BINOMIAL THEOREM ASSIGNMENT

1. If $x+y=1$, then $\sum_{r=0}^{n} r^2\ {}^nC_r x^r y^{n-r}$ equals

(a) *nxy* (b) *nx*(*x* + *yn*) (c) *nx*(*nx*+ *y*) (d) None of these

2. Let $f(x)=(\sqrt{x^2+1}+\sqrt{x^2-1})^6+\left(\frac{2}{\sqrt{x^2+1}+\sqrt{x^2-1}}\right)^6$. Then

(a) *f*(*x*) is a polynomial of the sixth degree in *x* (b) *f*(*x*) has exactly two terms
(c) *f*(*x*) is not a polynomial in *x* (d) Coefficient of x^6 is 64

3. In the expansion of $(x+a)^n$, the sum of odd terms is *P* and sum of even terms is *Q*, then the value of (P^2-Q^2) will be

(a) $(x^2+a^2)^n$ (b) $(x^2-a^2)^n$ (c) $(x-a)^{2n}$ (d) $(x+a)^{2n}$

4. $n^n\left(\frac{n+1}{2}\right)^{2n}$ is

(a) Less than $\left(\frac{n+1}{2}\right)^3$ (b) Greater than $\left(\frac{n+1}{2}\right)^3$ (c) Less than $(n!)^3$ (d) Greater than $(n!)^3$

5. The expression $(2+\sqrt{2})^4$ has value, lying between

(a) 134 and 135 (b) 135 and 136 (c) 136 and 137 (d) None of these

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

(a) 4 (b) 5 (c) 2 (d) 3

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

(a) 101 (b) $70\sqrt{2}$ (c) $140\sqrt{2}$ (d) $120\sqrt{2}$

8. The value of $(\sqrt{5}+1)^5-(\sqrt{5}-1)^5$ is

(a) 252 (b) 352 (c) 452 (d) 532

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

(a) 196 (b) 197 (c) 198 (d) 199

10. The integer next above $(\sqrt{3}+1)^{2m}$ contains

(a) 2^{m+1} as a factor (b) 2^{m+2} as a factor (c) 2^{m+3} as a factor (d) 2^m as a factor

11. Let *n* be an odd natural number greater than 1. Then the number of zeros at the end of the sum 99^n+1 is

(a) 3 (b) 4 (c) 2 (d) None of these

12. The value of *x* in the expression $[x+x^{\log_{10}(x)}]^5$, if the third term in the expansion is 10,00,000

(a) 10 (b) 11 (c) 12 (d) None of these

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

(a) (x^2+a^2) (b) $(x^2+a^2)^n$ (c) $(x^2+a^2)^{1/n}$ (d) $(x^2+a^2)^{-1/n}$

14. The value of *x*, for which the 6th term in the expansion of $\left\{2^{\log_2\sqrt{(9^{x-1}+7)}}+\frac{1}{2^{(1/5)\log_2(3^{x-1}+1)}}\right\}^7$ is 84, is equal to

(a) 4 (b) 3 (c) 2 (d) 1

15. Given that 4th term in the expansion of $\left(2+\frac{3}{8}x\right)^{10}$ has the maximum numerical value, the range of value of *x* for which this will be true is given by

(a) $-\frac{64}{21}<x<-2$ (b) $-\frac{64}{21}<x<2$ (c) $\frac{64}{21}<x<4$ (d) None of these

16. If the (*r* + 1)[th] term in the expansion of $\left(\sqrt[3]{\frac{a}{\sqrt{b}}}+\sqrt{\frac{b}{\sqrt[3]{a}}}\right)^{21}$ has the same power of *a* and *b*, then the value of *r* is

(a) 9 (b) 10 (c) 8 (d) 6

17. If the 6th term in the expansion of the binomial $\left[\sqrt{2^{\log(10-3^x)}}+\sqrt[5]{2^{(x-2)\log 3}}\right]^m$ is equal to 21 and it is known that the binomial coefficients of the 2nd, 3rd and 4th terms in the expansion represent respectively the first, third and fifth terms of an A.P. (the symbol log stands for logarithm to the base 10), then *x* =

(a) 0 (b) 1 (c) 2 (d) 3

18. If the fourth term of $\left(\sqrt{x^{\left(\frac{1}{1+\log_{10} x}\right)}}+\sqrt[12]{x}\right)^6$ is equal to 200 and *x* > 1, then *x* is equal to

(a) $10\sqrt{2}$ (b) 10 (c) 10^4 (d) $10/\sqrt{2}$

19. The sum of the coefficients in the binomial expansion of $\left(\frac{1}{x}+2x\right)^n$ is equal to 6561. The constant term in the expansion is

(a) ${}^8C_4$ (b) $16\cdot{}^8C_4$ (c) ${}^6C_4\cdot 2^4$ (d) None of these

20. The greatest value of the term independent of *x* in the expansion of $(x\sin\alpha+x^{-1}\cos\alpha)^{10}, \alpha\in R$, is

(a) 2^5 (b) $\frac{10\,!}{(5\,!)^2}$ (c) $\frac{1}{2^5}\cdot\frac{10\,!}{(5\,!)^2}$ (d) None of these

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

(a) $\frac{1}{3}$ (b) $\frac{19}{54}$ (c) $\frac{17}{54}$ (d) $\frac{1}{4}$

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

(a) $\frac{n\,!}{(n-1)!(n+1)!}$ (b) $\frac{(2n)!}{(n-1)!(n+1)!}$ (c) $\frac{(2n)!}{(2n-1)!(2n+1)!}$ (d) None of these

23. The coefficient of x^4 in the expansion of $(1+x+x^2+x^3)^n$ is

(a) ${}^nC_4$ (b) ${}^nC_4+{}^nC_2$ (c) ${}^nC_4+{}^nC_2+{}^nC_4.{}^nC_2$ (d) ${}^nC_4+{}^nC_2+{}^nC_1.{}^nC_2$

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

(a) ${}^{100}C_{47}$ (b) ${}^{100}C_{53}$ (c) $-{}^{100}C_{53}$ (d) $-{}^{100}C_{100}$

25. The sum of the coefficients of even power of *x* in the expansion of $(1+x+x^2+x^3)^5$ is

(a) 256 (b) 128 (c) 512 (d) 64

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

(a) ${}^{51}C_5$ (b) ${}^9C_5$ (c) ${}^{31}C_6-{}^{21}C_6$ (d) ${}^{30}C_5+{}^{20}C_5$

27. The coefficient of t^{32} in the expansion of $(1+t^2)^{12}(1+t^{12})(1+t^{24})$ is

(a) ${}^{12}C_6+2$ (b) ${}^{12}C_5$ (c) ${}^{12}C_6$ (d) ${}^{12}C_7$

28. If in the expansion of $(1+x)^m(1-x)^n$, the coefficient of *x* and x^2 are 3 and – 6 respectively, then *m* is

(a) 6 (b) 9 (c) 12 (d) 24

29. In the expansion of the following expression $1+(1+x)+(1+x)^2+......+(1+x)^n$, the coefficient of $x^k\ (0\le k\le n)$ is

(a) ${}^{n+1}C_{k+1}$ (b) ${}^nC_k$ (c) ${}^nC_{n-k-1}$ (d) None of these

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

(a) *n* – 2*r* is a positive integral multiple of 3
(b) *n* – 2*r* is even
(c) *n* – 2*r* is odd
(d) None of these

31. If the binomial coefficients of 2nd, 3rd and 4th terms in the expansion of $\left[\sqrt{2^{\log_{10}(10-3^x)}}+\sqrt[5]{2^{(x-2)\log_{10}3}}\right]^m$ are in A.P. and the 6th term is 21, then the value(*s*) of *x* is (are)

(a) 1, 3 (b) 0, 2 (c) 4 (d) – 1

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

(a) ${}^nC_r(3^r-2^n)$ (b) ${}^nC_r(3^{n-r}-2^{n-r})$ (c) ${}^nC_r(3^r+2^{n-r})$ (d) None of these

33. The coefficient of a^8b^{10} in the expansion of $(a+b)^{18}$ is

(a) ${}^{18}C_8$ (b) ${}^{18}P_{10}$ (c) 2^{18} (d) None of these

34. The coefficient of x^{65} in the expansion of $(1+x)^{131}(x^2-x+1)^{130}$ is

(a) ${}^{130}C_{65}+{}^{129}C_{66}$ (b) ${}^{130}C_{65}+{}^{129}C_{55}$ (c) ${}^{130}C_{66}+{}^{129}C_{65}$ (d) None of these

35. The coefficient of x^{13} in the expansion of $(1-x)^5(1+x+x^2+x^3)^4$ is

(a) 4 (b) – 4 (c) 0 (d) None of these

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

(a) 171 (b) – 171 (c) 342 (d) 171/2

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

(a) ${}^{40}C_4$ (b) ${}^{10}C_4$ (c) 210 (d) 310

38. The middle term in the expansion of $\left(x+\frac{1}{2x}\right)^{2n}$ is

(a) $\frac{1.3.5.....(2n-3)}{n!}$ (b) $\frac{1.3.5.....(2n-1)}{n!}$ (c) $\frac{1.3.5.....(2n+1)}{n!}$ (d) None of these

39. If the coefficient of the middle term in the expansion of $(1+x)^{2n+2}$ is *p* and the coefficients of middle terms in the expansion of $(1+x)^{2n+1}$ are *q* and *r*, then

(a) $p+q=r$ (b) $p+r=q$ (c) $p=q+r$ (d) $p+q+r=0$

40. Middle term in the expansion of $(1+3x+3x^2+x^3)^6$ is

(a) 4th (b) 3rd (c) 10th (d) None of these

41. The coefficient of each middle term in the expansion of $(1+x)^n$, when *n* is odd, is

(a) $\frac{1.3.5....(n-1)}{2.4.6....n}2^n$ (b) $\frac{1.3.5.....n}{2.4.6....n}2^n$ (c) $\frac{1.3.5....(n+1)}{2.4.6....n}2^n$ (d) $\frac{1.3.5....n}{2.4.6....(n+1)}2^n$

42. If the *r*th term is the middle term in the expansion of $\left(x^2-\frac{1}{2x}\right)^{20}$ then the $(r+3)$th term is

(a) ${}^{20}C_{14}\cdot\frac{1}{2^{14}}\cdot x$ (b) ${}^{20}C_{12}\cdot\frac{1}{2^{12}}\cdot x^2$ (c) $-\frac{1}{2^{13}}\cdot{}^{20}C_7\cdot x$ (d) None of these

43. 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) $\frac{-3}{10}$

44. If *n* is even positive integer, then the condition that the greatest term in the expansion of $(1+x)^n$ may have the greatest coefficient also, is

(a) $\frac{n}{n+2}<x<\frac{n+2}{n}$ (b) $\frac{n+1}{n}<x<\frac{n}{n+1}$ (c) $\frac{n}{n+4}<x<\frac{n+4}{4}$ (d) None of these

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

46. If $(1+x)^n=C_0+C_1x+C_2x^2+.....+C_nx^n$, then $C_0C_2+C_1C_3+C_2C_4+C_{n-2}C_n$ equals

(a) $\frac{(2n)!}{(n+1)!(n+2)!}$ (b) $\frac{(2n)!}{(n-2)!(n+2)!}$ (c) $\frac{(2n)!}{(n)!(n+2)!}$ (d) $\frac{2n!}{(n-1)!(n+2)!}$

47. If $(1+x)^n=C_0+C_1x+C_2x^2+....+C_nx^n$, then the value of $C_0+C_2+C_4+......$ is

(a) 2^{n-1} (b) 2^n-1 (c) 2^n (d) $2^{n-1}-1$

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

(a) 0 (b) *n* (c) – *n* (d) 2*n*

49. If $(1+x)^n = C_0 + C_1 x + C_2 x^2 + ... + ...\ C_n x^n$, then $C_0^2 + C_1^2 + C_2^2 + C_3^2 .... + C_n^2 =$

(a) $\frac{n!}{n!\,n!}$ (b) $\frac{(2n)!}{n!\,n!}$ (c) $\frac{(2n)!}{n!}$ (d) None of these

50. $\frac{\frac{1}{2}\cdot\frac{2}{2}}{1^3} + \frac{\frac{2}{2}\cdot\frac{3}{2}}{1^3+2^3} + \frac{\frac{3}{2}\cdot\frac{4}{2}}{1^3+2^3+3^3} + ...n$ terms =

(a) $\left(\frac{n}{n+1}\right)^2$ (b) $\left(\frac{n}{n+1}\right)^3$ (c) $\left(\frac{n}{n+1}\right)$ (d) $\left(\frac{1}{n+1}\right)$