



**01**  
No. Classes

Website:  
[www.questions.maarula.in](http://www.questions.maarula.in)

Mathem solvex  
for PYQ

# MAARULA CLASSES

# JAMIA 2022

- Topic Wise Weightage & Detailed Trend Analysis
  - All Last Years Papers
  - Syllabus & Important Documents
  - Topic Wise All PYQ's CUET-PG - FREE TEST
- Under the Guidance of**  
**Amit Katiyar**
- Complete Notes**



<https://youtube.com/@maarulaclassess?si=XkKXyJ2a16NiK-K>

**AMIT KATIYAR**  
(MCA-JNU)

0512-3163515      9935985550



- The instructions for starting the computer are housed in \_\_\_\_  
 (a) RAM (b) CD-ROM  
 (c) ROM chip (d) None of these
- \_\_\_\_\_ is the process of dividing the disk into tracks and sectors.  
 (a) Tracking (b) Crashing  
 (c) Allotting (d) Formatting
- In MICR, C stands for .....  
 (a) Computer (b) Color  
 (c) Code (d) Character
- The terms Goodput, Throughput and Maximum throughput are most closely associated with which among the following in computers?  
 (a) Response Time  
 (b) Bit Rate  
 (c) Command Line interface  
 (d) Random memory
- What will be the output of the following statement?  
`printf (3 + "goodbye")`  
 (a) goodbye (b) bye  
 (c) odybe (d) dbye
- What will be output of following statements?  
`int i = 1, J ; J = i - - - 2, printf ("%d", j) :`  
 (a) -2 (b) -1 (c) -3 (d) 0
- What will be output of following statements?  
`int i = 1, j ; j = - - i - 2; printf ("%d", j);`  
 (a) -2 (b) -1 (c) -3 (d) 0
- What is the output of following C program?  
`#include <stdio.h>`  
`int main ()`  
`{`  
`char grade [] = {'A', 'B', 'C'} ;`  
`printf ("GRADE=%C, ", *grade);`  
`printf ("GRADE = %d", grade);`  
`return 0;`  
`}`  
 (a) GRADE = some address of array, GRADE=A  
 (b) GRADE = A, GRADE = some address of array  
 (c) GRADE = A, GRADE = A  
 (d) Syntax error
- What is the output of following C program:  
`int main ()`  
`{`  
`int a [3] = {10, 12, 14};`  
`a [1] = 20 : int i = 0;`  
`while (i < 3)`  
`{printf ("%d", a[i]);`  
`i++;`  
`}return 0;`  
`}`  
 (a) 20 12 14 (b) 10 12 20  
 (c) 10 20 14 (d) Run-time error
- Which one is not a reserve keyword in C language?  
 (a) auto (b) main  
 (c) case (d) register
- The number of groups that can be made from 5 different green balls, 4 different blue balls and 3 different red balls, if at least 1 green and 1 blue ball is to be included?  
 (a) 3700 (b) 3720  
 (c) 4340 (d) 3600
- In a unique hockey series between India & Pakistan, they decide to play on till a team wins 5 matches. The number of ways in which the series can be win if no match ends in a draw is  
 (a) 126 (b) 252 (c) 225 (d) 200
- 20 persons are sitting in a particular arrangement around a circular table, 3 persons are to be selected for leaders. The number of ways of selection of 3 persons such that no 2 were sitting adjacent to each other is  
 (a) 600 (b) 900 (c) 800 (d) 700
- If A and B are two independent events in sample space, then  $P(\bar{A}/\bar{B})$  equals:  
 (a)  $1-P(A/\bar{B})$  (b)  $1-P(\bar{A}/\bar{B})$   
 (c)  $1-P(B)$  (d)  $1-P(A)$
- 100 identical coins, each with probability p, of showing heads are tossed. If  $0 < p < 1$  and the probability of showing heads on 50 coins is equal to that of heads showing up on 51 coins, then value of p is  
 (a) 1/2 (b) 49/101  
 (c) 51/101 (d) 52/101



16. At any time, the total no. of people on the earth shake hands an odd no. of times is  
 (a) Odd  
 (b) Even  
 (c) Can't say  
 (d) Less information provided
17. Let 2 fair six-faced dice A and B be thrown simultaneously. If  $E_1$  the event that die A shows up 4,  $E_2$  is the event that die B shows up 2 and  $E_3$  is the event is that the sum of the two no's both on the dice is odd then which statement is false  
 (a)  $E_1$  and  $E_2$  are independent  
 (b)  $E_2$  and  $E_3$  are independent  
 (c)  $E_1$  and  $E_3$  are independent  
 (d)  $E_1, E_2$  and  $E_3$  are independent
18. The sum of 3 numbers in A.P. is -3, and their product is 8. Then sum of squares of the number is  
 (a) 9 (b) 10 (c) 21 (d) 12
19. If  $x, 2x + 2, 3x + 3$  are in G.P., then the 4<sup>th</sup> term is  
 (a) 27 (b) -27 (c) 13.5 (d) -13.5
20. In a sequence of 21 terms, the first 11 terms are in A.P. with common difference 2 and the last 11 terms are in G.P. with common ratio 2. If the middle term of A.P. is equal to the middle term of G.P., then the middle term of the entire sequence is  
 (a) -10/31 (b) 10/31  
 (c) 32/31 (d) -31/32
21. If  $1, \log_9(3^{1-x} + 2)$  and  $\log_3(4 \cdot 3^x - 1)$  are in A.P., then  $x$  equals  
 (a)  $\log_3 4$  (b)  $1 - \log_3 4$  (c)  $1 - \log_4 3$  (d)  $\log_4 3$
22. Ram secures 100 marks in maths, then he will get a smartphone. converse of this statement is:  
 (a) If Ram will get a smartphone, then he does not secure 100 marks in maths.  
 (b) If Ram will not get a smartphone, then he secures 100 marks in maths.  
 (c) If Ram will get a smartphone, then he secures 100 marks in maths.  
 (d) Ram gets both the smartphone and the marks.
23. Negation of  $q \vee \sim (p \wedge r)$  is  
 (a)  $q \wedge \sim (p \wedge r)$  (b)  $\sim q \wedge (p \wedge r)$   
 (c)  $\sim q \vee (p \wedge r)$  (d)  $\sim q \vee \sim (p \wedge r)$
24. The median of a set of 9 distinctive observations is 20.5. If each of the largest 4 observations of the set is increased by 2 then the median of the new set  
 (a) Is increase by 2  
 (b) Is decreased by 2  
 (c) Is two times the original median  
 (d) Remains same as that of original set
25. The variance of first 50 even natural numbers is  
 (a) 699 (b) 833  
 (c) 833/4 (d) 437/4
26.  $(p \wedge \sim q) \wedge (\sim p \wedge q)$  is  
 (a) A tautology  
 (b) Neither tautology nor a contradiction  
 (c) A contradiction  
 (d) Contradiction and tautology
27. Marks obtained by 4 students are : 25, 35, 45, 55. The average deviation from the mean is  
 (a) 10 (b) 9 (c) 7 (d) 8
28. The numbers 3, 5, 7, 4 have frequencies  $x, x + 4, x - 3, x + 8$ . If their arithmetic mean is 4, the value of  $x$  is  
 (a) 7/4 (b) 5/3 (c) 2/3 (d) 5/2
29. For two datasets, each of size 5, the variances are given to be 4 and 5 and the corresponding means are given to be 2 and 4 respectively. The variance of combined dataset is  
 (a) 5/2 (b) 6  
 (c) 11/2 (d) 13/2
30. If  $\begin{vmatrix} x & 3 & 6 \\ 3 & 6 & x \\ 6 & x & 3 \end{vmatrix} = \begin{vmatrix} 2 & x & 7 \\ x & 7 & 2 \\ 7 & 2 & x \end{vmatrix} = \begin{vmatrix} 4 & 5 & x \\ 5 & x & 4 \\ x & 4 & 5 \end{vmatrix} = 0$ , then  $x$  is equal to  
 (a) 0 (b) 3 (c) -9 (d) None
31. If A, B, C are angles of a triangle then value of Determinant  $\begin{vmatrix} \sin 2A & \sin C & \sin B \\ \sin C & \sin 2B & \sin A \\ \sin B & \sin A & \sin 2C \end{vmatrix}$   
 (a) 0 (b)  $\pi$   
 (c)  $2\pi$  (d) None
32. If  $\begin{vmatrix} a & p & x \\ b & q & y \\ c & r & z \end{vmatrix} = 16$ , then the value of  $\begin{vmatrix} p+x & a+x & a+p \\ q+y & b+y & b+q \\ r+z & c+z & c+r \end{vmatrix}$  is  
 (a) 4 (b) 8 (c) 16 (d) 32



33. If  $\begin{vmatrix} x & 3 & 6 \\ 3 & 6 & x \\ 6 & x & 3 \end{vmatrix} = \begin{vmatrix} 2 & x & 7 \\ x & 7 & 2 \\ 7 & 2 & x \end{vmatrix} = \begin{vmatrix} 4 & 5 & x \\ 5 & x & 4 \\ x & 4 & 5 \end{vmatrix} = 0$ , then  $x$

is equal to

- (a) 0 (b) 3  
(c) -9 (d) 32

34. Evaluate the following integral:

$$\int_{-2}^2 \frac{3x^2 + 2|x| + 1}{x^2 + |x| + 1} dx$$

- (a)  $3\log_e 7$  (b)  $\log_e 6$   
(c)  $2\log_e 7$  (d)  $\log_e 3$

35. Evaluate the following integral:

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \log \left( \frac{2 - \sin x}{2 + \sin x} \right) dx$$

- (a) 1 (b) 0  
(c) -1 (d) 2

36. Solve the following differential

$$x \frac{dy}{dx} + 1 = 0; y(-1) = 0$$

- (a)  $y = \log |x|$  (b)  $y = 2 \log |x|$   
(c)  $y = \log |2x|$  (d)  $y = -\log |x|$

37. If the matrix  $AB$  is zero, then

- (a) It is not necessary that either  $A = 0$  or  $B = 0$   
(b)  $A = 0$  or  $B = 0$   
(c)  $A = 0$  and  $B = 0$   
(d) None of these

38. Which statement is false?

- (a) If  $f(x)$  is continuous at  $x = a$ , then  $|f(x)|$  is also continuous at  $x = a$   
(b) If  $f(x)$  is continuous at  $x = a$ , then  $f^{-1}(x)$  is also continuous at  $x = a$   
(c) If  $|f(x)|$  is continuous at  $x = a$ , then  $f(x)$  is also continuous at  $x = a$   
(d) None of these

39. The function  $f(x)$  is defined in  $(-5, 5)$  as

$$f(x) = \begin{cases} x, & \text{if } x \in Q \\ -x, & \text{if } x \notin Q \end{cases}$$

- (a)  $f(x)$  is continuous at every  $x$ , except  $x = 0$   
(b)  $f(x)$  is discontinuous at every  $x$ , except  $x = 0$   
(c)  $f(x)$  is continuous everywhere  
(d)  $f(x)$  is discontinuous everywhere

40. The relation  $R = \{(1,1), (2,2), (3,3), (1,2), (2,3), (1, 3)\}$  on a set  $A = \{1,2, 3\}$  is

- (a) Neither Symmetric nor transitive  
(b) Reflexive but not transitive  
(c) Reflexive but not symmetric  
(d) Symmetric and transitive

41. For real numbers  $x$  and  $y$ , define  $xRy$  iff  $x - y + \sqrt{2}$  is an irrational number. Then the relation  $R$  is:

- (a) reflexive (b) symmetric  
(c) transitive (d) None

42. If  $f(x) = ax^7 + bx^3 + cx - 5$ ,  $a, b, c$  are real constants, and  $f(-7) = 7$ , then the range of  $f(7) + 17 \cos x$  is

- (a)  $[-34, 0]$  (b)  $[0, 34]$   
(c)  $[-34, 34]$  (d) None

43. The domain of  $\sqrt{|x-2| - 1} + \sqrt{3 - |x-2|}$  is

- (a)  $[-1, 3] \cup [5, \infty]$  (b)  $[-1, 5]$   
(c)  $[1, 3]$  (d)  $[-1, 1] \cup [3, 5]$

44. If  $x$  is any complex number satisfying  $|z - 3 - 2i| \leq 2$  then the minimum value of  $|2z - 6 + 5i|$  is

- (a) 6 (b) 5 (c) 0 (d) 7

45.  $\arg(z) + \arg(\bar{z})$  ( $z \neq 0$ )

- (a)  $\pi$  (b)  $\pi/2$  (c) 0 (d) None

46. The value of  $b$  for which the equations  $x^2 + bx - 1$  and  $x^2 + x + b = 0$  have one root in common is

- (a)  $\sqrt{2}$  (b)  $-\sqrt{2}$   
(c)  $i\sqrt{5}$  (d)  $-i\sqrt{3}$

47. The coefficient of  $y$  in the expansion of  $(y^2 + \frac{c}{y})^5$  is

- (a)  $20c$  (b)  $10c^3$   
(c)  $10c$  (d)  $20c^2$

48. In the expansion of  $(1+x)^{50}$  the sum of coefficients of odd powers of  $x$  is

- (a)  $2^{50}$  (b) 0 (c)  $2^{49}$  (d)  $2^{51}$

49. If  $R$  is the largest equivalence relation on a set  $A$  and  $S$  is any relation on  $A$ , then

- (a)  $R \subset S$  (b)  $S \subset R$   
(c)  $R = S$  (d) None

50. The number of 4-digit numbers that can be formed with the digits 0,1,2,3,4,5,6,7 so that each number contain digit 1 is

- (a) 1225 (b) 1252 (c) 1522 (d) 480

51. Prototype of a function means \_\_\_\_\_

- (a) Name of function  
(b) Output of function  
(c) Declaration of function  
(d) Input of function

52. Far pointer can access \_\_\_\_\_

- (a) Single memory location  
(b) First and last memory location  
(c) All memory location  
(d) No memory location



53. A pointer that is pointing to NOTHING is called \_\_\_\_\_  
 (a) Dangling pointer (b) Null pointer  
 (c) Far pointer (d) Void pointer
54. What is the similarity between a structure, union and enumeration?  
 (a) All of them let you define new structure  
 (b) All of them let you define new values  
 (c) All of them let you define new data types  
 (d) All of them let you define new pointers
55. How will you free the allocated memory?  
 (a) remove(var); (b) free(var);  
 (c) delete(var); (d) dalloc(var);
56. Which of the following describes the characteristics of SRAM?  
 (a) Based on combination of transistor and capacitor  
 (b) Less consumption of power  
 (c) More clear and more consumption of power  
 (d) Cheap but slow
57. The primary memory (also called main memory) of a personal computer consists of  
 (a) RAM only (b) ROM only  
 (c) both RAM and ROM (d) Cache memory
58. Which of the following has the fastest speed in the computer memory hierarchy?  
 (a) Cache (b) Register in CPU  
 (c) Main memory (d) Disk cache
59. In which type of memory, once the program or data is written, it cannot be changed?  
 (a) EPROM (b) PROM  
 (c) EEPROM (d) None
60. In which type of ROM, data can be erased by ultraviolet light and then reprogrammed by the use or manufacturer?  
 (a) PROM (b) EPROM  
 (c) EEPROM (d) Both a & b
61. In which number system can the binary number 1011011111000101 be easily converted to?  
 (a) Decimal system (b) Gray  
 (c) Octal system (d) Hexadecimal system
62. Which bitwise operator is suitable for turning off a particular bit in a number?  
 (a) && operator (b) || operator  
 (c) & operator (d) ! operator
63. Convert  $(231)_4$  into  $(\quad)_3$   
 (a) 1102 (b) 1201  
 (c) 1100 (d) 1200
64. Convert  $(1278)_{12}$  into  $(\quad)_4$   
 (a) 200330 (b) 220330  
 (c) 12302 (d) 200300
65. Convert  $(110100)_2$  into  $(\quad)_{16}$   
 (a) CD (b) 43  
 (c) 34 (d) D
66. Simplify the following Boolean expression for three variables.  
 $F = A'B'C + A'B'C + ABC' + A'B'C' + ABC + AB'C'$   
 (a)  $A'B + AB'$  (b)  $AC' + BC + A'C'$   
 (c)  $AB' + A' + A'B$  (d)  $A' + B' + A'B$
67. The universal gate is .....  
 (a) NAND gate (b) OR gate  
 (c) AND gate (d) None
68. The inputs of a NAND gate are connected together. The resulting circuit is .....  
 (a) OR gate (b) AND gate  
 (c) NOT gate (d) None of the above
69. Exclusive – OR (XOR) logic gates can be constructed from ..... Logic gates  
 (a) OR gates only  
 (b) AND gates and NOT gates  
 (c) AND gates, OR gates, and NOT gates  
 (d) OR gates and NOT gates
70. .... truth table entires are necessary for a four-input circuit.  
 (a) 16 (b) 4 (c) 8 (d) 12
71. Minimize following 3 variable function  
 $F(A, B, C) = \sum(0,1,6,7)$   
 (a)  $A'B' + AB$  (b)  $A'B + AB'$   
 (c)  $AB$  (d)  $AB' + AB$
72. When some unidentified/ unknown person/ firm sends you mail in a trustworthy/ lucrative way asking for sensitive banks and online payment information, this is a case of \_\_\_\_?  
 (a) Span (b) Hacking (c) Phishing (d) Vishing
73. Which memory card format is most widely used in smartphones?  
 (a) compact Flash (b) Secure Digital  
 (c) Smart Media (d) Memory Stick



74. Which of the following is a popular VoIP application?

- (a) Google chat (b) Skype  
(c) iPhone (d) Wifi

75. Computer language used for Internet is

- (a) HTML (b) Python  
(c) Java (d) None

76. Convert the following number to decimal :  
(1032.2)<sub>4</sub>

- (a) 78 (b) 78.5  
(c) 79 (d) 68.5

77. \_\_\_\_\_ controls the way in which the computer system functions and provides means which users can interact with the computer

- (a) Platform (b) Application software  
(c) Operating system (d) Motherboard

78. Python was conceived in the late \_\_\_\_\_ by Guido van Rossum.

- (a) 1960s (b) 1970s  
(c) 1980s (d) 1990s

79. Which of the following memories must be refreshed many times per second?

- (a) EPROM (b) ROM  
(c) Static RAM (d) Dynamic RAM

80. USB-type storage device is

- (a) Secondary (b) Axillary  
(c) Tertiary (d) Primary

**Directions for Qs. 81 & 82: Choose the best word from the options.**

81. Climate change is one of the most \_\_\_\_\_ contested environmental debates of our time.

- (a) hot (b) heated  
(c) hotly (d) hoting

82. Will the Gulf stream ocean current \_\_\_\_\_ disrupted? \_\_\_\_\_ way, Antarctica is a crucial element in this debate.

- (a) be, either (b) was, neither  
(c) is, either (d) are, neither

83. Identify the word which means the same as HEAVING UP.

- (a) hiding (b) running away  
(c) climbing (d) raising

84. "Science is actually doing less than nothing." Here the word ACTUALLY is

- (a) noun (b) Verb  
(c) adjective (d) adverb

85. Noun form of INTELLECTUAL is

- (a) Intellectually (b) Intellect  
(c) Intelligence (d) Intelligent

86. The verb form of PRESSURE is

- (a) Pressuring (b) Pressuringly  
(c) Press (d) Pressing

**Direction for Qs. 87 – 90:** Supply the correct tense forms of the verb given in the brackets.

87. I certainly \_\_\_\_\_ (help) my colleague if I had been there.

- (a) will help (b) helped  
(c) would have helped (d) should have helped

88. He always \_\_\_\_\_ (try) to prove that the earth revolves round the sun.

- (a) tried (b) tries  
(c) was trying (d) is trying

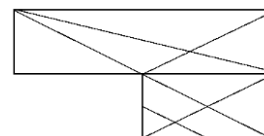
89. The train had left before I \_\_\_\_\_ (reach) the station.

- (a) reach (b) was reaching  
(c) reached (d) reaches

90. Syam told Sita that she \_\_\_\_\_ (play) tennis.

- (a) was playing (b) had been playing  
(c) is playing (d) will play

91. How many triangles are there in this figure?



- (a) 19 (b) 21 (c) 24 (d) 25

92. I am facing south, I turn right and walk 20m. Then I turn right again and walk 10 m. Then I turn left and walk 10 m and then turning right walk 20 m. Then I turn right again and walk 60 m. In which direction am I from the starting point?

- (a) North (b) North-west  
(c) East (d) North east

93. Identify the wrong term in this series:

- 31, 29, 31, 30, 28, 30, 29, 27, 26  
(a) 29 (b) 28  
(c) 27 (d) 26



94. If D=23, H = 19, decode 8767  
 (a) IGFH (b) STUR (c) STUT  
 (d) ZYXW
95. If BEAT is written as GIDV, then SOUP may be written as  
 (a) XSXR (b)ZSYS (c) XSYS  
 (d) ZYXW
96. If  $213 = 419$ ,  $322 = 924$ ,  $415 = 16125$ ; then  $215 = ?$   
 (a) 425 (b) 1625 (c) 4125  
 (d) 2541
97. If A + B means B is the brother of A ; A X B means B is the husband of A : A - B means A is the mother of B ; A % B means A is the father of B, which of the following expression shows that Q is the grandmother of T?  
 (a)  $Q - P + R \% T$  (b)  $P X Q \% R - T$   
 (c)  $P X Q \% R + T$  (d)  $P + Q \% R - T$

**Directions (98-99) :** Find the relation of order in which letters have been grouped together in the first two sets and then find a set of letters to fit in the place of question mark.

98. ARUN : CTWP :: RITA : ?  
 (a) TKCV (b) IMOP  
 (c) TKVC (d) TVCK
99. THIN : MCFM :: PRTV : ?  
 (a) IMQU (b) INQU  
 (c) INRV (d) IMRV
100. If 'HEALTH' is written as 'GSKZDG', then how will 'NORTH' be written in that code?  
 (a) OPSUI (b) GSQNM  
 (c) FRPML (d) IUSPO

DOWNLOAD- ALL THE PAPERS AVAILABLE

<https://maarula.in/download->

ON THE WEBSITE VISIT AT:

[www.maarula.in](http://www.maarula.in)

DOWNLOAD OUR APP :

MAARULA MATHEM -E LEARNING

### ANSWER KEY

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



## SOLUTION

- (c) ROM chip
- (d) Formatting
- (d) Character
- (b) Bit rate
- (d) dbye

6. (b)  
 int l = 1, j;  
 j = l - - - - 2  
 printf ("%d", j); = -1

7. (a)  
 int l = 1, j,  
 j = - - - - 2;  
 printf ("%d", j)  
 = -1 - 2  
 = 0 - 2 = 2 - 2

8. ( )  
 # include < < stdio.h>  
 Char grade [ ] = {'A', 'B', 'C'}  
 Printf ("GRADE = %C", grade);  
 Printf ("GRADE= %d", grade);  
 Return o;

9. (c)  
 int main ()  
 {  
 Int a[3] = {10, 12, 14};  
 a[1] = 20; int l = o;  
 while {l < 3)  
 printf ("%d", a[i]);  
 i + + ;  
 10, 20, 14

10. (b) main

11. (b)  
 Green ball = 5  
 Blue ball = 4  
 Red ball = 3  
 Total groups if 1 green, 1 blue atleast included  
 $\Rightarrow ({}^5C_1 + {}^5C_2 + \dots + {}^5C_5), ({}^4C_1 + {}^4C_2 + \dots + {}^4C_4), ({}^3C_0 + {}^3C_1 + {}^3C_2)$   
 $\Rightarrow (2^5 - 1) (2^4 - 1) (2^3)$   
 $= 31 \times 15 \times 8$   
 $= 3720$

12. (a)

Minimum match required to win 5 matches is = 5  
 Max matches = 9 (w = India win)

L = India loss

According to questions

www|w

wwwL|w

wwwLL|w

wwwLLL|w

wwwLLLL|w = 1 + 5 + 15 + 35 + 70 = 126

13. (c) Total person = 20

Select 3 person which are not adjacent

Req. ways = total ways - (2 are adjacent) - (3 are adjacent)

$\Rightarrow {}^{20}C_3 - 2$  adjacent 1 diff- all 3 adjacent

$\Rightarrow {}^{20}C_3 - {}^{20}C_1 \times {}^{16}C_1 - {}^{20}C_1$

$\Rightarrow \frac{20 \times 19 \times 18}{6} - 20 \times 16 - 20$

$\Rightarrow 1140 - 340 = 800$

14. (d)

A and B independent Then  $P(\bar{A}/\bar{B}) = ?$

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

$P(\bar{A} \cap \bar{B}) = P(\bar{A}) \cdot P(\bar{B})$   $P(\bar{A} \cap \bar{B})$

$\Rightarrow \frac{P(\bar{A} \cap \bar{B})}{P(\bar{B})}$

$\Rightarrow P(\bar{A})$

$1 - P(A)$

15. 100 identical coins each with P

Probability of showing head

$Q = 1 - P$

${}^{100}C_{50} P^{50} \cdot q^{50} = {}^{100}C_{51} P^{51} \cdot q^{49}$

$\frac{100!}{50! \cdot 50!} q - \frac{100!}{49! \cdot 51} \times p$

$\frac{q}{P} = \frac{50}{51}$

$\frac{1-P}{P} = \frac{50}{51}$

$\frac{1}{P} = \frac{50}{51} + 1 = \frac{101}{51}, P = \frac{51}{101}$

16. (b) At any time, the total no. of people on the earth shake hands on odd of time is

= even

17. (d)

$E_1 = A$  show up 4

$E_2 = B$  show up 2



$E_3$  = sum of 2 no. on both of dice is .....

(1,2) (2,1) (1,4) (4,1) (1,6) (6,1) (2,3) (3, 2) (2, 5) (5, 2)  
(3, 4) (4,3)(3,6) (6,3) (4,5) (5,4) (5,6)

$$P(E_1) = \frac{1}{6}, P(E_2) = \frac{1}{6}$$

$$P(E_3) = \frac{11}{36} = \frac{17}{36}$$

$$P(E_1 \cap E_2) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36} = P(E_1) P(E_2) \text{ independent}$$

$$P(E_1 \cap E_3) = \frac{1}{6} \times \frac{3}{6} = \frac{1}{12} \rightarrow \text{independ}$$

$P(E_1 \cap E_2 \cap E_3) \Rightarrow 0$  (No event are common)

$\Downarrow$  So  $P(E_1 \cap E_2 \cap E_3)$  not depend

18. (c)

Let 3 no. of AP =  $a - d, a, a + d$

$$a - d + a + a + d = -3$$

$$3a = -3, a = -1$$

$$(a - d) a (a + d) = 8$$

$$(-1 - d) (-1) (-1 + d) = 8$$

$$d^2 - 1 = 8, d = \pm 3$$

AP no.  $a - d, a, a + d$

$$-1 - 3, -1, -1 + 3 \Rightarrow -4, -1, 2$$

$$-1 + 3, -1, -1, 3 \Rightarrow 2, -1, -4$$

$$\text{Sum of the squares} = (-2)^2 + (-1)^2 + (-4)^2 = -21$$

19. (d)

If  $x, 2x + 2, 3x + 3$  are in GP then 4<sup>th</sup> term

$a, b, c$  are in GP then ( $b^2 = ac$ )

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

$$4x^2 + 4 + 8x = 3x^2 + 3x$$

$$x^2 + 5x + 4 = 0$$

$$(x+4)(x+1) = 0 \quad x = -4 \text{ or } x = -1$$

$$\text{Term} = -4, -6, -9$$

$$r = \frac{-6}{-4} = \frac{3}{2}$$

$$T_4 = ar^3 = (-4) \cdot \left(\frac{3}{2}\right)^3 = \frac{-27}{2} = -13.5$$

20. (a)

$$T_1, T_2, \dots, T_{21}$$

$$\text{AP } [d = 2] \quad \text{GP } [r = 2]$$

$$\text{AP } T_{11} = a + 10d = (a + 20)$$

$$T_6 = a + 5 \times 2 = (a + 10)$$

$$\text{GP } T_{11} = (a + 20)$$

$$T_{12} = (a + 20) \times 2$$

$$T_{16} = (a + 20) \times 2^5$$

$$T_6 = T_{16}$$

$$(a + 10) = (a + 20) \times 32$$

$$\left[ a = \frac{630}{31} \right] \Rightarrow T_{16} = a + 20$$

$$\Rightarrow \frac{-630 + 620}{31}$$

$$T_{11} \Rightarrow \frac{-10}{31} \text{ Answer.}$$

21. (b)

$$1, \log_9(3^{1-x} + 2), \log_3(4 \times 3^x - 1) - \text{AP}$$

$$2 \log_9(3^{1-x} + 2) = \log_3(4 \times 3^x - 1) + 1$$

$$\frac{2}{2} \log_3(3^{1-x} + 2) = \log_3(4 \times 3^x - 1) + \log_3 3$$

$$\log_3(3^{1-x} + 2) = \log_3 3(4 \times 3^x - 1)$$

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

$$\frac{3}{3^x} + 2 = 12 \times 3^x - 3 \quad \text{let } 3^x = x$$

$$\frac{3}{x} + 2 = 12x - 3$$

$$12x^2 - 5x - 3 = 0$$

$$12x^2 + 4x - 9x - 3 = 0$$

$$4x(3x + 1) - 3(3x + 1) = 0$$

$$3x = -1 \quad 4x = 3$$

$$x = \frac{-1}{3} \quad x = \frac{3}{4}$$

$$3^x = \frac{3}{4} \quad x = 1 - \log_3 4$$

$$3^x = \frac{-1}{3} \text{ not possible}$$

22. (c)

23. (c)

Negation of  $q \wedge \sim (P \wedge r)$

$$\sim (q \wedge \sim (p \wedge r))$$

$$\sim q \vee (p \wedge r)$$

24. (d)

Median of 9 distinct item is 20.5. If each of the 4 obs. Of the set is increases by 2 then median of the new set.

Poser =  $x_1, x_2, x_3, \dots, x_n \rightarrow$  in Ascending order

Median  $\Rightarrow x_5$

Largest 4 item  $x_6, x_7, x_8, x_9 \rightarrow$  increased by 2

No change in median.

25. Variance of 50 even natural number.

(b) number = 2, 4, 6, ..... 100

Variance =  $2^2 \times$  variance of 50 natural no.

$$\Rightarrow 4x \frac{n^2 - 1}{12}$$

$$\Rightarrow \frac{4 \times 2500 - 1}{12} = \frac{2499}{3} = 833$$



26. (c)

$$(P \wedge \neg q) \wedge (\sim P \wedge q)$$

Contradiction.

27. (a)

March obtained by 4 student 25, 35, 45, 55 the Avg.

deviation about mean

(x) observation = 25, 35, 45, 55

$$\bar{x} = \frac{25+35+45+55}{4} = 40$$

$$[x_i - \bar{x}] = 15, 5, 5, 15$$

$$MD = \frac{\sum |x_i - \bar{x}|}{n} = \frac{40}{4} = 10$$

28. (b)

$x_i$	X	X+4	x-3	X+8
$f_i$	3	5	7	4

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{19x-31}{4x+9} = 4$$

$$19x + 31 = 16x + 36$$

$$3x = 67$$

$$X = 5/3$$

29. (c)

$$\sigma_x^2 = 4 \quad \sigma_y^2 = 5 \quad n = 5$$

$$\bar{x} = 2 \quad \bar{y} = 4$$

$$\frac{\sum x_i}{5} = 2 \quad \sum y_i = 4 \times 5 = 20$$

$$\sum x_i = 10 \quad x_c = \frac{\sum(x_i)}{10} = \frac{30}{10} = 3$$

$$\sigma_x^2 = \frac{\sum x_1^2}{5} - (\bar{x})^2 \quad (5 + 16) \times 5 = \sum y_1^2 = 105$$

$$40 = \sum x_1^2$$

$$\text{Combined var} = \frac{\sum x_1^2 + \sum y_1^2}{10} - (X_c)^2$$

$$= \frac{40+105}{10} - y$$

$$\Rightarrow \frac{40+105-90}{10} = 11/2 = 5.5$$

30. (c)

$$\begin{bmatrix} x & 3 & 6 \\ 3 & 6 & x \\ 6 & x & 3 \end{bmatrix} = \begin{bmatrix} 2 & x & 7 \\ x & 7 & 2 \\ 7 & 2 & x \end{bmatrix} = \begin{bmatrix} 4 & 5 & x \\ 5 & x & 4 \\ x & 5 & 5 \end{bmatrix}$$

$$(A) x(18-x^2) - 3(9-6x) + 6(3x-36)$$

$$-x^3 + 18x - 27 + 18x + 18x - 216$$

$$[-x^3 + 54x - 373] \quad [-x^3 + 54x - 243] \quad x = -9$$

31. (a)

$$A + B + C = \pi$$

$$\begin{vmatrix} \sin 2A & \sin C & \sin B \\ \sin C & \sin 2B & \sin A \\ \sin B & \sin A & \sin(2C) \end{vmatrix}$$

$$B = \pi - (A + C) \Rightarrow \sin B = \sin(\pi - B + C)$$

$$\sin B = \sin(B + C)$$

$$\sin C = \sin(A + B)$$

$$\sin A = \sin(B + C)$$

$$\begin{vmatrix} \sin(A+B) & \sin(B+A) & \sin(C+A) \\ \sin(A+B) & \sin(B+B) & \sin(C+B) \\ \sin(A+C) & \sin(B+C) & \sin(C+C) \end{vmatrix}$$

$$\begin{vmatrix} \sin A \cos A + \cos A \sin A & \sin B \cos A + \cos B \sin A & \sin C \cos A + \cos C \sin A \\ \sin(A) \cos B + \cos A \sin B & \sin B \cos B + \cos A \sin B & \sin C \cos B + \cos C \sin B \\ \sin A \cos C + \cos A \sin C & \sin B \cos C + \cos B \sin C & \sin C \cos C + \cos C \sin C \end{vmatrix}$$

$$\begin{vmatrix} \cos A & \cos B & \cos C \\ \cos A & \cos B & \cos C \\ \cos A & \cos B & \cos C \end{vmatrix} + \begin{vmatrix} \sin A & \sin B & \sin C \\ \sin A & \sin B & \sin C \\ \sin A & \sin C & \sin C \end{vmatrix}$$

$$0 + 0 = 0$$

32. (d)

$$\begin{vmatrix} a & p & x \\ b & q & y \\ c & r & z \end{vmatrix} = 16, \begin{vmatrix} p+x & a+x & a+p \\ q+y & b+y & b+q \\ r+z & c+z & c+r \end{vmatrix} = ?$$

$$\begin{vmatrix} p+x & a+x & a+p \\ q+y & b+y & b+q \\ y+z & c+z & c+r \end{vmatrix}$$

$$\begin{vmatrix} p & a & a \\ q & b & b \\ r & c & c \end{vmatrix} + \begin{vmatrix} p & a & p \\ q & b & q \\ r & c & r \end{vmatrix} + \begin{vmatrix} p & x & q \\ q & y & b \\ r & z & c \end{vmatrix} + \begin{vmatrix} p & x & p \\ q & y & q \\ r & z & r \end{vmatrix}$$

$$+ \begin{vmatrix} x & a & a \\ y & b & b \\ z & c & c \end{vmatrix} + \begin{vmatrix} x & a & p \\ y & b & q \\ z & c & r \end{vmatrix} + \begin{vmatrix} x & x & a \\ y & y & b \\ z & z & c \end{vmatrix} + \begin{vmatrix} x & x & p \\ y & y & q \\ z & z & r \end{vmatrix}$$

$$0 + 0 + 16 + 0 + 0 + 16 + 0 + 0$$

$$16 + 16 = 32 \text{ Ans.}$$

33. (c)

$$\begin{vmatrix} x & 3 & 6 \\ 3 & 6 & x \\ 6 & x & 3 \end{vmatrix} = \begin{vmatrix} 2 & x & 7 \\ x & 7 & 2 \\ 7 & 2 & x \end{vmatrix} = \begin{vmatrix} 4 & 5 & x \\ 5 & x & 4 \\ x & 5 & 5 \end{vmatrix}$$

$$(A) x(18-x^2) - 3(9-6x) + 6(3x-36)$$

$$-x^3 + 18x - 27 + 18x + 18x - 216$$

$$[-x^3 + 54x - 373] \quad [-x^3 + 54x - 243] \quad x = -9$$

34. (c)  $I = \int_{-2}^2 \frac{3x^3+2|x|+1}{x^2+|x|+1}$

$$\int_{-a}^a f(x) dx \Rightarrow \int_0^a f(x) dx + f(-x) dx$$

$$I \Rightarrow \int_0^2 \frac{3(7)^3+2|x|+1}{x^2+|x|+1} + \frac{3(-x)^3+2|x|+1}{x^2+|x|+1} dx$$



$$\int_0^2 \frac{4|x|+2}{x^2+|x|+1} dx$$

let  $x^2 + |x| + 1 = t$

$$(2x + 1) dx = dt$$

$$\int_1^7 \frac{2}{t} dt \Rightarrow 2[\log t]_1^7$$

$$\Rightarrow 2\log_e 7$$

35. (b)

$$\int_{\pi/2}^{\pi/2} \log \left( \frac{2-\sin x}{2+\sin x} \right) dx$$

$$f(x) = \log \left( \frac{2-\sin x}{2+\sin x} \right)$$

$$f(-x) = \log \left( \frac{2+\sin x}{2-\sin x} \right)$$

$$f(x) = -f(-x) \Rightarrow \text{odd function}$$

$$I = 0$$

36. (d)

$$x \frac{dy}{dx} + 1 = 0$$

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

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

$$-f dy = \int \frac{1}{x} dx$$

$$-y = \log x$$

$$y = -\log x + c$$

37. (a)

38. (a)

39. (b)

40. (c)

$$R = \{(1,1) (2,2) (3, 3) (1, 2) (2, 3) (1, 3)\}$$

Reflexive but not symmetric.

41. (a)

$xRy$  if  $x - y + \sqrt[2]{2}$  is an irrational no. then

$$xRx \Rightarrow x - x + \sqrt{2}$$

$$\Rightarrow \sqrt{2} \rightarrow \text{irrational.}$$

Relation is reflexive.

42. (a)

$$f(x) = ax^7 + bx^3 + cx - 5$$

$$f(-7) = 7 \text{ then range of } (f(70) + 17 \cos x)$$

$$f(-7) = a(-7)^7 + b(-7)^3 + ((-7)-5)$$

$$7 = -(a(7)^7 + b(7)^3 + ((7)-5)$$

$$a7^7 + b7^3 + C^7 = -12$$

$$f(7) = a7^7 + b7^3 + C^7 - 5$$

$$-12-5$$

$$f(7) \Rightarrow -17$$

$$-1 \leq \cos x \leq 1$$

$$-17 + f(7) \leq f(7) + 17 \cos x \leq f(7) + 17$$

$$-17 - 17 \leq f(7) + 17 \cos x \leq -17 + 17$$

$$-17 - 17 \leq f(7) + 17 \cos x \leq -17 + 17$$

$$-34 \leq f(7) + 17 \cos x \leq 0$$

$$\text{Range } [-34, 0]$$

43. Domain of  $\sqrt{|x-2| - 1} + \sqrt{3 - |x-2|}$  is

$$|x-2| - 1 \geq 0 \text{ and } 3 - |x-2| \geq 0$$

$$|x-2| \geq 1 \quad |x-2| \leq 3$$

$$x-2 \geq 1 \text{ or } x-2 \leq -1 \quad -3 \leq x-2 \leq 3$$

$$x \geq 3 \text{ or } x \leq 1 \quad -1 \leq x \leq 5$$

$$x \in [-1, 1] \cup [3, 5]$$

44. (b)

$|z-3-2i| \leq 2$  then min value of

$$|2z-6+5i|$$

$$|2z-6+5i| \Rightarrow 2|z-3+\frac{5}{2}i|$$

$$\Rightarrow 2|z-3-2i+2i+\frac{5}{2}i|$$

$$\Rightarrow 2|(z-3-2i)+\frac{5}{2}i|$$

$$|z_1+z_2| \geq ||z_1|+|z_2||$$

$$2|(z-3-2i)+\frac{9}{2}i| \geq 2|2-\frac{9}{2}|$$

$$|27-6+5i| > 2 \times \frac{5}{2}$$

$$|2z-6+5i| \geq 5$$

Minimum value 5

45. (c)  $\arg z + \arg \bar{z} = 2$

$$\text{Let } z = x + iy$$

$$\bar{z} = x - iy$$

$$\arg z = \tan^{-1} \left( \frac{y}{x} \right), \quad \arg \bar{z} = \tan^{-1} \left( \frac{-y}{x} \right)$$

$$\arg z = \tan^{-1} \frac{y}{x}, \quad \arg \bar{z} = \tan^{-1} \frac{y}{x}$$

$$\arg z + \arg \bar{z} = 0$$

46. (d)

$$x^2 + bx - 1 = 0$$

one root is common.

$$x^2 + x + b = 0$$



Common root = equation (1) and equation (2)

$$x(b-1) - (1+b) = 0$$

$$x = \frac{1+b}{b-1}$$

$$\frac{(1+b)^2}{(b-1)^2} + \frac{(1+b)}{(b-1)} + b = 0$$

$$(1+b)^2 + (1+b)(b-1) + b(b-1)^2 = 0$$

$$1 + b^2 + 2b + b^3 - b^2 + b(b^2 + 1 - 2b) = 0$$

$$b^3 + 9b^2 + b = 0$$

$$b(b^2 + 3) = 0$$

$$b = 0$$

$$b^2 = -3, b = \pm\sqrt{3}i$$

47. (b) Coeff. of y is the exp.  $(y^2 + \frac{c}{y})^5$

$$r = \frac{np-m}{p+q} \Rightarrow \frac{5 \times 2 - 1}{3} = 3$$

$$T_{r+1} = {}^nC_r r^{n-r} y^r$$

$$T_4 = {}^5C_3 (y^2)^2 \cdot \left(\frac{c}{y}\right)^3 \Rightarrow {}^5C_3 y^4 C^3 y^{-3} \Rightarrow {}^5C_3 y C^3$$

$$\text{Coeff. } y \text{ is } {}^5C_3 C^3$$

48.  $(1+x)^{50}$  the sum of coeff. of odd power of x.

Coeff. of odd power

$$(1+x)^{50} \rightarrow {}^{50}C_0 x^0 + {}^{50}C_1 x^1 + {}^{50}C_2 x^2 + \dots + {}^{50}C_{50} x^{50}$$

Coeff. of odd power sum

$${}^{50}C_1 + {}^{50}C_3 + {}^{50}C_5 + {}^{50}C_7 + \dots + {}^{50}C_{47}$$

$$\Rightarrow 2^{50-1} = 2^{49}$$

49. (b)

R is largest equivalence relation on A

S is any relation on A

S is subset of R.

[S C R]

50. Four digit no. 0,1,2,3,4,5,6,7 formed by using these digit so that each digit contain = 1

Case -1:

If one appears at starting

$$\overline{1} \overline{7} \overline{6} \overline{5}$$

$$\text{Total way} = 7 \times 6 \times 5 = 210$$

Case- 2: If one not appears at starting

1 can place is 1 places = 3 ways

Remaining 3 places fill by =  $7 \times 6 \times 5$  way

$$\text{Total way} = 3 \times 6 \times 6 \times 5 = 540$$

$$\text{Total ways} = 210 + 540 = 750$$

51. (c) Declaration of function.

52. (c) All memory location.

53. (b) Null pointer.

54. (c)

55. (b)

56. (b)

57. (c)

58. (b) Register in CPU

59. (b) PROM

60. (b) EPROM

61. (d)

62. (c) & operator

63.  $(231)_4 \rightarrow ( )_3$

$$( )_4 \rightarrow ( )_{20} \rightarrow ( )_3$$

$$(231)_4 = 2 \times 4^2 + 3 \times 4^1 + 1 \times 4^0$$

$$= 32 + 12 + 1 = (45)_{10} \rightarrow ( )_3$$

$$= (1200)_3$$

64. (a)

$$(1278)_{12} \rightarrow ( )_3$$

$$1 \times 12^3 + 2 \times 12^2 + 7 \times 12^1 + 8 \times 12^0$$

$$(2108)_{10} \rightarrow ( )_3$$

$$(200330)_4$$

65. (c) Convert  $(110100)_2 \rightarrow ( )_{16}$

$$(34)_{10}$$

66. ()

67. (a) NAND Gate

68. (c) NOT Gate

69. (b)

70. (a) input entries =  $2^4 = 16$

71. (a)

72. (c) Phishing.

73. (b) Secure digital

74. (b) Skype

76. (b)  $(1032.2)_4 \rightarrow ( )_{10}$

$$1 \times 4^3 + 0 \times 4^2 + 3 \times 4 + 2 \times 4^0 + \frac{2}{4} \times 4^0$$

$$64 + 12 + 2 + 0.5$$

$$(78.5)_{10}$$

