1 If × means +, -means ×, + means + and + means -, then (3 - 15 + 19) × 8 + 6 = ?

A -1

B 2

C 4

D 8

2 If P means 'division', T means 'addition', M means 'subtraction' and D means 'multiplication', then what will be the value of the expression 12 M 12 D 28 P 7 T 15 ?

A -21

B -15

C 15

D 45

3 Arrange the following words in meaningful sequence

1. Site 2. Plan 3. Rent 4. Money 5. Building 6. Construction

A 1, 2, 3, 6, 5, 4

B 2, 3, 6, 5, 1, 4

C 3, 4, 2, 6, 5, 1

D 4, 1, 2, 6, 5, 3

4 A player holds 13 cards of four suits, of which seven are black and six are red. There are twice as many diamonds as spades and twice as many hearts as diamonds. How many clubs does he holds?

A 4

B 5

C 6

D 7

5 The total of the ages of Amar, Akbar and Anthony is 80 years. What was the total of their ages three years ago ?

A 71 years
B 72 years
C 74 years
D 77 years

6 If 100 cats kill 100 mice in 100 days, then 4 cats would kill 4 mice in how many days ?

A 1 day
B 4 days
C 40 days
D 100 days

7 A printer numbers the pages of a book starting with 1 and uses 3189 digits in all. How many pages does the book have?

A 1000
B 1074
C 1075
D 1080

8 If $\frac{x}{\alpha} + \frac{x}{\beta} = 1$ touches the circle $x^2 + y^2 = a^2$, then the point $(\frac{1}{\alpha}, \frac{1}{\beta})$ lies on

A a straight line
B a circle
C a parabola
D an ellipse

9 The length of latus rectum of $x^2 - 4x - 8y + 12 = 0$ is

A 4

B 6

C 8

D 10

10 The normal to the parabola $y^2 = 4x$ at P(1, 2) meets the parabola again in Q, the coordinates of Q are

A (-6, 9)

B (9, -6)

C (-9, -6)

D (-6, -9)

11 The pole of the line $lx + my + n = 0$ with respect to the parabola $y^2 = 4ax$ is

A $\left(\frac{n}{l}, \frac{-2am}{l}\right)$

B $\left(\frac{1}{m}, \frac{-2an}{l}\right)$

C $\left(\frac{n}{m}, \frac{2al}{n}\right)$

D $\left(\frac{1}{n}, \frac{2al}{n}\right)$

12 In an ellipse, the distance between its focus is 6 and minor axis is 8. The eccentricity is

A 1/2

B 4/5

C $1/\sqrt{5}$

D 3/5

13 The line $lx + my + n = 0$ is normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if

A $\frac{a^2}{m^2} + \frac{b^2}{l^2} = \frac{(a^2-b^2)^2}{n^2}$

B $\frac{a^2}{l^2} + \frac{b^2}{m^2} = \frac{(a^2-b^2)^2}{n^2}$

C $\frac{a^2}{n^2} + \frac{b^2}{l^2} = \frac{(a^2-b^2)^2}{m^2}$

D None

14 The eccentricity of the conjugate hyperbola of the hyperbola $x^2 - 3y^2 = 1$ is

A 2

B $\frac{\sqrt{2}}{3}$

C $\frac{4}{3}$

D 4

15 If the equation $\frac{1}{x} + \frac{1}{x+a} = \frac{1}{\lambda} + \frac{1}{\lambda+a}$ has real, equal and opposite sign roots then,

A $\lambda^2 = 3a^2$

B $\lambda^2 = 2a^2$

C $\lambda^2 = 3a^2$

D $a^2 = 2\lambda^2$

16 The product of three consecutive natural number is divisible by

A 3

B 8

C 6

D 11

17 How many signals can be made by 5 flags from 8 flags of different colours?

A ${}^8C_5$

B ${}^8C_5 \times 5!$

C 8^5

D 5^8

18 The letters of the word COCHIN are permuted and all the permutations are arranged in an alphabetical order s in an English dictionary. The number of words that appear before the word COCHIN is

A 360 B 192

C 96 D 48

19 Find the direction cosines of a vector $\vec{r}$ which is equally inclined with OX, OY and OZ are

A $\pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}$ B $\pm\frac{1}{3}, \pm\frac{1}{3}, \pm\frac{1}{3}$

C $\pm\frac{1}{\sqrt{2}}, \pm\frac{1}{\sqrt{2}}, \pm\frac{1}{\sqrt{2}}$ D None of these

20 The function $f(t) = \frac{t}{\log t}$ increases on the interval

A (O,∞) B (e,∞)

C $(0,e)$ D None of these

21 The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c is a positive parameter, is of

A Order 1 and degree 3 B Order 2 and degree 3

C Order 1 and degree 2 D none of these

22 The general solution of the differential equation $\frac{dy}{dx} + \frac{2}{x}y = x^2$, is

A $y = cx^2 + \frac{x^3}{5}$

B $y = cx^{-2} + \frac{x^3}{5}$

C $y = cx^3 - \frac{x^3}{4}$

D $y = cx^{-3}\frac{x^2}{4}$

23 Let $cos(\alpha + \beta) = \frac{4}{5}$ and let $sin(\alpha - \beta) = \frac{5}{13}$, where $0 < \alpha, \beta \leq \frac{\pi}{4}$. Then, $tan2\alpha =$

A $\frac{19}{12}$

B $\frac{20}{7}$

C $\frac{25}{16}$

D $\frac{56}{33}$

24 The circum-radius and in radius of a triangle ABC be 10 and 3 units respectively, then $a\,cot\,A + b\,cot\,B + c\,cot\,C$ is equal to

A 13

B 26

C 39

D None of these

25 The value of $\sin\left(2tan^{-1}\frac{1}{3}\right) + \cos(tan^{-1}2\sqrt{2})$, is

A $\frac{12}{13}$

B $\frac{13}{14}$

C $\frac{14}{15}$

D None of these

26 The set of values of α for which the equation $\sin^4 x + \cos^4 x = \alpha$ has a solution, is

A $(0, 1)$

B $(1, \frac{3}{2})$

C $[-1, 1]$

D $[\frac{1}{2}, 1]$

27 If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors such that $(\vec{a} \times \vec{b}) = \vec{c}, (\vec{b} \times \vec{c}) = \vec{a}, (\vec{c} \times \vec{a}) = \vec{b}$, then $|\vec{a}| + 2|\vec{b}| - 3|\vec{c}|$ is equal to

A 1

B 0

C 2

D None of these

28 A unit vector perpendicular to the plane of $\vec{a} = 2i - 6j - 3k$ and $\vec{b} = 4i + 3j - 3k$, is

A $\frac{1}{\sqrt{26}}(4i + 3j - k)$

B $\frac{1}{7}(2i + 6j - 3k)$

C $\frac{1}{7}(3i + 2j + 6k)$

D $\frac{1}{7}(2i + 3j - 6k)$

29 If $\vec{a} \times (\vec{b} \times \vec{c}) = \vec{b} \times (\vec{c} \times \vec{a})$ and $[\vec{a}\vec{b}\vec{c}] \neq 0$, then $\vec{a} \times (\vec{b} \times \vec{c})$ is equal to

A $\vec{0}$

B $\vec{a} \times \vec{b}$

C $\vec{b} \times \vec{c}$

D $\vec{c} \times \vec{a}$

30 If the lines $x = ay + b, z = cy + d$ and $x = a'y + b', z = c'y + d'$ are perpendicular then

A $aa' + cc^1 = 1$ B $aa' + cc^1 = -1$

C $ab + cd = a'b' + c'd'$ D $aa' + bb^1 = cc^1 + dd'$

31 If the lines $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$ and $\frac{x-1}{k} = \frac{y-4}{2} = \frac{z-5}{1}$ are coplanar, then k can have

A Any value B exactly one value

C exactly two values D exactly three values

32 The solution set of the inequation $|2x - 3| < x - 1$, is

A $\left(\frac{4}{3}, \frac{3}{2}\right) \cup \left(\frac{3}{2}, 2\right)$ B $\left(\frac{4}{3}, 2\right)$

C $\left[\frac{3}{2}, 2\right]$ D None of these

33 If a, b, c are positive real numbers then

$$\frac{1}{log_a bc+1} + \frac{1}{log_b ca+1} + \frac{1}{log_c ab+1} =$$

A 0 B 1

C 2 D -1

34 The number of real solutions of the equations

$sin(e^x) = 2^x + 2^{-x}$, is

A 0

B 1

C 2

D infinitely many

35 If $x + y + z = 1$, then the least value of $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$, is

A 3

B 9

C 27

D 1

36 Three set A, B, C are such that $A = B \cap C$ and $B = C \cap A$, then

A $A \subset B$

B $A \supset B$

C $A = B$

D $A \subset B'$

37 Let A and B be two sets containing four and two elements respectively. Then the number of subsets of the set A × B, each having at least three elements is

A 275

B 510

C 219

D 256

38 If $f:R \to R$ is given by $f(x) = 3x - 5$, then $f^{-1}(x)$

A is given by $\frac{1}{3x-5}$

B is given by $\frac{x+5}{3}$

C does not exist because f is not one-one

D does not exist because f is not onto .

39 The statement $p \to (q \to p)$ is equivalent to

A $p \to (p \wedge q)$

B $p \to (p \leftrightarrow q)$

C $p \to (p \to q)$

D $p \to (p \vee q)$

40 The amplitude of $\sin\frac{\pi}{5} + i(1 - \cos\frac{\pi}{5})$, is

A $\frac{2\pi}{5}$

B $\frac{\pi}{15}$

C $\frac{\pi}{10}$

D $\frac{\pi}{5}$

41 If the second term in the expansion of $(\sqrt[13]{a} + \frac{a}{\sqrt{a^{-1}}})^n$ is $14\ a^{5/2}$, then the value of $\frac{\binom{n}{3}}{\binom{n}{2}}$ is

A 4

B 3

C 12

D 6

42 If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial coefficients in the binomial expansion $(1+x)^n$, then $C_0 - C_1 + C_2 - \ldots + (-1)^n C_n =$

A 0 B 2^n

C n D 2^{n-1}

43 Sum of the series $\text{Log}_e 2 + \frac{(\log_e 2)^2}{2!} + \frac{(\log_e 2)^3}{3!} + \ldots\infty$ is equal to

A 3 B 2

C 1 D 0

44 Sum of the series $(\frac{1}{3})^2 + \frac{1}{3}(\frac{1}{3})^4 + \frac{1}{5}(\frac{1}{3})^6 + \ldots\infty$ is equal to

A $\frac{1}{4}\text{Log}_e 2$ B $\frac{1}{2}\text{Log}_e 2$

C $\frac{1}{6}\text{Log}_e 2$ D $\frac{1}{4}\text{Log}_e \frac{3}{2}$

45 If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, then the value of $|\text{adj } A|$ is

A a^{27} B a^9

C a^6 D a^2

46 The set of the all values of λ for which the system of linear equations: $2x_1 - 2x_2 + x_3 = \lambda x_1, 2x_1 - 3x_2 + 2x_3 = \lambda x_2, -x_1 + 2x_2 = \lambda x_3$ has a non trivial solution

A Contains two elements

B Contains more than two elements

C Is an empty set

D Is a singleton set

47 The probability that a leap year selected at random contains either 53 Sunday or 53 Mondays is

A $\frac{2}{7}$

B $\frac{4}{7}$

C $\frac{3}{7}$

D $\frac{1}{7}$

48 The three identical dice are thrown together. The probability that distinct numbers appear on them is

A $\frac{4}{9}$

B $\frac{5}{9}$

C $\frac{5}{36}$

D $\frac{1}{9}$

49 In a box containing 100 bulbs, 10 are defective. What is the probability that out of a sample of 5 bulbs none is defective?

A $(\frac{9}{10})^5$

B $\frac{9}{10}$

C 10^{-5}

D $(\frac{1}{2})^2$

50 A die is thrown 100 times. If getting an even number is considered a success, the variance of the number of success, is

A 50 B 25

C 10 D 100

51 The coordinates of two points A and B are (3, 4) and (5, -2) respectively. If P is a point not lying on any of the coordinate axes such that PA = PB and Area of triangle PAB =10, then the coordinates of P are

A (2, 7) B (7, 2)

C (1, 0) D (0, 1)

52 If the centroid and circumcentre of a triangle are (3, 3) and (6, 2) respectively, then the orthocenter is

A (-3, 5) B (-3, 1)

C (3, -1) D (9, 5)

53 If p and p' be the perpendiculars from origin upon the straight lines $x \sec\theta + y \operatorname{cosec}\theta = a$ and $x\cos\theta - y\sin\theta = a\cos 2\theta$, then

A $p^2 + p'^2 = a^2$ B $p^2 + 4p'^2 = a^2$

C $4p^2 + p'^2 = a^2$ D $4p^2 + p'^2 = 4a^2$

54 If O is the origin and Q is a variable point on $x^2 = 4y$, then the locus of the mid-point of OQ is

A $y^2 = 2x$

B $y^2 = x$

C $x^2 = y$

D $x^2 = 2y$

55 If the sum of the slopes of the lines given by $x^2 + 2cxy - y^2 = 0$, is four time their product, the c has value

A -2

B -1

C 2

D 1

56 If $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ bisect angles between the each other, then

A $p + q = 1$

B $pq = I$

C $pq + I = 0$

D $p^2 + pq + q^2 = 0$

57 The angle between the tangents drawn from the origin to the circle $(x - 7)^2 + (y + 1)^2 = 25$ is

A $\pi/3$

B $\pi/6$

C $\pi/2$

D $\pi/8$

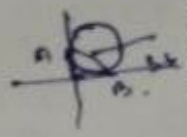
58 If a circle of constant radius 3k passes through the origin and meets the axes at A and B, the locus of the centroid of ΔOAB is

A $x^2 + y^2 = k^2$

B $x^2 + y^2 = 2k^2$

C $x^2 + y^2 = 3k^2$

D none of these



59 A circle passes through a fixed point A and cuts two perpendiculars straight lines through A in B and C. If the straight line BC passes through a fixed point (x_1, y_1), the locus of the centre of the circle is

A $\frac{x_1}{x} + \frac{y_1}{y} = 1$

B $x_1y = xy_1$

C $x_1y + xy_1 = 2$

D $\frac{x_1}{x} + \frac{y_1}{y} = 2$

60 The range of the function $f(x) = \frac{1+x^2}{x^2}$ is equal to

A $(0, 1)$

B $[0, 1]$

C $(1, \infty)$

D $[1, \infty)$

61 The circumference of a circle is measured as 56 cm with an error 0.02 cm. The percentage error in its area, is

A $\frac{1}{7}$

B $\frac{1}{28}$

C $\frac{1}{14}$

D $\frac{1}{56}$

62 The value of c in Lagrange's theorem for the function $f(x) = |x|$ in the interval $[-1,1]$, is

A 0

B $\frac{1}{2}$

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

D non-existent in the interval

63 The function $f(x) = x^3 - 3x$, is

A Increasing on $(-\infty, -1) \cup [1, \infty)$ and decreasing on $(-1,1)$

B decreasing on $(-\infty, -1) \cup [1, \infty)$ and increasing on $(-1,1)$

C increasing on $(0, \infty)$ and decreasing on $(-\infty, 0)$

D decreasing on $(0, \infty)$ and increasing on $(-\infty, 0)$

64 Let $(x) = 1 + 2x^2 + 2^2x^4 + \ldots + 2^{10}x^{20}$. Then, $f(x)$ has

A more than one minimum

B exactly one minimum

C at least one maximum

D none of these

65 $\int \frac{(x-x^5)^{\frac{1}{5}}}{x^6} dx$ is equal to

A $\frac{5}{54}\left(\frac{1}{x^4}-1\right)^{\frac{6}{5}}+C$

B $\frac{5}{24}\left(1-\frac{1}{x^4}\right)^{\frac{6}{5}}+C$

C $-\frac{5}{54}\left(\frac{1}{x^4}-1\right)^{\frac{6}{5}}+C$

D None of these

66 If $\int f(x)dx = f(x)$, $\int\{f(x)\}^2 dx$ is equal to

A $\frac{1}{2}\{f(x)\}^2$

B $\{f(x)\}^3$

C $|f(x)|^2$

D $\{f(x)\}^2$

67 $\int_{-1}^{10} sgn\,(x-[x])\,dx$ equals

A 10

B 11

C 9

D $\frac{11}{2}$

68 $\int_1^4 log_e\,[x]\,dx$ equals

A $log_e 6$

B $log_e 3$

C $log_e 2$

D none of these

69 The value of $\int_0^{\frac{\pi}{2}} \log\tan x\,dx$, is

A $\frac{\pi}{4}$

B $\frac{\pi}{2}$

C 0

D none of these

70 $\lim_{n\to\infty}\{\frac{n}{n^2+1^2}+\frac{n}{n^2+2^2}+\cdots+\frac{n}{n^2+n^2}\}$, is equal to

A 1

B 0

C $\frac{\pi}{4}$

D $\frac{\pi}{2}$

71 The domain of $f(x) = \frac{Log_2(x+3)}{x^2+3x+2}$ is

A R-{-1, -2}

B (-2, ∞)

C R-{-1, -2, -3}

D (-3, ∞)-{-1, -2}

72 If f: R→R is a function satisfying the property $f(2x + 3) + f(2x + 7) = 2$ for all $x \in R$, then the period of f (x) is

A 2

B 4

C 8

D 12

73 If $f(x)$ is defined on [0, 1] by the rule $f(x) = \{ {}^{x}_{1-x}$ if $x \in Q$ and if $x \notin Q$

Then, for all $x \in [O, 1], f(f(x)) =$

A x

B $-x$

C $1+x$

D $1-x$

74 $\lim_{x\to\infty} \left(\frac{x^2+4x-3}{x^2-2x+5}\right)^x$ is equal to

A e^6

B e^{-6}

C e^2

D e^4

75 If $\log_{x\to a} \frac{a^x - x^a}{x^x - a^a} = -1$, then the values of a is

A 1

B 0

C e

D None of these

76 If $g(x) = (x^2 + 2x + 3)f(x), f(0) = 5$ and $\lim_{x\to 0} \frac{f(x)-5}{x} =$, then $g'(x)$ is equal to

A 22

B 20

C 18

D None of these

77 The function $f(x) = x - [x]$, where [.] denotes the greatest integer function is

A Continuous everywhere

B Continuous at integer point only

C Continuous at non-integer points only

D Nowhere continuous

78 If $y = sec(tan^{-1}x)$, then $\frac{dy}{dx}$ at $x = 1$ is equal to

A $\frac{1}{\sqrt{2}}$

B $\frac{1}{2}$

C 1

D $\sqrt{2}$

79 The curve $y - e^{xy} + x = 0$ has a vertical tangent at the point:

A (1, 1)

B at no point

C (0, 1)

D (1, 0)

80 The surface area of a sphere when its volume is increasing at the same rate as its radius, is

A 1

B $\frac{1}{2\sqrt{\pi}}$

C 4π

D $\frac{4\pi}{3}$

81 If z_1, z_2 be any two non-zero complex numbers such that $|z_1 + z_2| = |z_1| + |z_2|$, then $\arg(z_1) - \arg(z_2)$ is equal to

A $-\pi$

B $-\frac{\pi}{2}$

C 0

D $\frac{\pi}{2}$

82 If $1, \alpha_1, \alpha_2, \ldots, \alpha_{n-1}$ are n^{th} roots of unity, then the value of $(1-\alpha_1)(1-\alpha_2)(1-\alpha_3)\ldots(1-\alpha_{n-1})$ is equal to

A $\sqrt{3}$

B $\frac{1}{2}$

C n

D 0

83 If $(\sqrt{3}-i)^n = 2^n, n \in Z$ then n is multiple of

A 6

B 10

C 9

D 12

84 If $log_5 2, log_5 (2^x - 3)$ and $log_5(\frac{17}{2} + 2^{x-1})$ are in AP, then the value of x is

A 0

B -1

C 3

D None of these

85 If the first and the n^{th} terms of a G.P. are a and b respectively and P is the product of the first n terms, then $P^2 =$

A ab

B $(ab)^n$

C $(ab)^{\frac{n}{2}}$

D $(ab)^{2n}$

86 If $x > l, y > 1, z > 1$ are in G.P., then $\frac{1}{1+lnx}, \frac{1}{1+lny}, \frac{1}{1+lnz}$ are in

A AP

B HP

C GP

D None of these

87 The sum of the series $1 + 3x + 6x^2 + 10x^3 + \ldots \infty$ is

A $\frac{1}{(1-x)^2}$ B $\frac{1}{1-x}$

C $\frac{1}{(1+x)^2}$ D $\frac{1}{(1-x)^3}$

88 Find the missing term in 3, 10, 29, 66, 127, ?

A 164 B 187

C 216 D 218

89 Find out the wrong term in the following series

3, 10, 27, 4, 16, 64, 5, 25, 125, ?

A 3 B 4

C 10 D 27

90 Monday : Saturday : : Thursday : ?

A Sunday B Tuesday

C Wednesday D Friday

91 Genuine : Authentic : : Mirage : ?

A Reflection B Hideout

C Illusion D Image

92 House : Garbage : : Ore : ?

A Rubbish
B Gangue
C Sand
D Dregs

93 Select the odd one

A SUWY
B MOQS
C CEGI
D HJMO

94 If DELHI can be coded as CCIDD, how would you code BOMBAY ?

A AJMTVT
B AMJXVS
C MJXVSU
D WXYZAX

95 If A = 26, SUN = 27, then CAT = ?

A 24
B 27
C 57
D 58

96 If ENGLAND is written as 1234526 and FRANCE is written as 785291, how is GREECE coded ?

A 381171
B 381191
C 832252
D 835545

97 Pointing to a gentleman, Deepak said, "His only brother is the father of my daughter's father." How is the gentleman related to Deepak ?

A Grandfather B Father

C Brother-in-law D Uncle

98 Rohan walks a distance of 3 km towards North, then turns to his left and walks for 2 km. He again turns left and walks for 3 km. At this point he turns to his left and walks for 3 km. How many kilometers is he from the starting point?-

A 1 km B 2 km

C 3 km D 5 km

99 Read the following arrangement carefully:

R E 5 D A P $ 3 T I Q 7 9 B # 2 K % U J M W 4 * J 8 N

Which one of the following is exactly in the middle between 3 and 1 in the above arrangement?

A B B K

C 9 D ' #

100 Read the following arrangement carefully:

R E $ D A P $ 3 T I Q 7 9 B # 2 K % U I M W 4 * J 8 N

How many such vowels are there in the above arrangement, each of which is immediately followed by a number but not immediately preceded by a consonant?

A None

B One

C Two

D Three