 = 0$

(C) $e^y \cos x + 1 = 0$

(D) $e^y \cos x - 1 = 0$

36. If $F(x,y,z) = xy^2 + 3x^2 - z^2$, then the value of $\nabla F(x,y,z)$ at $(2,-1,4)$ is equal to
(A) $13i - 4j - 48k$
(B) $i - 4j - k$
(C) $13i + j - 6k$
(D) $-13i + 4j - 6k$

37. The directional derivative of the function $F(x,y,z) = xy^2 - 4x^2y + z^2$ at (1,-1,2) in the direction of $6i + 2j + 3k$ is
(A) 1/7
(B) 2/7
(C) 54/7
(D) 7

38. If $\vec{F} = zi + xj + yk$, then curl $\vec{F}$ is
(A) $i + j + k$
(B) 0
(C) $i - j - k$
(D) $2i + j - 2k$

39. Let F be a finite field. Then which of the following may be the possible cardinality of F?
(A) 15
(B) 20
(C) 25
(D) 30

40. Every subgroup of an abelian group is
(A) abelian
(B) cyclic
(C) non abelian
(D) none of the above

41. Le $G = \{\begin{bmatrix} a & a \\ a & a \end{bmatrix} | a \in \mathbb{R}\backslash\{0\}\}$ be a group with binary operation defined by usual matrix multiplication. Then the inverse of $\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$ is
(A) $\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$
(B) $\begin{bmatrix} 1/2 & -1/2 \\ -1/2 & 1/2 \end{bmatrix}$
(C) $\begin{bmatrix} 1/4 & 1/4 \\ 1/4 & 1/4 \end{bmatrix}$
(D) $\begin{bmatrix} 1/8 & 1/8 \\ 1/8 & 1/8 \end{bmatrix}$

42. Let H and K be subgroups of G. Then which of the following is necessarily a subgroup of G?
(A) HK
(B) KH

(C) $H \cap K$
(D) $H \cup K$

43. Let S_5 be the permutation group on five symbols $\{1, 2, 3, 4, 5\}$. Then order of permutation $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 4 & 3 & 5 & 1 \end{pmatrix}$ is equal to
(A) 5
(B) 4
(C) 3
(D) 6

44. Let G be a group and $a, b, c \in G$ are non-identity elements. Which of the following solves the equation $axb = c$ for x?
(A) acb^{-1}
(B) $a^{-1}b^{-1}$
(C) $a^{-1}cb^{-1}$
(D) cb^{-1}

45. Let H be a subgroup of a noncyclic group G. Then which of the following is correct?
(A) H is always noncyclic
(B) H is always cyclic
(C) H is always nonabelian
(D) None of the above

46. Let S_6 be the permutation group on six symbols $\{1,2,3,4,5,6\}$. Which of the following is not an even permutation?
(A) $(1\ 3\ 5\ 6\ 2)$
(B) $(1\ 2\ 3)(4\ 5)(4\ 5)$
(C) $(2\ 6\ 3\ 4\ 5\ 1)$
(D) $(1\ 2)(1\ 4)(2\ 3)(4\ 5)$

47. Which of the following is correct?
(A) Every integral domain is a field.
(B) Every finite integral domain is a field.
(C) There is an integral domain with characteristic equal to 10.
(D) None of the above.

48. Let J be an ideal of commutative ring with unity and let u be an unit element of R such that $u \in J$. Then
(A) The multiplicative identity $1 \notin J$
(B) J is a proper ideal of R such that $J \neq R$
(C) $J = R$
(D) There is a minimal ideal M such that $J \subset M \subseteq R$

49. Which of the following is a prime ideal of $(\mathbb{Z}, +, \cdot)$?
(A) $6\mathbb{Z}$
(B) $2\mathbb{Z} \cap 4\mathbb{Z}$
(C) $7\mathbb{Z}$
(D) $4\mathbb{Z} \cap 8\mathbb{Z}$

50. If $Z = 2 - 3i$, then $|Z|$ equals
(A) 13
(B) $\sqrt{13}$
(C) -13
(D) -1

51. $\int_0^1 ze^{2z}\, dz$ equals
(A) $e^2 + 1$
(B) $(e^2 + 1)/4$
(C) $(e^2 - 1)/4$
(D) $e^2 - 1$

52. $\lim_{z \to i} \frac{z^{10}+1}{Z^6+1}$ equals
(A) 3/5
(B) 2/5
(C) 5/3
(D) 1/3

53. The integral $\int_{3i}^{1-i} 4zdz$ equals
(A) $18 - 4i$
(B) $-4i$
(C) i
(D) $-i$

54. If $f(z)$ is analytic in a simply connected domain D and $f'(z)$ is continuous in D, then $\oint_C f(z)dz$ equals
(A) 0
(B) 1
(C) $2\pi i$
(D) $-2\pi i$

55. The value of the integral $\int_{|z-2|=2} \frac{5z+7}{z^2+2z-3} dz$ is equal to
(A) πi
(B) $2\pi i$
(C) $3\pi i$
(D) $6\pi i$

56. If $f(z) = u(x,y) + iv(x,y)$ is analytic in a domain D, then
(A) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ and $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$
(B) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ and $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} \neq 0$
(C) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} \neq 0$ and $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$
(D) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} \neq 0$ and $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} \neq 0$

57. An entire function is
(A) infinitely differentiable
(B) finitely differentiable
(C) not differentiable
(D) identically zero

58. Which of the following is incorrect statement?
(A) If $f(z)$ is entire and bounded in complex plane, then $f(x)$ is constant.
(B) If $f(z)$ is analytic at z_0, then $f'(z)$ is also analytic at z_0
(C) Analytic function is entire.
(D) Entire function is analytic.

59. The complex line integral is
(A) path dependent
(B) independent of end points
(C) path independent
(D) none of these

60. The set of all feasible solutions to a linear programming problem (LPP) is
(A) a concave set
(B) a convex set
(C) a bounded set
(D) an infinite set only

61. A basic feasible solution to a LPP, in which at least one of the basic variables is zero is
(A) degenerate
(B) infeasible
(C) non-degenerate
(D) unbounded

62. The optimal solution of the LPP: Maximize $Z = 4x_1 + x_2$, such that $x_1 + x_2 \leq 50, 3x_1 + x_2 \geq 90, x_1, x_2 \geq 0$, is
(A) $x_1 = 30, x_2 = 0$
(B) $x_1 = 20, x_2 = 30$
(C) $x_1 = 0, x_2 = 0$
(D) $x_1 = 0, x_2 = 50$

63. Which of the following is incorrect statement?
(A) Arbitrary intersection of convex sets is a convex set.
(B) Hyperplane is a convex set.
(C) Union of two convex sets need not to be a convex set.
(D) Union of two convex sets is a convex set.

64. In a linear programming problem constraints are
(A) nonlinear
(B) linear
(C) linear as well as nonlinear
(D) none of the above

65. The sequence $\left\{\frac{1}{n}\right\}$ is
(A) convergent
(B) divergent
(C) oscillatory
(D) unbounded

66. $\lim_{n\to\infty} \frac{2n-3}{n+1}$ equals
(A) 0
(B) 1
(C) 2
(D) e

67. The series $\sum_{n=1}^{\infty} \frac{n+1}{n^p}$ is convergent for
(A) $0 < p < 1$
(B) $1 < p < 2$
(C) $p = 2$
(D) $p > 2$

68. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\sqrt{n}}$ is
(A) convergent
(B) divergent
(C) conditionally convergent
(D) absolutely convergent

69. $\lim_{n\to\infty} \left(1+\frac{1}{n}\right)^n$ equals
(A) e
(B) $\frac{1}{e}$
(C) 0
(D) 1

70. Which of the following statements is false?
(A) Every bounded sequence is convergent.
(B) Every convergent sequence is bounded.
(C) Every bounded sequence has a limit point.
(D) Every convergent sequence has a unique limit.

71. If a series $\sum_{n=0}^{\infty} a_n$ converges, then
(A) $\lim_{n\to\infty} a_n = 0$
(B) $\lim_{n\to\infty} a_n = \infty$
(C) $\lim_{n\to\infty} a_n = 1$
(D) $\lim_{n\to\infty} a_n = 10$

72. If $f: \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = |x - c|$, for all $x \in \mathbb{R}$; then
(A) f is discontinuous
(B) f is differentiable
(C) f is continuous but not differentiable
(D) f is continuously differentiable

73. The function $f(x) = \begin{cases} x\ sin 1/x & when\ x \neq 0 \\ 0, & when\ x = 0 \end{cases}$ is
(A) continuous at $x = 0$
(B) derivable at $x = 0$
(C) discontinuous at $x = 0$
(D) infinitely differentiable at $x == 0$

74. If Rolle's theorem holds for $f(x) = x^3 + ax^2 + bx$ on $[-2, 2]$ at $x = 1$, then
(A) $a = 1/2, b = -4$
(B) $a = 2, b = -4$
(C) $a = -1/2, b = 4$
(D) $a = 4, b = 1/2$

75. The local maxima of $x^3 - 3x + 3$ is attend at
(A) $x = -1$
(B) $x = 1$
(C) $x = 0$
(D) $x = 3$

76. The function $f(x) = sin\ 3x, x \in [0, \pi/2]$ is increasing in the interval
(A) $(0, \pi/6)$
(B) $(\pi/6, \pi/2)$
(C) $(0, \pi/2)$
(D) $(\pi/3, \pi/2)$

77. The function $f(x) = x^2$ is not uniformly continuous on the interval
(A) $[-1,1]$
(B) $[1,2]$
(C) $[0,\infty]$
(D) $[0,1]$

78. Every compact set of real numbers is
(A) open
(B) closed
(C) closed and bounded
(D) open and bounded

79. The set $\mathbb{R}$ of real real numbers is
(A) closed
(B) bounded
(C) countable
(D) none of the above

80. The upper limit of the sequence $\{(-1)^n\}$ is
(A) 1
(B) -1
(C) 0
(D) 2

81. If $f(x,y)$ is a homogeneous function of degree n in x and y and has continuous partial derivatives, then $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y}$ is equal to
(A) f
(B) nf
(C) 0
(D) $n(n-1)f$

82. $\lim_{(x,y)\to(2,1)} (x^2 + 2x - y^2)$ equals
(A) 0
(B) -7
(C) 7
(D) -1

83. The radius of convergence of the series $1 + 2x + 3x^2 + 4x^3 + \ldots$ is
(A) 0
(B) 1
(C) ∞
(D) 2

84. The value of the integral $\int_0^1 \int_0^x e^{y/x}\, dx\, dy$ is

(A) $\frac{(e-1)}{2}$

(B) $\frac{(e+1)}{2}$

(C) e

(D) e^2

85. The value of the surface integral $\int\int_S (x^3\, dy\, dz + y^3\, dz\, dx + z^3\, dx\, dy)$ over the sphere $x^2 + y^2 + z^2 = a^2$ is

(A) $\frac{12}{5}\pi a^5$

(B) πa^5

(C) $\frac{5}{12}\pi a^5$

(D) πa^2

86. Which of the following sets forms a basis of $\mathbb{R}^2$?

(A) $\{(1,1),(3,1)\}$

(B) $\{(0,1),(0,-3)\}$

(C) $\{(2,1),(1,-1),(3,0)\}$

(D) $\{(1,0),(2,0)\}$

87. Rank of the matrix $\begin{pmatrix} 2 & 1 & 1 \\ 0 & 3 & 0 \\ 3 & 1 & 2 \end{pmatrix}$ is equal to

(A) 1

(B) 2

(C) 3

(D) 4

88. Which of the following functions $F: \mathbb{R}^2 \to \mathbb{R}^2$ is not a linear transformation?

(A) $F(x,y) = (x + y, x - y)$

(B) $F(x,y) = (x + y, x)$

(C) $F(x,y) = (2x - y, x)$

(D) $F(x,y) = (x, 1 + y)$

89. The dimension of the vector space of all 3×3 real symmetric matrices is

(A) 9

(B) 6

(C) 3

(D) 4

90. The determinant of $\begin{pmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{pmatrix}$ is

(A) $(z-x)(z-y)\,(y-x)$

(B) $(z-x)^2(z-y)\ (y-x)$
(C) $(z^2-x^2)(z^2-y^2)\ (y^2-x^2)$
(D) $(z-x)^2\ (z-y)^2\ (y-x)^2$

91. If $M = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$, then M^{2019} equals
(A) $\begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$
(B) $\begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$
(C) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
(D) $\begin{pmatrix} 1 & 2019 \\ 0 & 1 \end{pmatrix}$

92. Which of the following matrix is singular?
(A) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
(B) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$
(C) $\begin{pmatrix} 1 & 4 \\ 2 & 10 \end{pmatrix}$
(D) $\begin{pmatrix} 2 & 2 \\ 3 & 3 \end{pmatrix}$

93. If $M = \begin{pmatrix} 4 & 0 \\ 2 & 3 \end{pmatrix}$, then the eigenvalues of M are
(A) -4 and -3
(B) 4 and 3
(C) 2 and 0
(D) 3 and -3

94. Let $F: \mathbb{R}^2 \to \mathbb{R}^2$ be a linear transformation defined by $F(x, y) = (2x + 3y, 4x - 5y)$. Then the matrix representation of the linear transformation relative to basis $B = \{(1, 0), (0, 1)\}$ is
(A) $\begin{pmatrix} 2 & 3 \\ 4 & -5 \end{pmatrix}$
(B) $\begin{pmatrix} 0 & -3 \\ 4 & 5 \end{pmatrix}$
(C) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
(D) $\begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$

95. The eigenvalues of a skew-symmetric matrix are
(A) always pure imaginary
(B) always zero
(C) either zero or imaginary
(D) always real

96. If $M = \begin{pmatrix} 2 & -2 \\ -2 & 5 \end{pmatrix}$ and $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, which of the following is a zero matrix?

(A) $M^2 - 7M - 6I$
(B) $M^2 - 7M + 6I$
(C) $M^2 - 6M - 7I$
(D) $M^2 - 6M - 7I$

97. Let $T: V_n(F) \rightarrow V_m(F)$, where $V_n(F)$ and $V_m(F)$ are finite dimensional vector spaces. Then
(A) $rank(T) + nullity(T) = dim\ (V_n(F))$
(B) $rank(T) = nullity(T))$
(C) $rank(T) - nullity\ (T) = dim\ (V_n(F))$
(D) $rank(T) - nullity(T) = dim\ (V_n(F))$

98. The singleton set $\{x\}$ is linearly dependent if
(A) $x = 0$
(B) $x \neq 0$
(C) x is a scalar
(D) none of these

99. The eigenvalues of an orthogonal matrix are
(A) zero
(B) imaginary
(C) always negative
(D) of unit modulus

100. Degree of the differential equation $dy = (y + sin\ x)dx$ is
(A) 1
(B) 2
(C) 3
(D) 4

CUET PG 2019