doubtnut
India's Number 1 Education App

MATHS

BOOKS - OBJECTIVE RD SHARMA ENGLISH

BINOMIAL THEOREM AND ITS APPLCIATIONS

Illustration

1. If in the expansion of $(1+x)^m(1-x)^n$, the coefficients of x and x^2 are 3 and - 6 respectively, the value of m and n are

Watch Video Solution

2. The coefficients of three consecutive terms of $(1+x)^{n+5}$ are in the ratio 5:10:14. Then $n =$ _____.

A. 5

B. 7

C. 6

D. 8

Answer: C

Watch Video Solution

3. Given positive integers $r > 1, n > 2$ and that the coefficient of $(3rd)thand(r+2)th$ terms in the binomial expansion of $(1+x)^{2n}$ are equal. Then $n = 2r$ b. $n = 2r+1$ c. $n = 3r$ d. none of these

A. 2r-1

B. 2r

C. 2r+1

D. 2r+2

Answer: c

Watch Video Solution

4. The coefficient of x^{20} in

$\left(1+3x+3x^2+x^3\right)^{20}$,I s

A. ${}^{60}C_{40}$

B. ${}^{30}C_{20}$

C. ${}^{15}C_2$

D. none of these

Answer: A

Watch Video Solution

5. The coefficient of x^{100} in the expansion $\sum_{r=0}^{200}(1+x)^r$ is

A. $\begin{pmatrix}200\\100\end{pmatrix}$

B. $\begin{pmatrix}201\\102\end{pmatrix}$

C. $\begin{pmatrix} 200 \\ 101 \end{pmatrix}$

D. $\begin{pmatrix} 201 \\ 101 \end{pmatrix}$

Answer: D

Watch Video Solution

6. FOr $\xi nr, x \neq -1$, If $(1+x)^{2016} + x(1+x)^{2015} + x^2(1+x)^{2014} + \ldots\ldots + x^{2016} = \sum_{i=0}^{2016} a_i x^i$, then a_{17} is equal to -

A. $\frac{2016!}{16!}$

B. $\frac{2017!}{2000!}$

C. $\frac{2017!}{17!2000!}$

D. $\frac{1016!}{17!1999!}$

Answer: C

Watch Video Solution

7. Let m be the smallest positive integer such that the coefficient of x^2 in the expansion of $(1+x)^2+(1+x)^3+\ldots\ldots+(1+x)^{49}+(1+mx)^{50}$ is $(3n+1).^{51}C_3$ for some positive integer n, then the value of n is _____.

A. 16

B. 5

C. 21

D. 11

Answer: B

Watch Video Solution

8. Coefficient of x^{11} in the expansion of $\left(1+x^2\right)\left(1+x^3\right)^7\left(1+x^4\right)^{12}$ is

1051 b. 1106 c. 1113 d. 1120

A. 1051

B. 1106

C. 1113

D. 1120

Answer: C

Watch Video Solution

9. In the binomial expansion of $(1+a)^{m+n}$, prove that the coefficient of $a^m and\ a^n$ are equal.

A. A= B

B. mA = nB

C. nA = mB

D. A = 2B

Answer: A

Watch Video Solution

10. If A and B are the coefficients of x^n in the expansion $(1+x)^{2n}$ and $(1+x)^{2n-1}$ respectively, then

A. A= B

B. 2A = B

C. A = 2B

D. none of these

Answer: C

Watch Video Solution

11. The value of $\left\{(\sqrt{2}+1)^5+(\sqrt{2}-1)^5\right\}$,is

A. 58

B. $58\sqrt{2}$

C. 42

D. $42\sqrt{2}$

Answer: B

Watch Video Solution

12. If o be the sum of odd terms and E that of even terms in the expansion of $(x+a)^n$ prove that: (i)$O^2 - E^2 = \left(x^2 - a^2\right)^n$ (ii) $4OE = (x+a)^{2n} - (x-a)^{2n}$ (iii) $2\left(O^2 + E^2\right) = (x+a)^{2n} + (x-a)^{2n}$

A. $\left(x^2 + a^2\right)^n$

B. $\left(x^2 - a^2\right)$

C. $(x-a)^{2n}$

D. none of these

Answer: b

Watch Video Solution

13. In the expansion of $(x+a)^n$ the sum of even terms is E and that of odd terms is O, then OE is equal to

A. $(x+a)^{2n}-(x-a)^{2n}$

B. $\frac{1}{4}\left\{(x+a)^{2n}-(x-a)^{2n}\right\}$

C. $\frac{1}{4}\left\{(x+a)^{2n}+(x-a)^{2n}\right\}$

D. none of these

Answer: b

Watch Video Solution

14. In the expansion of $(x+a)^n$, the sum of even terms is E, the sum of even terms is E, the sum of odd terms is O, then O^2-E^2 is equal to

A. $(x+a)^{2n}+(x-a)^{2n}$

B. $\frac{1}{2}\left\{(x+a)^{2n}+(x-a)^{2n}\right\}$

C. $\frac{1}{2}\left\{(x+a)^{2n}-(x-a)^{2n}\right\}$

D. $(x+a)^{2n}-(x-a)^{2n}$

Answer: b

Watch Video Solution

15. Consider the expansion $\left(x^3-\frac{1}{x^2}\right)^{15}$.

What is the independent term in the given expansion ?

A. ${}^{15}C_5$

B. 0

C. $-{}^{15}C_9$

D. 1

Answer: A

Watch Video Solution

16. Find the coefficient of x^4 in the expansion of $\left(x/2 - 3/x^2\right)^{10}$.

A. $\frac{405}{256}$

B. $\frac{504}{259}$

C. $\frac{450}{263}$

D. none of these

Answer: A

Watch Video Solution

17. If the coefficients of x^{-2} and x^{-4} the expansion of $\left(x^{\frac{1}{3}} + \frac{1}{2x^{\frac{1}{3}}}\right)^{18}$, are m and n respectively, then $\frac{m}{n}$ is equal to

A. $\frac{5}{4}$

B. $\frac{4}{5}$

C. 27

D. 182

Answer: D

Watch Video Solution

18. Find the term independent of x in the expansion of $\left(1+x+2x^3\right)\left[\left(3x^2/2\right)-(1/3)\right]^9$

A. $1/3$

B. $19/54$

C. $17/54$

D. $1/4$

Answer: c

Watch Video Solution

19. If the third term in the expansion of $\left(\frac{1}{x}+{}_{\mathrm{x}}(\log)_{10x}\right)^{5}$ is $1000,$ then find x.

A. 100

B. 10

C. 1

D. $1\sqrt{10}$

Answer: a

Watch Video Solution

20. If the fourth term in the expansion of $\left(ax+\frac{1}{x}\right)is\frac{5}{2},$ then find the values of $a\ and\ n$.

A. $\frac{1}{2}, 6$

B. 1,3

C. $\frac{1}{2}, 3$

D. cannot be found

Answer: A

Watch Video Solution

21. Find the coefficient of x^r in the expansion of $1+(1+x)+(1+x)^2+\ldots\ldots+(1+x)^n$.

A. ${}^nC_r$

B. ${}^{n+1}C_r$

C. ${}^{n+1}C_{r+1}$

D. none of these

Answer: C

Watch Video Solution

22. The coefficient of $x^r[0 \le r \le (n-1)]$ in the expansion of $(x+3)^{n-1} + (x+3)^{n-2}(x+2) + (x+3)^{n-3}(x+2)^2 + \ldots$

$+(x+2)^{n-1}$ is $a.^n C_r(3^r - 2^n)$ $b.^n C_r\left(3^{n-r} - 2^{n-r}\right)$ $c.^n C_r\left(3^r + 2^{n-r}\right)$

d. none of these

A. ${}^nC_r 2^{n-r}$

B. ${}^nC_r\left(2^{n-r} - 1\right)$

C. ${}^nC_r\left(2^{n-r} + 1\right)$

D. ${}^nC_r(2^r - 1)$

Answer: b

Watch Video Solution

23. If the second term of the expansion $\left[a^{\frac{1}{13}} + \frac{a}{\sqrt{a^{-1}}}\right]^n$ is $14a^{5/2}$, then the value of $\frac{\hat{}\, nC_3}{\hat{}\, nC_2}$ is.

A. 4

B. 3

C. 12

D. 6

Answer: a

Watch Video Solution

24. Show that the middle term in the expansion of $(1+x)^{2n} is \frac{(1.3.5(2n-1))}{n!} 2^n x^n$, $where n$ is a positive integer.

A. $\frac{1 \cdot 3 \cdot 5 \ldots (2n-1)}{n!} 2^n . X^n$

B. $\frac{1 \cdot 3 \cdot 5 \ldots (2n-1)}{n!!}$

C. ${}^{2n}C(n)$

D. ${}^{n}C_{n-1} x^{n-1}$

Answer: a

Watch Video Solution

25. Show that the coefficient of the middle term in the expansion of $(1+x)^{2n}$ is equal to the sum of the coefficients of two middle terms in the expansion of $(1+x)^{2n-1}$.

A. A+B=C

B. B+C=A

C. C+A= B

D. A+B +C = 0

Answer: b

Watch Video Solution

26. The greatest integer less than or equal to $\left(\sqrt{2}+1\right)^6$ is

A. 197

B. 198

C. 196

D. 199

Answer: a

Watch Video Solution

27. Let $\left(6\sqrt{6}+14\right)^{2n+1}=R$, if f be the fractional part of R, then prove that $Rf=20^{2n+1}$

A. 20^n

B. 20^{2n}

C. 20^{2n+1}

D. none of these

Answer: c

Watch Video Solution

28. If R = $\left(\sqrt{2}+1\right)^{2n+1}$ and $f = R - [R]$, where [ ] denote the greatest integer function, then [R] equal (a) $f + \frac{1}{f}$ (b) $f - \frac{1}{f}$ (c) $\frac{1}{f} - f$ (d) None of these

A. $f + \frac{1}{f}$

B. $f - \frac{1}{f}$

C. $\frac{1}{f} - f$

D. none of these

Answer: c

Watch Video Solution

29. Let $\left(5+2\sqrt{6}\right)^n = I + f$, where n, $I \in N$ and $0 < f < 1$, then the value of $f^2 - f + I \cdot f - I$. Is

A. $\frac{1}{f} - f$

B. $\frac{1}{1+f} - f$

C. $\frac{1}{1-f}-f$

D. $\frac{1}{1-f}+f$

Answer: c

Watch Video Solution

30. If $x=\left(7+4\sqrt{3}\right)^{2n}=[x]+f$, where $n\in$ N and $0\leq f<1$, then x (1-f) is equal to

A. $\left(7-4\sqrt{3}\right)^{2n}$

B. $\frac{1}{1+f}-f$

C. 1

D. none of these

Answer: c

Watch Video Solution

31. The numerically greatest term in the expansion of $(1+x)^{10}$ when $x = 2/3$, is

A. 4^{th}

B. 5^{th}

C. 6^{th}

D. 3^{rd}

Answer: B

Watch Video Solution

32. The greatest term in the expansion of $(1+3x)^{54}$ when $x = \frac{1}{3}$,is

A. 28^{th}

B. 25^{th}

C. 26^{th}

D. 24^{th}

Answer: A

Watch Video Solution

33. Find the numerically grates term in the expansion of $3-5x^{15} when x=1/5.$

A. ${}^{15}C_3 \times 3^{10}$

B. ${}^{15}C_3 \times 3^{11}$

C. ${}^{15}C_{12} \times 3^{12}$

D. ${}^{15}C_{11} \times 3^{12}$

Answer: c

Watch Video Solution

34. The sum $\sum_{r=0}^{m} {}^{10}C_r \times {}^{20}C_{m-r}$ is maximum . When m=

A. 5

B. 10

C. 15

D. 20

Answer: c

Watch Video Solution

35. The greatest coefficient in the expansion of $(1+x)^{2n}$ is :

A. $\left(\frac{n-1}{n}, \frac{n}{n-1}\right)$

B. $\left(\frac{n}{n+1}, \frac{n+1}{n}\right)$

C. $\left(\frac{n}{n+2}, \frac{n+2}{n}\right)$

D. none of these

Answer: b

Watch Video Solution

36. The coefficient of $x^2y^5z^3$ in the expansion of $(2x+y+3z)^{10}$ is

A. $\frac{10!}{2!3!5!}$

B. $\frac{10!}{2!3!5!} \times 2^2 \times 3^3$

C. $\frac{10!}{2!3!5!} \times 2^3 \times 3^2$

D. $10! \times 2^2 \times 3^3$

Answer: B

Watch Video Solution

37. The total number of terms in the expansion of

$(2x-y+4z)^{12}$,is

A. 90

B. 91

C. 13

D. none of these

Answer: B

Watch Video Solution

38. If the number of terms in the expansion of $\left(1-\frac{2}{x}+\frac{4}{x^2}\right)x \neq 0$, is 28, then the sum of coefficient of all the terms in this expansion, is

A. 64

B. 2187

C. 243

D. 729

Answer: d

Watch Video Solution

39. Find the greatest coefficient in the expansion of $(a+b+cd)^{15}$.

A. $\frac{15!}{3!4!}$

B. $\frac{15!}{3!(4!)^3}$

C. $\frac{15!}{3!(4!)^2}$

D. $\frac{15!}{(3!)^2(4!)^2}$

Answer: b

Watch Video Solution

40. Find the coefficient of $x^3y^4z^5$ in the expansion of $(xy+yz+zx)^6$

A. 120

B. 20

C. 30

D. 60

Answer: d

Watch Video Solution

41. The coefficient of x^5 in the expansion of $\left(2 - x + 3x^2\right)^6$, is

A. 3

B. 4

C. 5

D. none of these

Answer: a

Watch Video Solution

42. For a positive integer n if the mean of the binomial coefficients in the expansion of $(a+b)^{2n-3}$ is 16 Then n is equal to

A. 4

B. 5

C. 7

D. 9

Answer: b

Watch Video Solution

43. The sum of the series $\frac{1}{1!19!}+\frac{1}{3!17!}+\frac{1}{5!15!}+\ldots\ldots\ldots$ to 10 terms is equal to

A. $\frac{\left(2^{19}-1\right)}{20!}$

B. $\frac{2^{20}}{20!}$

C. $\frac{2^{10}}{20!}$

D. $\frac{2^{19}}{19!}$

Answer: a

Watch Video Solution

44. The sum of the last eitht coefficients in the expansion of $(1+x)^{15}$, is

A. 2^{16}

B. 2^{15}

C. 2^{14}

D. none of these

Answer: C

Watch Video Solution

45. Find the sum of the last 30 coefficients in the expansion of $(1+x)^{59}$, when expanded in ascending powers of x.

A. 2^{58}

B. 2^{29}

C. 2^{28}

D. $2^{59} - 2^{29}$

Answer: a

Watch Video Solution

46. The value of $\left(.^{21}C_1 - .^{10}C_1\right) + \left(.^{21}C_2 - .^{10}C_2\right) + \left(.^{21}C_3 - .^{10}C_3\right) + \left(.^{21}C_4 - .^{10}C_4\right.$ is

A. $2^{21} - 2^{11}$

B. $2^{21} - 2^{10}$

C. $2^{20} - 2^9$

D. $2^{20} - 2^{10}$

Answer: d

Watch Video Solution

47. If $C_0, C_1C_2, ..., C_n$ denote the coefficients in the binomial expansion of $(1+x)^n$, then $C_0 + 2.\ C_1 + 3.\ C_2 + ... + (n+1)C_n = \ .$

A. $n2^n$

B. $n2^{n-1}$

C. 2^{n-1}

D. $(n-1)2^{n-1}$

Answer: b

Watch Video Solution

48. If $C_0, C_1, C_2 . . C_n$ denote the coefficients in the binomial expansion of $(1+x)^n$, then $C_0 + 2.\, C_1 + 3.\, C_2 + . (n+1)C_n$

A. $n2^{n-1}$

B. $(n+1)2^{n-1}$

C. $(n+2)2^{n-1}$

D. $(n+2)2^n$

Answer: c

Watch Video Solution

49. The value of $C_0 + 3C_1 + 5C_2 + 7C_3 + \ldots. + (2n+1)C_n$ is equal to :

A. $n.2^n$

B. $(n-1)2^n$

C. $(n+1)2^{n+1}$

D. $(n+1)2^{n}$

Answer: d

Watch Video Solution

50. If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial cefficients in the expansion of $(1+x)^n$, then $aC_0 + (a+b)C_1 + (a+2b)C_2 + \ldots + (a+nb)C_n =$.

A. $(a+nb)2^n$

B. $(2a+nb)2^n$

C. $(a+nv)2^{n-1}$

D. $(2a+nb)2^{n-1}$

Answer: d

Watch Video Solution

51. If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial cefficients in the expansion of $(1+x)^n$, then $1^2.C_1 + 2^2 + 3^3.C_3 + \ldots + n^2.C_n = .$

A. $(n+1)2^{n-2}$

B. $n(n+1)2^{n-1}$

C. $n(n+1)2^{n-2}$

D. $n(n-1)2^{n-2}$

Answer: c

Watch Video Solution

52. If $C_o, C_1, C_2 \ldots, C_n$C denote the binomial coefficients in the expansion of $(1+x)^n$, then $1^3.C_1 + 2^3.C_2 + 3^3.C_3 + \ldots + n^3.C_n, =$

A. $(n+2)(n+3)3^{n-3}$

B. $n^2(n+3)2^{n-3}$

C. $n^2(n+3)2^n$

D. $n(n+1)(n+2)2^{n-3}$

Answer: b

Watch Video Solution

53. $1^2.C_1 - 2^2.C_2 + 3^2.C_3 - 4^2C_4 + \ldots + (-1).^{n-2}n^2C_n =$

A. 0

B. 2^n

C. $n2^{n-1}$

D. $-n2^{n-1}$

Answer: a

Watch Video Solution

54. If $C_0, C_1, C_2, ..., C_n$ denote the binomial coefficients in the expansion of $(1+x)^n$, then .

$1. C_1 - 2. C_2 + 3. C_3 - 4. C_4 + ... + (-1)^{n-1} n C_n =$

A. 0

B. 2^n

C. $n2^{n-1}$

D. $-n2^{n-1}$

Answer: a

Watch Video Solution

55. If $C_0, C_1, C_2, ..., C_n$ denote the binomial coefficients in the expansion of $(1+x)^n$, then .

$1^2. C_1 - 2^2. C_2 + 3^2. C_3 - 4^2 C_4 + ... + (-1). {}^{n-2} n^2 C_n = .$

A. 0

B. $n^2 2^n$

C. 2^n

D. $n(n-1)2^{n-2}$

Answer: a

Watch Video Solution

56. If $C_0, C_1, C_2, \ldots, C_N$ denote the binomial coefficients in the expansion of $(1+x)^n$, then $1^3 . C_1 - 2^3 . C_3 - 4^3 . C_4 + \ldots + (-1)^{n-1} n^3 C_n =$

A. 0

B. $n^3 2^n$

C. $n(n-1)(n-2)2^{n-3}$

D. 2^n

Answer: a

Watch Video Solution

57. If $C_0, C_1, C_2, ..., C_n$ denote the binomial coefficients in the expansion of $(1+x)^n)$, then

$xC_0 - (x-1)C_1 + (x-2)C_2 - (x-3)C_3 + ... + (-1)^n(x-n)C_n =$

A. 0

B. x

C. $2^n x$

D. nx

Answer: a

Watch Video Solution

58. If $x + y = 1$, prove that $\sum_{r=0}^{n} r.^n C_r x^r y^{n-r} = nx.$

A. n

B. np

C. npq

D. none of these

Answer: b

Watch Video Solution

59. If $(n)C_0, (n)C_1, (n)C_2, \ldots., (n)C_n,$ denote the binomial coefficients in the expansion of $(1+x)^n$ and $p+q=1 \sum_{r=0}^{n} r^2 \ {}^nC_r p^r q^{n-r} = .$

A. npq

B. np (p+q)

C. $np(np+q)$

D. $np(p+nq)$

Answer: b

Watch Video Solution

60. Prove that $.^{n}C_0 + \frac{.^{n}C_1}{2} + \frac{.^{n}C_2}{3} + \ldots\ldots + \frac{.^{n}C_n}{n+1} = \frac{2^{n+1}-1}{n+1}$.

A. $\frac{2^{n+1}+1}{n+1}$

B. $\frac{2^{n+1}-1}{n+1}$

C. $\frac{2^{n}+1}{n+1}$

D. $\frac{2^{n}-1}{n+1}$

Answer: b

Watch Video Solution

61. If $(1+x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + \ldots + C_nx^n$, prove that $C_0 - \frac{C_1}{2} + \frac{C_2}{3} - \ldots + (-1)^n\frac{C_n}{n+1} = \frac{1}{n+1}$.

A. 0

B. $\frac{1}{n+1}$

C. $\frac{2^2}{n+1}$

D. $\frac{-1}{n+1}$

Answer: b

Watch Video Solution

62. Prove that $\frac{.^{n}C_0}{1} + \frac{.^{n}C_2}{3} + \frac{.^{n}C_4}{5} + \frac{.^{n}C_6}{7} + ... + = \frac{2^n}{n+1}$

A. $\frac{2^{n+1}}{n+1}$

B. $\frac{2^{n+1}-1}{n+1}$

C. $\frac{2^n}{n+1}$

D. none of these

Answer: c

Watch Video Solution

63. If $(1+x)^n = C_0 + C_1 x + C_2 x^2 + \ldots + C_n x^n$

then ${C_0}^2 + {C_1}^2 + {C_2}^2 + \ldots + {C_n}^2$ is equal to

A. 2^{2n-2}

B. 2^n

C. $\frac{(2n)!}{2(2!)1^2}$

D. $\frac{(2n)!}{(n!)^2}$

Answer: d

Watch Video Solution

64. If $(1+x)^n = C_0 + C_1 x + C_2 x^2 + \ldots + C_n x^n$,then for n odd, $C_0^2 - C_1^2 + C_2^2 - C_3^2 + \ldots + (-1)C_n^2$, is equal to

A. 0

B. 2^{2n-3}

C. $\frac{(2n)!}{2(!n)^2}$

D. 2^{2n}

Answer: a

Watch Video Solution

65. If $C_0, C_1, C_2, \ldots, C_n$ are coefficients in the binomial expansion of $(1+x)^n$ and n is even , then $C_0^2 - C_1^2 + C_2^2 + C_3^2 + \ldots + (-1)^n {C_n}^2$ is equal to .

A. 0

B. $(-1)^{n/2} \frac{n!}{\left[\left(\frac{n}{2}\right)!\right]^2}$

C. $(-1)^n \frac{(2n)!}{(n!)^2}$

D. $\frac{(2n)!}{(n!)^2}$

Answer: b

Watch Video Solution

66. If $(1+x)^n = C_0 + C_1 x + C_2 x^2 + \ldots + C_n x^n$, find the values of the following .

$$\sum_{i=0}^{n} \sum_{j=0}^{n} (C_i + C_j)$$

A. $(n+1)^2$

B. $(n+1)2^{n+1}$

C. $n2^n$

D. $n2^{n+1}$

Answer: B

Watch Video Solution

67. If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial coefficients in the expansion of $(1+x)^n$, then $\sum_{r=0}^{n} \sum_{s=0}^{n} C_r C_s$=

A. 2^n

B. $n2^n$

C. 2^{2n}

D. ${}^{2n}C_n$

Answer: C

Watch Video Solution

68. If $C_0, C_1, C_2, \ldots\ldots, C_n$ denote the binomial coefficients in the expansion of $(1+1)^n$, then $\sum_{0 \le r} \sum_{< s \le n} (C_r + C_s)$

A. 2^n

B. 2^{n-1}

C. $n.2^n$

D. none of these

Answer: c

Watch Video Solution

69. If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial coefficients in the expansion of $(1+x)^n$, then $\sum_{0 \le r} \sum_{< s \le n}^{n} C_r C_s$=.

A. $2^{2n} - {}^{2n}C_n$

B. ${}^{2n}C_n - 2^{2n}$

C. $\frac{1}{2}\left(2^{2n} - {}^{2n}C_n\right)$

D. $\frac{1}{2}\left(2^{2n} + {}^{2n}C_n\right)$

Answer: c

Watch Video Solution

70. If $\left(1 - x + x^2\right)^n = a_0 + a_1 x + a_2 x^2 + \ldots\ldots\ldots + a_{2n} x^{2n}$, find the value of $a_0 + a_2 + a_4 + \ldots\ldots\ldots + a_{2n}$.

A. $\sum_{r=0}^{2n} a_r = 3^n$

B. $a_r = a_{2n-r} - \quad \le r \le 2n$

C. $a_0 + a_1 + a_2 + \ldots + a_{n-1} = \frac{3^n - a_n}{2}$

D. $a_0 + a_1 + a_2 + \ldots + a_n = \frac{3^n}{2}$

Answer: d

Watch Video Solution

71. If $\left(1 - x + x^2\right)^n = a_0 + a_1 x + a_2 x^2 + \ldots\ldots\ldots + a_{2n} x^{2n}$, find the value of $a_0 + a_2 + a_4 + \ldots\ldots . + a_{2n}$.

A. 0

B. 1

C. a_n

D. none of these

Answer: c

Watch Video Solution

72. $\left(1+x+x^2\right)^n = a_0 + a_1 x + a_2 x^2 + \ldots + a_{2n} x^{2n},$ then

$a_0 + a_1 + a_2 + a_3 - a_4 + \ldots a_{2n} = \ .$

A. 3^(n)

B. 1

C. a_{n-r}

D. none of these

Answer: A

Watch Video Solution

73. $\left(1+x+x^2\right)^n = a_0 + a_1 x + a_2 x^2 + \ldots + a_{2n} x^{2n}$, then

$a_0 a_{2n} - a_1 a_{2r+1} + a_2 a_{2r+2} - a_3 a_{2r+3} + \ldots + a_{2n-2r} a_{2n} = \ .$

A. 0

B. 1

C. a_{n-r}

D. a_{n+r}

Answer: C, D

View Text Solution

74. A is a set containing n elements, A subset P (may be void also) is selected at random from set A and the set A is then reconstructed by replacing the elements of P. A subset Q (may be void also) of A is again chosen at random. The probability that

	Column-I		Column-II
(A)	Number of elements in P is equal to the number of elements in Q is	(P)	$\frac{{}^{2n}C_n}{4^n}$
(B)	The number of elements in P is more than that in Q is	(Q)	$\frac{(2^{2n} - {}^{2n}C_n)}{2^{2n+1}}$
(C)	$P \cap Q = \phi$ is	(R)	$\frac{{}^{2n}C_{n+1}}{4^n}$
(D)	Q is a subset of P is	(S)	$\left(\frac{3}{4}\right)^n$
		(T)	$\frac{{}^{2n}C_n}{4^{n-1}}$

A. 2^n

B. 4^n

C. $2n$

D. 3^n

Answer: b

Watch Video Solution

75. In illustrations 33, the number of ways of selecting P and Q such that P $\cup$ Q = A , is

A. 3^{n-1}

B. $n3^n$

C. $n3^{n-1}$

D. $2n^{n-1}$

Answer: c

Watch Video Solution

76. There are p letters a, q letters b, r letters C.The number of ways of selecting k letters out of these if $p < k < q < r$ is

A. 2^n

B. 3^n

C. 4^n

D. $n3^{n-1}$

Answer: b

Watch Video Solution

77. The sum of the series $\sum_{r=0}^{n} {}^{2n}C_r,$ is

A. 2^{2n}

B. 2^n

C. $2^{2n} + {}^{2n}C_n$

D. $\frac{1}{2}(2^{2n} + {}^{2n}C_n)$

Answer: d

Watch Video Solution

78. The sum of the series $\sum_{r=0}^{n} \mathrm{r}.^{2n}C_r,$ is

A. 2^{2n-1}

B. $n.\ 2^{2n-1}$

C. $n2^{n-1}$

D. $n2^{2n-2}$

Answer: b

Watch Video Solution

79. If $|x| < 1,$ then find the coefficient of x^n in the expansion of $\left(1 + x + x^2 + ...\right)^2.$

A. n

B. n-1

C. n+2

D. n+1

Answer: d

Watch Video Solution

80. The general term in the expansion of

$(1-2x)^{3/4}$, is

A. $\frac{-3}{2^r r!}x^2$

B. $\frac{-3^r}{2^r r!}x^r$

C. $\frac{-3^r}{2^r(2r)!}x^r$

D. none of these

Answer: d

Watch Video Solution

81. Find the coefficient of x^n in the expansion of $\left(1-9x+20x^2\right)^{-1}$.

A. 5^n-4^n

B. $5^{n+1}-4^{n+1}$

C. $5^{n-1}-4^{n-1}$

D. none of these

Answer: b

Watch Video Solution

82. If $(1-x)^{-n}=a_0+a_1x+a_2x^2+\ +a_rx^r+,\ then a_0+a_1+a_2+\ +a_r$ is equal to $\frac{n(n+1)(n+2)(n+r)}{r!}$ $\frac{(n+1)(n+2)(n+r)}{r!}$ $\frac{n(n+1)(n+2)(n+r-1)}{r!}$ none of these

A. $\frac{n(n+1)(n+2)\ldots(n+r)}{r!}$

B. $\frac{(n+1)(n+2)\ldots(n+r)}{r!}$

C. $\frac{(n+1)(n+2)\ldots(n+r-1)}{r!}$

D. none of these

Answer: b

Watch Video Solution

83. If x be very small compered with such that

$\frac{\sqrt{1+x}+\sqrt[3]{(1-x)^2}}{\sqrt{1+x}+(1+x)}$~~a bx`, then the values of a and b are

A. $A=1, b=\frac{5}{6}$

B. $a=1, b=-\frac{5}{6}$

C. $a=1, b=\frac{5}{6}$

D. $a=1, b=-\frac{5}{3}$

Answer: b

Watch Video Solution

84. If x is very small in magnitude compared with a such that $\left(\frac{a}{a+x}\right)^{1/2} + \left(\frac{a}{a-x}\right)^{1/2} = 2 + k\frac{x^2}{a^2}$, then the value of k, is

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\frac{3}{4}$

D. 1

Answer: c

Watch Video Solution

85. The coefficient of x^n in the expansion of $\left(\frac{1+x}{1-x}\right)^2$, is

A. n

B. 2n

C. 3n

D. 4n

Answer: d

Watch Video Solution

86. The coefficients of x^6 in $\left(1+x+x^2\right)^{-3}$, is

A. 2

B. 3

C. 4

D. 6

Answer: b

Watch Video Solution

87. The sum of the series

$1+\frac{1}{3^2}+\frac{1\cdot 4}{1\cdot 2}\frac{1}{3^4}+\frac{1\cdot 4\cdot 7}{1\cdot 2\cdot 3}\frac{1}{3^6}+\ldots,$ is (a) $\left(\frac{3}{2}\right)^{\frac{1}{3}}$ (b) $\left(\frac{5}{4}\right)^{\frac{1}{3}}$ (c) $\left(\frac{3}{2}\right)^{\frac{1}{6}}$ (d) None of these

A. $\sqrt{\frac{3}{2}}$

B. $\left(\frac{3}{2}\right)^{1/3}$

C. $\sqrt{\frac{1}{3}}$

D. $\left(\frac{1}{3}\right)^{1/3}$

Answer: b

Watch Video Solution

88. If x is so small that x^3 and higher powers of x may be neglectd, then $\frac{(1+x)^{3/2}-\left(1+\frac{1}{2}x\right)^3}{(1-x)^{1/2}}$ may be approximated as a. $3x+\frac{3}{8}x^2$ b. $1-\frac{3}{8}x^2$ c. $\frac{x}{2}-\frac{3}{\times^2}$ d. $-\frac{3}{8}x^2$

A. $\frac{x}{2}-\frac{3}{8}x^2$

B. $-\frac{3}{8}x^2$

C. $3x+\frac{3}{8}x^2$

D. $1-\frac{3}{8}x^2$

Answer: b

Watch Video Solution

Section I - Solved Mcqs

1. Find the number of terms which are free from radical signs in the expansion of $\left(y^{1/5}+x^{1/10}\right)^{55}$.

A. 5

B. 6

C. 7

D. none of these

Answer: B

Watch Video Solution

2. In the expansion of $\left(5^{1/2}+7^{1/8}\right)^{1024}$, the number of integral terms is

128 b. 129 c. 130 d. 131

A. 128

B. 129

C. 130

D. 131

Answer: B

Watch Video Solution

3. If the second, third and fourth terms in the expansion of $(x+y)^n$ be 135, 30 and 10/3 respectively, then

A. $n=7$

B. n= 5

C. n = 6

D. none of these

Answer: B

Watch Video Solution

4. The coefficient of the term independent of x in the exampansion of $\left(\frac{x+1}{x^{2/3}-x^{1/3}+1}-\frac{x-1}{x-x^{1/2}}\right)^{10}$ is 210 b. 105 c. 70 d. 112

A. 210

B. 105

C. 70

D. 112

Answer: a

Watch Video Solution

5. In the binomial expansion of $(a-b)^n, n \geq 5$ the sum of the 5th and 6th term is zero , then find $\frac{a}{b}$

A. $\frac{n-5}{6}$

B. $\frac{n-4}{5}$

C. $\frac{5}{n-4}$

D. $\frac{6}{n-5}$

Answer: B

Watch Video Solution

6. Find the number of irrational terms in the expansion of $\left(\sqrt[8]{5}+\sqrt[6]{2}\right)^{100}$

A. 97

B. 98

C. 96

D. 99

Answer: A

Watch Video Solution

7. The sum of the rational terms in the expansion of $\left(\sqrt{2}+\sqrt[5]{3}\right)^{10}$ is

A. 32

B. 9

C. 41

D. none of these

Answer: c

Watch Video Solution

8. Find the greatest value of the term independent of x in the expansion of $\left(x \sin \alpha + \frac{\cos \alpha}{x}\right)^{10}$, where $\alpha \in R$.

A. 2^5

B. $\frac{10!}{(5!)^2}$

C. $\frac{10!}{\left(2^5 \times (5!)\right)^2}$

D. none of these

Answer: c

Watch Video Solution

9. If the sum of the coefficients in the expansion of

$(1+2x)^n$ is 6561 , the greatest term in the expansion for $x=1/2$, is

A. 4^{th}

B. 5^{th}

C. 6^{th}

D. none of these

Answer: b

Watch Video Solution

10. If the sum of the coefficients in the expansion of

$(1+2x)^n$ is 6561 , then the greatest coefficients in the expansion, is

A. 896

B. 3594

C. 1792

D. none of these

Answer: c

Watch Video Solution

11. If the sum of the coefficients in the expansion of $(b+c)^{20}\{1+(a-2)x\}^{20}$ is equal to square of the sum of the coefficients in the expansion of $[2bcx-(b+c)y]^{10}$, where a, b, c are positive constants, then

A. $\geq \sqrt{(ac)}$

B. $\frac{b+c}{2} \geq a$

C. c, a and b are in G. P

D. $\frac{1}{c}, \frac{1}{a}, \frac{1}{b}$ are in H.P

Answer: b

Watch Video Solution

12. The coefficient of x^n in the expansion of $(1-x)(1-x)^n$ is $n-1$ b. $(-1)^n(1-n)$ c. $(-1)^{n-1}(n-1)^2$ d. $(-1)^{n-1}n$

A. $(-1)^{n-1}n$

B. $(-1)^n(1-n)$

C. $(-1)^{n-1}(n-1)^2$

D. $(n-1)$

Answer: B

Watch Video Solution

13. The coefficient of the middle term in the binomial expansion in powers of x of $(1+\alpha x)^4$ and of $(1-\alpha x)^6$ is the same if α equals

A. $\frac{3}{5}$

B. $\frac{10}{3}$

C. $-\frac{3}{10}$

D. $-\frac{5}{3}$

Answer: c

Watch Video Solution

14. The coefficient of t^{24} in $\left(1+t^2\right)^{12}\left(1+t^{12}\right)\left(1+t^{24}\right)$ is ˆ $12C_6+3$ b. ˆ $12C_6+1$ c. ˆ $12C_6$ d. ˆ $12C_6+2$

A. ${}^{12}C_6+3$

B. ${}^{12}C_6+1$

C. ${}^{12}C_6$

D. ${}^{12}C_6+2$

Answer: c

Watch Video Solution

15. Find the positive integer just greater than $(1 + 0.0001)^{10000}$.

A. 3

B. 4

C. 5

D. none of these

Answer: a

Watch Video Solution

16. If $[x]$ denotes the greatest integer less than or equal to*, then $\left[(1 + 0.0001)^{10000}\right]$ equals

A. 3

B. 2

C. 0

D. none of these

Answer: b

Watch Video Solution

17. The approximate value if $(1.0002)^{3000}$, is

A. 1.6

B. 1.4

C. 1.8

D. 1.2

Answer: a

Watch Video Solution

18. The number 101^{100} -1 is divisible by

A. 100

B. 1000

C. 10000

D. all the above

Answer: d

Watch Video Solution

19. $\sum_{r=0}^{n}(-1)^{r}.{}^{n}C_{r}\frac{1+r\ln 10}{(1+\ln 10^{n})^{r}}$

A. 1

B. -1

C. n

D. none of these

Answer: d

Watch Video Solution

20. Find the coefficient of x^5 in the expansion of $(1+x)^{21}+(1+x)^{22}+\ +(1+x)^{30}$.

A. ${}^{51}C_5$

B. ${}^{9}C_5$

C. ${}^{31}C_6-{}^{21}C_6$

D. ${}^{30}C_5-{}^{20}C_5$

Answer: C

Watch Video Solution

21. Find the sum of the coefficients of all the integral powers of x in the expansion of $\left(1+2\sqrt{x}\right)^{40}$.

A. $3^{40}+1$

B. $3^{40}-1$

C. $\frac{1}{2}(3^{40}-1)$

D. $\frac{1}{2}\left(3^{40}+1\right)$

Answer: d

Watch Video Solution

22. If {x} denotes the fractional part of x, then $\left\{\frac{3^{2n}}{8}\right\}, n \in N,$ is

A. $\frac{3}{8}$

B. $\frac{7}{8}$

C. $\frac{1}{8}$

D. none of these

Answer: c

Watch Video Solution

23. 2^{60} when divided by 7 leaves the remainder

A. 1

B. 6

C. 5

D. 2

Answer: A

Watch Video Solution

24. The remainder when 9^{103} is divided by 25 is equal to

A. 5

B. 6

C. 4

D. none of these

Answer: c

Watch Video Solution

25. If the coefficient of the 5^{th} term be the numerically the greatest coefficient in the expansion of $(1-x)^n$, then the positiveintegral value of n is

A. 9

B. 8

C. 7

D. 10

Answer: b

Watch Video Solution

26. The coefficient of x^{50} in the polynomial $\left(x+{}^{50}C_0\right)\left(x+3.{}^5C_1\right)\left(x+5.{}^5C_2\right)\ldots..\left(x+(2n+1)^5C_{50}\right)$, is

A. 50.2^{50}

B. 50.2^{51}

C. 51.2^{50}

D. $50.\left(2^{50}+1\right)$

Answer: c

Watch Video Solution

27. The sum of the numerical coefficients in the expansion of $\left(1+\frac{x}{3}+\frac{2y}{3}\right)^{12}$, is

A. 1

B. 2

C. 2^{12}

D. none of these

Answer: c

Watch Video Solution

28. P is a set containing n elements . A subset A of P is chosen and the set P is reconstructed by replacing the element of A. B such that A and B have no common elements, is

A. 2^n

B. 3^n

C. 4^n

D. none of these

Answer: b

Watch Video Solution

29. In Example 28 , the number of ways of choosing A and B such that A = B, is

A. 2^n

B. 3^n

C. ${}^{2n}C_n$

D. none of these

Answer: a

Watch Video Solution

30. In , Example 28 , the number of ways of choosing A

and B such that A and B have equal number of elements, is

A. 2^n

B. 3^n

C. $(2^n)^2$

D. ${}^{2n}C_n$

Answer: d

Watch Video Solution

31. In Example 28, the number of ways of choosing A

and B such that B contains just one element more then A, is

A. ${}^{2n}C_{n-1}$

B. 3^n

C. $(2^n)^2$

D. ${}^{2n}C_n$

Answer: a

Watch Video Solution

32. In Example 28, the number of ways of choosing A

and B such that B is a subset of A, is

A. 2^n

B. 3^n

C. $^{2n}C_n$

D. none of these

Answer: b

Watch Video Solution

33. If $n > 3$, then $xyz^nC_0 - (x-1)(y-1)(z-1)^nC_1 + (x-2)(y-2)(z-2)^nC_2 - (x-3)(y-3)(z-3)^nC_3 + \ldots. + (-1)^n(x-n)(y-n)(z-n)^nC_n$ equals :

A. $xy \times 2^n$

B. n xy

C. xy

D. none of these

Answer: d

Watch Video Solution

34. If C_r be the coefficients of x^r in $(1+x)^n$, then the value of $\sum_{r=0}^{n}(r+1)^2 C_r$, is

A. $(n+1)(n+4)2^{n-2}$

B. $(n+1)(n+4)2^{n-1}$

C. $(n+1)^2 2^{n-2}$

D. $(n+4)^2 2^{n-2}$

Answer: a

Watch Video Solution

35. If n is an odd natural number , prove that

$$\sum_{r=0}^{n}\frac{(-1)^r}{{}^nC_r}=0$$

A. 0

B. $\frac{1}{n}$

C. $\frac{n}{2^n}$

D. none of these

Answer: a

Watch Video Solution

36. If n is an even natural number , find the value of

$$\sum_{r=0}^{n} \frac{(-1)^r}{{}^nC_r}$$

A. 0

B. $\frac{1}{n}$

C. $\frac{(-1)^{n/2}}{{}^nC_{n/2}}$

D. none of these

Answer: d

Watch Video Solution

37. If $a_n = \sum_{r=0}^{n} \frac{1}{\hat{} \, nC_r}$, then $\sum_{r=0}^{n} \frac{r}{\hat{} \, nC_r}$ equals $(n-1)a_n$ b. na_n c. $(1/2)na_n$ d. none of these

A. $(n-1)a_n$

B. na_n

C. $\frac{n}{2}a_n$

D. none of these

Answer: c

Watch Video Solution

38. The value of $1^2.\, C_1 + 3^2.\, C_3 + 5^2.\, C_5 + \ldots$ is

A. $n(n-1)2^{n-2} + n.2^{n-1}$

B. $n(n-1)2^{n-2}$

C. $n(n+1).\ 2^{n-3}$

D. none of these

Answer: c

Watch Video Solution

39. The sum of the series $\sum_{r=0}^{n} {}^{2n}C_r,$ is

A. $n2^{2n-1}$

B. 2^{2n-1}

C. $2^{n-1}+1$

D. none of these

Answer: a

Watch Video Solution

40. The value of $\left(\sum\sum\right)_{0\le i\le j\le n}\left({}^{n}C_{i}+{}^{n}C_{j}\right)$ is equal to

A. $n2^{n}$

B. $(n+1)2^{n}$

C. $(n+2)2^{n}$

D. none of these

Answer: c

Watch Video Solution

41. The value of $\sum_{r=0}^{n}\sum_{p=0}^{r}{}^{n}C_{r}.\,{}^{r}C_{p}$ is equal to

A. $3^{n}-2^{n}$

B. $3^{n}-2^{n}-2$

C. $3^{n}-2^{n}+2$

D. none of these

Answer: d

Watch Video Solution

42. The value of $\sum_{r=0}^{15} r^2 \left(\frac{{}^{15}C_r}{{}^{15}C_{r-1}} \right)$ is equal to

A. 1085

B. 560

C. 680

D. 1240

Answer: c

Watch Video Solution

43. $\sum_{r=0}^{n-1} \frac{{}^{n}C_r}{{}^{n}C_r + {}^{n}C_{r+1}}$ is equal to

A. $\frac{n-1}{n+1}$

B. $\frac{n+1}{2}$

C. $\frac{n(n+1)}{2}$

D. $\frac{n}{2}$

Answer: d

Watch Video Solution

44. If $\sum_{i=1}^{n-1}\left(\frac{{}^{n}C_{i-1}}{{}^{n}C_{i}+{}^{n}C_{i-1}}\right)^{3}=\frac{36}{13}$,, then n is equal to

A. 10

B. 11

C. 13

D. 12

Answer: d

Watch Video Solution

45. If $(1+x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + ... + C_nx^n$, n being even

the value of

$C_0 = (C_0 + C_1) + (C_0 + C_1 + C_2) + ... + (C_0 + C_1 + C_2 + ... + C_{n-}$

is equal to

A. $n2^{n-1}$

B. $(n-1)2^n$

C. $n2^n$

D. $(n+1)2^n$

Answer: a

Watch Video Solution

46. The value of $\sum_{r=1}^{10} r.\frac{{}^nC_r}{{}^nC_{r-1}}$ is equal to

A. $5(2n-9)$

B. 10n

C. $9(n-4)$

D. none of these

Answer: a

Watch Video Solution

47. 7^{103} when divided by 25 leaves the remainder .

A. 20

B. 16

C. 18

D. 15

Answer: C

Watch Video Solution

48. The coefficient of x^6 in the expansion of $\left(1+x+x^2\right)^{-3}$ is

A. 6

B. 5

C. 4

D. 3

Answer: d

Watch Video Solution

49. If $\frac{x^2+x}{1-x} = a_1x + a_2x^2 + \ldots$ to ∞, $|x| < 1$, then

A. $a_1 + a_2 = 4$

B. $a_1 - a_2 = 3$

C. $a_p = a_q$ for $p, q > 1$

D. none of these

Answer: c

Watch Video Solution

50. The sum of the series

$^4C_0 + {}^5C_1x + {}^6C_2x^2 + {}^7C_3x^3 + \ldots$ to ∞, is

A. $\frac{1}{(1-X)^5}$

B. $\frac{1}{(1-X)^5}$

C. $(1+X)^{-5}$

D. none of these

Answer: B

Watch Video Solution

51. the sum of the series $^2C_0 + {}^3C_1x^2 + {}^4C_2x^4 + {}^5C_3x^6 + \ldots$ to ∞, is

A. $\frac{1}{(1+x^2)^3}$

B. $(1-x^2)^{-3}$

C. $\frac{1}{(1+x)^3}$

D. none of these

Answer: a

Watch Video Solution

52. If $S_n = \sum_{r=0}^{n} \frac{1}{nC_r}$ and $t_n = \sum_{r=0}^{n} \frac{r}{nC_r}$, then $\frac{t_n}{S_n} =$

A. $\frac{2n-1}{2}$

B. $\frac{n}{2} - 1$

C. n-1

D. $\frac{n}{2}$

Answer: d

Watch Video Solution

Watch Video Solution

53. If $s_n = \sum_{r<s}\left(\frac{1}{nC_r} + \frac{1}{nC_s}\right)$ and $t_n = \sum_{r<s}\left(\frac{r}{nC_r} + \frac{s}{nC_s}\right)$, then $\frac{t_n}{s_n} =$

A. n-1

B. n+1

C. $\frac{n}{2}$

D. none of these

Answer: c

Watch Video Solution

54. The coefficient of x^5 in the expansion of $\left(x^2 - x - 2\right)^5$ is -83 b. -82 c. -86 d. -81

A. -83

B. -82

C. -81

D. 0

Answer: C

Watch Video Solution

55. If a_r is the coefficient of x^r in the expansion of $\left(1+x+x^2\right)^n$, then $a_1 - 2a_2 + 3a_3 \ldots . - 2na_{2n} =$

A. 0

B. n

C. $-n$

D. 2n

Answer: C

Watch Video Solution

56. If n be a positive integer and P_n denotes the product of the binomial coefficients in the expansion of $(1+x)^n$, prove that $\frac{P_{n+1}}{P_n} = \frac{(n+1)^n}{n!}$.

A. $\frac{n+1}{n!}$

B. $\frac{n^n}{n!}$

C. $\frac{(n+1)^n}{(n+1)!}$

D. $\frac{n+1^{n+1}}{(n+1)!}$

Answer: d

Watch Video Solution

57. Prove that in the expansion of $(1+x)^n(1+y)^n(1+z)^n$, the sum of the coefficient of the terms of degree r is $.^{3n}C_r$.

A. $({}^nC_r)^3$

B. $3.\ {}^nC_r$

C. ${}^{3n}C_r$

D. ${}^{n}C_{3r}$

Answer: c

Watch Video Solution

58. If

$$\frac{1}{\sqrt{4x+1}}\left\{\left(\frac{1+\sqrt{4x+1}}{2}\right)^{n}-\left(\frac{1-\sqrt{4x+1}}{2}\right)^{n}\right\}=a_0+a_1x$$

then find the possible value of n.

A. 11

B. 9

C. 10

D. none of these

Answer: a

Watch Video Solution

59. If $f(x) = x^n, f(1) + \frac{f^1(1)}{1} + \frac{f^2(1)}{2!} + \frac{f^n(1)}{n!}, where f^r(x)$ denotes the rth order derivative of $f(x)$ with respect to $x,$ is a. n b. 2^n c. 2^{n-1} d. none of these

A. n-1

B. 2^n

C. 2^{n-1}

D. none of these

Answer: b

Watch Video Solution

60. the coefficient of x^r in the expansion of $(1-4x)^{-1/2}$, is

A. $\frac{(2r)1}{(r!)2^r}$

B. ${}^{2r}C_r$

C. $\frac{1.35.\ldots.(2r-1)}{2^r r!}$

D. none of these

Answer: b

Watch Video Solution

61. In the expansion of $\left(x^2+1+\frac{1}{x^2}\right)^n, n \in N,$

A. 2n

B. 3n

C. $2n+1$

D. $3n+1$

Answer: c

Watch Video Solution

62. If $\left(1+x+x^2+x^3\right)^n = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \ldots + a_{3n} x^{3n}$,

then the

value of $a_0 + a_4 + a_8 + a_{12} + \ldots..$ is

A. -1

B. 0

C. 4^{n-1}

D. n

Answer: c

Watch Video Solution

63. The value of

$(n)C_1.\ X(1-x)^{n-1} + 2.\ {}^nC_2 x^2 (1-x)^{n-2}$

$+3.\ {}^nC_3 x^3 (1-x)^{n-3} + \ldots. + n^n C_n x^n, n \in$ N is

A. nx

B. $n(n-x)$

C. $n(x-1)$

D. none of these

Answer: a

Watch Video Solution

64. $\sum_{r=1}^{n}\left\{\sum_{r1=0}^{r-1}{}^{n}C_{r}{}^{r}C_{r_1}2^{r1}\right\}$ is equal to

A. 4^n-3^n+1

B. 4^n-3^n-1

C. 4^n-3^n+2

D. 4^n-3^n

Answer: d

Watch Video Solution

65. The coefficients of x^{13} in the expansion of $(1-x)^5\left(1+x+x^2+x^3\right)^4$, is

A. 4

B. -4

C. 9

D. none of these

Answer: a

Watch Video Solution

66. If $\left(1+x+x^2\right)^n = a_0 + a_1 x + a_2 x^2 + \ldots\ldots a_{2n} x^{2n}$, find the value of $a_0 + a_3 + a_6 + \ldots\ldots, n \in N.$

A. $a_1 + a_4 + a_7 + \ldots$

B. $a_2 + a_5 + a_8 + \ldots$

C. 3^{n-1}

D. all of these

Answer: d

Watch Video Solution

67. The sum of the series $1+\frac{1}{1!}\left(\frac{1}{4}\right)+\frac{1.3}{2!}\left(\frac{1}{4}\right)^2+\frac{1.3.5}{3!}\left(\frac{1}{4}\right)^3+\ldots$ to ∞, is

A. $\sqrt{2}$

B. 2

C. $\frac{1}{\sqrt{2}}$

D. none of these

Answer: A

Watch Video Solution

68. The sum of the series

$${}^3C_0 - {}^4C_1 . \frac{1}{2} + {}^5C_2 \left(\frac{1}{2}\right)^2 - {}^6C_3 \left(\frac{1}{2}\right)^3 + \ldots \text{ to } \infty, \text{ is}$$

A. 16

B. 8

C. $\frac{16}{81}$

D. none of these

Answer: c

Watch Video Solution

69. Let $\left(1 + x + x^2\right)^n = \sum_{r=0}^{2n} a_r x^r$. If $\sum_{r=0}^{2n} \frac{1}{a_r} = \alpha$, then $\sum_{r=0}^{2n} \frac{r}{a_r}$ =

A. $n\alpha$

B. $(n-1)\alpha$

C. $\frac{\alpha}{n}$

D. none of these

Answer: a

Watch Video Solution

70. If binomial coeffients of three consecutive terms of $(1+x)^n$ are in H.P., then the maximum value of n, is

A. 1

B. 2

C. 0

D. none of these

Answer: d

Watch Video Solution

71. If n is an even integer and a, b, c are distinct

number, then the number of distinct terms in the expansion of

$(a+b+c)^n + (a+b-c)^n$, is S

A. $\left(\frac{n+2}{2}\right)^2$

B. $n+2$

C. $\frac{n+4}{2}$

D. none of these

Answer: a

Watch Video Solution

72. The number of non negative integral solution of the equation, $x+y+3z=33$ is

A. 120

B. 135

C. 210

D. 520

Answer: c

Watch Video Solution

73. For natural numbers m, n if $(1-y)^m(1+y)^n = 1 + a_1y + a_2y^2 + \ldots\ldots$ and $a_1 = a_2 = 10$, then (m, n) is :

A. (20, 45)

B. (35, 20)

C. $(45, 35)$

D. (35, 45)

Answer: d

Watch Video Solution

74. If the expansion in powers of x be the function $1/[(1-ax)(1-bx)]$ is $a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots$, then a_n is

A. $\frac{b^n - a^n}{b-a}$

B. $\frac{a^n - b^n}{b-a}$

C. $\frac{a^{n+1} - b^{n+1}}{b-a}$

D. $\frac{b^{n+1} - a^{n+1}}{b-a}$

Answer: d

Watch Video Solution

75. Which is larger number , $99^{100} + 100^{50}$ or 101^{50} ?

A. $99^{50} + 100^{50}$

B. both are equal

C. $(101)^{50}$

D. none of these

Answer: c

Watch Video Solution

76. The value of $\binom{30}{0}\binom{30}{10} - \binom{30}{1}\binom{30}{11} + (302)(3012) + + (3020)(3030) =$ a. $\hat{}\ 60C20$ b. $\hat{}\ 30C10$ c. $\hat{}\ 60C30$ d. $\hat{}\ 40C30$

A. ${}^{30}C_{11}$

B. ${}^{60}C_{10}$

C. ${}^{30}C_{10}$

D. ${}^{65}C_{55}$

Answer: c

Watch Video Solution

77. The sum of series $\wedge(20)C0 - \wedge(20)C1 + \wedge(20)C2 - \wedge(20)C3 + + \wedge(20)C10$ is $\frac{1}{2}$ $\wedge(20)C10$ b. 0 c. $\wedge(20)C10$ d. $-\wedge(20)C10$

A. 0

B. ${}^{20}C_{10}$

C. $-{}^{20}X_{10}$

D. $\frac{1}{2}{}^{20}C_{11}$

Answer: d

Watch Video Solution

78. If $f(n) = \sum_{s=1}^{n}\sum_{r=s}^{n} {}^{n}C_{r}{}^{r}C_{s}$, then $f(3) =$

A. 27

B. 19

C. 1

D. 5

Answer: b

Watch Video Solution

79. The coefficient of x^{2012} in the expansion of $(1-x)^{2008}\left(1+x+x^2\right)^{2007}$, is

A. ${}^{2012}C_{2007}$

B. ${}^{2012}C_{2008}$

C. ${}^{2012}C_{2009}$

D. none of these

Answer: d

Watch Video Solution

80. If w is a non-real cube root of unity, x is a real number and $n \in N$ such that first three terms in the binomial expansion of $(w+x)^n$ are $1, 12\overline{w}$ and $69w$ respectively, then

A. $n = 36, x = 1$

B. n = 12, x=2

C. $n = 24, x = \frac{1}{2}$

D. $n = 18, x = \frac{1}{3}$

Watch Video Solution

81. If $\alpha \neq 1$ is an n^{th} root of unity and $n \in N$ such thatfirst three terms in the expansion of $(\alpha + x)^n$ are $1, \alpha$ and $\frac{n-1}{2n}\bar{a}^2$, then the value of x, is

A. $(1)/(n)$

B. $(2)/(n)$

C. $1/2$

D. $(1)/(4)$

Answer: a

Watch Video Solution

82. The coefficient of x^{50} in $\left(1+x^2\right)^{25}\left(1+x^{25}\right)\left(1+x^{40}\right)\left(1+x^{45}\right)\left(1+x^{47}\right)$, is

A. ${}^{25}C_5+1$

B. ${}^{25}C_5+{}^{25}C_{7+1}$

C. ${}^{25}C_7+1$

D. none of these

Answer: a

Watch Video Solution

83. Let $f(n) = \sum_{k=1}^{n} k^2 \hat{} (n)C_k \Bigg)^2$ then the value of f(5) equals

A. ${}^8C_4$

B. $25 \times {}^8C_4$

C. $25 \times {}^8C_5$

D. none of these

Answer: b

Watch Video Solution

84. If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial coefficients in the expansion of $(1+x)^n$, then

$C_0{}^2 + 2C_1{}^2 + 3C_2{}^2 + \ldots + (n+1)C_n{}^2 =$

A. $(2n+1)^{2n}C_n$

B. $(2n-1)^{2n}C_n$

C. $\left(\frac{n}{2}+1\right)^{2n}C_n$

D. $\left(\frac{n}{2}+1\right)^{2n-1}C_n$

Answer: c

Watch Video Solution

85. If for $n \in N$, $\sum_{k=0}^{2n}(-1)^k(\hat{}\,(2n)C_k)^2 = A$, then find the value of $\sum_{k=0}^{2n}(-1)^k(k-2n)(\hat{}\,(2n)C_k)^2$.

A. $n\alpha$

B. $-n\alpha$

C. `0

D. none of these

Answer: b

Watch Video Solution

86. $\sum_{r=0}^{n}(-1)^r \frac{{}^nC_r}{{}^{r+3}C_r}$ is equal to :

A. $\frac{1}{n+1}$

B. $\frac{1}{n+2}$

C. $\frac{2}{n+1}$

D. $\frac{2}{n+2}$

Answer: d

Watch Video Solution

87. If C_0, C_1C_2 ....., denote the binomial coefficients

in the expansion of $(1+x)^n$, then

$$\frac{C_0}{2} - \frac{C_1}{3} + \frac{C_2}{4} - \frac{C_3}{5} + \ldots + (-1)^n \frac{C_n}{n+2} =$$

A. $\frac{1}{n+1}$

B. $\frac{1}{n+2}$

C. $\frac{1}{n(n+1)}$

D. $\frac{1}{(n+1)(n+2)}$

Answer: d

Watch Video Solution

88. If $C_0, C_1, C_2 \ldots, C_n$, denote the binomial coefficients in the expansion of $(1+x)^n$, then $\frac{C_1}{2} + \frac{C_3}{4} + \frac{C_5}{6} + \ldots\ldots$ is equal to

A. $\frac{2^n - 1}{n+1}$

B. $\frac{2^n}{n+2}$

C. $\frac{2^{n-1}}{n}$

D. $\frac{2^{n-1}}{n+1}$

Answer: a

Watch Video Solution

89. For $r = 0, 1, \ldots..., 10$, let A_r, B_r, and C_r denote, respectively, the coefficient of x^r in the expansion of $(1+x)^{10}, (1+x)^{20}$ and $(1+x)^{30}$. Then $\sum_{r=1}^{10} A_r(B_{10}B_r - C_{10}A_r)$ is equal to

A. $B_{10-C_{10}}$

B. $A_{10}\left(B_{10}^2 - C_{10}A_{10}\right)$

C. 0

D. $C_{10} - B_{10}$

Answer: d

Watch Video Solution

90. Find the coefficient of x^7 in the expansion of $\left(1 - x - x^2 + x^3\right)^6$.

A. 144

B. -132

C. -144

D. 132

Answer: c

Watch Video Solution

91. If the coefficient of x^3 and x^4 in the expansion of $(1+ax+bx^2)(1-2x)^{18}$ in power of x are both zero, then (a, b) is equal to

A. $\left(14, \frac{272}{3}\right)$

B. $\left(16, \frac{272}{3}\right)$

C. $\left(16, \frac{251}{3}\right)$

D. $\left(14, \frac{251}{3}\right)$

Watch Video Solution

92. The sum of coefficient of integral powers of x in the binomial expansion of $\left(1-2\sqrt{x}\right)^{50}$ is

A. $\frac{1}{2}\left(3^{50}-1\right)$

B. $\frac{1}{2}\left(2^{50}+1\right)$

C. $\frac{1}{2}\left(3^{50}+1\right)$

D. $\frac{1}{2}\left(3^{50}\right)$

Answer: c

Watch Video Solution

93. The coefficient of x^9 in the expansion of $(1+x)\left(16x^2\right)\left(1+x^3\right)\left(1+x^{100}\right)$ is

A. 2

B. 6

C. 9

D. 8

Answer: d

Watch Video Solution

94. The power of x which has the greatest coefficient inthe expansion of $\left(1+\frac{x}{2}\right)^{10}$

A. 2

B. 3

C. 4

D. 5

Answer: b

Watch Video Solution

95. The term independent of x in the expansion of $\left(\frac{1}{x^2}+\frac{1}{x}+1+x+x^2\right)^5$, is

A. 381

B. 441

C. 439

D. 359

Answer: a

Watch Video Solution

96. The sum of rational term(s) in $\left(\sqrt{3}+2^{\frac{1}{3}}+5^{\frac{1}{4}}\right)^8$ is equal to

A. 3150

B. 336

C. 3486

D. 3592

Answer: d

Watch Video Solution

97. If $f(x)$ is periodic with periot $'t'$ such that $f(2x+3)+f(2x+7)=2$, then the coefficient of m^{-24} in the expansion of $\left(m+\frac{b}{m^3}\right)^{4t}$ is

A. ${}^{16}C_{10}b^6$

B. ${}^{16}C_6b^{10}$

C. ${}^{16}C_6b^4$

D. ${}^{16}C_6b^6$

Answer: b

Watch Video Solution

98. The number of real negative terms in the binomial expansion of $(1+ix)^{4n-2}, n \in N, x > 0$ is

A. n

B. n+1

C. n-1

D. 2n

Answer: b

Watch Video Solution

99. If $\left(3+a\sqrt{2}\right)^{100}+\left(3+b\sqrt{2}\right)^{100}=7+5\sqrt{2}$ number of pairs (a, b) for which the equation is true is, (a, b are rational numbers) (a) 1 (b) 6 (c) 0 (d) infinite

A. 1

B. 6

C. 0

D. infinite

Answer: C

Watch Video Solution

100. The value of $\sum_{r=0}^{n} r(n-r)({}^{n}C_{r})^{2}$ is equal to

A. $n^{22n-1}C_{n-1}$

B. $n^{22n-2}C_{n}$

C. $n^{22n}C_{n-1}$

D. $n^{22n-1}C_{n}$

Answer: b

Watch Video Solution

Section I - Assertion Reason Type

1. Stetemet - 1: $\sum_{r=0}^{n} r.\ {}^{n}C_r = n2^{n-1}$

Statement-2: $\sum_{r=0}^{n} r.\ {}^{n}C_r x^r = n(1+x)^{n-1}x$

A. 1

B. 2

C. 3

D. 4

Answer: a

Watch Video Solution

2. Statement - 1 $\sum_{r=0}^{n} (r+1)^{n}C_r = (n+2)\cdot 2^{n-1}$

Statement-2 $\sum_{r=0}^{n} (r+1)^{n}C_r x^r = (1+x)^{n} + nx(1+x)^{n-1}$.

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

3. Statement-1 : $\sum_{r=0}^{n} r^{2n}C_r x^r = n(n-1)x^2(1+x)^{n-2} + nx(1+x)^{n-1}$

Statement-2: $\sum_{r=0}^{n} r^{2n}C_r = n(n-1)2^{n-2} + n2^{n-1}$.

A. 1

B. 2

C. 3

D. 4

Answer: b

Watch Video Solution

4. Statement-1 $\sum_{r=0}^{n} r^{n}C_{r}x^{r}(-1)^{r} = nx(1-x)^{n-1}$

Statement-2: $\sum_{r=0}^{n} r^{n}C_{r}x^{r}(-1)^{r} = 0$

A. 1

B. 2

C. 3

D. 4

Answer: d

Watch Video Solution

5. Statement-1: $\sum_{r=0}^{n} \frac{1}{r+1}{}^{n}C_{r} = \frac{1}{(n+1)x}\left\{(1+x)^{n+1}-1\right\}^{-1}$

Statement-2: $\sum_{r=0}^{n} \frac{{}^{n}C_{r}}{r+1} = \frac{2^{n+1}}{n+1}.$

A. 1

B. 2

C. 3

D. 4

Answer: c

Watch Video Solution

6. Statement -2: $\sum_{r=0}^{n}(-1)^r \frac{{}^nC_r}{r+1} = \frac{1}{n+1}$

Statement-2: $\sum_{r=0}^{n}(-1)^r \frac{{}^nC_r}{r+1}x^r = \frac{1}{(n+1)x}\left\{1-(1-x)^{n+1}\right\}$

A. 1

B. 2

C. 3

D. 4

Answer: a

Watch Video Solution

7. For any n $\in$ N, let C_r stand for ${}^nC_r$,

$r = 0, 1, 2, 3, \ldots, n$ and let $S = \sum_{r=0}^{n} \frac{1}{C_r}$

Statement-1: $\sum_{0 \le i < i \le n} \sum \left(\frac{i}{C_i} + \frac{j}{C_j} \right) = \frac{n^2}{2} S$

Statement-2: $\sum_{0 \le i < i \le n} \sum \left(\frac{1}{C_i} + \frac{1}{C_j} \right) = nS$

Watch Video Solution

8. Statement -1: $\sum_{r=0}^{n} r({}^nC_r)^2 = n\left({}^{2n-1}C_{n-1}\right)$

Statement-2: $\sum_{r=0}^{n} ({}^nC_r)^2 = {}^{2n}C_n$

A. 1

B. 2

C. 3

D. 4

Answer: b

Watch Video Solution

9. Statement-1:

$$\frac{C_0}{2.3} - \frac{C_1}{3.4} + \frac{C_2}{4.5} - \ldots\ldots\ldots\ldots + \ldots\ldots\ldots\ldots + (-1)^n \frac{C_n}{(n+2)(n+3)} = \frac{}{(n}$$

Statement-2:

$$\frac{C_0}{k} - \frac{C_1}{k+1} + \frac{C_2}{k+3} + \ldots\ldots\ldots\ldots + (-1)^n \frac{C_n}{k+n} = \int_0^1 x^{k-1}(1-x)^n dx$$

A. 1

B. 2

C. 3

D. 4

Answer: a

Watch Video Solution

10. Let a, b, c be the sides of ΔABC opposite to angles

A, b,C respecitvely.

Let $\alpha = \sum_{r=0}^{n} {}^{n}C_r b^{n-r} c^r \cos\{rB - (n-r)C\}$

and $\beta = \sum_{r=0}^{n} {}^{n}C_r b^{n-r} c^r \sin\{rB - (n-r)C\}$

Statement -1: $\alpha = \alpha^n$

Statement-2: $\beta = \alpha^n$

A. 1

B. 2

C. 3

D. 4

Answer: c

Watch Video Solution

11. Prove that

$$\frac{1}{m!}.{}^{n}C_0 + \frac{n}{(m+1)!}.{}^{n}C_1 + \frac{n(n-1)}{(m+2)!}.{}^{n}C_2 + \ldots\ldots + \frac{n(n-1)\ldots.2 \times 1}{(m+2)!}.{}^{n}$$

A. 1

B. 2

C. 3

D. 4

Answer: a

Watch Video Solution

12.

$S_1 = \sum_{j=1}^{10} j(j-1)^{10}C_j$ and $S_2 = \sum_{j=1}^{10} j.\,^{10}C_j$. Statement-1

$S_3 = 50 \times 2^9$.

Statement-2 $S_1 = 90 \times 2^8$ and $S_2 = 10 \times 2^8$

Watch Video Solution

13. Let $(1+x)^{36} = a_0 + a_1 x + a_2 x^2 + \ldots + a_{36} x^{36}$. Then

Statememt-1: $a_0 + a_3 + a_6 + \ldots + a_{36} = \frac{2}{3}\left(2^{35} + 1\right)$

Statement-2: $a_0 + a_2 + a_4 + \ldots + a_{36} = 2^{35}$

A. 1

B. 2

C. 3

D. 4

Answer: b

Watch Video Solution

Exercise

1. If A and B are coefficients of x^r and x^{n-r} respectively in the expansion of $(1+x)^n$, then

A. A+B

B. A+B=0

C. A = Rb

D. A = nB

Answer: a

Watch Video Solution

2. Coefficient of x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is

A. $\frac{405}{226}$

B. $\frac{504}{289}$

C. $\frac{450}{263}$

D. none of these

Answer: D

Watch Video Solution

3. The number of terms in the expansion of $\left(1 + 2x + x^2\right)^{20}$ when expanded in decreasing powers of x is

A. 20

B. 21

C. 40

D. 41

Answer: D

Watch Video Solution

4. The greatest coefficient in the expansion of $(1+x)^{2n}$ is :

A. ${}^{2n}C_n$

B. ${}^{2n}C_{n-1}$

C. ${}^{2n}C_{n+1}$

D. ${}^{2n}C_{2n-1}$

Answer: c

Watch Video Solution

5. The number of terms in the expansion of $(2x+3y-4z)^n$ is

A. n+1

B. n+3

C. $\frac{(n+1)(n+2)}{2}$

D. none of these

Answer: C

Watch Video Solution

6. Given positive integers $r>1, n>2$ and that the coefficient of $(3rd)thand(r+2)th$ terms in the binomial expansion of $(1+x)^{2n}$ are equal. Then $n=2r$ b. $n=2r+1$ c. $n=3r$ d. none of these

A. n=2r

B. n=3r

C. n=2r+1

D. none of these

Answer: a

Watch Video Solution

7. Find the number of terms in the expansions of the following: $(1+\sqrt{2}x)^9+(1-5\sqrt{2}x)^9$

A. 5

B. 7

C. 9

D. 10

Answer: a

Watch Video Solution

8. The sum of the series $\sum_{r=0}^{10} {}^{20}C_r$ is $2^{19} + {}^{20}C_{10}$.

A. 2^{20}

B. 2^{19}

C. $2^{19} + \frac{1}{2}{}^{20}C_{10}$

D. $2^{19} - \frac{1}{2}{}^{20}C_{10}$

Answer: c

Watch Video Solution

9. The coefficient of x^{-10} in $\left(x^2 - \frac{1}{x^3}\right)^{10}$, is

A. -252

B. 210

C. $-5!$

D. -120

Answer: B

Watch Video Solution

10. If the coefficients of rth, $(r+1)th, and (r+2)th$ terms in the expansion of $(1+x)^{14}$ are in A.P., then r is/are a. 5 b. 11 c. 10 d. 9

A. 5,9

B. 6,9

C. 7,9

D. none of these

Answer: a

Watch Video Solution

11. If C_r stands for $.^r C_r$, then the sum of the first $(n+1)$ terms o the series $aC_0 - (a+d)C_1 + C_1 + (a+2d)C_2 - (a+3d)C_3 + \ldots$ is

equal to_____

A. $\frac{a}{2^n}$

B. na

C. 0

D. none of these

Answer: c

Watch Video Solution

12. If $\left(1+x+x^2\right)^n=\left(C_0+C_1x+C_2x^2+\ldots\ldots\ldots\right)$ then the value of $C_0C_1-C_1C_2+C_2C_3\ldots\ldots$

A. 3^n

B. $(-1)^n$

C. 2^n

D. none of these

Answer: d

Watch Video Solution

13. If the coefficients of 2nd, 3rd and the 4th terms in the expansion of $(1+x)^n$ are in AP, then the value of n is:

A. 2

B. 7

C. 6

D. 8

Answer: B

Watch Video Solution

14. If the coefficient of 2nd, 3rd and 4th terms in the expansion of $(1+x)^{2n}$ are in A.P., show that $2n^2 - 9n + 7 = 0$.

A. 1.3

B. 0.2

C. 4

D. -1

Answer: b

Watch Video Solution

15. If the 6th term in the expansion of $\left(\frac{1}{x^{\frac{8}{3}}}+x^{2}(\log)_{10}x\right)^{8}$ is 5600, then x equals 1 b. $(\log)_{e}10$ c. 10 d. x does not exist

A. 1

B. 10

C. $\log_{e}10$

D. 5

Answer: B

Watch Video Solution

16. Find the term in $\left(3\sqrt{\left(\frac{a}{\sqrt{b}}\right)}+\left(\sqrt{\frac{b}{\hat{}}3\sqrt{a}}\right)\right)^{21}$ which has the same power of a and b.

A. 9

B. 10

C. 8

D. 6

Answer: A

Watch Video Solution

17. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1+x)^{2n}$ are in A.P. then

A. $2n^2 + 9n + 7 = 0$

B. $2n^2 - 9n + 7 = 0$

C. $2n^2 - 9n - 7 = 0$

D. none of these

Answer: B

Watch Video Solution

18. Find the coefficient of x^4 in the expansion of $\left(1 + x + x^2 + x^3\right)^{11}$.

A. 900

B. 909

C. 990

D. 999

Answer: C

Watch Video Solution

19. If $\left(1+x-2x^2\right)^6 = 1 + C_1x + C_2x^2 + C_3x^3 + \ldots + C_{12}x^{12}$, then the value of $C_2 + C_4 + C_6 + \ldots + C_{12}$ is

A. 30

B. 32

C. 31

D. none of these

Answer: c

Watch Video Solution

20. If the coefficient of the middle of term in the expansion of $(1+x)^{2n+2}$ is α and the coefficient of the middle tems in the expansion of $(1+x)^{2n+1}$ are β and γ then relate α, β, γ.

A. $P + q = r$

B. $p + r = 0$

C. $p = q + r$

D. $p + q + r = 0$

Answer: c

Watch Video Solution

21. If a_1, a_2, a_3, a_4 be the coefficient of four consecutive terms in the expansion of $(1 + x)^n$, then prove that: $\frac{a_1}{a_1 + a_2} + \frac{a_3}{a_3 + a_4} = \frac{2a_2}{a_2 + a_3}$.

A. $P + q = r$

B. $\frac{1}{2}\frac{a_2}{a_2 + a_3}$

C. $\frac{2a_2}{a_2 + a_3}$

D. $\frac{2a_3}{a_2 + a_3}$

Answer: c

Watch Video Solution

22. The coefficient of $x^r[0 \leq r \leq (n-1)]$ in the expansion of $(x+3)^{n-1} + (x+3)^{n-2}(x+2) + (x+3)^{n-3}(x+2)^2 + \ldots.$

$+(x+2)^{n-1}$ is $a.^n C_r(3^r - 2^n)$ $b.^n C_r\left(3^{n-r} - 2^{n-r}\right)$ $c.^n C_r\left(3^r + 2^{n-r}\right)$

d. none of these

A. ${}^nC_r(3^r - 2^n)$

B. ${}^nC_r\left(3^{n-r} - 2^{n-r}\right)$

C. $\left({}^nC_r\left(3^r + 2^{n-r}\right)\right.$

D. none of these

Answer: b

Watch Video Solution

23. If $\left(1 - x + x^2\right)^n = a_0 + a_1x + a_2x^2 + \ldots\ldots\ldots + a_{2n}x^{2n}$, find the value of $a_0 + a_2 + a_4 + \ldots\ldots\ldots + a_{2n}$.

A. $\frac{3^n+1}{2}$

B. $\frac{3^n-1}{2}$

C. $\left(3^{n-1}+1\right).(2)$

D. $\frac{3^{n-1}-1}{2}$

Answer: A

Watch Video Solution

24. The coefficient of x^m in $(1+x)^m+(1+m)^{m+1}+\ldots+(1+x)^n, m \leq n$ is

A. ${}^{n+1}C_{m+1}$

B. ${}^{n-1}C_{m-1}$

C. ${}^{n}C_{m}$

D. ${}^{n}C_{m+1}$

Answer: A

Watch Video Solution

25. the coefficient of x^7 in $\left(ax - b^{-1}x^{-2}\right)^{11}$ is

A. 0

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

26. Find the coefficient of x^5 in the expansion of $\left(1 + x^2\right)^5(1 + x)^4$.

A. 30

B. 60

C. 40

D. none of these

Answer: b

Watch Video Solution

27. Find the greatest term in the expansion of $\sqrt{3}\left(1+\frac{1}{\sqrt{3}}\right)^{20}$.

A. $\frac{25840}{9}$

B. $\frac{24840}{9}$

C. $\frac{26840}{9}$

D. none of these

Answer: a

Watch Video Solution

28. If $T_0, T_1, T_2, , T_n$ represent the terms in the expansion of $(x+a)^n$, then find the value of $(T_0 - T_2 + T_4 -)^2 + (T_1 - T_3 + T_5 -)^2 n \in N$.

A. $\left(x^2 - a^2\right)^n$

B. $\left(x^2 + a^2\right)^n$

C. $\left(a^2 - x^2\right)^n$

D. none of these

Answer: b

Watch Video Solution

29. about to only mathematics

A. 50

B. 51

C. 202

D. none of these

Answer: B

Watch Video Solution

30. If the coefficients of three consecutive terms in the expansion of $(1+x)^n$ are in the ratio 1:7:42, then find the value of n.

A. 60

B. 70

C. 55

D. none of these

Answer: c

Watch Video Solution

31. The second, third and fourth terms in the binomial expansion $(x+a)^n$ are 240, 720 and 1080, respectively. Find x, a and n.

A. 15

B. 20

C. 10

D. 55

Answer: d

Watch Video Solution

32. The value of tan75

A. 10

B. 1

C. 2

D. 20

Answer: b

Watch Video Solution

33. If the coefficients of the $(2r+4)th$, $(r+2)th$ term in the expansion of $(1+x)^{18}$ are equal, then the value of r is.

A. 5

B. 6

C. 7

D. 9

Answer: b

Watch Video Solution

34. Write the middle term in the expansion of $\left(x+\frac{1}{x}\right)^{10}$.

A. ${}^{n}C_{1}\frac{1}{x}$

B. ${}^{10}C_{5}$

C. ${}^{10}C_{6}$

D. ${}^{10}C_7 x$

Answer: b

Watch Video Solution

35. The 14^{th} term from the end in the expansion of $\left(\sqrt{x} - \sqrt{y}\right)^{17}$, is

A. ${}^{17}C_5 x^6 \left(-\sqrt{y}\right)^5$

B. ${}^{17}C_6 \left(\sqrt{x}\right)^{11} y^3$

C. ${}^{17}C_4 x^{13/2} y^2$

D. none of these

Answer: C

Watch Video Solution

36. If [x] denotes the greatest less than or equal to x and F = R - [R] where $R = \left(5\sqrt{5}+11\right)^{2n+1}$, then Rf is equal to

A. 4^{2n+1}

B. 4^{2n}

C. 4^{2n-1}

D. none of these

Answer: a

Watch Video Solution

37. If [x] denotes the greatest integer less then or equal to x, then $\left[\left(6\sqrt{6}+14\right)^{2n+1}\right]$

A. is an even integer

B. is an odd integer

C. depands on n

D. none of these

Answer: a

Watch Video Solution

38. If n $\in$ N such that $\left(7+4\sqrt{3}\right)^n = I + F$, then IF is

A. 0

B. 1

C. 7^{2n}

D. 2^{2n}

Answer: b

Watch Video Solution

39. Find n in the binomial $\left(2^{\frac{1}{3}}+\frac{1}{3^{\frac{1}{3}}}\right)^{n}$, if the ration 7th term from the beginning to the 7 term from the end $\frac{1}{6}$.

A. 9

B. 6,15

C. 12,9

D. none of these

Answer: a

Watch Video Solution

40. The sum of the coefficients in $\left(1+x-3x^{2}\right)^{2143}$ is

A. -1

B. 1

C. 0

D. none of these

Answer: A

Watch Video Solution

41. If the sum of the coefficient in the expansion of $\left(\alpha^2 x^2 - 2\alpha x + 1\right)^{51}$ vanishes, then find the value of α

A. 2

B. -1

C. 1

D. -2

Answer: C

Watch Video Solution

42. Find the sum of coefficients in the expansion of the binomial $(5p-4q)^n$, where n is a positive integer .

A. 1

B. -1

C. n

D. 0

Answer: A

Watch Video Solution

43. If the sum of the coefficients in the expansion of $\left(1-3x+10x^2\right)^n isa$ and if the sum of the coefficients in the expansion of $\left(1+x^2\right)^n isb,$ then a. $a=3b$ b. $a=b^3$ c. $b=a^3$ d. none of these

A. $a=3b$

B. $a = b^3$

C. $b = a^3$

D. none of these

Answer: B

Watch Video Solution

44. In the expansion of $(1+x)^{2n}(n \in N)$, the coefficients of $(p+1)^{th}$ and $(p+3)^{th}$ terms are equal, then

A. $n - r + 1 = 0$

B. $n - r - 1 = 0$

C. $n + r + 1 = 0$

D. none of these

Answer: B

Watch Video Solution

45. Write the coefficient of the middle term in the expansion of $\left\{\left(x+y^3\right)^3\right\}^7$.

A. $\frac{1\cdot 3\cdot 5....(2n-1)}{n!}2^n$

B. $\frac{1\cdot 3\cdot 5....(2n-1)}{(n!)2^n}2^n$

C. $\frac{(2n)!}{(n!)2^n}2^n$

D. none of these

Answer: A

Watch Video Solution

46. The coefficient of x^5 in the expansion of $\left(1+x^2\right)(1+x)^4$ is (a) 12 (b) 5 (c) 4 (d) 56

A. 30

B. 60

C. 40

D. none of these

Answer: B

Watch Video Solution

47. If the coefficients of r^{th} and $(r+1)^{th}$terms in expansion of $(3+7x)^{29}$ are equal , then r equals

A. 15

B. 21

C. 14

D. none of these

Answer: B

Watch Video Solution

48. If there is a term containing x^{2r} in $\left(x+\frac{1}{x^2}\right)^{n-3}$, then

A. n - 2r is a positive integral mulitple of 3

B. n - 2r is even

C. n-2r is odd

D. none of these

Answer: A

Watch Video Solution

49. If n is an even positive integer, then find the value of x if the greatest term in the expansion of $1+x$ ^n may have the greatest coefficient also.

A. $\frac{n}{n+2}<x<\frac{n+2}{n}$

B. $\frac{n+2}{n}<x<\frac{n}{n+1}$

C. $\frac{n}{n+4}<x<\frac{n+4}{4}$

D. none of these

Answer: A

Watch Video Solution

50. The interval in which x must lie so that the numerically greatest term in the expansion of $(1-x)^{21}$ has the numerically greatest coefficient, is

A. $\left[\frac{5}{6}, \frac{6}{5}\right]$

B. $\left(\frac{5}{6}, \frac{6}{5}\right)$

C. $\left(\frac{4}{5}, \frac{5}{4}\right)$

D. $\left[\frac{4}{5}, \frac{5}{4}\right]$

Answer: B

Watch Video Solution

51. If the coefficients of $rth, (r+1)th$ and $(r+2)th$ terms in the expansion of $(1+x)^n$ be in H.P. then prove that n is a root of the equation $x^2 - (4r-1)x + 4r^2 = 0$.

A. $x^2 - x(4r+1) + 4r^2 - 2 = 0$

B. $x^2 + x(4r+1) + 4r^2 - 2 = 0$

C. $x^2 + x(4r+1) + 4r^2 + 2 = 0$

D. none of these

Answer: A

Watch Video Solution

52. Find the remainder when 5^{99} is divided by 13.

A. 6

B. 8

C. 9

D. 10

Answer: B

Watch Video Solution

53. If $C_oC_1, C_2, \ldots\ldots, C_n$ denote the binomial coefficients in the expansion of $(1+x)^n$, then the value of $\sum_{r=0}^{n}(r+1)C_r$ is

A. $(n2^n)$

B. $(n+1)2^{n-1}$

C. $(n+2)2^{n-1}$

D. $(n+2)2^{n-2}$

Answer: C

Watch Video Solution

54. If $C_0, C_1, C_2, \ldots, C_n$ denote the binomial cefficients in the expansion of $(1+x)^n$, then

$aC_0 + (a+b)C_1 + (a+2b)C_2 + \ldots + (a+nb)C_n = .$

A. $(a+nb)2^n$

B. $(a+nb)2^{n-1}$

C. $(2a+nb)2^{n-1}$

D. $(2a+nb)2^n$

Answer: C

Watch Video Solution

55. Let $(1+x)^n = \sum_{r=0}^{n} C_r x^r$ and ,

$\frac{C_1}{C_0} + 2\frac{C_2}{C_1} + \frac{C_3}{C_2} + \ldots + n\frac{C_n}{C_{n-1}} = \frac{1}{k}n(n+1),$

then the value of k, is

A. $1/2$

B. 2

C. $1/3$

D. 3

Answer: B

Watch Video Solution

56. Find the sum $3.^{n}C_0 - 8.^{n}C_1 + 13.^{n}C_2 - 18 \times .^{n}C_3 + \ldots\ldots$

A. 0

B. 3^n

C. 5^n

D. none of these

Answer: A

Watch Video Solution

57. If $(1+x)^n = C_0 + C_1 x + C_2 x^2 + \ldots + C_n x^n$, then for n odd,

$C_1^2 + C_3^2 + C_5^2 + \ldots + C_n^2$ is equal to

A. 2^{2n-2}

B. 2^n

C. $\frac{(2n)!}{2(n!)^2}$

D. $\frac{(2n)!}{(n!)^2}$

Answer: C

Watch Video Solution

58. If $(1+x)^n = C_0 + C_1 xm + C_2 x^2 + \ldots\ldots + C_n x^n$, then

$C_0C_1 + C_1C_2 + C_2C_3 + \ldots\ldots + C_{n-1}C_n$ is equal to :

A. $\frac{(2n)!}{(n-2)!(n+2)!}$

B. $\frac{(2n)!}{((n-2)!)^2}$

C. $\frac{(2n)!}{((n+2)!)^2}$

D. none of these

Answer: A

Watch Video Solution

59. Find the sum $2C_0 + \frac{2^3}{2}C_1 + \frac{2^3}{3}C_2 + \frac{2^4}{4}C_3 + + \frac{2^{11}}{11}C_{10}$.

A. $\frac{3^{11}n - 1}{11}$

B. $\frac{2^{11} - 1}{11}$

C. $\frac{11^3 - 1}{11}$

D. $\frac{11^2 - 1}{11}$

Answer: A

Watch Video Solution

60. Prove that

$$^{m+n}C_r = {}^mC_r + {}^mC_{r-1} + {}^nC_1 + {}^mC_{r-2}{}^nC_2 + \ldots + {}^nC_r$$

If $r < m, r < n$ and m,n,r and positive integers .

A. $({}^nC_r)^2$

B. $^{m+n}C_r$

C. $^{m+n}C_r + {}^mC_r + {}^nC_r$

D. none of these

Answer: B

Watch Video Solution

61. Find the value of

$$\frac{1}{81^n} - \frac{10}{(81^n)^{2n}}C_1 + \frac{10^2}{(81^n)^{2n}}C_2 - \frac{10^3}{(81^n)^{2n}}C_3 + + \frac{10^{2n}}{81^n}.$$

A. 2

B. 0

C. $1/2$

D. 1

Answer: D

Watch Video Solution

62. The term independent of x in the expansion of $\left(x-\frac{1}{x}\right)^4\left(x+\frac{1}{x}\right)^3$ is :

A. -3

B. 0

C. 1

D. 3

Answer: B

Watch Video Solution

63. if the coefficients of x^5 and x^{15} in the expansion of $\left(x^2+\frac{a}{x^3}\right)^{10}$ are equal then then the positive value of 'a' is:

A. $\frac{1}{2\sqrt{3}}$

B. $\frac{1}{\sqrt{3}}$

C. 1

D. $2\sqrt{3}$

Answer: A

Watch Video Solution

64. If n is a positive integer and $C_k = {}^nC_k$, then the value of $\sum_{k=1}^{n} k^3\left(\frac{C_k}{C_{k-1}}\right)^2$ is :

A. $\frac{n(n+1)(n+2)}{12}$

B. $\frac{n(n+1)^2(n+2)}{12}$

C. $\frac{n(n+1)(n+2)^2}{12}$

D. none of these

Answer: B

Watch Video Solution

65. Find the coefficients of x^{50} in the expression $(1+x)^{1000}+2x(1+x)^{999}+3x^2(1+x)^{998}++1001x^{1000}$.

A. ${}^{1000}C_{50}$

B. ${}^{1000}C_{50}$

C. ${}^{1002}C_{50}$

D. ${}^{1000}C_{51}$

Answer: C

Watch Video Solution

66. about to only mathematics

A. 0

B. $(-1)^{n/2}(n+1)$

C. $(-1)^{n/2}(n+2)$

D. $(-1)^n n$

Answer: C

Watch Video Solution

67. The coefficient of x^n in the expansion of $\frac{1}{(1-x)(3-x)}$, is

A. $\frac{3^{n+1}-1}{2.3^{n+1}}$

B. $\frac{3^{n+1}-1}{3^{n+1}}$

C. $2\left(\frac{3^{n+1}-1}{3^{n+1}}\right)$

D. none of these

Answer: A

Watch Video Solution

68. The coefficient of x^n in the expansion of $\frac{(1+x)^2}{(1-x)^3}$, is

A. $n^2 + 2n + 1$

B. $2n^2 + n + 1$

C. $2n^2 + 2n + 1$

D. $2^n + 2n + 2$

Answer: C

Watch Video Solution

69. If $(r+1)th$ term is the first negative term in the expansion of $(1+x)^{7/2}$, then find the value of r.

A. 5

B. 6

C. 4

D. 7

Answer: A

Watch Video Solution

70. The coefficient of x^6 in the expansion of $\left(1+x+x^2\right)^{-3}$ is

A. 67485

B. 67548

C. 67584

D. 67845

Answer: C

Watch Video Solution

71. The coefficient of x^n in the expansion of $\left(1+x+x^2+\ldots\ldots\ldots\right)^{-n}$, is

A. 1

B. $(-1)^n$

C. n

D. $n+1$

Answer: B

Watch Video Solution

72. If the binomial expansion of $(a+bx)^{-2}$ is $\frac{1}{4}-3x+\ldots\ldots$, then $(a,b)=$

A. $(2,12)$

B. $(2,8)$

C. $(-2, -12)$

D. none of these

Answer: A

Watch Video Solution

73. If $C_r = {}^nC_r$ and $(C_0 + C_1)(C_1 + C_2)\ldots(C_{n-1} + C_n) = k\frac{(n+1)^n}{n!}$, then the value of k, is

A. $C_0C_1C_2\ldots C_n$

B. $C_1^2C_2^2\ldots. C_n^2$

C. $C_1 + C_2 + \ldots + C_n$

D. none of these

Answer: A

Watch Video Solution

74. If the third term in the expansion of $(1+x)^m is -\frac{1}{8}x^2$, then find the value of m.

A. 2

B. 43467

C. 3

D. 4

Answer: B

Watch Video Solution

75. If p is nearly equal to q and n $>$ 1, such that $\frac{(n+1)p+(n-1)q}{(n-1)p+(n+1)q} = \left(\frac{p}{q}\right)^k$, then the value of k, is

A. n = 2r is a positive integral mulitple of 3

B. $\frac{1}{n}$

C. n+1

D. $\frac{1}{n+1}$

Answer: B

Watch Video Solution

76. If $y = 3x + 6x^2 + 10x^3 + \ldots$ then x =

A. $\frac{4}{3} - \frac{1 \cdot 4}{3^2 \cdot 2}y^2 + \frac{1 \cdot 4 \cdot 7}{3^2 \cdot 3}y^3 \ldots$

B. $\frac{4}{3} + \frac{1 \cdot 4}{3^2 \cdot 2}y^2 - \frac{1 \cdot 4 \cdot 7}{3^2 \cdot 3}y^3 \ldots$

C. $\frac{4}{3} + \frac{1 \cdot 4}{3^2 \cdot 2}y^2 + \frac{1 \cdot 4 \cdot 7}{3^2 \cdot 3}y^3 \ldots$

D. none of these

Answer: D

Watch Video Solution

77. If $y = \frac{1}{3} + \frac{1 \cdot 3}{3 \cdot 6} + \frac{1 \cdot 3 \cdot 5}{3 \cdot 6 \cdot 9} + \ldots$ then the value of $y^2 + 2y$ is $a.\ 2 b.\ -2 c.\ 0 d.$ None of these

A. 2

B. -2

C. 0

D. none of these

Answer: A

Watch Video Solution

78. If $\left(1 + 2x + x^2\right)^n = \sum_{r=0}^{2n} a_r x^r$,then a_r is a.$(.^n C_2)^2$ b. $.^n C_r .^n C_{r+1}$ c. $.^{2n} C_r$ d. $.^{2n} C_{r+1}$

A. $(^n C_r)^2$

B. $^n C_r \cdot {}^n C_{r+1}$

C. $^{2n} C_r$

D. ${}^{2n}C_{r+1}$

Answer: C

Watch Video Solution

79. In the expansion of $\left(\sqrt{x^5}+\frac{3}{\sqrt{x^3}}\right)^6$ coefficient of x^3 is (i)0 (ii)120 (iii)420 (iv)540

A. 0

B. 120

C. 420

D. 540

Answer: D

Watch Video Solution

80. Find the number of nonzero terms in the expansion of $\left(1+3\sqrt{2}x\right)^9+\left(1-3\sqrt{2}x\right)^9$.

A. 9

B. 0

C. 5

D. 10

Answer: C

Watch Video Solution

81. The coefficient of y in the expansion of $\left(y^2+c/y\right)^5$ is

A. 29c

B. 10 c

C. $10c^3$

D. $20c^2$

Answer: C

Watch Video Solution

82. The greatest coefficient in the expansion of $(1+x)^{10}$, is

A. $\frac{10!}{5!6!}$

B. $\frac{10!}{(5!)^2}$

C. $\frac{10!}{(5!7!)}$

D. none of these

Answer: B

Watch Video Solution

83. The approximate value of $(7.995)^{1/3}$ correct to four decimal places , is

A. 1.9995

B. 1.9996

C. 1.999.0

D. 1.9991

Answer: B

Watch Video Solution

84. Find the remainder when $32^{32^{32}}$ is divided by 7

A. 1

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

85. If x^m occurs in the expansion $\left(x+1/x^2\right)^{2n}$, then the coefficient of x^m is a. $\frac{(2n)!}{(m)!(2n-m)!}$ b. $\frac{(2n)!3!3!}{(2n-m)!}$ c. $\frac{(2n)!}{\left(\frac{2n-m}{3}\right)!\left(\frac{4n+m}{3}\right)!}$ d. none of these

A. $\frac{(2n)!}{m!(2n-m)!}$

B. $\frac{(2n)!3!3!}{(2n-m)!}$

C. $\frac{(2n)!}{\left(\frac{2n-m}{3}\right)!\left(\frac{4n-m}{3}\right)!}$

D. none of these

Answer: C

Watch Video Solution

86. If $n>1$, then $(1+x)^n-nx-1$ is divisible by :

A. 2x

B. x^2

C. x^3

D. x^4

Answer: B

Watch Video Solution

87. The number of terms with integral coefficients in the expansion of $\left(17^{\frac{1}{3}} + 35^{\frac{1}{2}}x\right)^{600}$ is (A) 100 (B) 50 (C) 150 (D) 101

A. 100

B. 50

C. 101

D. none of these

Answer: C

Watch Video Solution

88. The term independent of x in the expansion of $(1-x)^2\left(x+\frac{1}{x}\right)^{10}$, is

A. ${}^{11}C_5$

B. ${}^{10}C_5$

C. ${}^{10}C_4$

D. none of these

Answer: A

Watch Video Solution

89. The range of the values of term independent of x in the expansion of $\left(x\sin^{-1}\alpha+\frac{\cos^{-1}\alpha}{x}\right)^{10}, \alpha\in[-1,1]$, is :

A. $\left[-\frac{{}^{10}C_5\pi^{10}}{2^5},\frac{{}^{10}C_5\pi^{10}}{2^{20}}\right]$

B. $\left[\frac{{}^{10}C_5\pi^{2}}{2^{20}},\frac{{}^{10}C_5\pi^{2}}{2^{5}}\right]$

C. $[1, 2]$

D. $(1, 2)$

Answer: A

Watch Video Solution

90. If the sum of the coefficients in the expansion of $\left(\alpha x^2 - 2a + 1\right)^{35}$ is equal to the sum of the coefficients in the expansion of $(x - \alpha y)^{35}$, find the value of α.

A. 0

B. 1

C. any real number

D. none of these

Answer: B

Watch Video Solution

91. If the coefficients of r^{th} and $(r+1)^{th}$terms in expansion of $(3+7x)^{29}$ are equal , then r equals

A. 15

B. 21

C. 14

D. none of these

Answer: B

Watch Video Solution

92. The sum of the coefficients in the expansion of $\left(1-x+x^2-x^3\right)^n$,is

A. 0

B. 2^n

C. 3^n

D. 4^n

Answer: A

Watch Video Solution

93. about to only mathematics

A. $\log_{10} 15$

B. $\log_5 15$

C. $\log_e 15$

D. none of these

Answer: B

Watch Video Solution

94. If $n > 3,$ then

$xyC_0 - (x-1)(y-1)C_1 + (x-2)(y-2)C_2 - (x-3)(y-3)C_3 + ...$

equals

A. xyz

B. nxyz

C. #REF!

D. 0

Answer: D

Watch Video Solution

95. The coefficient of x^5 in the expansion of

$\frac{1+x^2}{1+x}, |x| < 1,$ is

A. -1

B. 2

C. 0

D. -2

Answer: D

Watch Video Solution

96. Find the digit at the unit's place in the number $17^{1995} + 11^{1995} - 7^{1995}$

a. 0 b.1 c.2 d.3`

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

97. Find the degree of the polynomial $\frac{1}{\sqrt{4x+1}}\left\{\left(\frac{1+\sqrt{4x+1}}{2}\right)^7-\left(\frac{1+\sqrt{4x+1}}{2}\right)^7\right\}$

A. 7

B. 5

C. 4

D. 3

Answer: D

Watch Video Solution

98. Let $(1+x)^n=\sum_{r=0}^{n} a_r x^r$. Then $\left(1+\frac{a_1}{a_0}\right)\left(1+\frac{a_2}{a_1}\right)....\left(1+\frac{a_n}{a_{n-1}}\right)$ is equal to :

A. $\frac{(n+1)^{n+1}}{n!}$

B. $\frac{(n+1)^n}{n!}$

C. $\frac{n^{n-1}}{(n-1)!}$

D. $\frac{(n+1)^{n-1}}{(n-1)!}$

Answer: B

Watch Video Solution

99. If n is even and

$${}^nC_0 < {}^nC_1 < {}^nC_2 < .... < {}^nC_r > {}^nC_{r+1} > {}^nC_{r+2} > ..... > {}^nC_n,$$

then, r=

A. $\frac{n}{2}$

B. $\frac{n-1}{2}$

C. $\frac{n-2}{2}$

D. does not exist

Answer: B

Watch Video Solution

100. The coefficient x^5 in the expansion of $\left(2 - x + 3x^2\right)^6$ is

A. -4692

B. 4692

C. 2346

D. -5052

Answer: D

Watch Video Solution

101. If $\left(1 + 2x + 3x^2\right)^{10} = a_0 + a_1 x + a_2 x^2 + \ + a_{20} x^{20}, then a_1$ equals

10 b. 20 c. 210 d. none of these

A. 10

B. 20

C. 210

D. none of these

Answer: B

Watch Video Solution

102. The coefficient of $x^8y^6z^4$ in the expansion of $(x+y+z)^{18}$, is not equal to

A. ${}^{18}C_{14} \times {}^{14}C_8$

B. ${}^{18}C_{10} \times {}^{10}C_6$

C. ${}^{18}C_6 \times {}^{12}C_8$

D. ${}^{18}C_6 \times {}^{14}C_6$

Answer: D

Watch Video Solution

103. The value of

$1 \times 2 \times 3 \times 4 + 2 \times 3 \times 4 \times 5 + 3 \times 4 \times 5 \times 6 + \ldots + n(n+1)(n+2)(n$

, is

A. $\frac{1}{5}(n+1)(n+2)(n+3)(n+4)(n+5)$

B. $\frac{1}{5}n(n+1)(n+2)(n+3)(n+4)$

C. $\frac{1}{5}n(n+1)(n+2)(n+3)(n+4)$

D. ${}^{n+4}C_5$

Answer: B

Watch Video Solution

Chapter Test

1. The term independent of x in $(1+x)^m\left(1+\frac{1}{x}\right)^n$ is :

A. ${C_0}^2 + 2{C_1}^2 + 3 \cdot {C_2}^2 + \ldots + (n+1){C_n}^2$

B. $(C_0 + C_1 + \ldots + C_n)^2$

C. $C_0 + C_1{}^2 + \ldots + C_n)^2$

D. none of these

Answer: C

Watch Video Solution

2. The expression

$\left[x + \left(x^3 - 1\right)^{\frac{1}{2}}\right]^5 + \left[x - \left(x^3 - 1\right)^{\frac{1}{2}}\right]^5$ is a polynomial of degree

A. 5

B. 6

C. 7

D. 8

Answer: C

Watch Video Solution

3. The coefficient of x^{53} in the expansion $\sum_{m=0}^{100} \hat{}\ (100)C_m(x-3)^{100-m}2^m$ is $\hat{}\ 100C_{47}$ b. $\hat{}\ 100C_{53}$ c. $-^{100}C_{53}$ d. none of these

A. $^{100}C_{47}$

B. $^{100}C_{53}$

C. $-^{100}C_{53}$

D. $-^{100}C_{100}$

Answer: C

Watch Video Solution

4. If $(1+x)^n = C_0 + C_1 x C_2 x^2 + \ldots + C_n x^n$, prove that

$C_0 + 3C_1 + 5C_2 + \ldots + (2n+1)C_n = (n+1)^2$

A. 2^n

B. $2^n + n \cdot 2^{n-1}$

C. $2^n . (n+1)$

D. none of these

Answer: C

Watch Video Solution

5. Find the numerically grates term in the expansion of $3 - 5x^{15} when x = 1/5.$

A. 5th, 6th

B. 51st

C. 6th, 7th

D. 7th, 8th

Answer: C

Watch Video Solution

6. In the expansion of $(1+x)^{50}$, find the sum of coefficients of odd powers of x.

A. 0

B. 249

C. 250

D. 251

Answer: B

Watch Video Solution

7. Find the position of the term independent of x in the expansion of $\left(\sqrt{\frac{x}{3}}+\frac{3}{2x^2}\right)^{10}$.

A. $\frac{9}{4}$

B. $\frac{3}{4}$

C. $\frac{5}{4}$

D. $\frac{7}{4}$

Answer: C

Watch Video Solution

8. If the coefficients of x^7 and x^8 in the expansion of $\left(2+\frac{x}{3}\right)^n$ are equal then n is

A. 56

B. 55

C. 45

D. 15

Answer: B

Watch Video Solution

9. If the rth term in the expansion of $\left(\frac{x}{3}-\frac{2}{x^2}\right)^{10}$ contains x^4, then r is equal to :

A. 2

B. 3

C. 4

D. 5

Answer: B

Watch Video Solution

10. If the third in the expansion of $\left[x+x^{\log x}\right]^6$ is 10^6 , then x (x>1) may be

A. 1

B. 10

C. $10^{-5/2}$

D. 102

Answer: B

Watch Video Solution

11. the value of x , for which the 6th term in the expansions of $\left[2^{\log}\_2\sqrt{9^{(x-1)+7}}+\frac{1}{2^{\frac{1}{5}}(\log)_2\left(3^{r-1}+1\right)}\right] is 84$, is equal to a. 4 b. 3 c. 2 d. 1

A. 4

B. 3

C. 2

D. 1

Answer: C

Watch Video Solution

12. If the coefficients of $(p+1)$th and $(P+3)$th terms in the expansion of $(1+x)^{2n}$ are equal then prove that n=p+1

A. p = n-2

B. p= n-1

C. p=n+1

D. p=2n-2

Answer: B

Watch Video Solution

13. about to only mathematics

A. 1365

B. -1365

C. 455

D. -455

Answer: B

Watch Video Solution

14. The value of $C_0 + 3C_1 + 5C_2 + 7C_3 + \ldots. + (2n+1)C_n$ is equal to :

A. ${}^{2n-1}C_{n-1}$

B. $(2n+1)^{2n-1}C_n$

C. $2(n+1) \cdot {}^{2n-1}C_{n-1}$

D. ${}^{2n-1}C_n + (2n+1)^{2n-1}C_{n-1}$

Answer: C

Watch Video Solution

15. Find the following sum :

$$\frac{1}{n!} + \frac{1}{2!(n-2)!} + \frac{1}{4!(n-4)!} + \ldots..$$

A. $\frac{2^{n-2}}{(n-1)!}$

B. $\frac{2^{n-1}}{n!}$

C. $\frac{2^n}{n!}$

D. $\frac{2^n}{(n-1)!}$

Answer: B

Watch Video Solution

16. The coefficient of $x^n y^n$ in the expansion of

$[(1+x)(1+y)(x+y)]^n$, is

A. $\sum_{r=0}^{n} C_r^{\,2}$

B. $\sum_{r=0}^{n} C_{r+2}^2$

C. $\sum_{r=0}^{n} C_{r+3}^2$

D. $\sum_{r=0}^{n} C_r^3$

Answer: D

Watch Video Solution

17. If $\left(1+x-2x^2\right)^6 = 1 + C_1x + C_2x^2 + C_3x^3 + \ldots + C_{12}x^{12}$, then the value of $C_2 + C_4 + C_6 + \ldots + C_{12}$ is

A. 30

B. 65

C. 31

D. 63

Answer: C

Watch Video Solution

18. Find the ratio of the coefficient of x^{15} to the term independent of x in the expansion of $\left(x^2 + \frac{2}{x}\right)^{15}$.

A. $1/4$

B. $1/16$

C. $1/32$

D. $1/32$

Answer: C

Watch Video Solution

19. Find the number of terms in the expansion of $(x+y+z)^n$.

A. 11

B. 33

C. 66

D. 1000

Answer: C

Watch Video Solution

20. In the expansion of $(1+x)^{30}$ the sum of the coefficients of odd powers of x is

A. 2^{30}

B. 2^{31}

C. 0

D. 2^{29}

Answer: D

Watch Video Solution

21. In the expansion of $\left(x^2+1+\frac{1}{x^2}\right)^n, n \in N,$

A. 2n

B. 3n

C. 2n+1

D. 3n+1

Answer: C

Watch Video Solution

22. The term independent ofx in the expansion of $(1+x)^{10} \cdot \left(1+\frac{1}{x}\right)^{10}$ is

A. ${}^{22}C_{10}$

B. 0

C. ${}^{22}C_{11}$

D. none of these

Answer: A

Watch Video Solution

23. In the expansion of $\left(x^3 - \frac{1}{x^2}\right)^{15}$, the constant term,is

A. ${}^{15}C_6$

B. 0

C. $-{}^{15}C_9$

D. 1

Answer: C

Watch Video Solution

24. The middle term in the expansion of $\left(1-\frac{1}{x}\right)^n(1-x)^n$ is

A. ${}^{2n}C_n$

B. $-{}^{2n}C_n$

C. $-{}^{2n}C_{n-1}$

D. none of these

Answer: A

Watch Video Solution

25. The total number of terms which are dependent on the value of x in the expansion of $\left(x^2 - 2 + \frac{1}{x^2}\right)^n$ is equal to $2n+1$ b. $2n$ c. n d. $n+1$

A. 2n+1

B. 2n

C. n+1

D. none of these

Answer: B

Watch Video Solution

26. The coefficient of x^6 in $\left\{(1+x)^6 + (1+x)^7 + \ldots\ldots. + (1+x)^{15}\right\}$ is

A. ${}^{16}C_9$

B. ${}^{16}C_5 - {}^{6}C_5$

C. $^{16}C_6 - 1$

D. none of these

Answer: A

Watch Video Solution

27. The number of real negative terms in the binomial expansion of $(1 + ix)^{4n-2}, n \in N, x > 0$ is

A. n = 2r is a positive integral mulitple of 3

B. n+1

C. n-1

D. 2n

Answer: A

Watch Video Solution

28. Find the number of terms in the expansion of $\left(x+\sqrt{x^2-1}\right)^6+\left(x-\sqrt{x^2-1}\right)^6$

A. 7

B. 14

C. 6

D. 4

Answer: D

Watch Video Solution

29. If the last tem in the binomial expansion of $\left(2^{\frac{1}{3}}-\frac{1}{\sqrt{2}}\right)^n is\left(\frac{1}{3^{\frac{5}{3}}}\right)^{\log_3 8}$, then 5th term from the beginning is 210 b. 420 c. 105 d. none of these

A. $\frac{1}{2}\times {}^{10}C_6$

B. $2\times {}^{10}C_4$

C. $\frac{1}{2} \times (10)C_4$

D. none of these

Answer: A

Watch Video Solution

30. The coefficient of $x^6 a^{-2}$ in the expansion of $\left(\frac{x^2}{a} - \frac{a}{x}\right)^{12}$, is

A. $(12)C_6$

B. $-{}^{12}C_5$

C. 0

D. none of these

Answer: C

Watch Video Solution

31. If in the expansion of $(1+ax)^n$, $n \in$ N, the coefficient of x and x^2 are 8 and 24 respectively, then

A. a = 2, n=4

B. a = 4, n=2

C. a = 2, n=6

D. a = -2, n=4

Answer: A

Watch Video Solution

32. In the expansion of $\left(x^3 - \frac{1}{x^2}\right)^n$, $n \in N$, if the sum of the coefficients of $x^5 and x^{10}$, then n is a. 25 b. 20 c. 15 d. none of these

A. 25

B. 20

C. 15

D. none of these

Answer: C

Watch Video Solution

33. The coefficient of x^{20} in the expansion of $\left(1+x^2\right)^{40}.\left(x^2+2+\frac{1}{x^2}\right)^{-5}$ is:

A. ${}^{30}C_{10}$

B. ${}^{30}C_{25}$

C. 1

D. none of these

Answer: B

Watch Video Solution

34. about to only mathematics

A. ${}^{8}C_{4}$

B. ${}^{8}C_{4} \times 2^{4}$

C. ${}^{6}C_{4} \times 2^{4}$

D. none of these

Answer: B

Watch Video Solution

35. The sum ${}^{40}C_{0} + {}^{40}C_{1} + {}^{40}C_{2} + \ldots + {}^{40}C_{20}$ is equal to

A. $2^{40} + \dfrac{40!}{(20!)^{2}}$

B. $2^{39} + \dfrac{1}{2}\dfrac{40!}{(20!)^{2}}$

C. $2^{39} + {}^{40}C_{20}$

D. none of these

Answer: D

Watch Video Solution

36. If x is positive, the first negative term in the expansion of $(1+x)^{27/5} is (|x|<1)\ 5thterm$ b. $8thterm$ c. $6thterm$ d. $7thterm$

A. 6th term

B. 7 th term

C. 5th term

D. 8 th term

Answer: D

Watch Video Solution

37. The numberof integral termsin the expansion of $\left((3)-\sqrt[8]{5}\right)^{256}$ is (A) 32 (B) 33 (C) 34 (D) 35

A. 35

B. 32

C. 33

D. 34

Answer: C

Watch Video Solution

38. Find the term independent of x in the expansion of $\left(\sqrt{\frac{x}{3}}+\left(\frac{\sqrt{3}}{2x^2}\right)\right)^{10}$

A. $5/3$

B. $4/5$

C. 6

D. $1/2$

Answer: A

Watch Video Solution

39. If the coefficients of x^2 and x^3 in the expansion of $(3+ax)^9$ be same, then the value of a is

A. $\frac{9}{7}$

B. $\frac{7}{9}$

C. $-\frac{9}{7}$

D. $-\frac{7}{9}$

Answer: A

Watch Video Solution

40. If the integers $r>1, n>2$ and coefficients of $(3r)th$ and $(r+1)th$ terms in the Binomial expansion of $(1+x)^{2n}$ are equal, then

A. 3r

B. 3r+1

C. 2r

D. 2r+1

Answer: C

Watch Video Solution

41. about to only mathematics

A. 7

B. 8

C. 9

D. 10

Answer: C

Watch Video Solution

42. The coefficient of x^5 in the expansion of $(x+3)^6$,is

A. 18

B. 6

C. 12

D. 10

Answer: A

Watch Video Solution

43. Coefficient of x^n in the expansion of $\frac{(1+x)^n}{1-x}$

A. 4n

B. 2^n

C. n^2

D. $\frac{n(n+1)}{2}$

Answer: B

Watch Video Solution

44. The sum of the rational terms in the expansion of $\left(2^{1/5}+\sqrt{3}\right)^{20}$, is

A. 71

B. 85

C. 97

D. none of these

Answer: D

Watch Video Solution

45. The expression $\left(\sqrt{2x^2+1}+\sqrt{2x^2-1}\right)^6+\left(\frac{2}{\sqrt{2x^2+1}+\sqrt{2x^2-1}}\right)^6$ is polynomial of degree

A. 6

B. 8

C. 10

D. 12

Answer: A

Watch Video Solution

46. If the sum of the coefficients of the first, second, and third terms of the expansion of $\left(x^2+\frac{1}{x}\right)^m$ is 46, then find the coefficient of the term that does not contain x.

A. 84

B. 92

C. 98

D. 106

Answer: A

Watch Video Solution

47. In the expansion of $\left(1+x+x^3+x^4\right)^{10}$, the coefficient of x^4 is

ˆ $40C_4$ b. ˆ $10C_4$ c. 210 d. 310

A. ${}^{40}C_4$

B. ${}^{10}C_4$

C. 210

D. 310

Answer: D

Watch Video Solution

48. Find the coefficient of x^5 in the expansion of $\left(1+x^2\right)^5(1+x)^4$.

A. 20

B. 30

C. 60

D. 55

Answer: C

Watch Video Solution

49. In the expansion of $\left(x^3-\frac{1}{x^2}\right)^n, n \in N$, if the sum of the coefficients of $x^5 and x^{10}$, then n is a. 25 b. 20 c. 15 d. none of these

A. 5

B. 10

C. 15

D. 20

Answer: C

Watch Video Solution

50. $\sum_{k=1}^{\infty} k\left(1-\frac{1}{n}\right)^{k-1} \Rightarrow ?a.$ n(n-1)$b.$ n(n+1)$c.$ n^2$d.$ (n+1)^2`

A. n(n-1)

B. n(n+1)

C. n^2

D. $(n+1)^2$

Answer: D

Watch Video Solution

51. The coefficient of x^{10} in the expansion of $\left(1+x^2-x^3\right)^8$ is 476 b. 496 c. 506 d. 528

A. 476

B. 496

C. 506

D. 528

Answer: A

Watch Video Solution

52. Find the interval of x, for which the expansion of $(8-3x)^{\frac{3}{2}}$ in terms of power of x is valid.

A. $x > \frac{4}{3}$

B. $|x| > \frac{8}{3}$

C. $x < \frac{3}{8}$

D. $x < \frac{8}{3}$

Answer: D

Watch Video Solution

53. If the coefficients of x^2 and x^3 in the expansion of $(3+ax)^9$ be same, then the value of a is

A. $-\frac{7}{9}$

B. $-\frac{9}{7}$

C. $\frac{7}{9}$

D. $\frac{9}{7}$

Answer: D

Watch Video Solution

54. If $x = 1/3,$ find the greatest tem in the expansion of $(1 + 4x)^8.$

A. 3rd term

B. 6th term

C. 5th term

D. 4 th term

Answer: B

Watch Video Solution

55. Find the following sum :

$$\frac{1}{n!} + \frac{1}{2!(n-2)!} + \frac{1}{4!(n-4)!} + \ldots..$$

A. $\frac{2^{n-1}}{n!}$

B. $\frac{2^n}{(n+1)!}$

C. $\frac{2^n}{n!}$

D. $\frac{2^{n-1}}{(n-1)!}$

Answer: A

Watch Video Solution

56. The coeffiicent of x^n in the binomial expansion of $(1-x)^{-2}$ is

A. $\frac{2^n}{2!}$

B. (n+1)

C. n

D. 2n

Answer: B

Watch Video Solution

57. The coefficient of x^6 in the expansion of $\left(1+x+x^2\right)^{-3}$, is

A. 6

B. 5

C. 4

D. 3

Answer: D

Watch Video Solution

58. The sum $\sum_{0 \leq i} \sum_{\leq j \leq 10} \left(10C_j\right)\left(jC_i\right)$ is equal to

A. $2^{10} - 1$

B. 2^{10}

C. $3^{10} - 1$

D. 3^{10}

Answer: C

Watch Video Solution