ezyEXAMSolution

JEE MAINS PATTERN

Mathematics : Binomial Theorem

Practice Paper – 01

1. The sum of coefficients of $(1 + x - 3x^2)^{2134}$ is

   (A) -1 (B) 1 (C) 0 (D) 2^{2134}

2. The sum ${}^{r}C_r + {}^{r+1}C_r + {}^{r+2}C_r + ... + {}^{n}C_r \ (n \geq r)$ equals

   (A) ${}^{n}C_{r+1}$ (B) ${}^{n+1}C_{r+1}$ (C) ${}^{n+1}C_{r-1}$ (D) ${}^{n+1}C_r$

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

   (A) 8 (B) 10 (C) 13 (D) 14

4. The term independent of x in $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$ is

   (A) 5 (B) 6 (C) 7 (D) 8

5. The value of the greatest term in the expansion of $\sqrt{3}\left(1 + \frac{1}{\sqrt{3}}\right)^{20}$ is

   (A) 2871.11 (B) 2871 (C) 2872 (D) 2873

6. $9^{n+1} - 8n - 9$ is divisible by

   (A) 18 (B) 64 (C) 128 (D) 81

7. The first integral term in the expansion of $\left(\sqrt{3} + \sqrt[3]{2}\right)^9$ is its

   (A) 2^{nd} term (B) 3^{rd} term (C) 4^{th} term (D) 5^{th} term

8. The number of irrational terms in the expansion of $\left(2^{1/5}+3^{1/10}\right)^{55}$ is

(A) 47 (B) 56 (C) 50 (D) 48

9. The number of terms in the expansion of $\left(2x+3y-4z\right)^{n}$ is

(A) $\frac{n(n+1)}{2}$ (B) $\frac{n(n-1)}{2}$ (C) $\frac{(n+1)(n+2)}{2}$ (D) $\frac{(n+2)(n+3)}{2}$

10. In the expansion of $\left(\frac{a}{x}+bx\right)^{12}$, the coefficient of x^{-10} will be

(A) $12a^{11}$ (B) $12b^{11}a$ (C) $12a^{11}b$ (D) $12a^{11}b^{11}$

11. If $(1 + ax)^n = 1 + 8x + 24x^2 + \ldots..$, then the values of a and n are equal to

(A) 2, 4 (B) 2, 3 (C) 3, 6 (D) 1, 2

12. The product of middle terms in the expansion of $\left(x+\frac{1}{x}\right)^{11}$ is equal to

(A) ${}^{11}C_6\,{}^{11}C_6$ (B) ${}^{11}C_5\,{}^{11}C_6\left(\frac{1}{x}\right)$ (C) ${}^{11}C_5\,{}^{11}C_6\left(x\right)$ (D) $\left({}^{11}C_6\right)^2 x^2$

13. The middle term in the expansion of $(1 – 2x + x^2)^n$ is

(A) $\frac{2n}{n!}(-x)^n$ (B) $\frac{2n}{(n!)^2}(-x)^n$ (C) $\frac{2n}{(n!)^2}(x)^n$ (D) $\frac{2n}{n!}x^n$

14. The sum of the binomial coefficients in the expansion of $\left(x^{-3/4}+ax^{5/4}\right)^n$ lies between 200 and 400 and the term independent of x equals 448. The value of a is

(A) 1 (B) 2 (C) 1/2 (D) for no value of a

15. ${}^{23}C_0 + {}^{23}C_2 + {}^{23}C_4 + .. + {}^{23}C_{22}$ equals

(A) $2^{23} – 2$ (B) 2^{22} (C) 2^{11} (D) $\frac{2^{10}-4^{10}}{2}$

16. If $\left(1-x+2x^2\right)^{10} = \sum_{r=0}^{20} a_r x^r$ then $\sum_{r=1}^{10} a_{2r-1}$ equals

(A) 2×6^9 (B) 3×6^9 (C) 6^{10} (D) $\frac{2^{10}-4^{10}}{2}$

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

(A) $\frac{(2n)!}{(n!)^2}$ (B) $\frac{(2n+2)!}{\{(n+1)!\}^2}$ (C) $\frac{(2n+2)!}{n!(n+1)!}$ (D) $\frac{(2n)!}{n!(n+1)!}$

18. $\left({}^nC_0\right)^2+\left({}^nC_1\right)^2+\left({}^nC_2\right)^2+....+\left({}^nC_n\right)^2$ equals

(A) $\frac{2n!}{n!}$ (B) $\frac{2n!}{n!n!}$ (C) 2^n (D) $2^n n!$

19. The value of $C_1+3C_3+5C_5+7C_7+....,$ where $C_0, C_3, C_5, C_7, ...$ are binomial coefficients is

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

20. Fractional part of $\frac{2^{78}}{31}$ is

(A) $\frac{2}{31}$ (B) $\frac{4}{31}$ (C) $\frac{8}{31}$ (D) $\frac{10}{31}$

21. $(103)^{86}-(86)^{103}$ is divisible by

(A) 7 (B) 13 (C) 17 (D) 23

22. $2^{3n}-bn-a$ is divisible by 49 then (a, b) is

(A) $(-1,-7)$ (B) $(1,7)$ (C) $(1,49)$ (D) $(7,49)$

23. The number of dissimilar terms in the expansion of $(a + b + c)^{2n+1} - (a + b - c)^{2n+1}$ is

(A) $(n + 1)^2$ (B) $(n - 1)^2$ (C) $4n^2 - 1$ (D) none of these

24. The numbers of terms in the expansion of $\left(a^3+\frac{1}{a^3}+1\right)^{100}$ is

(A) 201 (B) 300 (C) 200 (D) ${}^{100}C_3$

25. The coefficient of x^{50} in the expansion of $(1+x)^{1000}+2x(1+x)^{999}+3x^2(1+x)^{998}+...+1001x^{1000}$ is

(A) ${}^{1000}C_{50}$ (B) ${}^{1001}C_{50}$ (C) ${}^{1002}C_{50}$ (D) 2^{1001}

26. The coefficient of term independent of x in the expansion of $\left(\frac{x+1}{x^{\frac{2}{3}}-x^{\frac{1}{3}}+1}-\frac{x-1}{x-x^{\frac{1}{2}}}\right)^{10}$

(A) 70 (B) 112 (C) 105 (D) 210

27. The value of $\left[\left(\sqrt{2}+1\right)^6\right]$, where [x] represents integral part of 'x' is

(A) 199 (B) 198 (C) 197 (D) 196

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. For $2 \le r \le n$, $\binom{n}{r}+2\binom{n}{r-1}+\binom{n}{r-2}$ is equal to

(A) $\binom{n+1}{r-1}$ (B) $2\binom{n+1}{r+1}$ (C) $2\binom{n+2}{r}$ (D) $\binom{n+2}{r}$

30. Coefficient of t^{24} in $\left(1+t^2\right)^{12}\left(1+t^{12}\right)\left(1+t^{24}\right)$ is

(A) ${}^{12}C_6+3$ (B) ${}^{12}C_6+1$ (C) ${}^{12}C_6$ (D) ${}^{12}C_6+2$