Topic :-Binomial Theorem

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

   a) $^{18}C_{14} \times {}^{14}C_8$ b) $^{18}C_{10} \times {}^{10}C_6$ c) $^{18}C_6 \times {}^{12}C_8$ d) $^{18}C_6 \times {}^{14}C_6$

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

   a) 900   b) 909   c) 990   d) 999

3. If the sum of the coefficients in the expansion of $(1 - 3x + 10x^2)^n$ is a and if the sum of the coefficients in the expansion of $(1 + x^2)^n$ is b, then

   a) $a = 3b$ b) $a = b^3$ c) $b = a^3$ d) None of these

4. For $n \in N$, $10^{n-2} \geq 81n$ is

   a) $n > 5$ b) $n \geq 5$ c) $n < 5$ d) $n > 8$

5. The first 3 terms in the expansion of $(1 + ax)^n$ $(n \neq 0)$ are 1, $6x$, and $16x^2$. Then, the value of a and n are respectively

   a) 2 and 9   b) 3 and 2   c) $\frac{2}{3}$ and 9   d) $\frac{3}{2}$ and 6

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

   a) $(2, 12)$ b) $(2, 8)$ c) $(-2, -12)$ d) None of these

7. In the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$, the coefficient of x^{39}, is

   a) 1365   b) -1365 c) 455   d) -455

8. For natural numbers m,n if $(1 - y)^m(1 + y)^n = 1 + a_1 y^2 + ...$ and $a_1 = a_2 = 10$, then (m,n) is

a) (35,20) b) (45,35) c) (35,45) d) (20,45)

9. If a_1, a_2, a_3, a_4 are the coefficients of any four consecutive terms in the expansion of $(1 + x)^n$, then $\dfrac{a_1}{a_1 + a_2} + \dfrac{a_3}{a_3 + a_4}$ is equal to

   a) $\dfrac{a_2}{a_2 + a_3}$ b) $\dfrac{1}{2} \dfrac{a_2}{(a_2 + a_3)}$ c) $\dfrac{2a_2}{a_2 + a_3}$ d) $\dfrac{2a_3}{a_2 + a_3}$

10. If the sum of the coefficient in the expansion of $(a^2 x^2 - 6ax + 11)^{10}$, where a is constant is 1024, then the value of a is

    a) 5 b) 1 c) 2 d) 3

11. If x^{2r} occurs in $\left(x + \dfrac{2}{x^2}\right)^n$, then $n - 2r$ must be of the form

    a) $3k - 1$ b) $3k$ c) $3k + 1$ d) $3k + 2$

12. $(2^{3n} - 1)$ will be divisible by ($\forall n \in N$)

    a) 25 b) 8 c) 7 d) 3

13. If the sum of the coefficients in the expansion of $(\alpha x^2 - 2x + 1)^{35}$ is equal to the sum of the coefficient in the expansion of $(x - \alpha y)^{35}$, then $\alpha =$

    a) 0 b) 1 c) Any real number d) None of these

14. If the ninth term in the expansion of $\left\{3^{\log_3 \sqrt{25^{x-1}+7}} + 3^{-1/8 \log_3 (5^{x-1}+1)}\right\}^{10}$ is equal to 180 and $x > 1$, then x equals

    a) $\log_{10} 15$ b) $\log_5 15$ c) $\log_e 15$ d) None of these

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

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

16. 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) $-\dfrac{5}{3}$ b) $\dfrac{10}{3}$ c) $-\dfrac{3}{10}$ d) $\dfrac{3}{5}$

17. The term independent of x in the expansion of $\left(\sqrt{\dfrac{x}{3}} + \dfrac{3}{2x^2}\right)^{10}$ will be

    a) $\dfrac{3}{2}$

    b) $\dfrac{5}{4}$

c) $\dfrac{5}{2}$

d) None of these

18. If $(1 + x - 2x^2)^6 = 1 + a_1x + a_2x^2 + ... + a_{12}x^{12}$, then the value of $a_2 + a_4 + ... + a_{12}$

Is

a) 31   b) 32   c) 64   d) 1024

19. If $(1 + x - 3x^2)^{10} = 1 + a_1x + a_2x^2 + ... + a_{20}x^{20}$, then $a_2 + a_4 + a_6 + ... + a_{20}$ is equal to

a) $\dfrac{3^{10} + 1}{2}$ b) $\dfrac{3^9 + 1}{2}$ c) $\dfrac{3^{10} - 1}{2}$ d) $\dfrac{3^9 - 1}{2}$

20. If $(1 + x)^{2n} = a_0 + a_1 x + a_2 x^2 + ... + a_{2n}x^{2n}$, then

$(a_0 - a_2 + a_4 - a_6 + ... - a_{2n})^2 + (a_1 - a_3 + a_5 - a_7 + ... + a_{2n-1})^2$ is equal to

a) 2^n b) 4^n c) 0   d) None of these