MaaRula Entrance Classes

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01 No. Classes

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Mathem solvex for PYQ

MAARULA CLASSES

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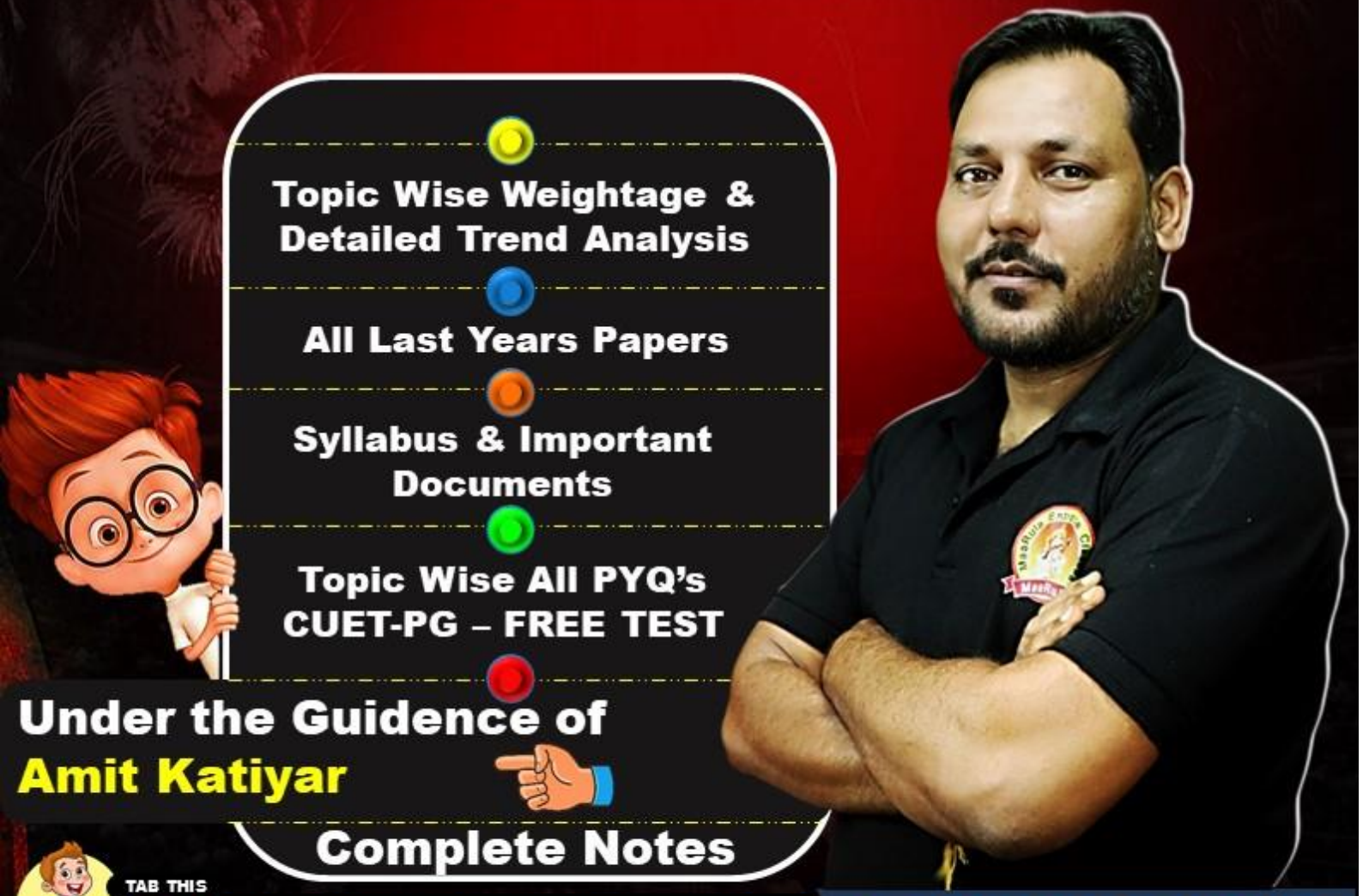

- Topic Wise Weightage & Detailed Trend Analysis
- All Last Years Papers
- Syllabus & Important Documents
- Topic Wise All PYQ's CUET-PG – FREE TEST

Under the Guidence of **Amit Katiyar**

Complete Notes

TAB THIS

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MATHS

1. Let A = {1,2,3} and consider the relation R = {(1,1),(2,2), (3,3), (1,2), (2,3), (1,3)}, Then R is
(a) Reflexive but not symmetric
(b) reflexive but not transitive
(c) symmetric and transitive
(d) neither symmetric, nor transitive

2. If a relation R on the set {1,2,3} be defined by R = {(1, 2)}, then R is
(a) Reflexive (b) transitive
(c) symmetric (d) none of these

3. A = {1,2,3} which of the following function f: A → A does not have an inverse function
(a) {(1,1), (2,2), (3,3)} (b) {(1,2), (2,1), (3,1)}
(c) {(1,3), (3, 2), (2, 1)} (d) {(1,2), (2, 3), (3, 1)}

4. The maximum number of equivalence relations on the set A = {1,2,3} are
(a) 1 (b) 2
(c) 3 (d) 5

5. If f : R → R such that f(x)= 3x then what type of function is f?
(a) one-one onto (b) many one onto
(c) one-one into (d) many-one into

6. A relation R in a set A is called _____. If $(a_1,a_2) \in R$, for all $a_1, a_2 \in A$
(a) symmetric (b) transitive
(c) equivalence (d) non-symmetric

7. Let f: R → R be defined by f(x) = 1/x ∀ x ∈ R. Then f is
(a) one-one (b) onto
(c) bijective (d) not defined

8. If $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ $(a \neq b)$ have exactly 1 common root then what is the value of (a + b)?
(a) 1 (b) 0
(c) –1 (d) 3

9. The coefficient of the middle term in the expansion of $(2 + 3x)^4$ is
(a) 5! (b) 6
(c) 216 (d) 8!

10. Simplified form of $\cos^{-1}(4x^3 - 3x)$
(a) $3\sin^{-1}x$ (b) $3\cos^{-1}x$
(c) $\pi - 3\sin^{-1}x$ (d) None of the above

11. $\tan^{-1}(1/2) + \tan^{-1}(1/3) =$
(a) π/4 (b) π/2
(c) π/3 (d) π

12. $\sin(\tan^{-1}x)$, where $|x| < 1$, is equal to
(a) $x/\sqrt{(1-x^2)}$ (b) $1/\sqrt{(1-x^2)}$
(c) $1/\sqrt{(1+x^2)}$ (d) $x/\sqrt{(1+x^2)}$

13. If A is a square matrix such that $A^2 = A$, then $(I-A)^3 + A$ is equal to
(a) I (b) 0
(c) I–A (d) I + A

14. A square matrix $A = [a_{ij}]_{n \times n}$ is called a lower triangular matrix if $a_{ij} = 0$ for
(a) i = j (b) i > j
(c) i < j (d) None of these

15. A matrix $A = [a_{ij}]_{m \times n}$ is said to be symmetric if
(a) $a_{ij} = 0$ (b) $a_{ij} = a_{ji}$
(c) $a_{ij} = -a_{ij}$ (d) $a_{ij} = 1$

16. Let A be a non-singular matrix of the order 2 x 2 then $|A^{-1}| =$
(a) |A| (b) 1/|A|
(c) 0 (d) 1

17. If A and B are symmetric matrices of the same order, then (AB– BA) is a
(a) Null Matrix
(b) Symmetric matrix
(c) Skew symmetric matrix
(d) None of the above

18. What is the value of $\lim_{x \to 0} \frac{x \tan x}{\cot x}$?
(a) 0 (b) 1
(c) 2 (d) 12

19. If sec ((x-y)/(x+y)) = a then dy/dx is
(a) –y/x (b) x/y
(c) –x/y (d) y/x

20. If $x^y \cdot y^x = 16$, then dy/dx at (2, 2) is
(a) 0 (b) 1
(c) –1 (d) None of these

21. The function f(x) = x + cos x is
(a) always increasing
(b) always decreasing
(c) increasing for certain range of x
(d) None of these

22. $\int x^2 \sin x^3 \, dx =$
(a) 1/3 cos x^3 + c (b) –1/3 cos x + c
(c) –1/3 cos x^3 + c (d) 1/2 sin x^3 + c

23. Objective function of a linear programming problem is
(a) a constraint
(b) function to be optimized
(c) A relation between the variables
(d) None of these

24. If $|z_1| = 4$, $|z_2| = 3$ then what is the value of $|z_1 + z_2 + 3 + 4i|$?
(a) Less than 2 (b) Less than 5
(c) Less than 7 (d) Less than 12

25. Region represented by $x \geq 0$, $y \geq 0$ is
(a) First quadrant (b) Second quadrant
(c) third quadrant (d) fourth quadrant

26. An urn contains 10 black and 5 white balls. Two balls are drawn from the urn one after the other without replacement. What is the probability that both drawn balls are black?
(a) 3/7 (b) 7/3
(c) 1/7 (d) 1/3

27. The absolute maximum value of $y = x^3 - 3x + 2$ in $0 \leq x \leq 2$ is
(a) 0 (b) 2
(c) 4 (d) 6

28. $\int_0^{\pi} sin^2 x \, dx =$
(a) π/2 (b) π/4
(c) 2π (d) 4π

29. If P(A) = 0.4, P(B) = 0.7 and P(B|A) = 0.6 then P (A U B) is equal to
(a) 0.24 (b) 0.3
(c) 0.48 (d) 0.86

30. The area bounded by the curves $y^2 = 4x$ and y = x is equal to
(a) 1/3 (b) 8/3
(c) 35/6 (d) None of these

31. What is the order of differential equation $y'' + 5y' + 6 = 0$?
(a) 0 (b) 1
(c) 2 (d) 3

32. The side of an equilateral triangle is increasing at the rate of 2 cm/s. The rate at which area increases when the side is 10 cm will be
(a) 10 cm^2/s (b) 10/3 cm^2/s
(c) $\sqrt{3}$ cm^2/s (d) $10\sqrt{3}$ cm^2/s

33. The scalar product of 5i + j – 3k and 3i – 4j + 7k is:
(a) 15 (b) –15
(c) 10 (d) –10

34. If $a_n = 4n + 6$, find 15^{th} term of the sequence.
(a) 6 (b) 10
(c) 60 (d) 66

35. If A.M. of two numbers is 15/2 and their G.M. is 6, then find the two numbers
(a) 6 and 8 (b) 12 and 3
(c) 24 and 6 (d) 27 and 3

36. The compound statement with 'And' is false if _____ of its compound statements are _____
(a) all true (b) any, true
(c) any, false (d) None of the above

37. If ${}^nP_3 = 4 * {}^nP_2$. Find n.
(a) 3 (b) 2
(c) 6 (d) 5

38. ${}^nP_r = {}^nC_r * $ _____
(a) r! (b) 1/r! (c) n! (d) 1/n!

39. Find the variance of the observation values taken in the table given below.

4.2	4.3	4	4.1

(a) 0.27 (b) 0.0125 (c) 0.3 (d) 0.31

40. If the coefficient of variation is 100, the mean of the data is 25, then find the standard deviation
(a) 5 (b) 10 (c) 15 (d) 25

COMPUTER

41. One Gigabyte is approximately equal to
(a) 1000,000 bytes
(b) 1000, 000, 000 bytes
(c) 1000,000,000,000 bytes
(d) None of these

42. In computer world. Trojan Horse refers to
(a) Virus (b) Malware
(c) Worm (d) Spyware

43. Computer resolution measures?
(a) Size of screen
(b) shape of screen
(c) number of pixels
(d) Number of colours it support

44. A collection of program that controls how your computer system runs and processes information is called?
(a) Operating System (b) Shape of screen
(c) office (d) compiler

45. _____ is the application of the investigation and analysis techniques to gather and preserve evidence from a particular computing device in a way that is suitable for presentation in a court of law.
(a) Robotics (b) Animation
(c) Simulation (d) Computer Forensics

46. What is the full for of W3C?
(a) Word Wide Web consortium
(b) World Wide Web Company
(c) World Wide Web center
(d) World Wide Web command

47. One nibble is equal to how many bits?
(a) 4 bits (b) 8 bits
(c) 12 bits (d) 16 bits

48. Which of the following is an anti-virus software
(a) Dreamweaver (b) McAfee
(c) Flash (d) Oracle

49. What is the term used for verification of a login name and password in computer terminology?
(a) configuration (b) Authentication
(c) Accessibility (d) Logging

50. A technique used by codes to convert an analog signal into a digital bit stream is known as
(a) Pulse code modulation
(b) pulse stretcher
(c) query processing
(d) Queue management

51. What is e-commerce?
(a) Buying and selling computer products
(b) Buying and selling products and services not found in stores
(c) Buying and selling international goods
(d) Buying and selling products and services over the internet

52. In networking terminology UTP means
(a) Ubiquitious Teflon Port
(b) Unshielded Twisted Pair
(c) Uniformly Terminating Port
(d) Unshielded T-connector Port

53. What is a Firewall in Computer Network?
(a) The physical boundary of Network
(b) An operating System of Computer network
(c) A system designed to prevent unauthorized access
(d) A web browsing software

54. Which of the following is the numerical computing software for scientists and mathematicians?
(a) EDGE (b) Excel
(c) MATLAB (d) Ada

55. A wireless technology built in electronic gadgets used for exchanging data over short distances is?
(a) Bluetooth (b) Wifi
(c) Modem (d) USB

56. Full form of URL is?
(a) Uniform Resource Locator
(b) Uniform Resources Link
(c) Uniform Registered Link
(d) Uniform Resource Link

57. Who is also known as Father of Computer?
(a) Vint Cerf (b) Tim Berner Lee
(c) Charles Babbage (d) Steve Jobs

58. An electronic path, that sends signals from one part of computer to another is?
(a) Logic Gate (b) Bus
(c) Modem (d) Serial Port

59. A device used for video games, flight simulators, training simulators and for controlling industrial robots?
(a) Mouse (b) Light pen
(c) Joystick (d) Keyboard

60. What is used to make computer chips?
(a) Copper (b) Steel
(c) Silicon (d) Iron

61. Which Technology company has launched a new initiative called 'Startup School'?
(a) Microsoft (b) Google
(c) Amazon (d) Apple

62. Mac operating system is developed by which company
(a) Microsoft (b) IBM
(c) Samsung (d) Apple

63. Which term is related to database?
(a) PHP (b) Oracle
(c) Java (d) Assembly

64. Total number of function keys on a computer keyboard is
(a) 10 (b) 12 (c) 14 (d) 8

65. The octal equivalent of the binary number $(0010010100)_2$ is ____
(a) 422 (b) 242 (c) 224 (d) 226

66. The 10's complement of 455 is ____
(a) 543 (b) 544 (c) 545 (d) 546

67. The 2's complement of 5 is _____
(a) 1011 (b) 0101 (c) 1010 (d) 0011

68. The decimal equivalent of $(0.101)_2$ will be____
(a) 0.5 (b) 0.625 (c) 0.25 (d) 0.875

69. Which of the following is false?
(a) x + y = y +x (b) x.y = y.x
(c) x.x' =1 (d) x + x' = 1

70. The Boolean expression A + BC is the reduced form of _____
(a) AB + BC (b) (A+B) (A+C)
(c) (A+C) B (d) (A+B) C

71. The expression of an XOR gate is _____
(a) A'B + AB' (b) AB + A'B
(c) A + A.B (d) A' + B'

72. If M denotes the number of memory locations and N denotes the word size, then an expression that denotes the storage capacity is ____
(a) M*N (b) M+N
(c) 2M+N (d) 2M–N

73. What is the high speed memory between the main memory and the CPU called?
(a) Register Memory (b) Cache Memory
(c) Storage Memory (d) Virtual Memory

74. Which of the following error can a compiler check?
(a) Syntax Error
(b) Logical Error
(c) Both Logical and Syntax Error
(d) Compiler cannot check errors

75. Which features of OOP indicates code reusability?
(a) Abstraction (b) Polymorphism
(c) Encapsulation (d) Inheritance

76. Internet works on _____
(a) packet switching
(b) circuit switching
(c) both packet switching and circuit switching
(d) data switching

77. What will be values for a and c after execution of the following code if a is 10, b is 5, and c is 10?
If ((a> b) && (a < = C))
a = a + 1;
else
c = c + 1;
(a) a = 10, c = 10 (b) a = 10, c = 11
(c) a = 11, c = 10 (d) a = 11, c = 11

78. Which of the following statement is correct about the array?
(a) in the array, users can only allocate the memory at the run time.
(b) In the array, users can only allocate the memory at the compile time.
(c) The array is a primitive and non-linear data structure that only stores a similar data type.
(d) All of the these

79. What is meant by 'a' in the following C file operation?
fp = fopen ("Random.txt","a");
(a) Attach (b) Append
(c) Apprehend (d) Add

80. The size of a union is determined by the size of the _____
(a) First member in the union
(b) Last member in the union
(c) Largest member in the union
(d) Sum of the sizes of all the members

ENGLISH

Directions (81-83): In the following questions, out of the four alternatives, choose the one, which can be substituted for the given words / sentence.

81. To take secretly in small quantities
(a) Robbery (b) Theft
(c) Defalcation (d) Pilferage

82. A disease that spreads by contact
(a) incurable (b) infectious
(c) contagious (d) Fatal

83. An emolument over and above fixed income or salary
(a) Honorarium (b) Sinecure
(c) Perquisite (d) Prerogative

Directions (84-85): In the following questions, groups of four words are given. In each group, one word is correctly spell. Find the correctly spelt word.

84. (a) parapharnelia (b) parsimonious
(c) peccadilo (d) peadiatrics

85. (a) measureble (b) managable
(c) marriageable (d) manoevrable

Directions 86-87: In the following questions, out of the four alternatives, choose the one which best expresses the meaning of the given word:

86. DEFER
(a) Differ (b) Defy
(c) Postpone (d) Indifferent

87. FOSTERING
(a) Nurturing (b)Safeguarding
(c) Guiding (d) Caring

Directions (88-90): Fill in the blank with the most suitable choice.

88. Many countries have sent medicine for _____ of the latest fighting.
(a) injured (b) wounded
(c) victims (d) culprits

89. A light breeze ____ the forest fire and made it more dangerous
(a) extinguished (b) lit
(c) fanned (d) blew

90. As he got older his belief in these principles did not ____
(a) wither (b) shake
(c) waver (d) dither

REASONING

91. Arrange the words given below in a meaningful sequences.
1. Word 2. Paragraph 3. Sentence 4. Letters 5. Phrase
(a) 3,1,2,4,5 (b) 1,2,4,3,5
(c) 5,4,3,2,1 (d) 4,1,5,3,2

92. In the series 2,6,18,54, ... what will be the 8^{th} term?
(a) 4370 (b) 4374
(c) 7443 (d) 7434

93. Look closely at the letter pattern and choose the series from the options given that will correctly fill in the blank at the end of the series.
FAG, GAF, HAI, IAH, ____
(a) JAK (b) HAL
(c) HAK (d) JAI

94. If LONDON is coded as MPOEPO. What code is needed for DELHI?
(a) DEHLI (b) EFIMJ
(c) HLDEI (d) EFMIJ

Direction (95-96): Three of the words will be in the same classification, the remaining one will not be. Your answer will be the one word that does NOT belong in the same classification as the others.

95. Which word does NOT belong with the others?
(a) Lungs (b) Cancer
(c) Pancreas (d) Heart

96. Which word does NOT belong with the others?
(a) Ghee (b) Milk
(c) Butter (d) Curd

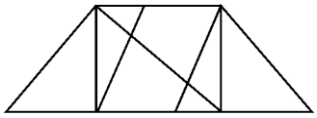
97. Play is to actor as concert is to
(a) symphony (b) musician
(c) piano (d) percussion

98. A man walks 5 km toward south and then turns to the right. After walking 3 km he turns to the left

and walks 5 km. Now in which direction is he from the starting place?

(a) West (b) South
(c) North-East (d) South-West

99. Find the number of triangles in the figure given below.



(a) 8 (b) 10 (c) 12 (d) 14

100. A and B are brothers. C and D are sisters. A's son is D's brother. How is B related to C?

(a) Father (b) Brother
(c) Uncle (d) Grandfather

ANSWER KEY

1.	A	**2.**	B	**3.**	B	**4.**	D	**5.**	A
6.	A	**7.**	D	**8.**	C	**9.**	C	**10.**	B
11.	A	**12.**	D	**13.**	A	**14.**	C	**15.**	B
16.	B	**17.**	C	**18.**	A	**19.**	D	**20.**	C
21.	A	**22.**	C	**23.**	B	**24.**	D	**25.**	A
26.	A	**27.**	C	**28.**	A	**29.**	D	**30.**	B
31.	C	**32.**	D	**33.**	D	**34.**	D	**35.**	B
36.	C	**37.**	C	**38.**	A	**39.**	B	**40.**	D
41.	B	**42.**	B	**43.**	C	**44.**	A	**45.**	D
46.	A	**47.**	A	**48.**	B	**49.**	B	**50.**	A
51.	D	**52.**	B	**53.**	C	**54.**	C	**55.**	A
56.	A	**57.**	C	**58.**	B	**59.**	C	**60.**	C
61.	B	**62.**	D	**63.**	B	**64.**	B	**65.**	C
66.	C	**67.**	A	**68**	B	**69**	C	**70.**	B
71.	A	**72.**	A	**73.**	B	**74.**	A	**75.**	D
76.	C	**77.**	C	**78.**	B	**79.**	B	**80.**	C
81.	D	**82.**	C	**83.**	C	**84.**	B	**85.**	C
86.	C	**87.**	A	**88.**	C	**89.**	C	**90.**	C
91.	D	**92.**	B	**93.**	A	**94.**	D	**95.**	B
96.	B	**97.**	B	**98.**	D	**99.**	D	**100.**	C

SOLUTION

1. (a)
A = {1,2,3}
R = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)}
(1,1), (2, 2), (3, 3) ∈ R R is reflexive
(1, 2) ∈ R (2, 1) ∈ R R is not symmetric
(1, 2) ∈ R (2, 3) ∈ R
⇒ (1, 3) R is transitive
Ans. (a) Reflexive but not symmetric.

2. (b)
Relation R on set {1,2,3} be defined by R = {(1,2)}
(1, 1) ∈ R R is not reflexives
(1, 2) ∈ R (2, 1) ∈ R Not symmetric
Ans. (b) transitive

3. Ans. (b)
(1,2) (2,1) (3,1)

4. (d)
A = {1, 2, 3}
R_1 = {(1, 1), (2, 2), (3, 3)}
R_2 = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 1)}
R_3 = {(1, 1), (2, 2), (3, 3), (1, 3), (3, 1)}
R_4 = {(1, 1), (2, 2), (3, 3), (2, 3), (3, 2)}
R_5 = {(1, 1), (2, 2), (3, 3), (1, 2), (1, 3), (2, 1), (2, 3), (3, 1), (3, 2)}
Option (d) 5+ a

5. (a) f : R → defined as f(x) = 3x
Let x.y∈ R such that f(x) = f(y)
⇒ 3x = 3y
⇒ x = y f is one-one.
Also for any real no. (y) is co-domain.

There exits $\frac{y}{3}$ in R such that $f\left(\frac{y}{3}\right) = 3\left(\frac{y}{3}\right) = y$

So f is onto.

Ans. (a) one-one onto.

6. (a) symmetric

7. (d)

$f(x) = \frac{1}{x}, \forall x \in R$

For x = 0, f(x) not defined

Option (d) not defined

8. Let common root be α then α satisfy batch equation.

$\alpha^2 + a\alpha + b = 0$ .....(I)

$\alpha^2 + b\alpha + a = 0$ .....(II)

Equating both equation

$\alpha^2 + a\alpha + b = \alpha^2 + b\alpha + a$

$a\alpha + b = b\alpha + a$

$\alpha (a-b) = a - b$

$\alpha = 1$_____ put in equation (1)

$1 + a + b = 0$

$A + b = -1$

Option (c) –1.

9. $(2 + 3x)^4$ n = 4 (even)

So Middle term = $\left(\frac{n}{2}+1\right):\left(\frac{4}{2}+1\right) = 3$

$T_3 = T_{(2+1)} = {}^4C_2 \times (2)^{(4-2)} \times (3x)^2$

$= 6 \times 4 + 9x^2 = 216\, x^2$

(c) 216

10. $\text{Cos}^{-1}(4x^3 - 3x)$ Put $x = \cos\theta$

$= \cos^{-1}(4\cos^3\theta - 3\cos\theta)$

$(\cos 3x = 4\cos^3 x - 3\cos x)$

$= \cos^{-1}(\cos 3\theta)$

$= 3\theta$ $(\cos^{-1}(\cos x) = x)$

$\therefore \cos^{-1}(x)\,\theta$

$= 3\cos^{-1} x$

Option (b) $3\cos^{-1} x$

11. (a)

$tan^{-1}\frac{1}{2} + tan^{-1}\frac{1}{3}$

$tan^{-1}\left(\frac{\frac{1}{2}+\frac{1}{3}}{1-\frac{1}{2}\times\frac{1}{3}}\right)$

$tan^{-1}(1)\left(\frac{5/6}{5/6}\right)$

$tan^{-1}(1) = \frac{\pi}{4}$

12. (d)

Sin $(\tan^{-1}x)$

Put $y = \tan^{-1}x$

$\tan y = x$

$\therefore \tan y = \frac{\sin y}{\cos y}$

$\sin y = \frac{\tan y}{\sec y}$ $\therefore y = \tan^{-1}x$

$\sin y = \frac{x}{\sqrt{1+x^2}}$

(d) $\frac{x}{\sqrt{1+x^2}}$

13. (a)

$A^2 = A$

$A^2 - A = 0$

$A(A-1) = 0$ $\therefore A = 0$ or $A - I = 0$

$(A-I)^3 = 0$

$(A-I)^3 + A$

$= 0 + A = I$

14. (c) $i < j$

15. (b) Symmetric matrix $\rightarrow A = A^T$

$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ $A^T = \begin{bmatrix} a_{11} & a_{12} \\ a_{12} & a_{22} \end{bmatrix}$

aij = aji

(a) aij = aji

16. (b)

$AA^{-1} = I$ non singular matrix

$|AB| = |A|\,|B|$

$|AA^{-1}| = I$

$|A|\,|A^-| = 1$

$|A^{-1}| = \frac{1}{|A|}$

17. (c)

A & B symmetric matrix

$\therefore A^T = A$ & $B^T = B$

$(AB - BA)^T = (AB)^T - (BA)^T$

$= B^TA^T - A^TB^T$

$= BA - AB$

$= -(AB - BA)$

(c) Skew symmetric matrix

18. (a)

$= \lim_{x\to 0} \frac{x\,tanx}{\cot x}$

$= \lim_{x\to 0} \frac{x\,tanx}{\frac{1}{\tan x}}$

$= \lim_{x\to 0} x \tan x \cdot \tan x$

$= \lim_{x\to 0} x \tan^2 x$

$= 0 \times \tan^2 0$

$= 0$

19. (d)

$sec\left(\frac{x-y}{x+y}\right) = a$

Differentiate w.r.t. x

$sec\left(\frac{x-y}{x+y}\right) tan\left(\frac{x-y}{x+y}\right)\left[\frac{(x+y)\left\{1-\frac{dy}{dx}\right\}-(x-y)\left\{1+\frac{dy}{dx}\right\}=0}{(x+y)^2}\right.$

$\Rightarrow a \tan\left(\frac{x-y}{x+y}\right)\left[\frac{x+y-x\frac{dy}{dx}-y\frac{dy}{dx}-x+y-x\frac{dy}{dx}+y\frac{dy}{dx}}{(x+y)^2}\right]=0$

$\Rightarrow a \tan\left(\frac{x-y}{x+y}\right)\frac{\left(-2x\frac{dy}{dx}+2y\right)}{(x+y)^2} = 0$

$\frac{x-y}{x+y} = 0$ and $-x\frac{dy}{dx} + y = 0$

$-x\frac{dy}{dx} = -y$

$\frac{dy}{dx} = \frac{y}{x}$

Ans. (d)

20. $x^y . y^x = 16$

$\log x^y + \log y^x = \log 16$

$y \log x + x \log y = \log 16$

differentiate w.r.t. x

$\frac{y}{x} + \log x \frac{dy}{dx} + \frac{x}{y}\frac{dy}{dx} + \log y = 0$

So at x = 2, y = 2

$1 + \log 2 \left(\frac{dy}{dx}\right)_{2,2} + 1\left(\frac{dy}{dx}\right)_{2,2} + \log 2 = 0$

$\frac{dy}{dx}(\log 2 + 1) = -(\log 2 + 1)$

$\frac{dy}{dx} = -1$

21. (a)

$f(x) = x + \cos x$

$f^1(x) = 1 - \sin x$

($\because \sin x$ lying between –1 and +1)

f' (x) > 0 for all value of x

Ans. (a)

22. (c)

$I \int x^2 \sin x^3 \, dx$

Let $x^3 = t$ and $3x^2 \, dx = dt$

$I = \frac{1}{3}\int \sin t \, dt$

$= -\frac{1}{3} \cos t + c$

$= -\frac{1}{3} \cos x^3 + c$

Ans. (c)

23. (b)

24. (d)

$|Z1| = 4 \; |Z2| = 3$

$|Z1 + Z2 + (3 + 4i)| \leq |Z1 + Z2| + |3 + 4i|$

$\leq |Z1 + Z2| + 5$

$\leq 4 + 3 + 5$

≤ 12

25. (a)

26. (a)

No. of black balls = 10

No. of white balls = 5

Total no. of balls = 15

Let E be the event 1st ball being black

Let F be the event 2nd ball being black

P (E) = P (black ball in 1st draw) = $\frac{10}{15}$

Since no replacement

$P\left(\frac{F}{E}\right) = \frac{9}{14}$

$\therefore$ probability of both ball are black

$= \frac{10}{15} \times \frac{9}{14}$

= 3/7

27. (c)

$f(x) = x^3 - 3x + 2$

$f^1(x) = 3x^2 - 3$

for maxima or minima

$f^1(x) = 0$

$\Rightarrow x = \pm 1$

$\because$ x = –1 does not lies in the given range

f(1) =0

f(0) = 2

f(2) = 4

28. (a)

$\int_0^{\pi} sin^2 x \, dx$

$\int_0^{\pi} \frac{1}{2}(1 - \cos 2x) \, dx.$

$\frac{1}{2}\int_0^{\pi}(1 - \cos 2x) dx$

$\frac{1}{2}\left[x - \frac{1}{2}\sin 2x\right]_0^{\pi}$

$\frac{1}{2}\left[\left\{\pi - \frac{1}{2}\sin(2\pi)\right\}\left\{0 - \frac{1}{2}\sin(2 \times 0)\right\}\right]$

$\frac{1}{2}[\pi - 0 - 0 + 0] = \frac{\pi}{2}$

Ans. (a)

29. (d)

P(A) = 0.4 P(B) = 0.7

P (B/A) = 0.6

$\because$ P (B/A) = $\frac{P(B \cap A)}{P(A)}$

$P(B \cap A)$ = 0.6 x 0.4 = 0.24

$\because$ P (A $\cup$ B) = P (A) + P (B) – P ($A \cap B$)

= 0.4 + 0.7 – 0.24

= 0.86

Ans. (d)

30. (b)

$y^2 = 4x$ & y = x

0(0, 0) A (4, 4)

The required area

$= \int_0^4 (y_2 - y_1)\, dx$

$= \int_0^0 (2\sqrt{x} - x)\, dx$

$\left[2\frac{x^{3/2}}{3/2} - \frac{x^2}{2}\right]_0^4$

$= \frac{4}{3}\left(4\sqrt{4}\right) - \frac{4^2}{4}$

$= \frac{32}{3} - 8$

$= \frac{32-24}{3} = \frac{8}{3}$

Ans. (b)

31. (c)

32. Let x side and A area of triangle

$\therefore$ A = $\frac{\sqrt{3}}{4} x^2$

Differentiating both side w.r.t. t

$\frac{dA}{dt} = \frac{\sqrt{3}}{4}\, 2x\, \frac{dx}{dt}$

Equation x = 10 cm

& $\frac{dx}{dt}$ = 2 cm/s

$\therefore \frac{dA}{dt} = \frac{\sqrt{3}}{4}$ 2 x (10) x 2

= $10\sqrt{3}$ cm^2/s

33. (d)

(5i + j – 3k). (3i – 4j + 7k)

= 15 – 4 – 21

= –10

Ans. (d)

34. (d)

an = 4 n + 6

15^{th} term

a 15 = 4 x 15 + 6 = 66

Ans. (d)

35. (b)

AM = $\frac{15}{2}$ GM = 6

$\frac{a+b}{2} = \frac{15}{2}$ $\sqrt{ab}$ =6

a + b = 15 ab = 36

b = 15– a ...(1) a(15-a)

= 36 from equation (1)

a = 3 or 12

for a = 3 b = 12

a = 12 b = 3

Ans. (b)

36. (c)

37. (c)

$^nP_3 = 4 \times {}^nP_2$

$\frac{n!}{(n-3)!} = 4 \times \frac{n!}{(n-2)!}$

(n-2)! = 4 (n-3)!

(n-2) (n-3)! = 4 (n–3)!

n –2 = 4

n = 6

Ans. (c)

38. $^nP_r = \frac{n!}{(n-r)!}$

$^nC_r = \frac{n!}{(n-r)!\, r!}$

$^nC_r = {}^nP_r \times \frac{1}{r!}$

^nC_r. r! = ^nP_r

Ans. (a)

39. (b)

$\bar{x} = \frac{(42+4.3+4+4.1)}{4} = 4.15$

xi	$x_i - \bar{x}$	$(xi-\bar{x})^2$
4.2	0.05	0.0025
4.3	1.04	1.0816
4	–0.15	0.025
4.1	–0.05	0.0025

$\sum(xi - \bar{x})^2 = 1.11$

Variance = $\frac{1}{x}\sum(xi - \bar{x})^2 = 1.11/4 = 0.28$

Ans. (b)

40. (d)

CV = 100

Mean = 25

St deviation = $\frac{cv \times mean}{100}$

= $\frac{25 \times 100}{100}$

= 25

Ans. (d)

COMPUTER

41.	(b)	**42.**	(b)	**43.**	(c)	**44.**	(a)
45.	(c)	**46.**	(a)	**47.**	(a)	**48.**	(b)
49.	(b)	**50.**	(a)	**51.**	(d)	**52.**	(b)
53.	(c)	**54.**	(c)	**55.**	(a)	**56.**	(a)
57.	(c)	**58.**	(b)	**59.**	(c)	**60.**	(c)
61.	(b)	**62.**	(d)	**63.**	(b)	**64.**	(b)

65. (c)
Group of 3
000 010 010 100
0 2 2 4 $= (224)_8$

66. (c)
10's complement = 9's complement + 1
9's complement = 999 – 455 = 544
10's complement = 544 + 1
= 545

67. (a)
2's complement = 1's complement + 1
1's complement of 5 (0101) = 1010
2's complement of 5 = 1010 + 1
= 1011

68. (b)
Binary no. $= (0.101)_2$
Decimal no. $= 0 \times 2^0 + 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3}$

$= 0 + \frac{1}{2} + 0\ \frac{1}{8}$
$= \frac{5}{8} = 0.625$

69. (c)
$(a)x + y = y + x$
$(b)x.y = y.x$ } commutative law
(c) x. x′ = 1 x
x.x′= 0
(d) x + x′ = 1

70. (b)
A + BC
= (A + B) (A + C)
= AA +AC +AB + BC
= A + AC + AB + BC
= A (1+C) + AB + BC
= A + AB + BC ∵ 1+ any variable = 1
= A (1+B) + BC
= A + BC
= (A + B) (A + C

71. A ⊕ B or A'B + AB'
72 (a)
73. (b)
74. (a)
75. (d)
76. (c)

77. (c)
If condition compress
a > b ⇒ 10 > 5 is true
& a < = c ⇒ 10 < = 10 is true
So logical & & is also true
∴ If condition executives & update
a = a + 1 ⇒ a = 10 + 1 = 11
b = 5, c = 10 b, c no change
Ans. (c)

78. (b)
79. (b)
80. (c)

ENGLISH

81.	(d)	**82.**	(c)	**83.**	(c)	**84.**	(a)
85.	(a)	**86.**	(c)	**87.**	(a)	**88.**	(c)
89.	(c)	**90.**	(a)				

REASONING

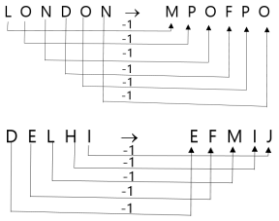
91. Letters → word→Phrase→sentence→ paragraph
4 1 5 3 2

92. (b)
2. 6. 18. 54....
2 x 3 = 6, 6 x 3 = 18, 18 x 3 = 54
Series is a GP a = 2 r = 3
8^{th} term = $ar^{8-1} = ar^7$
$= 2 \times 3^7$
= 2 x 2187
= 4374

93. (a)

+1	F	A	G	-1
	G	A	F	
+1	H	A	I	-3
+1	I	A	H	-1
	J	A	K	
+1				-3

94. (d)

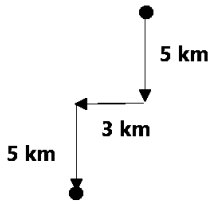


95. (b)

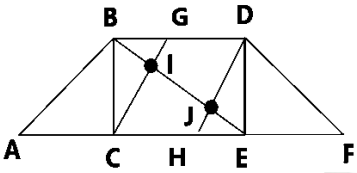
96 (b)

97. (b)

98. (d)



99. (d)



ΔABC. ΔBCE, ΔABE, ΔHJE, ΔCIE, ΔBIC = 6

ΔBDE, ΔBDJ, ΔDEJ, ΔBGI, ΔBGC = 5

ΔHDE, ΔDEF, ΔHDF = 3

Total 14

Option (d)

100. (c)