BINOMIAL THEOREM

- If n is a positive integer, then
$(x+a)^n = n_{c_0}x^n + n_{c_1}x^{n-1}a + n_{c_2}x^{n-2}a^2 + ...$
$+ n_{c_r}x^{n-r}a^r + ... + n_{c_n}a^n$

NOTE:

- Total number of terms in this expansion is (n+1)
- The sum of the indices of 'x' and 'a' in each term of the expansion is equal to n
- The general term is denoted by T_{r+1} where $T_{r+1} = n_{c_r}x^{n-r}a^r$

- If n is a positive integer,
$(x-a)^n = n_{c_0}x^n - n_{c_1}x^{n-1}a + n_{c_2}x^{n-2}a^2 -$
$...... + (-1)^r n_{c_r}x^{n-r}a^r + ... + (-1)^n n_{c_n}a^n$
$T_{r+1} = n_{c_r}x^{n-r}(-a)^r$

- $(x+a)^n + (x-a)^n =$
$2\left[n_{c_0}x^n + n_{c_2}x^{n-2}a^2 + n_{c_4}x^{n-4}a^4 + ...\right]$

- $(x+a)^n - (x-a)^n =$
$2\left[n_{c_1}x^{n-1}a + n_{c_3}x^{n-3}a^3 + n_{c_5}x^{n-5}a^5 + ...\right]$

- If n is even, then $\left(\frac{n}{2}+1\right)^{th}$ term is the only middle term in the expansion of $(x+a)^n$ $T_{\frac{n}{2}+1} = n_{c_{\frac{n}{2}}}x^{\frac{n}{2}}a^{\frac{n}{2}}$

- If n is odd, $\left(\frac{n+1}{2}\right)^{th}$ term and $\left(\frac{n+3}{2}\right)^{th}$ term are the two middle terms in the expansion of $(x+a)^n$.
$T_{\left(\frac{n+1}{2}\right)} = T_{\left(\frac{n-1}{2}\right)+1} = {}^nC_{\left(\frac{n-1}{2}\right)}x^{\frac{n+1}{2}}a^{\frac{n-1}{2}}$,
$T_{\left(\frac{n+3}{2}\right)} = T_{\left(\frac{n+1}{2}\right)+1} = {}^nC_{\left(\frac{n+1}{2}\right)}x^{\frac{n-1}{2}}a^{\frac{n+1}{2}}$

- Binomial coefficients:
$n_{c_0}, n_{c_1}, n_{c_2}, ... n_{c_n}$ are called the binomial coefficients in the expansion of $(x+a)^n$. They are denoted by $C_0, C_1, C_2, ...C_n$ respectively.

- ***Greatest binomial coefficient:*** The binomial co-efficient of the middle term is the greatest binomial co-efficient in the expansion of $(x+a)^n$
  - If n is even, the greatest binomial coefficient in the expansion of $(x+a)^n$ is ${}^nc_{\frac{n}{2}}$
  - If n is odd, the greatest binomial coefficient in the expansion of $(x+a)^n$ is ${}^nc_{\left(\frac{n-1}{2}\right)}$ or ${}^nc_{\left(\frac{n+1}{2}\right)}$.

- If n is a positive integer,
$(1+x)^n = {}^nc_0 + {}^nc_1x + {}^nc_1x^2 + ... + {}^nc_rx^r +$
$.......... + {}^nc_nx^n$

NOTE:
- general term $T_{r+1} = {}^nc_r\, x^r$
- coefficient of $x^r = {}^nc_r$
- coefficient of r^{th} term $= {}^nc_{r-1}$

- If n is a positive integer, $(1-x)^n$
$= n_{c_0} - n_{c_1}x + n_{c_2}x^2 - .... + (-1)^r n_{c_r}x^r +$
$......... + (-1)^n n_{c_n}x^n$
general term $T_{r+1} = (-1)^r n_{c_r}x^r$.

- $(1+x)^n + (1-x)^n = 2\left[{}^nc_0 + {}^nc_2x^2 + {}^nc_4x^4 + ...\right]$

- $(1+x)^n - (1-x)^n = 2\left[{}^nc_1x + {}^nc_3x^3 + {}^nc_5x^5 + ...\right]$

- Let f(x) be any polynomial in x
  - Sum of the coefficients = f(1)
  - Sum of the coefficients of even powers of x = $\frac{f(1)+f(-1)}{2}$
  - Sum of the coefficients of odd powers of x $\frac{f(1)-f(-1)}{2}$

- $C_0, C_1, C_2, ..., C_n$ are the binomial coefficients in the expansion of $(1+x)^n$.
  - ${}^nc_0 + {}^nc_1 + {}^nc_2 + {}^nc_3 + ... + {}^nc_n = 2^n$
  - ${}^nc_0 - {}^nc_1 + {}^nc_2 - {}^nc_3 + ... + (-1)^n.\ {}^nc_n = 0$
  - $n_{c_0} + n_{c_2} + n_{c_4} + ... = n_{c_1} + n_{c_3} + ... = 2^{n-1}$

- $C_0 + \frac{C_1}{2}x + \frac{C_2}{3}x^2 + ... + \frac{C_n}{n+1}x^n = \frac{(1+x)^{n+1}-1}{(n+1)x}$
  - $C_0 + \frac{C_1}{2} + \frac{C_2}{3} + \frac{C_3}{4} + ... + \frac{C_n}{n+1} = \frac{2^{n+1}-1}{n+1}$
  - $C_0 - \frac{C_1}{2} + \frac{C_2}{3} - \frac{C_3}{4} + ... + (-1)^n\frac{C_n}{n+1}$
$= \frac{1}{n+1}$
  - $C_0 + \frac{C_2}{3} + \frac{C_4}{5} + ... = \frac{2^n}{n+1}$
  - $\frac{C_1}{2} + \frac{C_3}{4} + \frac{C_5}{6} + ... = \frac{2^n-1}{n+1}$

- $a.C_0 + (a+d).C_1 + (a+2d).C_2 + \ldots\ldots + (a+nd).C_n = (2a+nd)\,2^{n-1}$
- $a.C_0 - (a+d).C_1 + (a+2d).C_2 - \ldots\ldots + (-1)^n(a+nd).C_n = 0$
- $C_0^2 + C_1^2 + C_2^2 + \ldots\ldots\ldots\ldots + C_n^2 = 2n_{c_n}$
- $C_0^2 - C_1^2 + C_2^2 - C_3^2 + \ldots\ldots\ldots$ $\ldots + (-1)^n C_n^2 = (-1)^{n/2}\, n_{c_{\frac{n}{2}}}$ if n is even = 0, if n is odd
- $a.C_0^2 + (a+d).C_1^2 + (a+2d).C_2^2 + \ldots\ldots$ $\ldots\ldots + (a+nd).C_n^2 = \left(\frac{2a+nd}{2}\right).\,2n_{c_n}$
- $c_0c_r + c_1c_{r+1} + \ldots\ldots c_{n-r}c_n$ $= {}^{2n}c_{n-r} = \frac{(2n)!}{(n-r)!(n+r)!}$
- $c_0^2 + c_1^2 + c_2^2 + \ldots\ldots + c_n^2 = \frac{(2n)!}{(n!)^2}$

- Numerically greatest term in the expansion of $(1+x)^n$ where n is a positive interger.
  - If $\frac{(n+1)|x|}{1+|x|} = p$ (an integer), then p^{th} term and $(p+1)^{th}$ term are the two numerically greatest terms in $(1+x)^n$ Also $|t_p| = |t_{p+1}|$.
  - If $\frac{(n+1)|x|}{1+|x|} = p + F$ where p is an integer and $0 < F < 1$, then $(p+1)^{th}$ term is the numerically greatest term in $(1+x)^n$.

- If n is a rational number and $-1 < x < 1$, then
  - $1 + nx + \frac{n(n-1)}{2!} + \frac{n(n-1)}{\underline{|2}}x^2 + \frac{n(n-1)(n-2)}{\underline{|3}}x^3 + \ldots\ldots\ldots\ldots\ldots + \frac{n(n-1)(n-2)\ldots\ldots\ldots(n-r+1)}{\underline{|r}}x^r + \ldots\ldots\ldots\infty$
  - $(-1)^r \frac{n(n-1)(n-2)\ldots\ldots\ldots(n-r+1)}{\underline{|r}}x^r + \ldots\ldots\ldots\infty$
  - $(1-x)^{-n} = 1 + nx + \frac{n(n+1)}{\underline{|2}}x^2 + \frac{n(n+1)(n+2)}{\underline{|3}}x^3 + \ldots + \frac{n(n+1)(n+2)\ldots\ldots(n+r-1)}{\underline{|r}}x^r + \ldots\ldots\infty$
  - $(1+x)^{-n} = 1 - nx + \frac{n(n+1)}{\underline{|2}}x^2 + \frac{n(n+1)(n+2)}{\underline{|3}}x^3 + \ldots + (-1)^r \frac{n(n+1)(n+2)\ldots\ldots(n+r-1)}{\underline{|r}}x^r + \ldots\ldots\infty$
  - $(1+x)^{\frac{p}{q}} = 1 + p\left(\frac{x}{q}\right) + \frac{p(p-q)}{\underline{|2}}\left(\frac{x}{q}\right)^2 + \frac{p(p-q)(p-2q)}{\underline{|3}}\left(\frac{x}{q}\right)^3 + \ldots + \frac{p(p-q)(p-2q)\ldots[p-(r-1)q]}{\underline{|r}}\left(\frac{x}{q}\right)^r + \ldots\ldots\infty$
  - $(1-x)^{\frac{p}{q}} = 1 - p\left(\frac{x}{q}\right) + \frac{p(p-q)}{\underline{|2}}\left(\frac{x}{q}\right)^2 - \frac{p(p-q)(p-2q)}{\underline{|3}}\left(\frac{x}{q}\right)^3 + \ldots + (-1)^r \frac{p(p-q)(p-2q)\ldots[p-(r-1)q]}{\underline{|r}}\left(\frac{x}{q}\right)^r + \ldots\ldots\infty$
  - $(1-x)^{\frac{-p}{q}} = 1 + p\left(\frac{x}{q}\right) + \frac{p(p+q)}{\underline{|2}}\left(\frac{x}{q}\right)^2 + \frac{p(p+q)(p+2q)}{\underline{|3}}\left(\frac{x}{q}\right)^3 + \ldots\ldots + \ldots\ldots + \frac{p(p+q)(p+2q)\ldots\ldots[p+(r-1)q]}{\underline{|r}}\left(\frac{x}{q}\right)^r + \ldots\ldots\ldots\infty$
  - $(1+x)^{\frac{-p}{q}} = 1 - p\left(\frac{x}{q}\right) + \frac{p(p+q)}{\underline{|2}}\left(\frac{x}{q}\right)^2 - \frac{p(p+q)(p+2q)}{\underline{|3}}\left(\frac{x}{q}\right)^3 + \ldots\ldots + (-1)^r \frac{p(p+q)(p+2q)\ldots\ldots[p+(r-1)q]}{\underline{|r}}\left(\frac{x}{q}\right)^r + \ldots\ldots\ldots\infty$
  - $(1-x)^{-1} = 1 + x + x^2 + x^3 + \ldots\ldots + x^r \ldots\ldots \infty$
  - $(1+x)^{-1} = 1 - x + x^2 - x^3 + \ldots\ldots\ldots\ldots\ldots + (-1)^r x^r \ldots.\ \infty$
  - $(1-x)^{-2} = 1 + 2x + 3x^2 + 4x^3 + \ldots\ldots\ldots\ldots + (r+1)x^r \ldots \infty$
  - $(1+x)^{-2} = 1 - 2x + 3x^2 - 4x^3 + \ldots\ldots + (-1)^r (r+1)x^r \ldots\ldots \infty$
  - $1-x)^{-3} = 1 + 3x + 6x^2 + 10x^3 + \ldots\ldots + \frac{(r+1)(r+2)}{\underline{|2}}x^r + \ldots\ldots\ldots\infty$
  - $(1+x)^{-3} = 1 - 3x + 6x^2 - 10x^3 + \ldots\ldots \ldots + (-1)^r \frac{(r+1)(r+2)}{\underline{|2}}x^r + \ldots\ldots\ldots\infty$

LEVEL - I

I. NUMBER OF TERMS:

1. If n is a positive integer, then the number of terms in the expansion of $(x+a)^n$ is
   1) n 2) n+1
   3) n+2 4) infinitely many
2. In any binomial expansion, the number of terms is
   1) ≥ 1 2) ≥ 2 3) ≥ 3 4) ≥ 4

II. PARTICULAR TERMS:

3. The 4th term in the expansion of $\left(\sqrt{x}+\frac{1}{x}\right)^{12}$ is
   1) $110x^{\frac{3}{2}}$ 2) $220x^{\frac{3}{2}}$ 3) $220x^2$ 4) $110x^2$
4. The seventh term in the expansion of $\left(4x-\frac{1}{2\sqrt{x}}\right)^{13}$ is
   1) ${}^{13}C_7.2^5.x^4$ 2) ${}^{13}C_6.2^8.x^3$
   3) ${}^{13}C_6.2^8.x^4$ 4) ${}^{13}C_6.2^8.x^3$
5. The 5th term in the expansion of $\left(2x^2+\frac{3}{x}\right)^5$ is
   1) $810.x^{-2}$ 2) $810.x^{-4}$ 3) 810 4) $810.x^{-5}$
6. The third term from the end in the expansion of $\left(\frac{x^3}{2}-\frac{2}{x^2}\right)^8$ is
   1. $448.x^{-6}$ 2. $\frac{224}{x}$ 3) $\frac{448}{x}$ 4) $224x^{-6}$
7. The $(n+1)^{th}$ term from the end in $\left(x-\frac{1}{x}\right)^{3n}$ is
   1) ${}^{3n}C_n.x^{-n}$ 2) $(-1)^n.{}^{3n}C_n.x^{-n}$
   3) ${}^{3n}C_n.x^n$ 4) $(-1)^n.{}^{3n}C_n.x^n$

III. INDEPENDENT TERMS:

8. The term independent of x in $\left(2x-\frac{1}{2x^2}\right)^{12}$ is
   1) $-{}^{12}C_3.2^6$ 2) $-{}^{12}C_5.2^2$
   3) ${}^{12}C_6$ 4) ${}^{12}C_4.2^4$
9. The term independent of y in $\left(y^{\frac{1}{6}}-y^{-\frac{1}{3}}\right)^9$ is
   1) 84 2) 8.4 3) -0.84 4) -84
10. The term independent of x in $\left(\frac{3x^2}{2}-\frac{1}{3x}\right)^9$ is
   1) $\frac{7}{18}$ 2) $\frac{5}{18}$ 3) $\frac{11}{18}$ 4) $\frac{13}{18}$
11. The term independent of x in $\left(\frac{1}{2}x^{\frac{1}{3}}+x^{\frac{-1}{5}}\right)^8$ is
   1) $\frac{35}{8}$ 2) 7 3) $\frac{7}{2}$ 4) 28
12. The term independent of x in $\left(2\sqrt{x}-\frac{3}{x^{\frac{1}{3}}}\right)^{20}$ is
   1) ${}^{20}C_8.2^8.3^{12}$ 2) $-{}^{20}C_8.2^8.3^{12}$
   3) ${}^{20}C_7.2^7.3^{13}$ 4) $-{}^{20}C_7.2^7.3^{13}$
13. The term independent of x in $\left(x^2-\frac{1}{x}\right)^9$ is
   1) 1 2) -1 3) 48 4) 84
14. The term independent of x in $\left(\sqrt{\frac{x}{3}}+\frac{\sqrt{3}}{2x^2}\right)^{10}$ is
   1) ${}^{10}C_1$ 2) $\frac{5}{12}$ 3) 1 4) 32
15. If the fourth term in the expansion of $\left(px+\frac{1}{x}\right)^n$ is 5/2, then (n, p) =
   1) (3, 1/2) 2) (6, 1/2) 3) (5, 1/2) 4) (6, 2)
16. If the 5th term in the expansion of $\left(3\sqrt{x}+\frac{1}{x}\right)^n$ is independent of x, then n=
   1) 8 2) 12 3) 16 4) 20
17. The term independent of x in the expansion of $(1+x)^{10}.\left(1+\frac{1}{x}\right)^{10}$ is
   1) ${}^{10}C_5$ 2) ${}^{20}C_{10}$ 3) ${}^{20}C_5$ 4) ${}^{10}C_2$
18. The number of terms in the expansion of $(1+x)^{21}$ is
   1) 20 2) 21 3) 22 4) 24

IV. COEFFICIENT OF x^k :

19. The coefficient of x^3 in $\left(2x-\frac{3}{x^2}\right)^9$ is
   1) $2^9.3^5$ 2) $2^8.3^5$ 3) $2^8.3^4$ 4) $2^9.3^4$

20. The coefficient of x^{30} in $\left(3x^2+\frac{2}{3x^2}\right)^{15}$ is

1) ${}^{15}C_2.3^8.2^7$ 2) ${}^{15}C_1.3^7.2^8$
3) 3^{15} 4) $3^{14}.2^2$

21. The coefficient of y in $\left(y^2+\frac{c}{y}\right)^5$ is

1) 20c 2) 10c 3) $10c^3$ 4) $20c^2$

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

1) $\frac{405}{256}$ 2) $\frac{504}{259}$ 3) $\frac{450}{263}$ 4) $\frac{405}{128}$

23. The coefficient of x^7 in $\left(\frac{x^2}{2}-\frac{2}{x}\right)^9$ is

1) -56 2) 14 3) -14 4) 0

24. The coefficient of x^{-15} in $\left(3x^2-\frac{1}{3x^3}\right)^{10}$ is

1) $\frac{40}{27}$ 2) $-\frac{40}{27}$ 3) $\frac{40}{81}$ 4) $-\frac{40}{81}$

25. The coefficient of x^{-17} in $\left(x^4-\frac{1}{x^3}\right)^{15}$ is

1) $-{}^{15}C_{11}$ 2) ${}^{15}C_{11}$ 3) ${}^{15}C_5$ 4) $-{}^{15}C_5$

26. The term containing x^3 in the expansion of $(x-2y)^7$ is

1) 3rd 2) 4th 3) 5th 4) 6th

27. Coefficient of a^{32} in the expansion of $\left(a^4-\frac{1}{a^3}\right)^{15}$ is

1) ${}^{15}C_4$ 2) $-{}^{15}C_4$ 3) 0 4) ${}^{15}C_3$

28. If the coefficient of x in $\left(x^2+\frac{k}{x}\right)^5$ is 270, then k=

1) 3 2) 4 3) 5 4) 6

29. Coefficient of x^4 in the expansion of $(e^x-1)^2$ is

1) $\frac{3}{4}$ 2) $\frac{7}{12}$ 3) $\frac{5}{12}$ 4) $\frac{1}{4}$

30. The greatest binomial coefficient in the expansion of $\left(\frac{x^{\frac{3}{2}}.y}{2}+\frac{2}{x.y^{\frac{3}{2}}}\right)^{12}$ is

1) ${}^{12}C_5$ 2) ${}^{12}C_6$ 3) ${}^{12}C_5.2^2$ 4) ${}^{12}C_6.2^3$

31. If the coefficient of x^7 in $\left(ax^2+\frac{1}{bx}\right)^{11}$ is equal to the coefficient of x^{-7} in $\left(ax-\frac{1}{bx^2}\right)^{11}$ then

1) ab = -1 2) a = b 3) ab = 1 4) a+b = 0

32. The coefficients of x^p and x^q (p and q are positive integers) in the expansion of $(1+x)^{p+q}$ are

1) equal
2) equal with opposite signs
3) reciprocal to each other
4) unequal

33. The coefficient of x^9 in $(1+9x+27x^2+27x^3)^6$ is

1) ${}^{18}C_9.3^9$ 2) ${}^{18}C_8.3^9$ 3) ${}^{18}C_{10}.3^8$ 4) ${}^8C_9.3^7$

34. In the expansion of $(3+ax)^9$ coefficients of x^2 and x^3 are equal then a=

1) $\frac{9}{7}$ 2) $\frac{7}{9}$ 3) $-\frac{9}{7}$ 4) $-\frac{7}{9}$

35. In the expansion of $\left(2+\frac{x}{3}\right)^n$, coefficients of x^7 and x^8 are equal. Then n=

1) 49 2) 50 3) 55 4) 56

36. If the coefficients of (2r+4)th term and (r-2)th term in the expansion of $(1+x)^{18}$ are equal, then r =

1) 4 2) 5 3) 6 4) 7

37. If the coefficients of (r+2)th and (2r+1)th terms ($r\neq 1$) are equal in the expansion of $(1+x)^{43}$, then r =

1) 12 2) 13 3) 14 4) 15

38. If the coefficients of (3r)th and (r+2)the terms in the expansion of $(1+x)^{2n}$ are equal (r>1, n>2), then

1) n=2r 2) n=3r 3) n = 2r+1 4) n = 4r

39. Sun of the coefficients of $(1+x)^n$ is always a

1) any integer 2) positive integer
3) negative integer 4) zero

40. If the coefficient of x in the expansion of $(1+ax)^8(1+3x)^4-(1+x)^3(1+2x)^4$ is zero, then a=

1) 1/4 2) -1/4 3) 1/8 4) -1/8

41. If the coefficients of 5th, 6th and 7th terms in the expansion of $(1+x)^n$ are in A.P. then n =

1) 7 2) 14 3) 7 or 14 4) 8

42. If the coefficients of r^{th}, (r+1)th and (r+2)th terms in the expansion of $(1+x)^{14}$ are in A.P. then r =

1) 5 2) 9 3) 7 4) 5 or 9

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

1) 1 2) $\frac{7}{2}$ 3) 1 or $\frac{7}{2}$ 4) 5 or 7

44. If $(x-2)^{100}=\sum_{r=0}^{100}a_r.x^r$, then $a_1+2a_2+.........+100a_{100}$ =

1) 100 2) -100 3) 1 4) 101

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

1) $\dfrac{(2n)!}{(n!)^2}$ 2) $\dfrac{(2n+2)!}{((n+1)!)^2}$

3) $\dfrac{(2n+2)!}{n!(n+1)!}$ 4) $\dfrac{(2n)!}{n!(n+1)!}$

46. If $(x-2)^{100}=\sum_{r=0}^{100} a_r.x^r$, then $a_{97}=$

1) $(-2)^3\ 100C_3$ 2) $8(100C_3)$
3) $16(100C_4)$ 4) 97

47. Coefficient of x in the expansion of

$(1-2x^3+3x^5)\left(1+\dfrac{1}{x}\right)^8$ is

1) 154 2) 164 3) 146 4) 156

48. Coefficient of x^5 in the expansion of

$(1+x)^{10}.\left(1+\dfrac{1}{x}\right)^{20}$ is

1) $^{30}C_5$ 2) $^{10}C_5$ 3) $^{20}C_5$ 4) $^{30}C_{20}$

V. RATIOS:

49. The ratio of the coefficient of x^{10} in $(1-x^2)^{10}$ and the term independent of x in $\left(x-\dfrac{2}{x}\right)^{10}$ is

1) 32 : 1 2) -32 : 1 3) -1 : 32 4) 1 : 32

50. In the expansion of $\left(\sqrt{a}+\dfrac{1}{\sqrt{3a}}\right)^n$ if the ratio of the binomial coefficient of the 4th term to the binomial coefficient of the 3rd term is $\dfrac{10}{3}$, the 5th term is

1) 55a 2) $45a^2$ 3) $50a^2$ 4) $55a^2$

51. If the ratio of the coefficients of rth term and (r+1)th term in the expansion of $(1+x)^{20}$ is 1 : 2, then r =

1) 4 2) 5 3) 6 4) 7

52. The ratio of the rth term and the (r+1)th term in the expansion of $(1+x)^n$ is

1) $\dfrac{r}{(n-r+1)x}$ 2) $\dfrac{1}{(n-r+1)x}$

3) $\dfrac{r}{n-r+1}$ 4) $\dfrac{(n-r+1)x}{r}$

53. The ratio of (r+1)th and rth terms in the expansion of $(1-x)^n$ is

1) $-\dfrac{r}{(n-r+1)x}$ 2) $\dfrac{r}{(n-r+1)x}$

3) $\dfrac{-(n-r+1)x}{r}$ 4) $\dfrac{(n-r+1)x}{r}$

54. The ratio of ^nc_r and $^nc_{r-1}$ is

1) $n-r+1\ ;\ r$ 2) $n-r\ ;\ r$
3) $n-r-1\ ;\ r$ 4) $n+r\ ;\ r$

55. In the expansion of $(a+b)^n$, the ratio of the binomial coefficients of 2nd and 3rd terms is equal to the ratio of the binomial coefficients of 5th and 4th terms, then n=

1) 4 2) 5 3) 6 4) 7

56. If the coefficient of x^n in $(1+x)^{2n}$ is 'a' and the coefficient of x^n in $(1+x)^{2n-1}$ is b, then $\dfrac{a}{b}=$

1) 2 2) 4 3) 2n 4) n

57. The ratio of the coefficient of (r+1)th term in the expansion in the expansion of $(1+x)^{n+1}$ to the sum of the coefficients of rth and (r+1) terms in the expansion of $(1+x)^n$ is

1) 1 : 1 2) 1 : 2 3) 2 : 1 4) 1 : 4

58. If the coefficients of (r-1)th, rth and (r+1) terms in $(x+1)^n$ are in the ratio 1 : 3 : 5, then n=

1) 5 2) 6 3) 7 4) 8

59. The two successive terms in the expansion of $(1+x)^{24}$ whose coefficients are in the ratio 4 : 1 are

1) t_{18}, t_{19} 2) t_{19}, t_{20} 3) t_{20}, t_{21} 4) t_{21}, t_{22}

VI. MIDDLE TERMS:

60. The middle term in the expansion of $\left(x+\dfrac{1}{x}\right)^{10}$ is

1) $^{10}C_4.\dfrac{1}{x}$ 2) $^{10}C_5$ 3) $^{10}C_5.\dfrac{1}{x}$ 4) $^{10}C_6.x$

61. The middle term in the expansion of $(1+x)^{2n}$ is

1) $^{2n}C_n$ 2) $^{2n}C_{n-1}.x^{n+1}$
3) $^{2n}C_{n-1}.x^{n-1}$ 4) $^{2n}C_n.x^n$

62. The middle term of $\left(x-\dfrac{1}{x}\right)^{2n+1}$ is

1) $(2n+1)C_n.x$ 2) $(2n+1)C_n$
3) $(-1)^n(2n+1)C_n$ 4) $(-1)^n(2n+1)C_n.x$

63. The middle term in the expansion of $\left(\dfrac{x^{\frac{3}{2}}}{\sqrt{a}}-\dfrac{y^{\frac{5}{2}}}{b^{\frac{3}{2}}}\right)^8$ is

1) $^8C_4.\dfrac{x^6.y^{10}}{a^2b^6}$ 2) $^8C_4.\dfrac{x^6.y^8}{a^2b^4}$

3) ${}^8C_5.\dfrac{x^5.y^{10}}{a^2b^5}$ 4) ${}^8C_1.\dfrac{x^5.y^{10}}{a^2b^5}$

64. The product of two middle terms in the expansion of $\left(\dfrac{3x^2}{2}-\dfrac{1}{3x}\right)^9$ is

1) $({}^9C_4)^2.\dfrac{x^9}{512}$ 2) ${}^9C_4.{}^9C_5.\dfrac{x^8}{512}$

3) $-{}^9C_4.{}^9C_5.\dfrac{x^9}{512}$ 4) ${}^9C_4.{}^9C_5.\dfrac{x^9}{256}$

VII. NUMERICALLY GREATEST TERMS:

65. When $x=\dfrac{5}{2}$, numerically greatest term in the expansion of $(3+2x)^{15}$ is
1) 6th 2) 8th 3) 10th 4) 12th

66. When x=1, $y=\dfrac{3}{2}$, numerically greatest term in the expansion of $(2x-3y)^{12}$ is
1) 6th 2) 8th 3) 10th 4) 12th

67. When x=9, y=4, value of the numerically greatest term in the expansion of $(2x-3y)^{28}$ is
1) ${}^{28}C_{12}.2^{40}.3^{44}$ 2) $-{}^{28}C_{12}.2^{40}.3^{44}$
3) ${}^{28}C_{11}.2^{39}.3^{45}$ 4) $-{}^{28}C_{11}.2^{39}.3^{45}$

68. When x=2, y=1, value of the numerically greatest term in the expansion of $(5x-6y)^{16}$ is
1) ${}^{16}C_6, 5^{10}.2^{16}.3^6$ 2) ${}^{16}C_5.5^{11}.2^{17}.3^{17}$
3) $-{}^{16}C_5.5^{11}.2^{17}.3^{17}$ 4) ${}^{16}C_2.5^{11}.2^{17}.3^{17}$

69. Value of the numerically greatest term in the expansion of $\sqrt{3}\left(1+\dfrac{1}{\sqrt{3}}\right)^{20}$ is

1) ${}^{20}C_7.\dfrac{1}{27\sqrt{3}}$ 2) ${}^{20}C_8.\dfrac{1}{27}$

3) ${}^{20}C_8.\dfrac{1}{27\sqrt{3}}$ 4) ${}^{20}C_7.\dfrac{1}{27}$

VIII. COEFFICIENTS:

70. In the expansion of $\left(a^2\sqrt{a}+\dfrac{\sqrt[3]{a}}{a}\right)^n$ the binomial coefficient of 3rd term is 36. The 7th term is

1) $84\,a^3\sqrt{a}$ 2) $84\,a^2\sqrt{a}$

3) $84\,a^2$ 4) $84\,a^3$

71. In the expansion of $(x+x^{\log_{10}x})^5$, the third term is 10^6, then x=
1) 1 2) 2 3) 10 4) 100

72. The 3rd, 4th and 5th terms in the expansion of $(1+x)^n$ are 60, 160 and 240 respectively, then x=
1) 2 2) 4 3) 5 4) 6

73. Sum of the coeffients of $(1-x)^{25}$ is
1) -1 2) 1 3) 0 4) 2^{25}

74. If the 2nd, 3rd and 4th terms in the expansion of $(a+b)^n$ are 135, 30 and 10/3 respectively, then n=
1) 5 2) 6 3) 7 4) 8

75. The 21st and 22nd terms in the expansion of $(1+x)^{44}$ are equal. Then x=
1) 8/7 2) 7/8 3) 7 4) 8

76. If 462, 330 and 165 are three successive coefficients in the expansion of $(1+x)^n$, then n=
1) 9 2) 10 3) 11 4) 12

77. If the coefficient of pth term in the expansion of $(1+x)^n$ is p and that of (p+1)th term is q, then (p+q-1)=
1) n 2) 2n 3) 3n 4) 4n

78. If a, b, c, d are any four consecutive coefficients in the expansion of $(1+x)^n$, then $\dfrac{a}{a+b}$, $\dfrac{b}{b+c}$, $\dfrac{c}{c+d}$ are in
1) A.P. 2) G.P. 3) H.P. 4) A.G.P

79. In the expansion of $(1+x)^n$, the binomial coefficients of 3 consecutive terms are respectively 220, 495 and 792, then n=
1) 4 2) 8 3) 12 4) 16

80. The coefficients of x^{16} and x^{17} in $(a+bx)^{101}$ are equal. If a and b are natural numbers, then the least possible value of 'a' is
1) 1 2) 3 3) 5 4) 7

81. The coefficient of x^k $(0\le k\le n)$ in the expansion of $1+(1+x)+(1+x)^2+..........+(1+x)^n$ is
1) $(n+1)C_k$ 2) ${}^nC_k$
3) ${}^nC_{k+1}$ 4) $(n+1)C_{k+1}$

82. The consecutive terms whose coefficients are equal in the expansion of $(5+10x)^{80}$ are
1) t_{27}, t_{28} 2) t_{53}, t_{54} 3) t_{54}, t_{55} 4) t_{26}, t_{27}

83. The consecutive terms whose coefficients are equal in the expansion of $(8+7x)^{44}$ are
1) t_{21}, t_{22} 2) t_{23}, t_{24} 3) t_{22}, t_{23} 4) t_{20}, t_{21}

84. The coefficients of 2nd, 3rd and 4th terms in the expansion of $(1+x)^n$ are in A.P. then n=
1) 7 2) 8 3) 9 4) 14

85. The coefficients of 9th, 10th and 11th terms in the expansion of $(1+x)^n$ are in A.P. then n =
1) 7 2) 7 or 14 3) 14 4) 21

86. In the expansion of $(x+y)^n$, if the binomial coefficient of the third term is greater by 9 then that of the second term, then the sum of the binomial coefficients of the terms occupying the odd places is
1) 2^9 2) 2^6 3) 2^5 4) 2^8

87. If $(1+ax)^n=1+9x+27x^2+$............ then (a, n)=
1) (1, 9) 2) (2, 9) 3) (3, 3) 4) None

88. The first 3 terms in the expansion of $(1+x+x^2)^{10}$ (in the ascending powers of x) are
1) $1, 10x, 55x^2$ 2) $1,10x,65x^2$
3) $1, 10x, 75x^2$ 4) $1,5x, 10x^2$

89. If the first three terms in the expansion of $(1+ax)^n$ are $1, 8x, 24x^2$ respectively, then a=
1) 1 2) 2 3) 4 4) 8

90. In the expansion of $\left(\sqrt{y}+\frac{1}{2\sqrt[4]{y}}\right)^n$, the first three co-efficients form an A.P. then n =
1) 2 2) 4 3) 6 4) 8

91. If the sum of the coefficients in the expansion $\left(1+x-3x^2\right)^{171}$ is
1) 2 2) 1 3) 2^{171} 4) -1

92. In the binomial expansion of $\left(\sqrt{y}+\frac{1}{2\sqrt[4]{y}}\right)^8$, the terms in the expansion in which the power of y is a natural number are
1) T_1, T_5 2) T_1, T_2, T_3, T_4
3) T_2, T_4 4) T_1, T_3, T_5

93. The value of $(1.02)^4+(0.98)^4$ correct to three decimal places is
1) 2.004 2) 2.005 3) 2.006 4) 1.995

94. The value of $(1.01)^{10}$ correct to 3 decimal places is
1) 1.105 2) 1.205 3) 1.104 4) 1.204

95. If two consecutive terms in the expansion of $(p+q)^n$ are equal, where n is a positivve integer, then $\frac{(n+1)q}{p+q}$ is
1) a rational number 2) a positive integer
3) a negative integer 4) an integer

IX. SUM OF COFFICIENTS:

96. Sum of the binomial coefficients in the expansion of $\left(\frac{2x}{3}+\frac{3}{2nx^2}\right)^n$ is equal to 64. The term independent of x is
1) $\frac{27}{5}$ 2) $\frac{5}{27}$ 3) $\frac{7}{27}$ 4) $\frac{27}{7}$

97. The sum of the coefficients in the expansion of $(1-x)^{10}$ is
1) 0 2) 1 3) -1 4) 2^{10}

98. If the sum of the coefficients in the expansion of $(x+y)^n$ is 4096, then the greatest coefficient is
1) $^{11}C_5$ 2) $^{12}C_5$ 3) $^{12}C_6$ 4) $^{14}C_7$

99. Sum of the coefficients in the expansion of $(5x-4y)^n$ where n is a positive integer is
1) 1 2) 9^n 3) $(-1)^n$ 4) 5^n

100. The sum of the coefficients in the expansion of $(1+x-3x^2)^{2143}$ is
1) 0 2) 1 3) -1 4) $(-2)^{2143}$

101. If $(1+x-2x^2)^6=\sum_{r=0}^{12} a_r.x^r$, then $a_2+a_4+.......+a_{12}=$
1) 64 2) 63 3) 32 4) 31

102. If $(1-2x+3x^2)^n=\sum_{r=0}^{2n} a_r.x^r$, then $\sum_{r=0}^{2n} r.a_r=$
1) $n.2^{n-1}$ 2) 2^n 3) $n.2^n$ 4) $n.2^{n+1}$

103. If $(1-2x+x^2)^n=\sum_{r=0}^{2n} a_r.x^r$, then $a_r=$
1) $^{2n}C_r$ 2) $^{n}C_r$
3) $(-1)^r\ {}^{n}C_r$ 4) $(-1)^r\ {}^{2n}C_r$

104. In the expansion of $(x+a)^n$, sum of the odd terms is P and the sum of the even terms is Q, then 4PQ=
1) $(x^2-a^2)^n$ 2) $(x+a)^{2n}+(x-a)^{2n}$
3) $(x+a)^{2n}-(x-a)^{2n}$ 4) $(x-a)^{2n}-(x+a)^{2n}$

105. In the expansion of $(1-x)^n$, the sum of the odd terms is S_1, and the sum of the even terms is S_2, then $S_1-S_2=$
1) 0 2) $(1+x)^n$ 3) $-(1-x)^n$ 4) $(1-x)^{2n}$

106. If a=4/3 and b=3/4, then the sum of the odd terms in $(6a+8b)^3$ exceeds the sum of the even terms by
1) 1 2) 8 3) 27 4) None

107. In $(1+ax)^n$, sum of the coefficients is S_1. If we double 'a' and half 'n', the new sum is S_2. Then
1) $S_1 > S_2$ 2) $S_1 < S_2$
3) $S_1 = S_2$ 4) Cannot be decided

X. INFINITE SERIES (RATIONAL POWERS):

108. Expansion of $(4-7x)^{\frac{-2}{5}}$ is valid if
1) $x<\frac{4}{7}$ 2) $x>\frac{4}{7}$
3) $-\frac{4}{7}<x<\frac{4}{7}$ 4) $-\frac{4}{7}\le x\le\frac{4}{7}$

109. Expansion of $\frac{5}{2-x}+\frac{1}{1+3x}$ is valid if
1) $-2<x<2$ 2) $x<-2$ (or) $x>2$
3) $x<\frac{1}{3}$ 4) $-\frac{1}{3}<x<\frac{1}{3}$

110. To expand $\left(4-\frac{3}{x^2}\right)^{\frac{-1}{2}}$ as the sum of infinite series, |x|>
1) $\frac{2}{\sqrt{3}}$ 2) $\frac{\sqrt{3}}{2}$ 3) 2 4) 1/2

111. In the expansion of $(2-3x)^{-1}$, the 3rd term is

1) $\frac{9x^2}{4}$ 2) $\frac{9x^2}{8}$ 3) $\frac{27x^3}{8}$ 4) $\frac{27x^3}{16}$

112. 4th term of $\left(1-\frac{2x}{3}\right)^{\frac{3}{4}}$ is

1) $\frac{5x^3}{72}$ 2) $-\frac{5x^3}{72}$ 3) $\frac{5x^3}{432}$ 4) $-\frac{5x^3}{432}$

113. a>0, b<0. If the first two terms in the expansion of $\frac{1}{(1-x)^2}+\frac{1}{(a+bx)^2}$ are 2, 3x, then (a, b)=

1) (1, -1) 2) (2, -1/2)
3) (2, -1) 4) (1, -1/2)

114. In the expansion of $\frac{1}{1-3x}$, coefficient of x^4 is

1) 81 2) 27 3) -27 4) 28

115. In the expansion of $\frac{1-x^2}{(1-2x)^2}$, coefficient of x^7 is

1) 128 2) 96 3) 832 4) 1024

116. In the expansion of $\frac{1-2x+3x^2}{(1-x)^2}$ coefficient of x^{20} is

1) 35 2) 36 3) 37 4) 38

117. In the expansion of $(1+x+x^2+x^3+x^4)^{-2}$, coefficient of x^{10} is

1) 3 2) 5 3) 7 4) 9

118. In the expansion of $\frac{3-x}{(1-x)^2}$ coefficient of x^r is 10, then r=

1) 3 2) 4 3) 3.5 4) 4.5

119. In the expansion of $(1+x+x^2+.........\infty)^3$, the coefficient of x^n is

1) $\frac{n(n+1)}{2}$ 2) $\frac{(n+1)(n+2)}{2}$
3) $\frac{n(n-1)}{2}$ 4) $\frac{(n+2)(n+3)}{2}$

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

1) $3n^2+2n+1$ 2) $2n^2+2n+1$
3) $3n^2+n+1$ 4) $2n^2-2n+1$

121. Coefficient of x^r in the expansion of $\frac{(1+x)^2}{(1-2x)^3}$ is

1) $(2r^2+r+2)2^{r-2}$ 2) $(9r^2+15r+8)2^{r-3}$
3) $(9r^2+15r+8)2^{r-2}$ 4) $(2r^2+r+2)2^{r-3}$

122. Coefficient of x^4 in the expansion of $\frac{1}{(x+1)(x+2)}$ is

1) $\frac{1}{32}$ 2) $\frac{11}{32}$ 3) $\frac{21}{32}$ 4) $\frac{31}{32}$

123. Coefficient of x^n in the expansion of $\frac{x-4}{x^2-5x+6}$ is

1) $\frac{1}{3^n}-\frac{1}{2^n}$ 2) $\frac{1}{3^n}-\frac{1}{2^{n+1}}$
3) $\frac{1}{3^{n+1}}-\frac{1}{2^n}$ 4) $\frac{1}{3^{n+1}}-\frac{1}{2^{n+1}}$

124. The coefficient of x^7 in $(1+2x+3x^2+......\infty)^{-3}$ is

1) 0 2) 1 3) 2 4) 3

125. Coefficient of x^4 in $\frac{(1-3x)^2}{1-2x}$ is

1) 1 2) 4 3) 3 4) 2

126. Coefficient of x^n in the expansion of $\frac{x}{(x-a)(x-b)}$ is

1) $\left(\frac{a^n-b^n}{a+b}\right)\frac{1}{a^nb^n}$ 2) $\left(\frac{a^n+b^n}{a-b}\right)\frac{1}{a^nb^n}$
3) $\left(\frac{a^n-b^n}{a-b}\right)\frac{1}{a^nb^n}$ 4) ab

127. Coefficient of x^n in the expansion of $(1-2x+3x^2-4x^3+............\infty)^2$ is

1) $\frac{n(n+1)(n+2)}{3!}$
2) $(-1)^n.\frac{n(n+1)(n+2)}{3!}$
3) $\frac{(n+1)(n+2)(n+3)}{3!}$
4) $(-1)^n.\frac{(n+1)(n+2)(n+3)}{3!}$

128. If n is a positive integer, then the coefficient of x^n in the expansion of $\frac{(1+x)^n}{1-x}$ is

1) $(n+1)2^n$ 2) 2^n 3) 2^{n-1} 4) $n.2^n$

129. If n is a positive integer, then the coefficient of x^n in the expansion of $\frac{(1+2x)^n}{1-x}$ is

1) $n.3^n$ 2) $(n-1)3^n$ 3) $(n+1)3^n$ 4) 3^n

130. If n is a positive integer, then the coefficient of x^n in the expansion of $\frac{(1-2x)^n}{1-3x}$ is

1) 1 2) 2^n 3) 3^n 4) 4^n

131. Value of $(1.03)^{\frac{1}{3}}$ upto 4 decimal places is

1) 1.0998 2) 1.0099 3) 1.0098 4) 1.0989

132. $1+n\left(\frac{2n}{1+n}\right)+\frac{n(n+1)}{2!}\left(\frac{2n}{1+n}\right)^2+.......\infty=$

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

3) $\left(\frac{1+3n}{1+n}\right)^n$ 4) $\left(\frac{1+n}{1+3n}\right)^n$

133. $1+\frac{n}{2}+\frac{n(n-1)}{2.4}+\frac{n(n-1)(n-2)}{2.4.6}+......\infty=$

1) 2^n 2) $\left(\frac{1}{2}\right)^n$ 3) $\left(\frac{2}{3}\right)^n$ 4) $\left(\frac{3}{2}\right)^n$

134. $1+\frac{n}{3}+\frac{n(n+1)}{3.6}+\frac{n(n+1)(n+2)}{3.6.9}+......\infty=$

1) $\left(\frac{3}{2}\right)^n$ 2) $\left(\frac{2}{3}\right)^n$ 3) $\left(\frac{4}{3}\right)^n$ 4) $\left(\frac{3}{4}\right)^n$

135. Neglecting x^n for $n\geq 2$, vlaue of $\frac{(1+3x)^{\frac{1}{4}}}{(1-3x)^{\frac{1}{5}}}$ is

1) $1+\frac{3x}{20}$ 2) $1+\frac{27x}{20}$

3) $1-\frac{3x}{20}$ 4) $1-\frac{27x}{20}$

136. Neglecting x^n for $n\geq 2$, value of

$(1-7x)^{\frac{1}{3}}(1+2x)^{\frac{-3}{4}}$ is

1) $1-\frac{5x}{6}$ 2) $1+\frac{5x}{6}$

3) $1+\frac{23x}{6}$ 4) $1-\frac{23x}{6}$

137. If x is small $\sqrt{x^2+16}-\sqrt{x^2+9}=$

1) $1+\frac{x^2}{24}$ 2) $1-\frac{x^2}{24}$ 3) $1+\frac{x^2}{48}$ 4) $1-\frac{x^2}{48}$

138. If 'c' is very small when compared to 'k', then

$\left(\frac{k}{k+c}\right)^{\frac{1}{2}}+\left(\frac{k}{k-c}\right)^{\frac{1}{2}}=$

1) $2+\frac{c}{k}$ 2) $2-\frac{c}{k}$

3) $2+\frac{3c^2}{4k^2}$ 4) $2-\frac{3c^2}{4k^2}$

139. If $1+\frac{2}{x}+\frac{3}{x^2}+\frac{4}{x^3}+.......\infty=\frac{1}{2}$, then x=

1) $-1+\sqrt{2}$ 2) $-1-\sqrt{2}$ 3) $1+\sqrt{2}$ 4) $1-\sqrt{2}$

140. If $\sum_{n=0}^{\infty}(-1)^n x^{n+1}=\frac{-1}{3}$, then x=

1) $\frac{1}{4}$ 2) $-\frac{1}{4}$ 3) $\frac{1}{2}$ 4) $-\frac{1}{2}$

141. $1+\frac{1}{4}+\frac{1.4}{4.8}+\frac{1.4.7}{4.8.12}+........\infty=$

1) $\left(\frac{1}{4}\right)^{\frac{1}{3}}$ 2) $\left(\frac{1}{2}\right)^{\frac{1}{3}}$ 3) $(2)^{\frac{1}{3}}$ 4) $(4)^{\frac{1}{3}}$

142. $1+\frac{2}{6}+\frac{2.5}{6.12}+\frac{2.5.8}{6.12.18}+........\infty=$

1) $2^{\frac{1}{3}}$ 2) $2^{\frac{2}{3}}$ 3) $4^{\frac{2}{3}}$ 4) $2^{\frac{-2}{3}}$

143. $1+\frac{1}{3^2}+\frac{1.4}{1.2}.\frac{1}{3^4}+\frac{1.4.7}{1.2.3}.\frac{1}{3^6}+........\infty=$

1) $\sqrt{\frac{3}{2}}$ 2) $\left(\frac{2}{3}\right)^{\frac{1}{3}}$ 3) $\left(\frac{3}{2}\right)^{\frac{1}{3}}$ 4) $\left(\frac{3}{4}\right)^{\frac{1}{3}}$

144. $1+\frac{1}{2}.\frac{3}{5}+\frac{1.3}{2.4}\left(\frac{3}{5}\right)^2+\frac{1.3.5}{2.4.6}\left(\frac{3}{5}\right)^3+.......\infty=$

1) $\sqrt{\frac{5}{2}}$ 2) $\sqrt{\frac{2}{5}}$ 3) $\frac{1}{2}\sqrt{\frac{5}{2}}$ 4) $\sqrt{\frac{5}{3}}$

145. $1-\frac{1}{5}+\frac{1.4}{5.10}-\frac{1.4.7}{5.10.15}+.....\infty=$

1) $\sqrt[3]{5}$ 2) $\frac{1}{2}\sqrt[3]{5}$ 3) $\left(\frac{5}{2}\right)^{\frac{1}{3}}$ 4) $\frac{1}{2}\left(\frac{5}{2}\right)^{\frac{1}{3}}$

146. $1-\frac{3}{4}+\frac{3.5}{4.8}-\frac{3.5.7}{4.8.12}+.....\infty=$

1) $2\sqrt{2}$ 2) $\sqrt{\frac{2}{3}}$ 3) $\sqrt{\frac{8}{27}}$ 4) $3\sqrt{2}$

147. $\frac{7}{5}\left(1+\frac{1}{10^2}+\frac{1.3}{1.2}.\frac{1}{10^4}+\frac{1.3.5}{1.2.3}.\frac{1}{10^6}+.....\infty\right)=$

1) $\sqrt{2}$ 2) $2\sqrt{2}$ 3) $2^{1/3}$ 4) $\sqrt{\frac{2}{3}}$

148. $\left(\frac{1}{2}\right)^2+\frac{1.3}{2!}\left(\frac{1}{2}\right)^4+\frac{1.3.5}{3!}\left(\frac{1}{2}\right)^6+.....\infty=$

1) $\sqrt{2}$ 2) $2\sqrt{2}$ 3) $2\sqrt{2}-1$ 4) $\sqrt{2}-1$

149. If $z=\frac{1}{3}+\frac{1.3}{3.6}+\frac{1.3.5}{3.6.9}+.......\infty$, then

1) $z^2-2z+2=0$ 2) $z^2-2z-2=0$
3) $z^2+2z-2=0$ 4) $z^2+2z+2=0$

150. $\frac{3}{6}+\frac{3.5}{6.9}+\frac{3.5.7}{6.9.12}+.......\infty=$

1) $3\sqrt{3}$ 2) $3\sqrt{3}-\frac{4}{3}$

3) $3\sqrt{3}-4$ 4) $2\sqrt{3}$

151. $\frac{5}{3.6}+\frac{5.7}{3.6.9}+\frac{5.7.9}{3.6.9.12}+.......\infty=$

1) $\sqrt{3}-2$ 2) $\frac{1}{3}(3\sqrt{3}-2)$

3) $\frac{1}{3}(\sqrt{3}-2)$ 4) $3\sqrt{3}-2$

152. $2+\frac{5}{2!.3}+\frac{5.7}{3!.3^2}+.......\infty=$

1) $3\sqrt{3}-1$ 2) $\sqrt{3}$

3) $3\sqrt{3}+1$ 4) $3\sqrt{3}$

153. $\frac{1}{6}+\frac{5}{6.12}+\frac{5.8}{6.12.18}+.......\infty=$

1) $2^{-\frac{1}{3}}$ 2) $2^{-\frac{1}{3}}-\frac{1}{2}$

3) $2^{\frac{1}{3}}$ 4) $2^{\frac{1}{3}}-\frac{1}{2}$

XI. MULTINOMIAL EXPANSIONS:

154. The number of terms in the expansion of $(x+y+z)^n$ is

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

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

155. The coefficient of $x^2y^3z^4$ in the expansion of $(ax-by+cz)^9$ is

1) $1260a^2b^3c^4$ 2) $-1260a^2b^3c^4$
3) $1220a^2b^3c^4$ 4) $-1220a^2b^3c^4$

156. Coefficient of x^{16} in $(1+x+x^2)(1-x)^{15}$ is

1) 16 2) -14 3) 14 4) -16

157. Coefficient of x^{10} in $(1+2x^4)(1-x)^8$ is

1) -56 2) 56 3) 112 4) -112

158. Coefficient of x^5 in $(1+x^2)^5(1+x)^4$ is

1) 60 2) 80 3) 90 4) 100

159. Coefficient of x^4 in $(1+x-2x^2)^6$ is

1) -60 2) -45 3) 45 4) 15

160. Coefficient of x^4 in $(1+x+x^2+x^3)^{11}$ is

1) 55 2) 605 3) 990 4) 1120

161. Coefficient of x^7 in the expansion of $(1-x-x^2+x^3)^6$ is

1) 140 2) 280 3) 144 4) -144

XII. BINOMIAL COEFFICIENTS:

162. ${}^{2n}C_2+{}^{2n}C_4+......+{}^{2n}C_{2n}=$

1) 2^{2n} 2) $2^{2n}-1$ 3) 2^{2n-1} 4) $2^{2n-1}-1$

163. $(2n+1)C_1+(2n+1)C_3+.........+(2n+1)C_{2n+1}=$

1) 2^{2n+1} 2) $2^{2n+1}-1$ 3) 2^{2n} 4) $2^{2n}-1$

164. ${}^nC_0+{}^nC_2+{}^nC_4+......+{}^nC_{2\left[\frac{n}{2}\right]}=$

1) 2^{2n-1} 2) $2^{2n-1}-1$ 3) 2^{n-1} 4) $2^{n-1}-1$

165. If n is odd, ${}^nC_1+{}^nC_3+{}^nC_5+.........+{}^nC_{2\left[\frac{n}{2}\right]-1}=$

1) 2^{n-1} 2) $2^{n-1}-1$ 3) 2^n 4) 2^n-1

166. If n is even, ${}^nC_1+{}^nC_3+{}^nC_5+.......+{}^nC_{2\left[\frac{n}{2}\right]-1}=$

1) 2^{n-1} 2) $2^{n-1}-1$ 3) 2^n 4) 2^n-1

167. A. ${}^{2n}c_n = C_0^2+C_1^2+C_2^2+C_3^2+...........+C_n^2$

B. ${}^{2n}c_n$ = term independent of x in $(1+x)^n\left(1+\frac{1}{x}\right)^n$

C. ${}^{2n}c_n=\frac{1.3.5.7.............(2n-1)}{n!}$ then

1) A, B are false, C is true
2) A is false, B and C are true
3) A and B are true; C is false
4) A, B, C are true

168. $C_0+2.C_1+3.C_2+............+(n+1).C_n=$

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

169. $C_1+2.C_2+3.C_3+..........+n.C_n=$

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

170. $C_0+3.C_1+5.C_2+..........+(2n+1).C_n=$

1) $(n+1)2^n$ 2) $(2n+1)2^{n-1}$
3) $(2n+1)2^n$ 4) $(n+1)2^{n-1}$

171. $2.C_0+3.C_1+4.C_2+........+(n+2).C_n=$

1) $(n+3)2^n$ 2) $(n+4)2^{n-1}$
3) $(n+1)2^n$ 4) $(n+1)2^{n-1}$

172. $5.C_0+8.C_1+11.C_2+........$ to (n+1) terms =

1) $(3n+5)2^n$ 2) $(3n+5)2^{n-1}$
3) $(3n+10)2^n$ 4) $(3n+10)2^{n-1}$

173. $C_1+4.C_2+7.C_3+.........+(3n-2).C_n=$
1) $(3n-4)2^{n-1}$ 2) $(2n-3)2^{n-1}$
3) $(2n-3)2^{n-1}+2$ 4) $(3n-4)2^{n-1}+2$

174. $3.C_0 - 5.C_1 + 7.C_2 -.......+(-1)^n(2n+3).C_n=$
1) 0 2) 3 3) -3 4) none

175. $3.C_1 - 4.C_2 + 5.C_3 - ...... +(-1)^{n-1}(n+2).C_n=$
1) 0 2) 2 3) -2 4) none

176. $(a-1).C_1 - (a-2).C_2 + (a-3).C_3 - .... (-1)^{n-1}(a-n).C_n=$
1) 0 2) a-1 3) a 4) a+1

177. $C_1+2C_2.a+3.C_3.a^2+...........+2n.C_{2n}.a^{2n-1}=$
1) $n(1+a)^{n-1}$ 2) $n(1+a)^n$
3) $2n(1+a)^{2n-1}$ 4) $2n(1+a)^{2n}$

178. $\frac{C_1}{C_0}+2\frac{C_2}{C_1}+3\frac{C_3}{C_2}+..........+n\frac{C_n}{C_{n-1}}=$
1) $\frac{(n+1)(n+2)}{2}$ 2) $\frac{n(n+1)}{2}$
3) $\frac{n(n-1)}{2}$ 4) $\frac{n(n+2)}{2}$

179. $\frac{{}^{15}c_1}{{}^{15}c_0}+2.\frac{{}^{15}c_2}{{}^{15}c_1}+3.\frac{{}^{15}c_3}{{}^{15}c_2}+....+15.\frac{{}^{15}c_{15}}{{}^{15}c_{14}}=$
1) 105 2) 91 3) 120 4) 15

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

181. $C_0.a+\frac{a^2.C_1}{2}+\frac{a^3.C_2}{3}+..........+\frac{a^{n+1}.C_n}{n+1}=$
1) $\frac{(1+a)^{n+1}-1}{n+1}$ 2) $\frac{(1+a)^{n+1}-1}{a(n+1)}$
3) $\frac{(1+a)^n-1}{n+1}$ 4) $\frac{(1+a)^n-1}{a(n+1)}$

182. $C_0^2+3.C_1^2+5.C_2^2+.........+(2n+1).C_n^2=$
1) $(n+1)2^n$ 2) $(2n+1)^{2n}c_n$
3) $(n+1).{}^{2n}c_n$ 4) None

183. $C_0^2+2.C_1^2+3.C_2^2+........+(n+1).C_n^2=$
1) $(n+2).{}^{2n}c_n$ 2) $\left(\frac{n+2}{2}\right).{}^{2n}c_n$
3) $(n+2).2^{n-1}$ 4) $(n+1).{}^{2n}c_n$

184. $\frac{C_0}{1.2}+\frac{C_1}{2.3}+\frac{C_2}{3.4}+..........+\frac{C_n}{(n+1)(n+2)}=$
1) $\frac{2^{n+1}-n}{(n+1)(n+2)}$ 2) $\frac{2^{n+2}-n-3}{(n+1)(n+2)}$
3) $\frac{2^n-1}{n+1}$ 4) $\frac{2^{n+1}+1}{(n+1)(n+2)}$

185. $\frac{2^2.C_0}{1.2}+\frac{2^3.C_1}{2.3}+\frac{2^4.C_2}{3.4}+...+\frac{2^{n+2}.C_n}{(n+1)(n+2)}=$
1) $\frac{3^{n+2}-2n-5}{(n+1)(n+2)}$ 2) $\frac{3^{n+1}-2n-3}{n+1}$
3) $\frac{2^{n+1}}{n+1}$ 4) $\frac{2^{n+1}}{n-1}$

186. $\left({}^{2n}c_0\right)^2-\left({}^{2n}c_1\right)^2+\left({}^{2n}c_2\right)^2-....+\left({}^{2n}c_{2n}\right)^2=$
1) ${}^{2n}c_n$ 2) $(-1)^n.{}^{2n}c_n$
3) $(-1)^{n/2}.{}^{n}c_{n/2}$ 4) $(-1)^{n/2}.{}^{2n}c_n$

187. If n is an even integer,
$\frac{1}{1!(n-1)!}+\frac{1}{3!(n-3)!}+\frac{1}{5!(n-5)!}+....+\frac{1}{(n-1)!1!}=$
1) $\frac{2^n}{n!}$ 2) $\frac{2^n}{(n-1)!}$ 3) $\frac{2^{n-1}}{n!}$ 4) $\frac{2^{n-1}}{(n-1)!}$

188. Sum of the products of the binomial coefficients $C_0, C_1, C_2,$ .... C_n taken two at a time is
1) $2^{2n} - {}^{2n}c_n$ 2) $2^n - {}^{2n}c_n$
3) $\frac{1}{2}(2^n - {}^{2n}c_n)$ 4) $\frac{1}{2}(2^{2n} - {}^{2n}c_n)$

189. The sum to (n+1) terms of the series $\frac{C_0}{2}-\frac{C_1}{3}+\frac{C_2}{4}-\frac{C_3}{5}+.........=$
1) $\frac{1}{n+1}$ 2) $\frac{1}{n+2}$
3) $\frac{1}{n(n+1)}$ 4) $\frac{1}{(n+1)(n+2)}$

190. ${}^5C_0+2.{}^5C_1+2^2.{}^5C_2+2^3.{}^5C_3+2^4.{}^5C_4+2^5.{}^5C_5=$
1) 32 2) 243 3) 64 4) 729

XI. NUMBER OF INTEGRAL AND RATIONAL TERMS:

191. The total number of terms in the expansion of $(x+a)^{100}+(x-a)^{100}$ after simplification is
1) 202 2) 51 3) 101 4) 50

192. The number of terms in the expansion of $(1+5\sqrt{2}x)^9+(1-5\sqrt{2}x)^9$ is
1) 5 2) 10 3) 18 4) 20

193. The number of rational terms in the expansion of $\left(\sqrt{3}+\sqrt[4]{5}\right)^{124}$ is
1) 31 2) 32 3) 33 4) 34

194. Total number of rational terms in the expansion of $\left(\sqrt[4]{3}+\sqrt[3]{4}\right)^{136}$ is
1) 10 2) 11 3) 12 4) 21

195. Sum of the third from the begining and the third from the end of the binomial coefficients of the expansion of $\left(\sqrt[4]{3}+\sqrt[3]{4}\right)^n$ is equal 9900. Number of rational terms contained in the expansion is
1) 8 2) 9 3) 10 4) 11

196. In the expansion of $\left(\sqrt[5]{3}+\sqrt[3]{7}\right)^{36}$, the integer terms are
1) T_6, T_{21}, T_{36} 2) T_7, T_{22}, T_{37}
3) T_7, T_9, T_{11} 4) T_5, T_{20}, T_{35}

XIII MISCELLANEOUS:

197. The greatest integer less than or equal to $\left(2+\sqrt{3}\right)^6$ is
1) 2702 2) 2701 3) 2700 4) 2699

198. Given $(\sqrt{2}+1)^6+(\sqrt{2}-1)^6=198$, the integral part of $(\sqrt{2}+1)^6$ is
1) 196 2) 195 3) 197 4) 194

199. If $x=(99)^{50}+(100)^{50}$ and $y=(101)^{50}$ then
1) x>y 2) x<y
3) x=y 4) cannot be decided

200. The expansion
$$\left[x+\left(x^3-1\right)^{\frac{1}{2}}\right]^5+\left[x-\left(x^3-1\right)^{\frac{1}{2}}\right]^5$$ is a polynomial of degree
1) 5 2) 6 3) 7 4) 8

201. $(\sqrt{2}+1)^6+(\sqrt{2}-1)^6=$
1) 99 2) 98 3) 196 4) 198

202. If n is a positive even integer, which of the following will always be integers
A. $\left(\sqrt{2}+1\right)^n+\left(\sqrt{2}-1\right)^n$
B. $\left(\sqrt{2}+1\right)^n-\left(\sqrt{2}-1\right)^n$
C. $\left(\sqrt{2}+1\right)^{2n+1}+\left(\sqrt{2}-1\right)^{2n+1}$
D. $\left(\sqrt{2}+1\right)^{2n+1}-\left(\sqrt{2}-1\right)^{2n+1}$
1) A and B only 2) A and C only
3) A and D only 4) B and C only

203. If $(6+\sqrt{35})^n=I+F$ when I is odd and $0<F<1$, then $(I+F)(1-F)=$
1) 1 2) 1/2 3) 2 4) 4

204. If $(9+\sqrt{80})^n=I+F$, where I is odd and $0<F<1$, then $1-F=$
1) 1 2) $(9-\sqrt{80})^n$
3) $(9+\sqrt{80})^n$ 4) 4

KEY

01. 2	02. 2	03. 2	04. 3
05. 1	06. 1	07. 1	08. 4
09. 4	10. 1	11. 2	12. 1
13. 4	14. 2	15. 2	16. 2
17. 2	18. 3	19. 4	20. 2
21. 3	22. 1	23. 4	24. 2
25. 1	26. 3	27. 1	28. 1
29. 2	30. 2	31. 3	32. 1
33. 1	34. 1	35. 3	36. 3
37. 3	38. 1	39. 2	40. 4
41. 3	42. 4	43. 2	44. 2
45. 2	46. 1	47. 1	48. 1
49. 4	50. 4	51.4	52. 1
53. 3	54. 1	55. 2	56. 1
57. 1	58. 3	59. 3	60. 2
61. 4	62. 4	63. 1	64. 3
65. 3	66. 3	67. 4	68. 1
69. 3	70. 2	71. 3	72. 1
73. 3	74. 1	75. 2	76. 3
77. 1	78. 1	79. 3	80. 3
81. 4	82. 3	83. 1	84. 1
85. 3	86. 3	87. 3	88. 1
89. 2	90. 4	91. 4	92. 1
93. 2	94. 1	95. 2	96. 2
97. 1	98. 3	99. 1	100.3
101. 4	102. 4	103. 4	104. 3
105. 2	106. 2	107. 1	108. 3
109. 4	110. 2	111. 2	112. 4
113. 4	114. 1	115. 3	116. 4
117. 3	118. 3	119. 2	120. 2
121. 2	122. 4	123. 3	124. 1
125. 2	126. 3	127. 4	128. 2
129. 4	130. 1	131. 2	132. 2
133. 4	134. 1	135. 2	136. 4
137. 2	138. 3	139. 2	140. 2
141. 4	142. 2	143. 3	144. 1
145. 2	146. 3	147. 1	148. 4
149. 3	150. 3	151. 2	152. 4
153. 2	154. 2	155. 2	156. 3
157. 2	158. 1	159. 2	160. 3
161. 4	162. 4	163. 3	164. 3
165. 2	166. 1	167. 3	168. 4
169. 2	170. 1	171. 2	172. 4
173. 4	174. 1	175. 2	176. 3
177. 3	178. 2	179. 3	180. 2
181. 1	182. 3	183. 2	184. 2
185. 1	186. 2	187. 3	188. 4
189. 4	190. 2	191. 2	192. 1
193. 2	194. 3	195. 2	196. 2
197. 2	198. 3	199. 2	200. 3
201. 4	202. 3	203. 1	204. 2

LEVEL - II

INDEPENDENT TERM & VALUES:

1. The term in dependent of x in the expansion $\left(1+2x+\frac{2}{x}\right)^3$ is
1) 12 2) 18 3) 36 4) 25

2. If a term independent of x is exist in the expansion of $\left(x+\frac{1}{x^2}\right)^n$ then n must be

1) a multiple of 2 2) a multiple of 3
3) a multiple of 5 4) a multiple of 7

COEFFICIENT OF X^K:

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

1) ${}^{2n}C_{\frac{4n+p}{3}}$ 2) ${}^{2n}C_{\frac{2n+p}{3}}$
3) ${}^{2n}C_{\frac{n+p}{3}}$ 4) ${}^{n}C_{\frac{n+p}{3}}$

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

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

5. The expansion $\left(x-\frac{3x^2}{2}\right)^{40}$ is a polynomial of n^{th} degree in x. then n=

1) 20 2) 40 3) 80 4) 120

5)a. The term independent of x in the expansion of $\left(1+x+2x^3\right)\left(\frac{3x^2}{2}-\frac{1}{3x}\right)^9$ is

1) $\frac{13}{54}$ 2) $\frac{15}{54}$ 3) $\frac{17}{54}$ 4) $\frac{19}{54}$

COEFFICIENTS:

6. If the coefficients of 2^{nd}, 3^{rd} and 4^{th} terms of the expansion of $(1+x)^{2n}$ are in A.P. then the value of $2n^2-9n+7$ is

1) 0 2) 5 3) 2 4) 6

7. In the expansion of $(1+x)^n$ if the coefficients of three consecutive terms are in A.P. then n+2 is

1) n^2 2) a perfect square
3) a perfect cube 4) None

8. If $(1+kx)^{10}=a_0+a_1x+a_2x^2+....+a_{10}x^{10}$ and $a_2+\frac{7}{5}a_1+1=0$ then k=

1) $-1/5,-1/9$ 2) $1/5,1/9$
3) $-1/5,-1/7$ 4) $1/5,-1/9$

9. If the term containing x^3 in $\left(1-\frac{x}{n}\right)^n$ is $\frac{7}{8}$ when x=-2 and n is a positive integer, then n=

1) 7 2) 8 3) 9 4) 10

10. If the 5^{th} term of $\left(\frac{q}{2x}-px\right)^8$ is 1120 and $p+q=5, p>q$ then p=

1) 3 2) 6 3) 4 4) 7

11. The coefficient of x^{53} in the expansion of $\sum_{m=0}^{100}{}^{100}C_m(x-3)^{100-m}.2^m$ is

1) $C(100,53)$ 2) $-C(100,43)$
3) $-C(100,53)$ 4) ${}^{100}C_{50}$

12. In the expansion $(1+x)^m(1-x)^n$, the coefficients of x and x^2 are 3 and -6 respectively, then m is

1) 6 2) 9 3) 12 4) 24

13. The coefficient of x^5 in the expansion of $(1+x)^{21}+(1+x)^{22}+........+(1+x)^{30}$ is

1) ${}^{51}C_5$ 2) ${}^{9}C_5$
3) ${}^{31}C_6-{}^{21}C_6$ 4) ${}^{30}C_5+{}^{20}C_5$

13a. If the coefficient of x^{2r} in the expansion of $\left(x+\frac{1}{x^2}\right)^{n-3}$ is not zero, then $\left(\frac{n-2r}{3}\right)$ is

1) a rational number 2) a positive integer
3) a negative integer
4) a positive rational number

13.b. In the expansion of

$$\left[2^{\log 2^{\sqrt{9^{x-1}+7}}}+\frac{1}{2^{\frac{1}{5}\log 2^{\left(3^{x-1}+1\right)}}}\right]^7$$

6th term is 84. Then x =

1) 1 2) 2 3) 1 or 2 4) 2 or 4

RATIOS:

14. In the expansion of $(1+x)^n$, the 5^{th} term is 4 times the 4^{th} term and the 4^{th} term is 6 times the 3^{rd} term. then n=

1) 9 2) 10 3) 11 4) 12

15. If a_1, a_2, a_3, a_4 are the coefficients of $2^{nd}, 3^{rd}, 4^{th}$ and 5^{th} terms in the expansion of $(1+x)^n$ respectively, then $\frac{a_1}{a_1+a_2}+\frac{a_3}{a_3+a_4}=$

1) $\frac{a_2}{a_2+a_3}$ 2) $\frac{2a_2}{a_2+a_3}$

3) $\frac{3a_2}{a_2+a_3}$ 4) $\frac{4a_3}{a_2+a_3}$

16. If a and b are values of the second and third terms respectively in the expansion of $(1+x)^n$, then x=

1) $\frac{a^2-2b}{a}$ 2) $\frac{a^2}{a^2-2b}$

3) $\frac{a^2+2b}{a^2}$ 4) $\frac{a^2+2b^2}{b^2}$

17. In the expansion of $(a+b)^n$ if two consective terms are equal, then $\frac{(n+1)b}{a+b}$ and $\frac{(n+1)a}{a+b}$ are

1) integers 2) complex numbers
3) irrational numbers 4) can not exist

17a. The ratio of $(r+1)$ th and $(r-1)$ th terms in the expansion of $(a-b)^n$ is

1) $\frac{(n-r+2)(n-r+1)}{r(r-1)}.\frac{b^2}{a^2}$

2) $\frac{(n-r+2)(n-r+1)}{r(r-1)}.\frac{a^2}{b^2}$

3) $\left(\frac{n-r+2}{r}\right).\frac{b}{a}$ 4) $\left(\frac{n-r+1}{r-1}\right).\frac{b}{a}$

SUM OF THE COEFFICIENTS:

18. The sum of the coefficients of even powers of in the expansion $(1-x+x^2-x^3)^5$ is

1) 512 2) 0 3) -512 4) 510

19. The sum of the coefficients of odd powers of x in the expansion $(1+x+x^2+x^3)^5$ is

1) 520 2) 525 3) 576 4) 512

20. The sum of the binomial coefficients of the $3^{rd}, 4^{th}$ terms from the beginning and from the end of $(a+x)^n$ is 440 then n=

1) 10 2) 11 3) 12 4) 13

21. The sum of the coefficients in the expansion of $(1+2x+5x^2)^n$ and $(1+3x)^{3n}$ are a and b respectively. Then

1) a<b 2) a=b 3) $b=a^3$ 4) $b^2=a$

22. The sum of the coefficients of the first 10 terms in the expansion of $(1-x)^{-3}$ is

1) 220 2) 286 3) 120 4) 150

23. The sum of the coefficients of odd terms in $(1+x)^{2n}$ is

1) 2^{2n} 2) 2^n 3) 2^{n-1} 4) 2^{2n-1}

24. If the sum of the coefficients in the expansion of $(a^2x^2-2ax+1)^{51}$ vanishes, then the value of a is

1) 2 2) -1 3) 1 4) -2

25. Sum of coefficients in the expansion of $(x+2y+z)^{10}$ is

1) 2^{10} 2) 3^{10} 3) 4^9 4) 4^{10}

26. If $(1-x-x^2)^{20}=\sum_{r=0}^{40} a_r.x^r$, then $a_1+3a_3+5a_5+..........+39a_{39}=$

1) 40 2) -40 3) 80 4) -80

27. If $(1-x-x^2)^{20}=\sum_{r=0}^{40} a_r.x^r$, then $a_2+2a_4+3a_6+............+20a_{40}=$

1) 20 2) 40 3) 10 4) -10

28. The sum of the coefficients of middle terms in the expansion of $(1+x)^{2n-1}$

1) $(2n)!$ 2) $\frac{(2n)!}{n!}$

3) $\frac{(2n)!}{(n!)^2}$ 4. $\frac{(2n-1)!}{n!}$

29. If $(1+x+x^2+x^3+.......x^p)^n=a_0+a_1x+a_2x^2+.....+a_{np}x^{np}$, then $a_0+a_1+a_2+....+a_{np}=$

1) p^n 2) $(2p+1)^n$

3) $(p+1)^{n-1}$ 4) $(p+1)^n$

MIDDLE TERMS:

30. The middle term in the expansion of $(1-3x+3x^2-x^3)^{2n}$ is

1) ${}^{6n}C_{3n}(-x)^{3n}$ 2) ${}^{6n}C_{2n}(-x)^{2n+1}$
3) ${}^{4n}C_{3n}(-x)^{3n}$ 4) ${}^{6n}C_{3n}(-x)^{3n-1}$

31. The coefficient of middle term in the expansion of $(1+x)^{40}$ is
1) $\frac{1.3.5.---39}{20!}.2^{20}$ 2) $\frac{1.3.5.----39}{20!}$
3) $\frac{40!}{20!}$ 4) $40!\,20^{20}$

32. If the middle term of $(1+x)^{2n}$ is the greatest term then x lies between
1) $n-1<x<n$ 2) $\frac{n}{n+1}<x<\frac{n+1}{n}$
3) $n<x<n+1$ 4) $\frac{n+1}{n}<x<\frac{n}{n+1}$

33. If a is the coefficient of the middle term in the expansion of $(1+x)^{2n}$ and b, c are the coefficients of the two middle terms in the expansion of $(1+x)^{2n-1}$ then
1) $a+b=c$ 2) $a=b+c$
3) both are equal 4) cannot be decided

NUMRICALLY GREATEST TERM:

34. The values of x for which the 4^{th} term in the expansion of $(5+3x)^{10}$ is the greatest are
1) $\frac{5}{8}\le x\le\frac{20}{21}$ 2) $\frac{5}{8}<x<\frac{20}{21}$
3) $\frac{5}{7}<x<\frac{19}{21}$ 4) $-\frac{5}{8}<x<\frac{20}{21}$

NUMBER OF INTEGRAL AND RATIONAL TERMS:

35. The number of irrational terms in the expansion $\left(\sqrt[4]{3}+\sqrt[3]{7}\right)^{36}$ is
1) 30 2) 33 3) 31 4) 29

36. The number of non zero terms in $\left(\sqrt{3}+1\right)^{75}-\left(\sqrt{3}-1\right)^{75}$ is
1) 38 2) 34 3) 37 4) 75

37. The number of terms in the expansion of $(a+b+c+d+e)^{3}$ is
1) 20 2) 24 3) 27 4) 35

INFINITE SERIES (RATIONAL POWERS):

38. $1+\frac{2.1}{3.2}+\frac{2.5.1}{3.6.2^2}+\frac{2.5.8}{3.6.9}.\frac{1}{2^3}+---+\infty=$
1) 0.4 (nearly) 2) 0.3
3) $\sqrt{3}$ 4) $\sqrt{3}-1$

39. $\sqrt[3]{1003}-\sqrt[3]{997}=$
1) 0.01 2) 0.02 3) 0.03 4) 0.04

40. The coefficient of x^{24} in the expansion of $\left(1+3x+6x^2+10x^3+----+\infty\right)^{2/3}=$
1) 300 2) 250 3) 25 4) 205

41. The coefficient of x^{10} in is $\left(x+x^2+x^3+x^4+x^5\right)^3$ is
1) 19 2) 18 3) 27 4) 17

42. If $n\in N$, then $\sum_{k=1}^{\infty}k\left(1-\frac{1}{n}\right)^{k-1}=$
1) $n(n-1)$ 2) $n(n+1)$
3) n^2 4) $(n+1)^2$

43. If S_n denotes the sum of first 'n' natural numbers then $S_1+S_2x+S_3x^2+........+S_nx^{n-1}+...\infty=$
1) $(1-x)^{-1}$ 2) $(1-x)^{-2}$
3) $(1-x)^{-3}$ 4) $(1-x)^{-4}$

44. The coefficient of x^2 in the expansion of $\left(1+4x+x^2\right)^{1/2}$ is =
1) -3 2) -2 3) 2 4) $-\frac{3}{2}$

45. If $0<x<1$, then the first negative term in the expansion of $(1+x)^{7/2}$ is
1) T_6 2) T_5 3) T_4 4) T_3

46. If $y=x-x^2+x^3-x^4+....\infty$, $|x|<1$, then x=
1) $\frac{y}{y+1}$ 2) $y-\frac{1}{y}$ 3) $\frac{y}{1-y}$ 4) $y+\frac{1}{y}$

47. The coefficient of x^4 in the expansion of $\frac{3x-8}{4-4x+x^2}$ is
1) $-1/4$ 2) -4 3) 4 4) $1/4$

48. If $y=2x+3x^2+4x^3+........$ then
$\frac{y}{2}-\frac{1.3}{2!}\left(\frac{y}{2}\right)^2+\frac{1.3.5}{3!}\left(\frac{y}{2}\right)^3-.......\infty=$

1) $x+2$ 2) x 3) $x-2$ 4) $x+4$

49. If $\frac{1}{1-2x+x^2}=1+b_1x+b_2x^2+b_3x^3+...\infty$ $|x|<1$, then the value of b_1 is
1) 3 2) 2 3) 4 4) 1

50. If cubes and higher powers of x are negligible then one can write $\sqrt{\frac{1-x}{1+x}}=1+Ax+Bx^2$, then A=
1) -1 2) 1 3) 0 4) 2

51. If x is very large and positive we can write $\sqrt[3]{x^3+1}=x+\frac{a}{x^2}+\frac{b}{x^5}$, then
1) $a+b=0$ 2) $3a+b=0$
3) $a+3b=0$ 4) $a-3b=0$

52. The general term of $(2a-3b)^{-1/2}$ is
1) $\frac{1.3.5......(2r-5)}{r!}\frac{1}{\sqrt{2a}}\left(\frac{3b}{2a}\right)^{r+1}$
2) $\frac{1.3.5.....(2r-5)}{r!}\frac{1}{\sqrt{2a}}\left(\frac{3b}{4a}\right)^{r}$
3) $\frac{1.3.5......(2r-1)}{r!}\frac{1}{\sqrt{2a}}\left(\frac{3b}{4a}\right)^{r}$
4) $\frac{1.3.5......(2r+5)}{r!}\left(\frac{1}{\sqrt{2a}}\right)\left(\frac{3b}{4a}\right)^{r-1}$

BINOMIAL COEFFICIENTS:

53. $C_1+2.5C_2+3.5^2C_3+---=$
1) $n.6^{n-1}$ 2) 6^{n-1} 3) 6^n 4) $n.6^n$

54. If $(1+x)^{25}=C_0+C_1x+C_2x^2+....+C_{25}x^{25}$ then $C_0-C_2+C_4-C_6............=$
1) 2^{24} 2) 0 3) 2^{12} 4) 2^{23}

55. $\sum_{r=0}^{n} r.C_r^2=$
1) $\frac{n}{2}\frac{(2n)!}{(n!)^2}$ 2) $\frac{(2n)!}{(n!)^2}$ 3) $(2n)!$ 4) $\frac{n(2n)!}{2}$

56. $C_0+C_1+2C_2(3)+3C_3(3)^2+...+nC_n(3)^{n-1}=$
1) $n(3^n+1)$ 2) $n.4^{n-1}$
3) $(n.4^{n-1}+1)$ 4) $n(4^{n-1}+1)$

57. ${}^{15}C_2+2.{}^{15}C_3+3.{}^{15}C_4+.....+14.{}^{15}C_{15}=$
1) $14.2^{15}+1$ 2) $13.2^{14}+1$
3) $14.2^{15}-1$ 4) $13.2^{14}-1$

58. If $C_0+2C_1+4C_2+....+2^nC_n=243$, then n=
1) 3 2) 4 3) 5 4) 6

59. If $C_0+C_1+C_2+.......+C_n=128$ then $C_0-\frac{C_1}{2}+\frac{C_2}{3}-\frac{C_3}{4}+.......=$
1) 0 2) 8 3) $\frac{1}{8}$ 4) $\frac{7}{8}$

60. If $(1+x)^n=\sum_{i=0}^{n}C_ix^i$, then the sum of the products of C_i's taken two at a time is represented by $\sum_{0<i<j<n}C_iC_j=$
1) $2^n-\frac{(2n)!}{2(n!)^2}$ 2) $2^n-\frac{(2n)!}{2(n!)^2}$
3) $2^{2n}-\frac{2n!}{(n!)^2}$ 4) $\frac{2^{2n}}{2(n!)^2}$

61. $\int_0^1(1-x^3)^n\,dx=$
1) $C_0-\frac{C_1}{4}+\frac{C_2}{7}-\frac{C_3}{10}+.....+(-1)^n\frac{C_n}{3n+1}$
2) $C_0+\frac{C_1}{4}+\frac{C_2}{7}+\frac{C_3}{10}+.....+\frac{C_n}{3n+1}$
3) $C_0+\frac{C_1}{4}+\frac{C_2}{7}+\frac{C_3}{10}+.....+\frac{C_{n-1}}{3n-2}$
4) $C_0C_1+C_2C_2+C_2C_3+---+C_{n-1}C_n$

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

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

64. The value of $\binom{2n}{0}^2-\binom{2n}{1}^2+\binom{2n}{2}^2-....$

$\dots\binom{2n}{2n-1}^2+\binom{2n}{2n}^2=$

1) $\binom{4n}{2n}$ 2) $\binom{2n}{n}$ 3) 0 4) $(-1)^n\binom{2n}{n}$

65. $(2n+1)c_o-(2n+1)c_1+(2n+1)c_2-\dots\dots.(2n+1)c_{2n}=$

1) 1 2) 2^{2n} 3) -1 4) 0

66. If $C_r={}^nC_r$; then $\frac{C_3}{4}+\frac{C_5}{6}+\frac{C_7}{8}+---$

1) $\frac{2^{n+1}-n-2}{2(n+1)}$ 2) $\frac{2^{n+1}-n^2-n-2}{2(n+1)}$

3) $\frac{2^{n+1}-n^2+2}{2(n+1)}$ 4) $\frac{2^{n+1}-2n+1}{2(n-1)}$

67. $\frac{(C_0+C_1)(C_1+C_2)(C_2+C_3)+\dots\dots(C_{n-1}+C_n)=}{C_0C_1C_2\dots\dots..C_n}$

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

3) $\frac{(n+1)^{n-1}}{\angle n}$ 4) $\frac{(n+1)^n}{\angle n}$

68. If ${}^{2n}C_r=C_r$; then

$C_1^2-2.C_2^2+3.C_3^2-4.C_4^2+\dots\dots+2n.C^2{}_{2n}$

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

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

69. If P_n is the product of the Binomial Co-efficients in the expansion $(1+x)^n$ then $\frac{P_{n+1}}{P_n}=$

1) $\frac{(n+1)^n}{n!}$ 2) $\frac{n+1}{n!}$ 3) $\frac{(n+1)^n}{n}$ 4) 1

70. ${}^mC_r+{}^mC_{r-1}.{}^nc_1+{}^mC_{r-2}.{}^nC_2+\dots+{}^nC_r=$

1) ${}^{m+n}C_{n+r}$ 2) ${}^{m+n}C_{m+r}$

3) ${}^{(m+n)}C_r$ 4) 0

71. If $S_1={}^mC_1+{}^{(m+1)}C_2+{}^{(m+2)}C_3+\dots\dots\dots+{}^{(m+n-1)}C_n$

$S_2={}^nC_1+{}^{(n+1)}C_2+{}^{(n+2)}C_3+\dots\dots..+{}^{(m+n-1)}C_n$ then

1) $S_1+S_2=0$ 2) $S_1-S_2=0$

3) $S_1+S_2=2^n$ 4) $S_1+S_2=2^n-1$

72. The sum of the series

$\frac{2\left(\frac{n}{2}\right)!\left(\frac{n}{2}\right)!}{n!}\left[C_0^2-2.C_1^2+\dots.+(-1)^n(n+1).C_n^2\right]=$

where n is even integer is equal to

1) 0 2) $(-1)^{n/2}(n+2)$

3) $(-1)^n(n+2)$ 4) $(-1)^{n/2}(n+1)$

73. The value of

$\left({}^nC_0+3.{}^nC_1+9.{}^nC_2+\dots\dots.+3^n.{}^nC_n\right)=$

1) 2^n 2) 3^n 3) 4^n 4) 5^n

74. $\sum_{r=0}^{n}(r-4)C_r=$

1) $(n-8)2^n$ 2) $(n-8)2^{n-1}$

3) $(n-4)2^{n-1}$ 4) 0

75. If $(1+x)^n=C_0+C_1x+C_2x^2+\dots.+C_nx^n$ then the sum $C_0+(C_0+C_1)+\dots..+(C_0+C_1+C_2+\dots..+C_{n-1})$ is equal to

1) $n.2^n$ 2) $n.2^{n-1}$ 3) $n.2^{n+1}$ 4) 2^n

76. $\sum_{r=2}^{n}(5r-3).C_r=$

1) $(5n+6).2^{n-1}-2n+2$

2) $(5n+6).2^{n-1}-2n+3$

3) $(5n-6)2^{n-1}-2n+2$

4) $(5n-6)2^{n-1}-2n+3$

77. $\sum_{r=0}^{n-1}\frac{{}^nC_r}{{}^nC_r+{}^nC_{r+1}}=$

1) $\frac{n}{2}$ 2) $\frac{n+1}{2}$

3) $\frac{n(n+1)}{2}$ 4) $\frac{n(n-1)}{2(n+1)}$

78. $C_1-C_3+C_5-C_7+\dots\dots\dots.=$

1) 2^{n-1} 2) $2^{\frac{n}{2}}\sin\frac{n\pi}{4}$

3) $2^{\frac{n}{2}}\cos\frac{n\pi}{4}$ 4) 0

79. If $\frac{{}^nC_0}{2^n}+2.\frac{{}^nC_1}{2^n}+3.\frac{{}^nC_2}{2^n}+....(n+1)\frac{{}^nC_n}{2^n}=16$ then the value of 'n' is

1) 20 2) 25 3) 30 4) 40

80. $\frac{C_1}{2}+\frac{C_3}{4}+........+\frac{C_{15}}{16}=$

1) $\frac{1}{16}$ 2) $\frac{2^{15}}{16}$ 3) $\frac{2^{16}}{16}$ 4) $\frac{2^{15}-1}{16}$

81. $\frac{C_0}{1}+\frac{C_2}{3}+\frac{C_4}{5}+........+\frac{C_{16}}{17}=$

1) $\frac{1}{17}$ 2) $\frac{2}{17}$ 3) $\frac{2^{16}}{17}$ 4) $\frac{2^{17}}{17}$

MISCELLANEOUS:

82. If $(1+x+x^2)^n=a_0+a_1x+a_2x^2+...+a_{2n}x^{2n}$ then $a_0+a_3+a_6+------=$

1) 3^n 2) 3^{n-1} 3) 3^{n-2} 4) 1

83. $(2-\sqrt{5})^6+(2+\sqrt{5})^6=$

1) 1264 2) 1964 3) 2889 4) 5778

84. $(\sqrt{3}+1)^5-(\sqrt{3}-1)^5=$

1) 152 2) 142 3) 124 4) 162

85. $(1-\sqrt{2})^6=$

1) $98-70\sqrt{2}$ 2) $99-70\sqrt{2}$
3) $99+70\sqrt{2}$ 4) $98+70\sqrt{2}$

86. Let $R=(5\sqrt{5}+11)^{2n+1}$, $f=R-[R]$, then $Rf=$

1) 1 2) 2^n 3) 2^{2n} 4) 4^{2n+1}

87. If m and n are +ve integers and $m>n$ and if $(1+x)^{m+n}(1-x)^{m-n}$ is expanded as a polynomial in x, then the coefficient of x^2 is

1) $2m^2-n$ 2) $2n^2-m$
3) $2m^2+n$ 4) $2n^2+m$

88. The number of terms in the expansion of $\left[(a+4b)^3+(a-4b)^3\right]^2$ are

1) 6 2) 8 3) 7 4) 3

89. The number of terms in the expansion of $\left[(a+4b)^3(a-4b)^3\right]^2$ are

1) 6 2) 7 3) 8 4) 32

90. The number of terms in the expansion of $(a_1+b_1)(a_2+b_2).....(a_n+b_n)$

1) 2^n 2) 3^n 3) 3^{2n} 4) 2^{2n}

91. The number of rational terms in the expansion of $(1+\sqrt{2}+\sqrt[3]{3})^6$ is

1) 6 2) 7 3) 3 4) 8

92. $9^{11}+11^9$ is divisible by

1) 7 2) 8 3) 9 4) 10

93. The coefficient of x^{17} in the expansion of $(x-1)(x-2)(x-3)-------(x-18)$ is

1) 164 2) -171 3) 194 4) 221

94. The coefficient of x^9 in the expansion of $(x-1)(x-4)(x-9)-----(x-100)$ is

1) -325 2) 365 3) 425 4) -385

95. For $n\in N$; $(1+x)^n-nx-1$ is divisible by

1) 2 2) x 3) x^2 4) x^3

96. If the coefficients of x^{39} and x^{40} are equal in the expansion of $(p+qx)^{49}$. then the possible values of p and q are

1) 1, 5 2) 1, 4 3) 1. 3 4) 2, 7

97. If $t_0, t_1, t_2, ...t_n$ are the consecutive terms in the expansion $(x+a)^n$ then $(t_0-t_2+t_4-t_6+....)^2+(t_1-t_3+t_5....)^2=$

1) x^2+a^2 2) $(x^2+a^2)^n$
3) x^2-a^2 4) $(x^2-a^2)^n$

98. If $(1+x)(1+x+x^2)(1+x+x^2+x^3).......+(1+x+x^2+x^{n-1})=a_0+a_1x+a_2x^2+...+a_mx^m$ then $a_0+a_1+a_2+........+a_m$ is given by

1) m! 2) n!
3) $(m!)^2/m!n!$ 4) n

99. Coefficient of x^{50} in $(1+x)^{1000}+2x(1+x)^{999}+3x^2(1+x)^{998}+......$ is

1) ${}^{1000}C_{50}$ 2) ${}^{1001}C_{50}$
3) ${}^{1002}C_{50}$ 4) ${}^{1002}C_{49}$

100. $(x-1)^4+4(x-1)^3+6(x-1)^2+4(x-1)+1=$

1) x^4 2) x^3 3) x^2 4) 1

101. If the expansion of $\left(1-\frac{x}{2}\right)^{10}$ is to be valid then $x\in$

1) $(-2,2)$ 2) $(-\infty,-1)\cup(1,\infty)$
3) $R-\{1\}$ 4) R

102. A positive integer which is just greater than $(1+0.0001)^{10000}$ is

1) 3 2) 4 3) 5 4) 6

103. If n is an integer lying between 0 and 21, then the least value of $n!(21-n)!$ is

1) 1!.20! 2) 11!.10!
3) 9!12! 4) 2!.19!

104. Coefficeint of x^5 in the expansion of $\frac{3x}{(x-1)^2(x+2)}$ is

1) $\frac{171}{32}$ 2) $\frac{171}{64}$ 3) $\frac{57}{32}$ 4) $\frac{57}{16}$

105. Coefficient of x^n in $\frac{(1+x)(1+2x)(1+3x)}{(1-x)(1-2x)(1-3x)}$ is

1) $12-30.2^n-20.3^n$ 2) $12-30.2^n+20.3^n$
3) $12+30.2^n+20.3^n$ 4) $12+30.2^n-20.3^n$

106. The coefficient of x^9 in $(x+2)(x+4)(x+8)....(x+1024)$ is

1)2046 2) 1023 3) 55 4)0

107. The positive integer just greater than $(1+0.0001)^{10000}$ is

1) 4 2) 5 3) 2 4) 3

108. If A= $(300)^{600}$, B=600!, C= $(200)^{600}$ then

1) A<B<C 2) A>B>C
3) A>C and C=B 4) A=B and B>C

109.If $(1+x)(1+x+x^2)(1+x+x^2+x^3)...(1+x+x^2+.....+x^{n-1}) = a_0+a_1x+a_2x^2+....+a_mx^m$ then $a_0+a_1+a_2+....+a_m$ is given by

1) m! 2) n! 3) $(m!)^2/m!\,n!$ 4) n

110. If $\frac{^nC_0}{2^n}+2.\frac{^nC_1}{2^n}+3.\frac{^nC_2}{2^n}+...(n+1)\frac{^nC_n}{2^n}=$ 16, then the value of n =

1) 20 2) 25 3) 30 4) 40

111. If $\sum_{n=0}^{\infty}(-1)^n x^{n+1}$ =1/10, then x =

1) 1/9 2) 1/10 3) 1/11 4) 9/10

112. The coefficient of x^2 in the expansion of $(1+x)^{m+n}(1-x)^{m-n}$ where m>n and m, n are positive integers is

1) $2m^2-n$ 2) $2m^2+n$
3) $2n^2-m$ 4) $2n^2+m$

113. The sum of the coefficients of the middle terms of $(1+x)^{2n-1}$ is

1) $^{2n-1}C_n$ 2) $^{2n-1}C_{n+1}$
3) $^{2n}C_{n-1}$ 4) $^{2n}C_n$

KEY

1) 4	2) 2	3)2	4)2
5)3	5a) 3	6)1	7)2
8)1	9)2	10)3	11)3
12)3	13)3	3a)2	13b) 3
14)3	15)2	16)1	17)1
17a) 1	18)1	19)4	20)2
21)1	22)1	23)4	24)3
25)4	26)1	27) 3	28)3
29)4	30)1	31)1	32)2
33)2	34)2	35)2	36)1
37)4	38)1	39)2	40)3
41)3	42)3	43)3	44)4
45)1	46)3	47)1	48)2
49)2	50)1	51)3	52)3
53)1	54)3	55)1	56)3
57)2	58)3	59)3	60)3
61)1	62)1	63)2	64)4
65)1	66)2	67)4	68)3
69)1	70)3	71)2	72)2
73)3	74)2	75)2	76)4
77)1	78)2	79)3	80)4
81)3	82)2	83)4	84)1
85)2	86)4	87)2	88)4
89)2	90)1	91)2	92)4
93)2	94)4	95)3	96)2
97)2	98)2	99)3	100)1
101)4	102)1	103)2	104)1
105)2	106)1	107)4	108)2
109)2	110)3	111)1	112)3
113)4			

HINTS

1. $^3C_0+^3C_1\left(2x+\frac{2}{x}\right)+^3C_2\left(2x+\frac{2}{x}\right)^2+^3C_3\left(2x+\frac{2}{x}\right)^3$ independent of

$x=1+3(8)=25$

2. $r=\frac{n(1)-0}{1+2}=\frac{n}{3}=$ a positive integer

$\therefore$ n is a multiple of 3

3. $r=\frac{np-k}{p+2}=\frac{4n-p}{3}$

$^{2n}C_{\frac{4n-p}{3}}$ (or) $^{2n}C_{\frac{2n+p}{3}}$

4. $\frac{(1+x)^{2n}}{x^n}$ $\therefore$ coefficient of x^{n-1} in $(1+x)^{2n}$ is $^{2n}C_{(n-1)}$

5. (Highest power of x) . power=2(40)=80

6. If the coefficients of the r^{th}, $(r+1)^{th}$ and $(r+2)^{th}$ terms of $(1+x)^N$ are in A.P. then

$$(N-2r)^2 = N+2$$

Put $N = 2n;\ r = 2$

7. $(n+2) = (n-2r)^2$ is a perfect square

8. $a_1 = 10k;\ a_2 = 45k^2$

$1+10k.\frac{7}{5}+45k^2 = 0 \Rightarrow k = -\frac{1}{5}$ or $\frac{-1}{9}$

9. $^nC_3.\left(-\frac{x}{n}\right)^3 = \frac{7}{8};$ then $n = 8$

put $x = -2$ *verify*

10. $^8C_4.\frac{q^4}{2^4}.p^4 = 1120$

$p^4.q^4 = 256$

$p^4(5-p)^4 = 64.4 \quad \therefore p = 4$

11. $(x-3+2)^{100} = (x-1)^{100}$

Coefficient of x^{53} is $^{-100}C_{53}$

12. $^mC_1 - ^nC_1 = 3$

$-mn + ^nC_2 + ^mC_2 = -6$ Verify answers

13. $(1+x)^{21} = \left[1+(1+x)+(1+x)^2+---+(1+x)^9\right]$

$= (1+x)^{21}\left[\frac{(1+x)^{10}-1}{1+x-1}\right] = (1+x)^{31}-(1+x)^{21}$

coefficient of x^5 is $\frac{(1+x)^{31}-(1+x)^{21}}{x}$

coefficient of x^6 is $(1+x)^{31}-(1+x)^{21}$

$= ^{31}C_6 - ^{21}C_6$

14. $T_5 = 4.T_4;\ T_4 = 6.T_3$

$^nC_4.x^4 = 4.^nC_3.x^3;\quad ^nC_3 = 6.^nC_2.x^2$

$\therefore n = 11$

15. $\frac{1}{1+\frac{a_2}{a_1}}+\frac{1}{1+\frac{a_4}{a_3}} = \frac{6}{n+1} = 2\left(\frac{1}{1+\frac{a_3}{a_2}}\right)$

16. $a = nx;\ b = \frac{n(n-1)}{2}.x^2$

put n =a/x in b then $\quad \therefore x = \frac{a^2-2b}{a}$

17. $\frac{(n+1)\left|\frac{b}{a}\right|}{\left|\frac{b}{a}\right|+1}$ and $\frac{(n+1)\left|\frac{a}{b}\right|}{\left|\frac{a}{b}\right|+1}$ are int egers

18. $\frac{f(1)+f(-1)}{2}$

19. $\frac{f(1)-f(-1)}{2}$

20. $^nC_2 + ^nC_3 + ^nC_{n-2} + ^nC_{n-3} = 440$

$2\left(^nC_2 + ^nC_3\right) = 440$

$\therefore n = 11$

21. put x = 1 and compare

22. The sum of coefficients of the first r terms in

$(1-x)^{-n}$ is $^{n+r-1}C_n$

23. Sum of coefficients of odd terms

$= C_0 + C_2 + C_4 + ------- = 2^{2n-1}$

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

$a = 1$

25. put $x = y = z = 1$

26. $\frac{f^{|}(-1)+f^{|}(1)}{2}$

27. $\frac{f^{|}(1)-f^{|}(-1)}{4}$

28. $^{(2n-1)}C_n + ^{(2n-1)}C_{n-1} = ^{2n}C_n$

29. put x = 1

30. $\left[(1-x)^3\right]^{2n} = (1-x)^{6n}$

midile term $= {}^{6n}C_{3n}(-x)^{3n}$

31. The coefficient of middle term in $(1+x)^{2n}$ is $\dfrac{1.3.5.-----(2n-1)}{n!}2^n$

32. middle term T_{n+1}

$n < \dfrac{(2n+1)|x|}{|x|+1} < n+1$

33. $a = {}^{2n}C_n;\ b = {}^{(2n-1)}C_n;\ c = {}^{(2n-1)}C_{n-1}$

$\therefore a = b + c$

34. $3 < \dfrac{11\left|\frac{3x}{2}\right|}{\left|\frac{3x}{2}\right|+1} < 4 \Rightarrow \dfrac{5}{8} < n < \dfrac{20}{21}$

35. Rational terms $\left[\dfrac{36}{\text{L.C.M of }(4,3)}\right]+1 = 4$

Irrational terms $= (36+1)-4 = 33$

36. $\dfrac{75+1}{2}(\because \text{n is odd})$

37. The number of terms in

$(a_1 + a_2 + \dots\dots\dots + a_r)^n$ is ${}^{n+r-1}C_n$

38. $n = \dfrac{2}{3},\ x = \dfrac{1}{2}$

$\left(1-\dfrac{1}{2}\right)^{-2/3} = \sqrt[3]{4} = 0.4(\text{nearly})$

39. $(1000+3)^{1/3} - (1000-3)^{1/3} =$

$10\left[\left(1+\dfrac{3}{1000}\right)^{\frac{1}{3}} - \left(1-\dfrac{3}{1000}\right)^{\frac{1}{3}}\right] = 0.02$

40. $\left[(1-x)^{-3}\right]^{\frac{2}{3}} = (1-x)^{-2}$

Formula: coefficient of x^r in $(1-x)^{-n}$ is ${}^{(r+n-1)}C_r$

41. Coefficient of x^7 in

$(1+x+x^2+x^3+x^4+x^5)^3 = \left(\dfrac{1-x^6}{1-x}\right)^3$

$= (1-x^6)^3(1-x)^{-3} = (1)(36) - 3(3) = 27$

42. $1\left(1-\dfrac{1}{n}\right)^0 + 2\left(1-\dfrac{1}{n}\right)^1 + 3\left(1-\dfrac{1}{n}\right)^2 + \dots\dots.$

comparing with

$(1-x)^{-2} = 1 + 2x + 3x^2 + \dots\dots\dots.$

$\therefore \left[1-\left(1-\dfrac{1}{n}\right)\right]^{-2} = n^2$

43. $1 + (1+2)x + (1+2+3)x^2 + -----$

$= 1 + 3x + 6x^2 + ------- = (1-x)^{-3}$

44. $1 + \dfrac{1}{2}(4x+x^2) + \dfrac{\frac{1}{2}\left(\frac{1}{2}-1\right)}{2!}(4x+x^2)^2 + \dots..$

$\therefore$ coefficient of $x^2 = \dfrac{1}{2} - \dfrac{1}{8}(16) = \dfrac{-3}{2}$

45. $\left[\dfrac{7}{2}\right] + 3 = 6$

46. $y = \dfrac{x}{1+x} \Rightarrow y + yx = x$

$\Rightarrow y = x(1-y) \qquad \therefore x = \dfrac{y}{1-y}$

47. $\dfrac{(3x-8)}{(2-x)^2} = \dfrac{(3x-8)}{4}\left(1-\dfrac{x}{2}\right)^{-2}$

48. $1 + y = (1-x)^{-2}$

$(1-x) = (1+y)^{-\frac{1}{2}} \Rightarrow x = 1 - (1+y)^{-\frac{1}{2}}$

49. $1 + b_1x + b_2x^2 + \dots\dots\dots\dots. = (1-x)^{-2}$

$b_1 = 2$

50. $\left(\dfrac{1-x}{1+x}\right)^{\frac{1}{2}} = 1 - \dfrac{1}{2}\left(\dfrac{2x}{1+x}\right) + -----$

$\therefore A = -1$

51. $x\left(1+\dfrac{1}{x^3}\right)^{\frac{1}{3}} = x\left(1+\dfrac{1}{3x^3} - \dfrac{1}{9x^6} + ----\right)$

$= x + \dfrac{1}{3x^2} - \dfrac{1}{9x^5} + ------$

$a=\frac{1}{3};\ b=-\frac{1}{9};\qquad \therefore a+3b=0$

52. $\frac{1}{\sqrt{2a}}\left(1-\frac{3b}{2a}\right)^{-1/2}$

$=\frac{1}{\sqrt{2}a}\left(\frac{\left(\frac{1}{2}\right)\left(\frac{1}{2}+1\right)---\left(\frac{1}{2}+r-1\right)}{r\,!}\right)\left(\frac{3b}{2a}\right)^{r}$

simplify

53. Put $n=2$, 2^{nd} option is satisfied

54. $2^{\frac{n}{2}}\cos\frac{n\pi}{4}=2^{\frac{25}{2}}\cos\frac{25\pi}{4}=2^{\frac{25}{2}}.2^{\frac{1}{2}}=2^{12}$

55. put n = 2 ; L.H.S. is 6 First option is verified

56. $n(1+x)^{n-1}=C_1+2.C_2x+3.C_3x^2+....+n.C_nx^{n-1}$
put x = 3 and adding C_0 on both sides.

57. L.H.S. $=1+(-1)^{15}C_0+0.^{15}C_1+1.^{15}C_2+$

$..........+(14)^{15}C_{15}$

$=1+(-1+14)2^{15-1}=13.2^{14}+1$

58. $(1+2)^n=243\qquad n=5$

59. $2^n=128\ \Rightarrow\quad n=7$

60. Standard result

61. Put $\quad n=1;\int_0^1\left(1-x^3\right)dx=\left[x-\frac{x^4}{4}\right]_0^1=\frac{3}{4}$

62. put n = 1 and verify the options

63. ${}^{(n+1)}C_0+{}^{(n+1)}C_1+.........+{}^{(n+1)}C_n+$

$......+\ {}^{(n+1)}C_{n+1}=2^{n+1}$

64. $\left({}^NC_0\right)^2-\left({}^NC_1\right)^2+......+\left({}^NC_N\right)^2$

$=(-1)^{\frac{N}{2}}\ {}^NC_{\frac{N}{2}}$. If N is even $(N=2n)$

65. ${}^{(2n+1)}C_0-{}^{(2n+1)}C_1+....+{}^{(2n+1)}C_n-{}^{(2n+1)}C_{2n+1}=0$

66. Put n=3

L.H.S. $=\frac{{}^3C_3}{4}=\frac{1}{4}$

Option 2 is only $\frac{1}{4}$

67. Put n=2

L.H.S. $=\frac{(1+2)(2+1)}{1.2.1}=\frac{9}{2}$

4^{th} option is satisfied

68. Put n=2

3^{rd} option is satisfied

69. $\frac{p_{n+1}}{p_n}=\frac{{}^{(n+1)}C_0.{}^{(n+1)}C_1........{}^{(n+1)}C_{n+1}}{{}^nC_0.{}^nC_1..........{}^nC_n}$

put n=2; $\frac{{}^3C_0.{}^3C_1.{}^3C_2.{}^3C_3}{{}^2C_0.{}^2C_1.{}^2C_2}=\frac{9}{2}$

Option 1 is only $\frac{9}{2}$

70. Vandermonde's theorem ${}^{(m+n)}C_r$

71. Replacing m by n then $S_1=S_2$

72. Let n = 2 then 3^{rd} option is satisfied

73. ${}^nC_0+{}^nC_1.3+{}^nC_2.3^2+---+{}^nC_n.3^n=$
$(1+3)^n=4^n$

74. $\sum_{r=0}^{n}r.\,C_r-4.\sum_{r=0}^{n}C_r$

$=n.2^{n-1}-4.2^n$

75. Put n = 2 , 2^{nd} option is satisfied

76. $5\sum_{r=2}^{n}r.C_r-3\sum_{r=2}^{n}C_r$

$=5\left[n.2^{n-1}-n\right]-3\left[2^n-n-1\right]$

$=2^{n-1}(5n-6)-2n+3$

77. $\sum_{r=0}^{n-1}\frac{{}^nC_r}{{}^{(n+1)}C_{r+1}}=\sum_{r=0}^{n-1}\frac{r+1}{n+1}=\frac{1}{n+1}(\Sigma n)=\frac{n}{2}$

78. Standard result

79. $\frac{1}{2^n}\left[1.{}^nC_0+2.{}^nC_1+---+(n+1){}^nC_n\right]=16$

$\frac{1}{2^n}(n+1+1).2^{n-1}=16$

$\frac{n+2}{2}=16\Rightarrow n=30$

80. $\frac{C_1}{2}+\frac{C_3}{4}+------=\frac{2^n-1}{n+1}$

81. $\frac{C_0}{1}+\frac{C_2}{3}+\frac{C_4}{5}+----=\frac{2^n}{n+1}$

Put $n=16$

82. Put x=1, $x=\omega$, $x=\omega^2$ and add those then it is $\frac{f(1)}{3}=3^{n-1}$

83. $2\left({}^6C_02^6+{}^6C_22^45+{}^6C_42^25^2+{}^6C_65^3\right)$

84. $2\left[{}^5C_1(\sqrt{3})^4 + {}^5C_3(\sqrt{2})^2 + {}^5C_5\right]$

85. $\left[(1-\sqrt{2})^2\right]^3 = (3-2\sqrt{2})^3 = 97-70\sqrt{2}$

86. $\left[(5\sqrt{5})^2 - (11)^2\right]^{2n+1}$

87. Put m=2 and n=1

$(1+x)^3(1-x)$

Coefficient of $x^2 = 3-3=0$; option 2 is0

88. $\left[2(a^3+3.a.16b^2)\right]^2$

89. $(a^2-16b^2)^6$ terms $=6+1=7$

90. Each bracket 2 elements $\therefore$ n brackets 2^n elements

91. General term ${}^6C_r(\sqrt{2}+\sqrt[3]{3})^r$

$\left[\frac{r}{6}\right]+\left[\frac{r}{2}\right]$ put $r=1,2,3,4,5,6$ and find

92. $(10-1)^{11}+(10+1)^9$ $\therefore$ divisible by 10

93. $-1-2-3-.........-18=-\sum 18=-171$

$-1^2-2^2-3^2-......-10^2=$

$-\sum 10^2=-385$

95. Standard result

96. ${}^{49}C_{39}\,p^{10}q^{39}={}^{49}C_{40}\,p^9\,q^{40}\ \frac{p}{10}=\frac{q}{40};$

$\therefore p,q=1,4$

97. Expand $(x+ai)^n$ and $(x-ai)^n$ then multiply

98. Put x=1 then $a_0+a_1+a_2+.......+a_m=1.2........n=n!$

99. Take $(1+x)^{1000}$ as common, after simplification it becomes $(1+x)^{1002}$ coefficient of x^{50} is ${}^{1002}C_{50}$

100. $(x-1+1)^4=x^4$

101. $n\in Z^+$ $\quad\therefore x\in R$

102. ${}^{10000}C_0+{}^{10000}C_1.(0.0001)+---------+$
${}^{10000}{}_{10000}(0.0001)^{10000}=$
$1+1+.........=2$

103. $n!.(21-n)!$ is minimum $\Rightarrow \frac{2!}{n!(21-n)!}$ is maximum $\Rightarrow {}^{21}C_n$ is maximum

$\Rightarrow n=\frac{21-1}{2}(\text{or})\frac{21+1}{2}$

104. By using partial fractions

105. By using partial fractions

$-1+\frac{12}{1-x}+\frac{-30}{1-2x}+\frac{20}{1-3x}$

NEW PATTERN QUESTIONS

1. (i) The no. of distinct terms in the expansion of $(x_1+x_2+....+x_n)^3$ is $(n+2)\ C_3$
(ii) The no. of irrational terms in the expansion $(2^{1/5}+3^{1/10})^{55}$ is 55
1) (i) is true (ii) is false
2) both (i) & (ii) are true
3) both (i) & (ii) are false
4) (i) is false (ii) is true

2. Let R= $(5\sqrt{5}+11)^{2n+1}$ and F=R-[R] where [ ] denotes greatest integer less than or equal to R, and if $f=(5\sqrt{5}-11)^{2n+1}$

List - I	***List - II***
A) [R]	1) 1
B) RF	2) 4^{2n+1}
C) f+F	3) odd integer
D) R+f	4) even integer
	5) 4^{2n-1}

The correct match is

	A	B	C	D
1)	2	3	1	5
2)	1	5	2	3
3)	3	1	2	4
4)	3	2	1	4

3. The arrangement of the following with respect to coefficient of x^r in ascending order
A) x^5 in $(1-x)^{-3}$
B) x^7 in $(1+2x+3x^2+...\infty)$
C) x^{10} in $(1+x)^{-1}$
D) x^3 in $(1+x)^4$
1) B,A,C,D 2) C,D,B,A
3) A,B,D,C 4) C,D,A,B

4. Assertion (A): ${}^nC_{r-1},{}^nC_r$ and ${}^nC_{r+1}$ can be H.P.
Reason (R): ${}^nC_{r-1},{}^nC_r$ and ${}^nC_{r+1}$ may be in A.P.
1) (A) is wrong but (R) is correct
2) (A) is correct but (R) is wrong
3) (A) is correct (R) is correct and (R) is not correct reason of (A)
4) (A) is correct (R) is correct and (R) is the correct reason of (A)

5. S_1: If the coefficients of x^6 and x^7 in the ex-

pansion of $\left(\frac{x}{4}+3\right)^n$ are equal, then the number of divisors of n is 12.

S_2 : If the expansion of $\left(x^2+\frac{2}{x}\right)^n$ for positive integer n has 13 th term independent of x. Then the sum of divisors of n is 39.

1) Only S_1 is true
2) Only S_2 is true
3) Both S_1 and S_2 are true
4) Neither S_1 nor S_2 is true

6. S_1 : The fourth term in the expansion of $\left(2x+\frac{1}{x^2}\right)^9$ is equal to the second term in the expansion of $(1+x^2)^{84}$ then the positive value of x is $\frac{1}{2\sqrt{3}}$

S_2 : In the expansion of $\left(x^2+\frac{a}{x^3}\right)^{10}$, the coefficients of x^5 and x^{15} are equal, then the positive value of a is 8

1) Only S_1 is true 2) Only S_2 is true
3) Both S_1 and S_2 are true
4) Neither S_1 nor S_2 is true

7. i. The sum of the binomial coefficients of the expansion $\left(x+\frac{1}{x}\right)^n$ is 2^n

ii. The term independent of x in the expansion of $\left(x+\frac{1}{x}\right)^n$ is 0 when is even.

Which of the above statements is correct?
1) Only i 2) Only ii
3) both i and ii 4) neither i nor ii

8. i. Three consecutive binomial coefficients can not be in G.P.
ii. Three consecutive binomial coefficients can not be in A.P.
Which of the above statement is correct?
1) both i and ii 2) neither i nor ii
3) Only i 4) Only ii

9. The arrangement of the following binomial expressions in the ascending order of their independent terms

A. $\left(\sqrt{x}-\frac{3}{x^2}\right)^{10}$ B. $\left(x+\frac{1}{x}\right)^6$

C. $(1+x)^{32}$ D. $\left(\frac{3}{2}x^2-\frac{1}{3x}\right)^9$

1) C,A,B,D 2) B,C,A,D
3) C,A,D,B 4) D,C,B,A

10. Assertion (A): The coefficient of x^7 in $\left(\frac{x^2}{2}-\frac{2}{x}\right)^9$ is zero

Reason (R) : r in t_{r+1} that contain coefficient of x^7 is not positive integer

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

11. Assertion (A): In $(1+x)^n$ sum of coefficients of even powers of x is not equal to the sum of coefficients off odd powers of x.

Reason (R): The value $(1+x)^n$ for x = -1 is zero

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

12. Assertion (A): The sum of the coefficients of the middle terms in the expansion of $(1+x)^{2n-1}$ is equal to ${}^{2n}C_n$

Reason (R) : To find the sum of the coefficients of the two middle terms in the expansion $(1+x)^{2n-1}$ the Value of n is any natural number.

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

13. Observe the following lists:

List - I	**List - II**
A. The value of the x for which the expansion $\sqrt{1-25x^2}$ is valid	1. $-1-\sqrt{2}$
B. If x is so small that x^2 and higher powers of	2. $8+\frac{25}{3}x$
C. If $1+\frac{2}{x}+\frac{3}{x^2}+\frac{4}{x^3}+\ldots\infty=\frac{1}{2}$ then x=	3. $1+3x+6x^2+10x^3+\ldots$
D. $(1-x)^{-3}$	4. $+\sqrt{2}$
	5. $\frac{-1}{5}<x<\frac{1}{5}$

The correct match for List-I from List-II is

	A	B	C	D
1.	4	3	2	1
2.	5	2	1	3
3.	3	4	5	1
4.	1	2	4	3

14. Assertion (A): The coefficient of x^{-2} in the expansion of $\left(x^2+\frac{1}{x}\right)^5$ is equal to ${}^5C_4$

Reason (R) : The value of r for the above expansion is 3.

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

15. Assertion (A): The expansion of $(1+x)^n=$ $C_0+C_1x+C_2x^2+....+C_nx^n$

Reason (R) : If $x=-1$, then the above expansion is zero

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

16. Assertion (A): The value of $C_0^2+C_1^2+C_2^2+....+C_n^2$ is 2^n

Reason (R) : The value of the above series is ${}^{2n}C_n$

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

17. i. The value of the expansion $(1-x)^{-2}=$ $1+3x+4x^2+5x^3+...$

ii. The value of x in above expression lies between "0" and "1"

Which of the above statement is correct

1) Only i 2) Only ii
3) Both i and ii 4) Neither i nor ii

18. Observe the following lists:

List - I	***List - II***
A. The sum of (n+1) terms in the series $a.C_0-(a+d).C_1+(a+2d).C_2-....=$	1. ${}^{(n+1)}C_{(k+1)}$
B. If C_r denotes ${}^nC_r$, in the expansion of $(1+x)^n$, the value of $\sum_{r=0}^{n}(r+1).C_r$	2. ${}^nC_r.x^{n-r}.a^r$
C. The coefficient of $x^k\,(0\le k\le n)$ in the expansion of $1+(1+x)+(1+x)^2+....+(1+x)^n$ is	3. 0
D. The general term in $(x+a)^n$ is	4. $(n+2).2^{n-1}$
	5. $(n+2).2^{n-2}$

The correct match for List I from List II is

	A	B	C	D
1.	1	3	2	4
2.	1	4	2	3
3.	3	1	4	2
4.	3	4	1	2

19. A : If the term independent of x in the expansion of $\left(\sqrt{x}-\frac{n}{x^2}\right)^{10}$ is 405, then n =

B: If the third term in the expansion of $\left(\frac{1}{n}+n^{\log_n 10}\right)^5$ is 1000, then n = (here n<10)

C: If in the binomial expansion of $(1+x)^n$, the coefficients of 5^{th}, 6^{th} and 7^{th} terms are in A.P then n =

Arranging the values of n in ascending order

1) A,B,C 2) B,A,C 3) A,C,B 4) C,A,B

20. Assertion (A): Number of terms in the expansion of $(x+y+z)^5$ is 21.

Reason (R) : The number of terms in the expansion of $(x+y+z)^n$ is ${}^{(n+2)}C_2$

1) Both A and R are true and the R is correct explanation of the A
2) Both A and R are true, but R is not correct explanation of the A
3) A is true, but the R is false
4) A is false, but the R is true

KEY

1.1	2.4	3.2	4.1 5.1
6.4	7.1	8.3	9.3 10.1
11.4	12.2	13.2	14.3
15.2	16.4	17.4	18.4
19.2	20.1		

PREVIOUS EAMCET QUESTIONS

[2005]

1. $(1+x)^{15}=a_0+a_1x+.....+a_{15}x^{15}$

$\Rightarrow \sum_{r=1}^{15} r \frac{a_r}{a_{r-1}} =$

1) 110 2) 115 3) 120 4) 135

2. If $|x| < \frac{1}{2}$, then the coefficient of x^r in the expansion of $\frac{1+2x}{(1-2x)^2}$ is

1) $r.2^r$ 2) $(2r-1)2^r$
3) $r.2^{2r+1}$ 4) $(2r+1)2^r$

[2004]

3: The binomial coeff. which are in decreasing order are

1) ${}^{15}c_5, {}^{15}c_6, {}^{15}c_7,$ 2) ${}^{15}c_{10}, {}^{15}c_9, {}^{15}c_8$
3) ${}^{15}c_6, {}^{15}c_7, {}^{15}c_8$ 4) ${}^{15}c_7, {}^{15}c_6, {}^{15}c_5$

4. If $\frac{x-4}{x^2-5x+6}$ can be expanded in ascending power of x then the coefficient of x^3 is

1) $-\frac{73}{648}$ 2) $\frac{73}{648}$ 3) $\frac{71}{648}$ 4) $\frac{-71}{648}$

[2003]

5. If a_r is the coeff. of x^2 in the expansion of $(1+x+x^2)^n$ then $a_1 - 2a_2 + 3a_3 - .... -2na_{2n}$

1) 0 2) n 3) -n 4) 2n

6: The coefficient of x^5 in the expansion of $(x^2-x-2)^5$ is

1) -83 2) -82 3) -81 4) 0

[2002]

7. If the coefficient of x in the expansion of $\left(x^2 + \frac{k}{x}\right)^5$ is 270, then k=

1) 1 2) 2 3) 3 4) 4

8. The sum of the coefficients in the expansion of $(1+x+x^2)^n$ is

1) 2 2) 2^n 3) 3^n 4) 4^n

9. In the expansion of $(1+x)^n$ the coefficients of pth and (p+1)th term are respectively p and q then p+q=

1) n 2) n+1 3) n+2 4) n+3

[2001]

10. If $(1+x)^n = c_0 + c_1.x^1 + c_2.x^2 + ... + c_n.x^n$, Then $C_0 + 2.C_1 + 3.C_2 ..... + (n+1).C_n =$

1) $(n+2)2^{n-1}$ 2) $2^{n-1} + n.2^n$
3) $2^{n-1} + n.2^n$ 4) $2^{n-1} + (n-1)2^n$

11. The coefficient of x^4 in the expansion of $\frac{(1-3x)^2}{1-2x}$ is

1) 1 2) 2 3) 3 4) 4

12. $1 + \frac{1}{4} + \frac{1.3}{4.8} + \frac{1.3}{4.8.12} + ...\text{to } \infty =$

1) $\sqrt{2}$ 2) $\frac{1}{\sqrt{2}}$ 3) $\sqrt{3}$ 4) $\frac{1}{\sqrt{3}}$

[2000]

13. If the coefficient of r'th term and (r+1)th term in the expansion of $(1+x)^{20}$ are in the ratio 1:2, then r=

1) 6 2) 7 3) 8 4) 9

14. The coefficient of x^{-n} in $(1+x)^n.\left(1+\frac{1}{x}\right)$ is

1) 0 2) 1 3) 2^n 4) ${}^{2n}C_n$

15. The sum of the coeffs. in the expansion of $(1+x-3x^2)^{171}$ is

1) 0 2) 1 3) -1 4) 2

[1999]

16. The coeff. of the middle term in the expansion of $(1+x)^{40}$ is

1) $\frac{1.3.5....39}{20!}.2^{20}$ 2) $\frac{1.3.5....39}{20!}$
3) $\frac{40!}{20!}$ 4) $40!\ 2^{20}$

17. The coeff. of 8^{th} term in the expansion of $(1+x)^{10}$ is

1) 120 2) 7 3) ${}^{10}C_8$ 4) 210

18. The term independent of x in the expansion of $\left(x^2 - \frac{1}{x}\right)^6$ is

1) -12 2) 15 3) 24 4) -15

[1998]

19. $1 + \frac{1.3}{2.5} + \frac{1.3.9}{2.4.25} + \frac{1.3.5.27}{2.4.6.125} + ...\text{ to } =$

1) $\sqrt{5/2}$ 2) $\sqrt{2/5}$ 3) $\sqrt{3/5}$ 4) $\sqrt{5/3}$

20. If C_n is the coefficient of x^n in the expansion of $(1+x)^n$, then $C_1 + 2.C_2 + 3.C_3 + ... + n.C_n =$

1) 2^n 2) $n.2^n$ 3) $n.2^{n+1}$ 4) $n.2^{n-1}$

21. The term independent of x in $\left[2x^2+\frac{3}{x^3}\right]^{15}$ is

1. ${}^{15}C_9 \cdot 2^8.3^7$ 2) $-{}^{15}C_9 \cdot 2^{10}.3^5$
3) ${}^{15}C_9 \cdot 2^{15}$ 4) ${}^{15}C_9 \cdot 3^6.2^9$

[1997]

22. The sum of the series

$1+\frac{k}{3}+\frac{k(k+1)}{3.6}+\frac{k(k+1)(k+2)}{3.6.9}+\ldots$ is

1) $\left(\frac{2}{3}\right)^4$ 2) $\left(\frac{3}{2}\right)^k$ 3) $\frac{2}{3}$ 4) $\frac{3}{2}$

23. The numerically greatest term in the expansion of $(3+2x)^{14}$ when x=4/5 is

1) 4^{th} term 2) 5^{th} term 3) 6^{th} term 4) 7^{th} term

24. If $(1+x+x^2)^n=\sum_{r=0}^{2n} a_r x^r$, then

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

1) 0 2) 1 3) n 4) -n

[1996]

25. The coefficient of x^5 in the expansion of $(1+x^2)^5(1+x)^4$ is

1) 20 2) 30 3) 60 4) 55

26. If T_r denotes the rth term in the expansion of $\left(x+\frac{1}{x}\right)^{23}$, then

1) $T_{12}=T_{13}$ 2) $x^2.T_{13}=T_{12}$
3) $T_{12}=x^2T_{13}$ 4) $T_{12}+T_{13}=25$

27. If $C_0, C_2 C_4, \ldots$ are binomial coefficients in the expansion of $(1+x)^9$, then $C_0+C_2+C_4+C_6+C_8=$

1) 2^7 2) 256 3) 2^9 4) 258

28. The term independent of x in the expansion of $\left(\frac{\sqrt{x}}{2}-\frac{2}{x^2}\right)^{10}$ is ...

1) 45/64 2) 64/45 3) 6/5 4) 4/5

29. If a_r is the coefficient of x^r in $(1-2x+3x^2)^n$, then $\sum_{r=0}^{2n} r.a_r=\ldots.$

1) $n.2^{n+1}$ 2) $n.2^{n-1}$ 3) $n.2^n$ 4) n

30. Using the binomial expansion upto 3 terms the approx value of $(8.8)^{1/3}$ can be shown to be

1) $\frac{67}{900}$ 2) $\frac{107}{900}$ 3) $\frac{58}{900}$ 4) $\frac{47}{900}$

[1995]

31. If the coefficients ${}^nC_4, {}^nC_5, {}^nC_6$ of $(1+x)^n$ are in A.P. then n=

1) 12 2) 11 3) 7 4) 8

32. The expansion

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

1) 8 2) 7 3) 6 4) 5

]1994]

33. Let n be a positive integer. If the coefficients of 2 nd, 3rd, 4th terms in $(1+x)^n$ are in A.P., then n=

1) 5 2) 6 3) 7 4) 8

34. If $(1+2x+x^2)^n=\sum_{r=0}^{2n} a_r x^r$, then a_r =

1) $\left({}^nC_r\right)^2$ 2) ${}^nC_r.{}^nC_{r+1}$
3) ${}^{2n}C_r$ 4) ${}^{2n}C_{r+1}$

35. The coefficient of x^3 in $\left(\sqrt{x^5}+\frac{3}{\sqrt{x^3}}\right)^6$ is

1) 0 2) 120 3) 420 4) 540

36. If $(1+x)^n=C_0+C_1x^1+\text{----}+C_nx^n$, then $C_0-C_2+C_4-C_6+\text{----}=$

1) 2^{n-1} 2) $2^{n/2}\sin\frac{n\pi}{4}$
3) $2^{n/2}\cos\frac{n\pi}{4}$ 4) 0

[1992]

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

1) $\frac{n}{n+1}$ 2) $\frac{1}{n+1}$ 3) $\frac{2^n}{n+1}$ 4) $\frac{2^n-1}{n+1}$

38. If n is a positive integer, $\sum_{r=0}^{n}\left({}^nC_r\right)^2=$

1) 0 2) ${}^nC_{n/2}$
3) $\frac{(2n)!}{n!}$ 4) $\frac{(2n)!}{(n!)^2}$

[1991]

39. The number of non zero terms in the expansion of $\left(1+3\sqrt{2}x\right)^9+\left(1-3\sqrt{2}x\right)^9$ is

1) 9 2) 0 3) 5 4) 10

40. If C_0, C_1, ----, C_n are binomial coefficients in the expansion of $(1+x)^n$, then

$C_0+C_1.\frac{x}{2}+C_2.\frac{x^2}{3}+----+C_n.\frac{x^n}{n+1}=$

1) $\frac{(1+x)^{n+1}-1}{(n+1)}$ 2) $\frac{(1+x)^{n+1}-1}{(n+1)x}$

3) $\frac{(1+x)^{n+1}+1}{(n+1)x}$ 4) $\frac{(1+x)^{n+1}+1}{(n+1)}$

[1990]

41. In $\left(\sqrt{x}-\frac{2}{x}\right)^{18}$, the term independent of x is

1) ${}^{18}C_6$ 2) $2\times{}^{18}C_6$

3) ${}^{18}C_6.2^6$ 4) $16\times{}^{18}C_6$

[1989]

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

1) $C_0^2+C_1^2+C_2^2+----+C_n^2$

2) $\left(C_0+C_1+C_2+C_3+----+C_n\right)^2$

3) $C_0^2+2.C_1^2+3.C_2^2+----+(n+1)C_n^2$

4) None

43. $1-\frac{1}{8}+\frac{1.3}{8.16}-\frac{1.3.5}{8.16.24}+----to\ \infty$

1) $1/\sqrt{5}$ 2) $2/\sqrt{5}$ 3) $\sqrt{5}$ 4) $\sqrt{5}/2$

[1988]

44. The sum of the coefficients of even powers of x in the expansion of $(1+x+x^2+x^3)^5$ is

1) 512 2) 256 3) 128 4) None

45. The term independent of x in $\left(2x^{1/2}-3x^{-1/3}\right)^{20}$ is

1) ${}^{20}C_8.6^8.2^4$ 2) ${}^{20}C_8.2^8.3^8$

3) ${}^{20}C_8.6^8.3^4$ 4) ${}^{20}C_{12}.6^{12}$

[1984]

46. The term independent of x in the expansion of $\left(\sqrt{\frac{x}{3}}+\frac{\sqrt{3}}{x^2}\right)^{10}$ is

1) 5/9 2) 5/3 3) 1/3 4) 4/3

[1983]

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

1) 56 2) 55 3) 45 4) 15

[1982]

48. The term independent of x in the expansion of $\left(x^2+\frac{1}{x}\right)^9$ is

1) 1 2) –1 3) 48 4) 84

Eamcet-2007

49. If a_k is the coefficient tof x^k in the expansion of $\left(1+x+x^2\right)^n$ for k = 0, 1, 2, ..., 2n then $a_1+2a_2+3a_3+........+2na_{2n}=$ **(E-2007)**

1) $-a_0$ 2) 3^n 3) $n.3^n$ 4) $n-3^n$

50. The coefficient of x^k in the expansion of $\frac{1-2x-x^2}{c^{-x}}$ is **(E-2007)**

1) $\frac{1-k-k^2}{k!}$ 2) $\frac{k^2+1}{k!}$ 3) $\frac{1-k}{k!}$ 4) $\frac{1}{k!}$

KEY

1. 3	2. 4	3. 4	4. 1	5. 3
6. 3	7. 3	8. 3	9. 3	10. 1
11. 4	12. 1	13. 2	14. 2	15. 3
16. 1	17. 1	18. 2	19. 1	20. 4
21. 4	22. 2	23. 3	24. 4	25. 3
26. 3	27. 2	28. 1	29. 1	30. 3
31. 3	32. 2	33. 3	34. 3	35. 4
36. 3	37. 2	38. 4	39. 3	40. 2
41. 3	42. 1	43. 2	44. 1	45. 3
46. 2	47. 2	48. 4	49. 3	50. 1