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# MAARULA CLASSES

# JAMIA 2019

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Topic Wise All PYQ's  
CUET-PG - FREE TEST

Under the Guidance of  
**Amit Katiyar**



Complete Notes



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- Which of the following is not a Language processor  
(a) Compiler (b) Loader  
(c) Interpreter (d) Assembler
- If  $(41)_6 = (121)_b$ , then b is  
(a) 1 (b) 2  
(c) 3 (d) 4

- Match List - I and List - II and select correct group of matching

List I		List II	
P.	RAM	1.	Hertz
Q.	CPU Speed	2.	MB
R.	Monitor	3.	Bytes/Sec
S.	CD - ROM Speed	4.	Inch

- (a) (P, 2), (Q, 1), (R, 4), (S, 3)  
(b) (P, 2), (Q, 1), (R, 3), (S, 4)  
(c) (P, 3), (Q, 4), (R, 2), (S, 1)  
(d) (P, 4), (Q, 3), (R, 1), (S, 2)
- Bitcoin uses which network technology for transaction and mining.  
(a) Peer to peer network  
(b) Distributed Network  
(c) Wide Area Network  
(d) Intranet Network
- The binary coding system that represents 256 different characters or bit combination is:  
(a) BCD (b) ASCII  
(c) EBCDIC (d) Both b and c
- The hexadecimal subtraction  $(56)_{16}$  from  $(427)_{16}$  results in:  
(a)  $(3B1)_{16}$  (b)  $(331)_{16}$   
(c)  $(371)_{16}$  (d)  $(3D1)_{16}$
- Which type of processor is ideal for Mobile phones and PDAs  
(a) CISC (b) RISC  
(c) VISC (d) LISC
- RAID stands for  
(a) Reductant Array of Intelligent Disks  
(b) Reproduce Array of inexpensive Disks  
(c) Redundant Array of Inexpensive disks  
(d) Redundant Array of Unexpensive Disks
- Choose the ODD one out from the following:  
(a) QWERTY (b) SULTRY  
(c) AZERTY (d) DVORAK
- What does XP stands for in the operating system 'Windows XP'?  
(a) Extra Power (b) Extended Product  
(c) Extra Performance (d) Experience

- The range of 2's complement representation of n-bit signed integers is:  
(a)  $-2^n$  to  $2^n$   
(b)  $-(2^{n-1} - 1)$  to  $(2^{n-1} - 1)$   
(c)  $-2^{n-1}$  to  $2^{n-1}$   
(d)  $-2^{n-1}$  to  $2^{n-1} - 1$
- Match List I and List II and select correct group of matching

List I		List II	
(1)	Procedural Oriented Language	P.	COBOL
(2)	Object Oriented Language	Q.	HTML
(3)	Business Oriented Language	C.	C++
(4)	Web Page	D.	Pascal

- (a) (1, S), (2, Q), (3, P), (4, R)  
(b) (1, S), (2, R), (3, P), (4, Q)  
(c) (1, P), (2, R), (3, S), (4, Q)  
(d) (1, S), (2, P), (3, Q), (4, R)
- When a computer is switched on, the BIOS is loaded from:  
(a) Hard Disk (b) RAM  
(c) ROM (d) CD - Rom
- Which of the following is not search engine:  
(a) Zing (b) Google  
(c) Yahoo (d) Bing
- 8 GB is equal to:  
(a)  $2^{30}$  bytes (b)  $2^{33}$  bytes  
(c)  $2^{20}$  bytes (d)  $2^{23}$  bytes
- $x = 0.125E + 01$ ,  $x = (1.01)_2$  and  $y = (1.2)_8$   
(a) x, y and z are equal  
(b) Only x and y are equal  
(c) Only x and z are equal  
(d) All x, y and z are different
- The product of two binary numbers 00001101 and 00001111 is:  
(a) 11000011 (b) 01100011  
(c) 00001101 (d) 00010010
- Which of the following group of statements are correct:  
P: Mouse, Keyboard and Plotter are all input devices.  
Q: Unix, Windows and Linux are all operating system  
R: Register, Cache and Hard Disk are all memory modules.  
S: Monitor, Printer and Scanner are all output devices.  
(a) P,Q (b) P,S  
(c) R,S (d) Q,R





19. Which of the following or inventor of BITCOIN the famous crypto currency  
 (a) Santoshi Nakomoto (b) Peter Thiel  
 (c) Warren Buffet (d) Bitcoin.org
20. Which of the following group consist of volatile memory:  
 (a) RAM and Floppy Disk  
 (b) HARD Disk and ROM  
 (c) RAM and Cache  
 (d) Cache and ROM
21. Let A and B be two sets containing 2 elements and 4 elements respectively. The number of subsets of  $A \times B$  having 3 or more elements is  
 (a) 256 (b) 220  
 (c) 219 (d) 211
22. If A, B and C are the three sets such that  $A \cap B = A \cap C$  and  $A \cup B = A \cup C$ , then  
 (a)  $A = C$  (b)  $B = C$   
 (c)  $A \cap B = \phi$  (d)  $A = B$
23. The value of  $\tan^{-1}(\tan 13)$  is  
 (a)  $\pi - 13$  (b) 13  
 (c)  $4\pi - 13$  (d)  $-4\pi + 13$
24.  $(\cot x \cdot \cot 2x - \cot 2x \cdot \cot 3x - \cot 3x \cdot \cot x)$  equals  
 (a)  $\cot x + \cot 2x + \cot 3x$   
 (b)  $\cot x - \cot 2x - \cot 3x$   
 (c) 1  
 (d) -1
25. Value of  $\tan\left(\frac{\pi}{8}\right)$  is  
 (a)  $\sqrt{2} - 1$  (b)  $1 - \sqrt{2}$   
 (c)  $1 - \frac{1}{\sqrt{2}}$  (d)  $1 + \frac{1}{\sqrt{2}}$
26. The number of complex number Z such that  $|Z - 1| = |Z + 1| = |Z - i|$   
 (a) 1 (b) 2  
 (c)  $\infty$  (d) 0
27. If  $\omega$  is a cube root of unity and  $(1 + \omega)^7 = A + B\omega$ , then  $A + B =$   
 (a) -1 (b) 0  
 (c) 2 (d) -2
28. If  $x + y + z = 5$  and  $xy + yz + zx = 3$ , then the least and greatest value of x are  
 (a)  $\frac{10}{3}, 5$  (b)  $-1, \frac{13}{3}$   
 (c)  $-\frac{17}{3}, 7$  (d) None of these
29. The sum of inetegers from 1 to 100 that are divisible by 2 or 5 is  
 (a) 3000 (b) 3050  
 (c) 3600 (d) 3250
30. The remainder when  $27^{40}$  is divisible by 12 is  
 (a) 3 (b) 7  
 (c) 9 (d) 11
31. The sum of the series  $1 + \frac{1}{4.2!} + \frac{1}{64.6!} + \dots \infty$   
 (a)  $\frac{e-1}{\sqrt{e}}$  (b)  $\frac{e+1}{\sqrt{e}}$   
 (c)  $\frac{e-1}{2\sqrt{e}}$  (d)  $\frac{e+1}{2\sqrt{e}}$
32. If the sum of two numbers is 6 items their geometric mean, then the numbers are in the ratio  
 (a)  $\frac{3+\sqrt{2}}{3-\sqrt{2}}$  (b)  $\frac{3+2\sqrt{2}}{3-2\sqrt{2}}$   
 (c)  $\frac{2+\sqrt{2}}{2-\sqrt{2}}$  (d)  $\frac{2+3\sqrt{2}}{2-3\sqrt{2}}$
33. The orthocenter of the triangle formed by (0,0), (4,0) and (3,4) is  
 (a) (2,0) (b)  $\left(\frac{3}{2}, 2\right)$   
 (c)  $\left(\frac{3}{4}, 3\right)$  (d)  $\left(3, \frac{3}{4}\right)$
34. A ray of light passing through the point (1,2) reflects on the X-axis at point A and the reflected ray passes through the point (5,3), the coordinates of A are  
 (a) (5,0) (b) (-5,0)  
 (c)  $\left(\frac{13}{5}, 0\right)$  (d)  $\left(-\frac{13}{5}, 0\right)$
35. From a point on the circle  $x^2 + y^2 = a^2$ , tangents are drawn to the circle  $x^2 + y^2 = b^2$ , the chord of contact of these tangents is tangent at  $x^2 + y^2 = c^2$ , then a, b and c are in  
 (a) AP (b) GP  
 (c) HP (d) None
36. If the chord of contacts of tangents from a point P to the parabola  $y^2 = 4ax$  touches the parabola  $x^2 = 4by$ , the locus of P is  
 (a) Circle (b) Parabola  
 (c) Ellipse (d) Hyperbola
37. A man running a race notes that the sum of the distance from two flag posts from him is always 10m and the distance between the flag posts is 8. The equation of path traced by man is  
 (a)  $\frac{x^2}{25} + \frac{y^2}{9} = 1$  (b)  $\frac{x^2}{9} + \frac{y^2}{25} = 1$   
 (c)  $\frac{x^2}{9} - \frac{y^2}{25} = 1$  (d)  $\frac{y^2}{9} - \frac{x^2}{25} = 1$
38. The vertices of parallelogram ABCD are  $A(3, -1, 2)$ ,  $B(1, 2, -4)$  and  $C(-1, 1, 2)$ . The fourth vertex D is  
 (a) (1,2,8) (b) (1, -2, 8)  
 (c) (-2, 1, 8) (d) (-2, -1, 8)





39. If all the word with or without meaning formed using all the letters of the word JAMIA are arranged in dictionary then what will be the 50<sup>th</sup> word  
 (a) AAJMI (b) AAMIJ  
 (c) JAAMI (d) MAAJI
40. Evaluate  $\lim_{x \rightarrow 0} \left[ \frac{\sin x}{x} \right]$ , where  $[ \ ]$  denotes the greatest integer function  
 (a) 0 (b) 1  
 (c) -1 (d) Does not exist
41. Evaluate  $\lim_{x \rightarrow 0} \frac{\sqrt{1-\cos 2x}}{x}$   
 (a)  $\sqrt{2}$  (b)  $-\sqrt{2}$   
 (c) 1 (d) does not exist
42. The mean of 5 observations is 4.4 and their variance is 8.24. If three of the observations are 1, 2 and 6, the other two observations are  
 (a) 4 and 5 (b) 5 and 9  
 (c) 4 and 9 (d) 5 and 8
43. Three letters are dictated to three persons and an envelope is addressed to each of them, the letters are inserted into the envelope at random so that each envelop contains exactly one letter. What is the probability that at least one letter is in its proper envelop  
 (a)  $\frac{1}{3}$  (b)  $\frac{2}{3}$   
 (c)  $\frac{2}{5}$  (d)  $\frac{1}{5}$
44. A tourist visits four cities A, B, C and D in a random order. What is the probability that he visits A before B.  
 (a)  $\frac{1}{2}$  (b)  $\frac{1}{3}$   
 (c)  $\frac{1}{4}$  (d)  $\frac{1}{5}$
45. The function  $f: [0, 3] \rightarrow [1, 29]$  defined by  $f(x) = 2x^3 - 15x^2 + 36x + 1$  is  
 (a) one-one and onto (b) one but not one-one  
 (c) one-one but onto (d) neither one-one nor onto
46. If  $f: R \rightarrow R$  be given by  $f(x) = (3 - x^3)^{\frac{1}{3}}$ , then  $f(f(f(x)))$  is  
 (a)  $x^{\frac{1}{3}}$  (b)  $x^3$   
 (c) x (d)  $3 - x^3$
47. If the matrix A is both symmetric and skew symmetric, then  
 (a) A is a diagonal Matrix (b) A is a null matrix  
 (c) A is a square Matrix (d) None of these
48. If  $A = \begin{pmatrix} 2 & -3 \\ -4 & 1 \end{pmatrix}$ , then  $adj(3A^2 + 12A)$  is equal to  
 (a)  $\begin{pmatrix} 72 & -84 \\ -63 & 51 \end{pmatrix}$  (b)  $\begin{pmatrix} 51 & 63 \\ 84 & 72 \end{pmatrix}$   
 (c)  $\begin{pmatrix} 51 & 84 \\ 63 & 72 \end{pmatrix}$  (d)  $\begin{pmatrix} 72 & -63 \\ -84 & 51 \end{pmatrix}$
49. If a, b, c are in AP then value of the  

$$\begin{vmatrix} x+2 & x+3 & x+2a \\ x+3 & x+4 & x+2b \\ x+4 & x+5 & x+2c \end{vmatrix}$$
 is  
 (a) 0 (b) 1  
 (c) x (d) 2x
50. If a determinant of order  $3 \times 3$  is formed using the numbers 1 or -1, then the minimum value of determinant is  
 (a) -2 (b) -4  
 (c) 0 (d) -8
51. Number of points at which  $f(x) = \min(|x|, |x+1|, |x-4|)$  is not differentiable  
 (a) 3 (b) 4  
 (c) 5 (d) 6
52. Consider the functions  $f(x)$  and  $g(x)$  such that  $f(x) = |x| + [x]$  and  $g(x) = |x| \times [x]$ , where  $[x]$  denotes the greatest integer function  
 (a)  $f(x)$  is continuous at  $x = 1$ ,  $g(x)$  is continuous at  $x = 1$   
 (b)  $f(x)$  is continuous at  $x = 1$ ,  $g(x)$  is discontinuous at  $x = 1$   
 (c)  $f(x)$  is discontinuous at  $x = 1$ ,  $g(x)$  is discontinuous at  $x = 1$   
 (d)  $f(x)$  is discontinuous at  $x = 1$ ,  $g(x)$  is discontinuous at  $x = 1$
53.  $\lim_{x \rightarrow \infty} \left( 1 + \frac{a}{x} + \frac{b}{x^2} \right)^{2x} = e^2$ , then values of a and b are  
 (a)  $a \in R, b \in R$  (b)  $a = 1, b \in R$   
 (c)  $A \in R, b = 2$  (d)  $a = 1, b = 2$
54. If m is the slope of the tangent at any point on the curve  $e^y = 1 + x^2$ , then  
 (a)  $|m| > 1$  (b)  $|m| \leq 1$   
 (c)  $|m| < 2$  (d)  $|m| \geq 2$
55. Let  $f(x) = (x^3 + ax^2 + bx + 5 \sin^2 x)$  be increasing for all  $x \in R$ , then a and b satisfies  
 (a)  $a^3 - 3b - 15 > 0$  (b)  $a^3 - 3b + 15 > 0$   
 (c)  $a^3 - 3b + 15 < 0$  (d)  $a^3 - 3b - 15 < 0$
56. The point o extremum of the function  $f(x) = \int_1^x e^{-\frac{t^2}{2}} (1 - t^2) dt$  are  
 (a)  $\pm 1$  (b) 0  
 (c)  $\pm \frac{1}{2}$  (d)  $\pm 2$
57. Value of  $\int_1^2 \left( \frac{1}{x} - \frac{1}{2x^2} \right) e^{2x} dx$  is  
 (a)  $\frac{e^2(e^2-4)}{4}$  (b)  $\frac{e^2(e^2+4)}{4}$   
 (c)  $\frac{e^2(e^2+2)}{2}$  (d)  $\frac{e^2(e^2-2)}{2}$





58. Value of  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^3 + x \cdot \cos x + \tan^3 x) dx$  is  
 (a)  $-\frac{\pi}{2}$  (b) 0  
 (c)  $2\pi$  (d)  $3\pi$
59.  $\int \frac{d\theta}{1 - \tan \theta}$  equals to  
 (a)  $\frac{\theta}{2} - \frac{1}{2} \log |\cos \theta - \sin \theta| + C$   
 (b)  $\frac{\theta}{2} + \frac{1}{2} \log |\cos \theta - \sin \theta| + C$   
 (c)  $\frac{\theta}{3} - \frac{1}{3} \log |\cos \theta - \sin \theta| + C$   
 (d)  $\frac{\theta}{3} + \frac{1}{3} \log |\cos \theta - \sin \theta| + C$
60. If  $|\hat{a} + \hat{b}| = |\hat{a} - \hat{b}|$ , then  
 (a)  $\hat{a}$  is parallel to  $\hat{b}$  (b)  $\hat{a}$  is perpendicular to  $\hat{b}$   
 (c)  $\hat{a} = \hat{b}$  (d) None
61. Distance between the two planes  $2x + y + 2z = 8$  and  $4x + 2y + 4z + 5 = 0$  is  
 (a)  $\frac{3}{2}$  units (b)  $\frac{5}{2}$  units  
 (c)  $\frac{7}{2}$  units (d)  $\frac{9}{2}$  units
62. A man known to speak truth 3 out of 4 time. He throws a die and report that it is a six. The probability that it is actually a six is  
 (a)  $\frac{1}{8}$  (b)  $\frac{5}{8}$   
 (c)  $\frac{7}{8}$  (d)  $\frac{3}{8}$
63. The probability of shooter hitting a target is  $\frac{3}{4}$ . The minimum number of times that he must fire so that the probability of hitting the target at least once is more than 0.99 is  
 (a) 2 (b) 3  
 (c) 4 (d) 5
64. A and B are two independent events such that  $P(A) = 0.3, P(B) = 0.6$ , then  $P(\text{neither A nor B})$  is  
 (a) 0.28 (b) 0.30  
 (c) 0.32 (d) 0.18
65. Periods of the function  $f(x) = \cos\left(\frac{2x}{3}\right) - \sin\left(\frac{4x}{5}\right)$  is  
 (a)  $5\pi$  (b)  $10\pi$   
 (c)  $15\pi$  (d)  $20\pi$
66. Which of the following is not an indeterminate form  
 (a)  $0^0$  (b)  $0^\infty$   
 (c)  $\infty^0$  (d)  $1^\infty$
67. The area of the region described by  $A = \{(x, y): x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1 - x\}$   
 (a)  $\frac{\pi}{2} + \frac{4}{3}$  (b)  $\frac{\pi}{2} - \frac{4}{3}$   
 (c)  $\frac{\pi}{2} - \frac{2}{3}$  (d)  $\frac{\pi}{2} + \frac{2}{3}$
68. A curve passes through the point  $\left(1, \frac{\pi}{6}\right)$ . Let the slope of the curve at each point  $(x, y)$  be  $\frac{y}{x} + \sec\left(\frac{y}{x}\right)$ ,  $x > 0$ . Then the equation of the curve is  
 (a)  $\sin\left(\frac{y}{x}\right) = \log x + \frac{1}{2}$   
 (b)  $\cos\left(\frac{2y}{x}\right) = \log x + 2$   
 (c)  $\sec\left(\frac{2y}{x}\right) = \log x + 2$   
 (d)  $\cos\left(\frac{2y}{x}\right) = \log x + \frac{1}{2}$
69. Let  $P = \begin{bmatrix} 0 & \omega \\ \omega & 0 \end{bmatrix}$ , where  $\omega$  is a cube root of unity. Then  $P^{24}$  is  
 (a)  $P^2$  (b) P  
 (c) Identity Matrix (d) Null Matrix
70. The area bounded by the curve is  $y^2 = x$  and  $x^2 = y$  is  
 (a)  $\frac{1}{3}$  (b)  $\frac{2}{3}$   
 (c)  $\frac{4}{3}$  (d)  $\frac{5}{3}$
71. Choose the most appropriate word from the option given below to complete the following sentence. Given the seriousness of the situation that he had to face, his ..... was impressive.  
 (a) Beggary (b) Nomenclature  
 (c) Nonchalance (d) Jealousy
72. Select the option, which would best fill in the blanks as follows. Football evokes a ..... response in India compared to cricket, the almost ..... The nation.  
 (a) Tepid, boiling  
 (b) lukewarm, electrifies  
 (c) Turbid, fascinating  
 (d) Apocryphal, genuinely fascinates
73. Which of the following words have similar meaning.  
 (I) Cacophonic (II) Calligraphic  
 (III) Calamitous (IV) Catastrophic  
 (V) Contraindicative (VI) Cataclysmic  
 (a) IV and VI Only (b) I, II and V Only  
 (c) II, V and VI Only (d) III, IV and VI Only
74. (I) He is the most ..... of the speakers to address us today.  
 (II) The belief in ..... Justice is the essence of his talk.  
 (III) This hall would have been full but for the ..... Rain.  
 (IV) Many in the audience have achieved ..... in their respective fields.  
 Which of the following sequence of words would most appropriately fit the blanks in the sentences given above?  
 (a) Eminent, Imminent, Immanent, Eminence  
 (b) Immanent, Imminent, Imminence, Eminence  
 (c) Eminent, Immanent, Imminent, Eminence  
 (d) Eminent, Immanent, Imminent, Immience





75. Clinical Practitioners ..... integrated mindfulness ..... Treatment of ..... host of emotional and behavioural disorders, ..... Borderline personality disorder, major depression, chronic pain, eating disorders. Number of such practitioners ..... increased substantially.
- (a) have, in the, a, such as, has  
(b) has, in the, the, like, have  
(c) were, for, a, like, has  
(d) have, for, a, like, has
76. Choose the statement where underline and bold word is used correctly.
- (I) The minister **insured** the victims that everything would be all right.  
(II) He **ensured** that the company will not have to bear any loss.  
(III) The actor got himself **ensured** against any accident.  
(IV) The teacher **insured** students of good results.
- (a) I (b) II  
(c) III (d) IV
77. The word similar to meaning of 'Dreary' is
- (a) Cheerful (b) Dreamy  
(c) Hard (d) Dismal
78. Choose the appropriate word form the options given below to complete the following sentence.  
The official answered ..... That the complaints of the citizens would be looked into.
- (a) Respectably (b) Respectfully  
(c) Reputably (d) Respectively
79. Which of the following sentence is/are grammatically incorrect?
- (I) Bats are able to fly in the dark  
(II) Bats can fly in the dark.  
(III) Bats have the ability of flying in the dark, if it does not rain.  
(IV) Bats cannot fly in the dark if it rains  
(V) Bats have the ability for flying in the fark.
- (a) III and V only (b) I only  
(c) II and IV Only (d) V and II Only
80. Which is not the antonym of SANITY
- (a) LANANCY (b) INSANITY  
(c) STUPIDITY (d) RATIONALITY
81. A, B and C scored 581 runs such that four times A's run is equal to 5 times B's run which is equal to 7 times C's run. Difference between A's and C's run is
- (a) 105 (b) 150  
(c) 97 (d) 125
82. When the price of computer was reduced by 20% the sale increased by 60%. What was increase in total revenue?
- (a) 30% (b) 28%  
(c) 55% (d) 40%
83. A watch ticks 90 times in 95 seconds and another watch ticks 315 times in 323 seconds. If both the watches are started together, how many times they will tick together in the first hour?
- (a) 110 times (b) 101 times  
(c) 320 times (d) 210 times
84. Rama gets an elevator at 11<sup>th</sup> floor of a multistory building and rides up at the rate of 57 floors per minutes. At the same time, Somya gets another elevator at the 51<sup>st</sup> floor of the same building and rides down at the rate of 63 floors per minute. If they travel at these, at which floor they will cross each other?
- (a) 19 (b) 28  
(c) 30 (d) 32
85. If 7 parallel lines are intersected by another set of 7 parallel lines, the number of parallelograms formed is:
- (a) 441 (b) 400  
(c) 49 (d) 98
86. The result of a class were declared. The boy 'X' stood 5<sup>th</sup> in the class. The girl was 8<sup>th</sup> from the last. The positions of the boy 'Z', was 6<sup>th</sup> after 'X', and in the middle of 'X' and 'Y'. The total number of students in the class was:
- (a) 24 (b) 29  
(c) 25 (d) 26
87. A is 300 days older to B and C is 50 weeks older to A. If C was born on Tuesday, on which day was B born?
- (a) Tuesday (b) Thursday  
(c) Wednesday (d) Monday
88. Branches of 5 nationalized banks A, B, C, D and E in Uttar Pradesh are as follows:  
A, B, C, D and E are in Lucknow and Kanpur.  
A, B and E are in Kanpur and Allahabad.  
B, C and D are in Lucknow and Varanasi.  
B, E and D are in Allahabad and Saharanpur.  
C, E and D are in Saharanpur and Moradabad?  
Which bank has branches in all the cities except Moradabad?
- (a) A (b) B  
(c) C (d) D
89. Select ODD ONE OUT form the following pairs:
- (a) May : January  
(b) September : November  
(c) October : April  
(d) January : December





90. If  $A + B$  means A is the daughter of B,  $A \times B$  means A is the son of B and  $A - B$  means A is the wife of B, then  $P \times Q - S$  means
- S is the father of P
  - Q is the daughter of S
  - A is the father of Q
  - None of these
91. In the following series 50 is wrongly placed. Which number will come at place of 50?  
5, 16, 50, 158, 481, .....
- 51
  - 53
  - 48
  - 49
92. Jamia Central Library has 510 visitors on Sundays and 240 visitors on other days. Then the average number of visitors per day in a 30 days month beginning with a Sunday is:
- 285
  - 276
  - 250
  - 280
93.  $6 : 43 :: 5 : ?$
- 63
  - 52
  - 26
  - 31
94. Next term in the following series is:  
122, 197, 290, .....
- 399
  - 400
  - 401
  - 402
95. Select the ODD number from given alternatives:
- 2179
  - 3375
  - 4099
  - 2744
96. In the following series how many '8' are there which are not preceded by '7' and followed by '9'  
7, 8, 9, 9, 8, 5, 4, 3, 8, 9, 5, 8, 9, 8, 7, 7, 8, 9
- One
  - Two
  - Three
  - Four
97. Looking at a portrait of a man, Sanjay said "His mother is the wife of my father's sons", Brother and sisters I have none". At whose portrait was Sanjay looking
- His son
  - His nephew
  - His cousin
  - His uncle
98. In a certain LATE is written as PEXI then code of TRACE is:
- XUEGH
  - XVFGI
  - XVEGI
  - MVELI
99. **Statement :** S1: Some cats are rats.  
S2: All rats are bats.  
S3: Some bats are birds.
- Conclusion :**
- Some birds are cats.
  - Some bats are cats.
  - Some birds are rats.
  - No birds is a rat.

- Which is the conclusions(s) follows from the above statement S1, S2 and S3
- Only C3 follows
  - Either C1 or C4 and C3 follows.
  - Either C1 or C4 and C2 follows.
  - None of these
100. A liquid container is usually filled up in 8 hrs. Due to a leak since the beginning it took 2 hours more to fill up the container. The leak empty the filled container in:
- 30 hrs
  - 40 hrs
  - 28 hrs
  - 34 hrs

## ANSWER KEY

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



## SOLUTION

1. (b)  
Loader
2. (d)  
 $(41)_6 = (121)_b$   
 $24 + 1 = b^2 + 2b + 1$   
 $b^2 + 2b - 24 = 0$   
 $b^2 + 6b - 4b - 24 = 0$   
 $b(b + 6) - 4(b + b) = 0$   
 $b = 4$
3. (a)  
(P, 2), (Q, 1), (R, 4), (S, 3)
4. (a)  
Per to per Network.
5. (c)  
EBCDIC
6.  $(427)_{16} - (56)_6$   
 $4 \ 2 \ 7$   
 $= \frac{56}{(3 \ B \ 1)_{16}}$
7. (b) RICS
8. (b)  
Redundant Array of  $\frac{\text{Inexpensive}}{\text{independent}}$  disk
9. (b) SULTRY
10. (d) Experience
11. (d)  $-2^{n-1}$  to  $2^{n-1} - 1$
12. (b)  
(1, S), (1, S), (2, R), (3, P), (4, Q)
13. (c) ROM
14. (a) Zing
15.  $8 \text{ GB} = 2^{30}$  bytes
16. (a) x, y and z are equal.
17. (a) product of  
00001101 and  
0000 1111  
 $(00001101)_2 = (13)_{10}$   
 $(00001111)_2 = (15)_{10}$   
 $13 \times 15 = (195)_{10}$   
 $(11000011)_2$
18. (d) Q,R
19. (a) Santoshi Nakamoto
20. (c) 219
21. Set A = 2 Element  
Set B = 4 Element  
 $n(A \Delta B) = 8$   
subset of A x B having 30r more element.  
Total subset of A x B =  $2^8$   
Required .....  
 $2^8 - ({}^8C_0 + {}^8C_1 + {}^8C_2)$   
 $2^8 - (01 + 8 + \frac{8 \times 7}{2})$   
 $2^8 - (9 + 28)$   
 $2^8 - 37$   
 $256 - 37$   
219 Ans.
22. (b)  $A \cap C$  and  
 $A \cup B = A \cup C$   
 $B = C$
23. (b) 13  
 $\tan^{-1}(\tan 13)$   
 $\Rightarrow 13$ .
24. (c)  
 $[\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x]$   
 $\cot(3x - 2x) = \frac{1 + \cot 3x \cot 2x}{\cot 2x - \cot 3x}$   
 $\cot 3x \cot 2x = \cot x \cot 2x - \cot x \cot 3x - 1$   
 $[\cot x \cot 2x - \cot x \cot 2x + \cot x \cot 3x + 1 - \cot 3x \cot x]$   
 $= 1$
25. (a)
26.  $|Z-1| = |Z+1| = |z-i|$   
 $|z-1| = |x+iy+1| = \sqrt{(x-1)^2 + y^2}$   
 $|z+1| = |x+iy+1| = \sqrt{(x+1)^2 + y^2}$   
 $|z-i| = |x+iy-i| = \sqrt{x^2 + (y-1)^2}$   
 $|z-1| = |z+1| = |z-i|$   
 $\sqrt{(x-1)^2 + y^2} = \sqrt{(x+1)^2 + y^2} = \sqrt{x^2 + (y-1)^2}$   
 $\sqrt{x^2 + (y-1)^2}$   
 $(x-1) = \pm(x+1)$   
 $x = 0$   
 $(x+1)^2 + y^2 = x^2 + (y-1)^2$   
 $X = 0$   
 $1 + y^2 (y-1)^2$   
 $1 + y^2 = 4^2 + 1 - 2y$   
 $y = 0$   
 $z = 0$   
Therefore there is only the complex number.
27.  $(1+w)^7 = A + Bw$   
Then  $A + B$   
 $W^3 = 1$   
 $1 + w + w^2 = 0$   
 $1 + w = -w^2$   
 $A + Bw = (1+w)(-w^2)^6$   
 $(1+w)(w^{12})$   
 $(1+w)(w^3)^4$   
 $W^3 - 1$   
 $(1+w)$   
 $A + Bw = 1 + w$





$$A = 1$$

$$B = 1$$

$$(A + B) = (1 + 1) = 2$$

28.  $x + y + z = 5$   
 $z = 5 - x - y$   
 $xy + yz + zx = 3$   
 $xy + z(x + y) = 3$   
 $xy + (5 - x - y)(x + y) = 3$   
 $xy + x(5 - x - y) + y(5 - x - y) = 3$   
 $xy + 5x - x^2 - xy + 5y - xy - y^2 = 3$   
 $y^2 + xy - 5x + x^2 - 5y + 3 = 0$   
 $y^2 + y(x - 5) + x^2 - 5x + 3 = 0$   
 For real values of y  
 $D \geq 0$   
 $(x - 5)^2 - 4 \times 1(x^2 - 5x + 3) \geq 0$   
 $x^2 + 25 - 10x - 4x^2 + 20x - 12 > 0$   
 $-3x^2 - 10x - 13 < 0$   
 $3x^2 - 13x + 3x - 13 < 0$   
 $x(3x - 13) + 1(3x - 13) < 0$   
 $-1 < x < 13/3$   
 $(-1, 13/3)$

29.  $1 + \dots + 100$   
 $\frac{100(100+1)}{2}$   
 $101 \times 50$   
 $5050$   
 $5050/2 = 2525$   
 $5050/5 = 1010$   
 $5050/10 = 505$   
 $= 2525 + 1010 - 505$   
 $3535 - 505$   
 $= 3030$   
 From 1 to 100  
 Sum of no. div. by 2 = 2550  
 Sum of no. div. by 5 = 500  
 Required = 3050 Ans.

30.  $27^{40}$  divide by 12  
 $\frac{(3)^{3 \times 40}}{3^{119}} = \frac{3^{120}}{3^{119}}$   
 $\frac{12}{3}$   
 Power odd remainder out to be 3.

31.  $1 + \frac{1}{4 \cdot 2!} + \frac{1}{6 \cdot 4 \cdot 6!} + \dots$   
 $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$   
 $e^x = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$   
 $\frac{e^x + e^{-x}}{2} = 2 + \frac{2x^2}{2!} + \frac{2x^4}{4!} + \dots$   
 $1 + \frac{x^2}{x!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \dots$   
 Put  $x = 1/2$   
 $\frac{e^{1/2} + e^{-1/2}}{2} = 1 + \frac{1}{4 \cdot 2!} + \frac{1}{16 \cdot 4!} + \dots$   
 $\frac{e+1}{2\sqrt{e}}$

32.  $a + b = 6\sqrt{a \cdot b}$

$$(a+b)^2 = 36 ab$$

$$(a-b)^2 = (a+b)^2 - 4ab$$

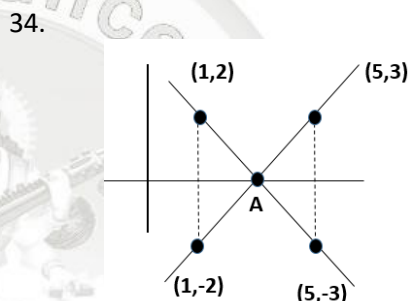
$$= 36ab - 4ab$$

$$= 32 ab$$

$$a - b = \sqrt{32} \sqrt{ab} = 4\sqrt{2} \cdot \sqrt{ab}$$

$$\frac{a+b}{a-b} = \frac{6\sqrt{ab}}{4\sqrt{2}\sqrt{ab}} = \frac{3}{2\sqrt{2}}$$

33. Equation of Attitude AD  
 AD line is parallel to Y-axis through (3,4)  
 $x = 3$  .....(1)  
 equation of OE  
 $y = -\frac{3-4}{4-0} x$   
 $y = \frac{x}{4}$  .....(2)  
 Solving the equation (1) & (2)  
 $0, (3, 3/4)$



$$(y + 3) = \frac{2+3}{1-5} (x - 5)$$

$$y + 3 = \frac{5}{-4} (x - 5)$$

$$4y + 12 - 5x + 25$$

$$5x + 4y - 13 = 0 \quad \text{.....(1)}$$

$$(y - 3) = \frac{-2-3}{1-5} (x - 5)$$

$$4y - 12 = 5x - 25$$

$$5x - 4y - 13 = 0 \quad \text{.....(2)}$$
 equation (1) and (2)  
 $5x + 4y - 13 = 0$   
 $5x - 4y - 13 = 0$   
 $10x = 26$   
 $x = 26/10$   
 $x = 13/5$   
 $A\left(\frac{13}{5}, 0\right)$  Ans.

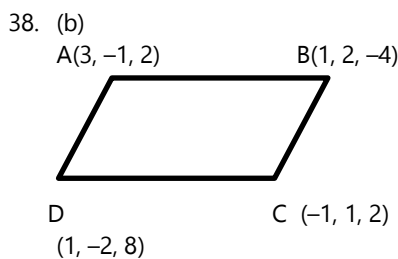
35. (b)  
 36. (d) Hyperbola  
 37. (a)  
 $\frac{x^2}{25} + \frac{y^2}{9} = 1$   
 Let the equation be  
 $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$   
 Given,  $2a = 10$   
 $A = 5$   
 $26 = 8 \Rightarrow C = 4$   
 $C^2 = a^2 - b^2$



$$b = \sqrt{25 - 16} = 3$$

required equation  $\Rightarrow$

$$\frac{x^2}{25} + \frac{y^2}{9} = 1$$



39. (b)
- No. of words starts  
With A = 4! = 24
- No. of words starts with  
I = 4! = 12
- 2!
- No. of words starts with  
J = 4! = 12
- 2!
- 24 + 12 + 12 = 48 words completed
- Hence, 50<sup>th</sup> word must starts with M
- So MAAJI

40. (a)

$$\lim_{n \rightarrow 0} \left[ \frac{\sin x}{x} \right]$$

$\sin x < x$

$$\frac{\sin x}{x} < 1$$

$$\lim_{n \rightarrow 0} \left[ \frac{\sin x}{x} \right] = 0$$

41.

$$\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2x}}{x}$$

LHL

$$\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2(0-h)}}{0-h}$$

$$\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2h}}{-h}$$

$$\lim_{x \rightarrow 0} \frac{\sqrt{\frac{1 - \cos 2h}{(2n)^2}} (2x)^2}{-h}$$

$$\lim_{x \rightarrow 0} \frac{1}{\sqrt{2} (2h)}$$

RHC

$$\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2(o+h)}}{0+h}$$

$$\lim_{x \rightarrow 0} \frac{\sqrt{\frac{1 - \cos 2}{(2x)^2}} (2x)^2}{h}$$

$$\lim_{x \rightarrow 0} \frac{\frac{1}{\sqrt{2}} 2h}{h}$$

RHL =  $\sqrt{2}$

RHL  $\neq$  LHL

No Exit.

$$\Rightarrow 41 + a^2 + b^2 - 96.80 = 41.20$$

$$a^2 + b^2 = 41.20 - 41 + 96.80$$

$$a^2 + b^2 = 20 + 96.80$$

$$a^2 + b^2 = 97.00$$

$$a^2 + b^2 = 97$$

$$a = 4$$

$$b = 9$$

42.

$$1 + 2 + 6 + a + b = 4.4 \times 5$$

$$9 + a + b = 22.0$$


$$a + b = 13$$

Variance = 8.24

$$= \frac{1}{5} (1^2 + 4^2 + 6^2 + a^2 + b^2) - (4.4)^2 = 8.24$$

$$= \frac{1}{5} (1 + 4 + 36 + a^2 + b^2) - 19.36 = 8.24$$

43. (b)



P(a) correct envelope =  $\frac{1}{3}$

P(A') =  $\frac{2}{3}$

For P(E) when exactly 1 in correct envelop

1 - [(all in correct) + (no incorrect)]

$$1 - \left[ \frac{1}{27} + \frac{8}{27} \right]$$

$$1 - \frac{9}{27} \Rightarrow 1 - \frac{1}{3}$$

$$\frac{2}{3}$$

44. (a)

Total ways = 4! = 24

A before B  $\Rightarrow$  12 ways

Required PLF =  $\frac{12}{24} = \frac{1}{2}$

45. (a)

f: [0, 3]  $\rightarrow$  [1, 29]

$$f(x) = 2x^3 - 15x^2 + 36x + 1$$

#for one-one

$$f'(x) = 6x^2 - 30x + 36$$

$$x^2 - 5x + 6 = 0$$

$$x = 2, 3$$

F(x) is increasing for  
 $x < 2$  or  $x > 3$

(f'(x) > 0)

2 < x < 3 (f'(x) < 0)

f(x) is not strictly increasing or decreasing

f(x) is not one-one

# for onto





$f(x)$  is not as many at  $x = 2$   
 $f(2) = 29$   
 $f(0) = 1$        $f(b) = 28$   
 range of  $f(x) = [1, 29]$   
 which is equal to co-domain  
 $f(x)$  is onto  
 $f(x)$  is onto but not one-one.

46.  $f: \mathbb{R} \rightarrow \mathbb{R}$

$$f(x) = (3-x^3)^{1/3}$$

$$f(f(f(f(x)))) = ?$$

$$f(f(x)) \Rightarrow$$

$$\{3 - (3 - x^3)^{1/3}\}^{1/3}$$

$$\{3 - 3 + x^3\}^{1/3}$$

$x$

$$f(f(f(x))) \Rightarrow$$

$$(3-x^3)^{1/3}$$

$$F(f(f(f(x)))) \Rightarrow$$

$$[3 - \{(3-x^3)^{1/3}\}^{1/3}]^{1/3}$$

$$(3 - 3 + x^3)^{1/3}$$

$x$ .

47. (b) a null matrix.

48. (b)

$$A = \begin{pmatrix} 2 & -3 \\ -4 & 1 \end{pmatrix}$$

$$A^2 = \begin{pmatrix} 16 & -9 \\ -12 & 13 \end{pmatrix}$$

$$3A^2 + 12A = \begin{pmatrix} 72 & -63 \\ -84 & 51 \end{pmatrix}$$

$$\text{Adj.}(3A^2 + 12A) = \begin{pmatrix} 51 & +63 \\ +84 & 72 \end{pmatrix}$$

49. (a)  $a, b, c$  are in A.P.

$$\begin{vmatrix} x+2 & x+3 & x+2a \\ x+3 & x+4 & x+2b \\ x+4 & x+5 & x+2c \end{vmatrix}$$

Let  $a, b, c \Rightarrow 1, 1, 1$

$$\begin{vmatrix} x+2 & x+3 & x+2 \\ x+3 & x+4 & x+2 \\ x+4 & x+5 & x+2 \end{vmatrix}$$

$$\begin{vmatrix} x+2 & x+3 & x+2 \\ 1 & 1 & 0 \\ 2 & 2 & 0 \end{vmatrix}$$

$$x+2(2-2) - (x-3)(0) + 0 = 0 \text{ Ans.}$$

50. (b) Let's assume that

Matrix

$$A = \begin{vmatrix} x & x & x \\ -x & x & -x \\ x & x & -x \end{vmatrix}$$

$$A = -4x^3$$

$$X = 1 \text{ or } -1$$

$$\text{Min value (a) } -4.$$

51.  $f(x) \min(1x+1, 1x+1) [1x+4]$

$$f(x) = \begin{cases} 1 & , & -\infty < x \leq -2 \\ -x-1 & , & 2 < x \leq -1 \\ x+1 & , & 0 < x \leq 2 \\ 1-x & , & 0 < x \leq 1 \end{cases}$$

$$x-1 \quad , \quad 1 < x \leq 2$$

$$1 \quad , \quad 2 < x < \infty$$

$$f^1(-2^-) = 0 \quad f^1(-2^+) = -1$$

$$f^1(-1^-) = -1 \quad f^1(-1^+) = 1$$

$$f^1(0^-) = 1 \quad f^1(0^+) = -1$$

$$f^1(1^-) = -1 \quad f^1(1^+) = 1$$

$$f^1(2^-) = 1 \quad f^1(2^+) = 0$$

5 non differentiable points.

53.  $\lim_{n \rightarrow \infty} \left[ \frac{1+a}{x} + \frac{b}{x^2} \right]^{2x}$  (1st) from

$$e^{\lim_{n \rightarrow \infty} \left[ \frac{a}{x} + \frac{b}{x^2} \right] 2x}$$

$$e^{\lim_{n \rightarrow \infty} \left[ a + \frac{b}{x} \right]} = e^2$$

$$a = 2, \quad b \in \mathbb{R}.$$

54. (b)  $e^y = 1 + x^2$

$$y = \log(1 + x^2)$$

$$dy = 2x$$

$$dx = 1 + x^2$$

$$x^2 \geq 0$$

$$x^2 + 1 \geq 1$$

$$x^2 + 1 \geq 1$$

$$2x - \frac{1}{1+x^2} \leq 1$$

$$\frac{2x}{1+x^2}$$

$$|m| \leq 1$$

55. (c)  $f(x) = x^3 ax^2 + bx + 5 \sin^2 x$

$$f^1(x) = 3x^2 + 2ax + b + 5 \sin 2x$$

Hence  $D < 0$

$$4a^2 - 4(3)(b + 5 \sin^2 x)^2 < 0$$

$$4a^2 - 12b - 60 \sin 2x < 0$$

$$A^2 - 12b - 60 \sin 2x < 0$$

$$A^2 - 3b - 15 \sin 2x < 0$$

$$\text{Min value of } \sin 2x = -1$$

$$a^2 - 3b + 1520$$

56.  $f(x) = \int_1^x e^{-\frac{x^2}{e^2}} (1-t^2) dt.$

57.  $\int_1^2 \left( \frac{1}{x} - \frac{1}{2x^2} \right) e^{2x} dx$

$$t = 2x$$

$$\frac{dt}{dx} = 2$$

$$\frac{dt}{2} = dx$$

$$= \int_2^4 e^t \left( \frac{1}{\frac{t}{2}} - \frac{1}{2\left(\frac{t}{2}\right)^2} \right) \frac{dt}{2}$$

$$= \int_2^4 e^t \left( \frac{2}{t} - \frac{4}{2t^2} \right) \frac{dt}{2}$$

$$\int_2^4 e^t \left( \frac{1}{t} - \frac{2}{t^2} \right) dt$$

$$\left[ e^t \times \frac{1}{t} \right]_2^4$$

$$\left( \frac{e^4}{4} - \frac{e^2}{2} \right)$$

$$= \frac{e^2(e^2-2)}{4}$$

58.  $I = \int_{-\pi/2}^{\pi/2} (x^3 + x \cos x + \tan^5 x + 1) \tan$



$$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x^2 + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x \cos x + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \tan^5 x + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 1 dx$$

As we know that if  $f(x)$  is even function then

$$\int_{-a}^a f(x) dx = 2 \int_0^a f(x) dx$$

Here,  $x^3$ ,  $x \cos x$  and  $\tan^5 x$

are odd function and 1 is an even function

$$I = 0 + 0 + 0 + 2 \int_0^{\pi/2} 1 dx$$

$$= 2 [x]_0^{\pi/2}$$

$$= 2 \times \frac{\pi}{2} = \pi$$

59.  $\int_{1-\tan \theta}^{d\theta}$

$$\frac{\theta}{2} - \frac{1}{2} \log(1 + \cos \theta - \sin \theta) + C$$

60.  $|a + b| = |a - b|$

$$(a + b)^2 = (a - b)^2$$

$$|a|^2 + |b|^2 + a \cdot b = |a|^2 + |b|^2 - 2a \cdot b$$

$$a \cdot b = 0$$

$\vec{a}$  is perpendicular to  $\vec{b}$

61.  $2x + y + 2z = 8$

$$4x + 2y + 4z - 5 = 0$$

distance between plane

$$2x + y + 2z - 8 = 0 \quad \text{--- } P_1$$

$$4x + 2y + 4z - 16 = 0 \quad \text{--- } P_2$$

$$4x + 2y + 4z + 5 = 0 \quad \text{--- } P_3$$

$$d = \frac{|d_2 - d_1|}{\sqrt{a^2 + b^2 + c^2}} = \frac{|5 + 16|}{\sqrt{4^2 + 2^2 + 4^2}}$$

$$= \frac{21}{62} = \frac{7}{2} \text{ Ans.}$$

62.  $P(\text{speaking truth}) = 3/4$

$$\frac{\frac{3}{4} \times \frac{1}{6}}{\frac{3}{4} \times \frac{1}{6} + \frac{1}{4} \times \frac{5}{6}}$$

$$= \frac{\frac{1}{8}}{\frac{1}{8} + \frac{5}{24}} = \frac{1}{8}$$

$$3/8 \text{ Ans.}$$

63.  $P(a) = \frac{3}{4} = P$

$$P(\bar{A}) = 1/14 = 2$$

hitting target atleast one

$$1 - {}^n C_0 \left(\frac{3}{4}\right)^0 \left(\frac{1}{4}\right)^n > 0.99$$

$$n(-0.99) > \left(\frac{1}{4}\right)^n$$

$$\frac{0.01}{100} > \left(\frac{1}{4}\right)^n$$

$$\frac{1}{100} > \frac{1}{4^n}$$

$$256 > 100$$

$$n = 4 \text{ Ans.}$$

64.  $P(a) = 0.3$

P (b) are Independent Event

$$P(A \cup B) = 0.3 + 0.6 = 0.9$$

within A nor B

$$= 1 - 0.9 = 0.1$$

$$P(A \cap B) = P(a) \cdot P(b)$$

$$= 0.3 \times 0.6$$

$$P(A \cap B) = 0.18$$

$$P(A \cup B) = 0.3 + 0.6 - 0.18$$

$$= 0.90 - 0.18$$

$$P(A \cup B) = 0.72$$

Neither A nor B

$$= 1 - 0.72$$

$$= 0.28 \text{ Ans.}$$

65.  $f(x) = \cos\left(\frac{2x}{3}\right) - \sin\left(\frac{4x}{5}\right)$

$$\text{Period} = \frac{2\pi \times 3}{2} - \frac{2\pi \times 5}{4}$$

$$= 3\pi, \frac{5}{2}\pi$$

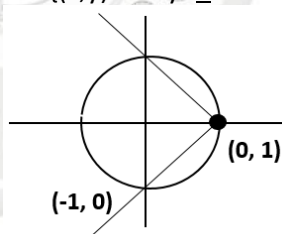
$$\text{LCM}\left(3\pi, \frac{5}{2}\pi\right)$$

$$\left(\frac{6\pi}{2}, \frac{5\pi}{2}\right) = \frac{30\pi}{2}$$

$$= 15\pi$$

66. (b)  $\infty$

67.  $A = \{(x, y) : x^2 + y^2 \leq 1 \text{ and } y^2 < 1 - x\}$



$$A = \text{Area of semi circle} + 2 \int_0^1 \sqrt{1-x} dx$$

$$\frac{\pi r^2}{2} + 2 \left[ \frac{-(1-x)^{3/2}}{-3/2} \right]_0^1$$

$$= \frac{\pi}{2} + 2 \times \frac{2}{3} = \frac{\pi}{2} + \frac{4}{3} \text{ sq. units}$$

68.  $\frac{dy}{dx} = \frac{y}{x} + \sec\left(\frac{y}{x}\right)$

$$\text{Put } y = vx = v \Rightarrow \frac{y}{x} = v$$

$$v + x \frac{dv}{dx} = v + \sec v$$

$$= \cos v \Rightarrow dv = \frac{dx}{x}$$

$$\int \cos v dv = \int \frac{dx}{x}$$

$$\sin v = \log |x| + C$$

$$\sin\left(\frac{y}{x}\right) = \log x + C$$

The curve passes through  $\left(1, \frac{\pi}{6}\right)$

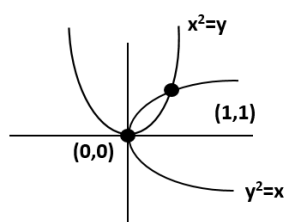


$$C = \frac{1}{2}$$

$$\sin\left(\frac{y}{x}\right) = \log x + \frac{1}{2}$$

69.  $P^2 = \begin{bmatrix} 0 & w \\ w & 0 \end{bmatrix} \begin{bmatrix} 0 & w \\ w & 0 \end{bmatrix} = \begin{bmatrix} w^2 & 0 \\ 0 & w^2 \end{bmatrix}$   
 $P^3 = \begin{bmatrix} w^2 & 0 \\ 0 & w^2 \end{bmatrix} \begin{bmatrix} 0 & w \\ w & 0 \end{bmatrix} = \begin{bmatrix} 0 & w^3 \\ w^3 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$   
 $P^4 = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 0 & w \\ w & 0 \end{bmatrix}$   
 $P^4 = \begin{bmatrix} w & 0 \\ 0 & w \end{bmatrix}$   
 $P^2 = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$  Identity matrix

70.



$$x^2 = y \quad y^2 = x$$

$$y = x^2$$

$$(x^2)^2 = x$$

$$x^4 = x$$

$$x^3 = 1$$

$$x = 1$$

$$y = 1 \quad (1, 1)$$

$$= \int_0^1 x^{\frac{3}{2}} - x^{\frac{3}{3}} dx$$

$$\frac{2}{3} - \frac{1}{3} = \frac{1}{3}$$

$$= \frac{1}{3} \text{ sq. unit Area}$$

72. (b)  
 73. (d)  
 74. (c)  
 75. (a)  
 76. (b)  
 77. (d)  
 78. (b)  
 79. ()  
 80. (b)

81.  $A + b + C = 581$   
 $4A = 5B$   
 $\frac{A}{5} = \frac{B}{4}$   
 $A : B = 5 : 4$   
 $5B = 7C$   
 $\frac{B}{7} = \frac{C}{5}$   
 $B : C = 7 : 5$   
 $A : B : C \Rightarrow$   
 $5 : 4 : 4$   
 $7 : 7 : 5$   
 $35 : 28 : 20$

83.  $\rightarrow 581$   
 $1 \rightarrow 7$   
 Difference between  
 A and C

$= 7 \times 15 = 105$   
 82. Reduced = 20%  
 Increased = 60%  
 $= -20 + 60 + \frac{-20 \times 60}{100}$   
 $= 40 - 12$   
 $= 28\%$

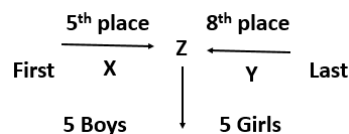
83. 90 times in 95 second  
 1 times =  $\frac{95}{90}$   
 315 times in 323 second  
 1 times =  $\frac{323}{315}$   
 L.C.M. of  $\frac{95}{90}$  &  $\frac{323}{315}$   
 $= \frac{\text{LCM of } 95 \text{ \& } 323}{\text{HCF of } 90 \text{ \& } 315}$   
 $= \frac{19 \times 5 \times 17}{5 \times 3 \times 3}$   
 $= \frac{19 \times 17}{9}$

In first hour tick together  
 $= \frac{3600 \times 9}{19 \times 17}$   
 $= \frac{32400}{323}$   
 $= 101$

84. David's position =  $11 + 57x$   
 Albert's position =  $51 - 63x$   
 $11 + 57x = 51 - 63x$   
 $120x = 40$   
 $x = \frac{1}{3}$   
 David's position =  $11 + 57 \times \frac{1}{3}$   
 $11 + 19 = 30$

85. (a)

86. (a)



Rank of Z = 5th + 6th = 11th from top  
 Rank of Y = Rank of C + 5  
 $= 11 + 5 = 16$ th from top  
 Total students =  $16 + 8 = 24$

87. (d)

A is 300 days older than B  
 b is born after A, So his birthday will be 6 days after the day of birthday of A  
 B was born on (Tuesday + 6)  
 $=$  Monday

Direction 89 and 90:

City	Banks
Lucknow	A, B, C, D





Kanpur	A, B, C, D, E
Allahabad	A, B, E
Saharanpur	B, E, D
Moradabad	E, C, D
Varanasi	B, C, D

88. (b)  
89. (c)  
October 31 Days  
April 30 Days

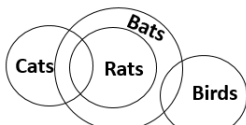
90. (a)  $P \times Q - S$   
 $Q^- \text{ --- } S^+$   
|  
 $P^-$   
(a) 'S' is father of 'P'

91. Incomplete  
92. (a) No. of visitors on 5 Sunday  
 $510 \times 5 = 2550$   
No. of other days visitor  
 $240 \times 25 = 6000$   
Average =  $\frac{(2550+6000)}{30} = 285$

93.  $6 : 43 :: 5 : ?$   
94. (c)  
122      197      290      401  
  
 $(11^2)+1$     $(14^2)+1$     $(17^2)+1$     $(20^2)+1$

96. (b)  
97. (c)  
His      Son  
 $\leftarrow \Delta$   
 $\Delta + O$   
|      |  
man   woman

98. L      A      T      E  
+5      +5      +5      +5  
P      E      X      I  
  
T      R      A      C      E  
+5      +5      +5      +5      +5  
X      V      E      Q      I

99. (d)  


100. (b) Time taken to fill = 8 hours  
Time is taken to fill with leakage = 10 hrs.  
Let the leakage done will empty the full tank in x hours

Total work = 40 units (LCM of 8 and 100)  
Capacity to fill the tank without leakage (a) =  $40/8 = 5$  unit  
Capacity to fill the tank with leakage  
(A + x) =  $40/10 = 4$  unit/h  
X = 1 unit/hr  
To empty a full tank, (ie. 40 unit) leakage will 40

hour

