kd education academy (9582701166

Time : 10 Hour | STD 11 Maths | Total Marks : 200

kd90+ ch- 7 binomial theorem

*** Choose the right answer from the given options. [1 Marks Each]** **[79]**

1. In the expansion of $\left(\sqrt{2}+\sqrt[5]{3}\right)^{120}$ the number of irrational terms is:

   (A) 12 (B) 13 (C) 108 (D) 54

2. If in the expansion of $(1+y)^n$, the coefficients of 5th, 6th and 7th terms are in A.P., then n is equal to:

   (A) 7, 11 (B) 7, 14 (C) 8, 16 (D) None of these.

3. Choose the correct answer.

   If the middle term of $\left(\frac{1}{x}+x\sin x\right)^{10}$ is equal to $7\frac{7}{8}$, then value of x is:

   (A) $2n\pi+\frac{\pi}{6}$. (B) $n\pi+\frac{\pi}{6}$. (C) $n\pi+(-1)^n\frac{\pi}{6}$. (D) $n\pi+(-1)^n\frac{\pi}{3}$.

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

   (A) $^{2n}Cn\ x^{2n}$ (B) $^{2n}Cn\ x^{-2n}$ (C) ^{2n}Cn (D) $^{2n}C_{n-1}$

5. What is the middle term in the expansion of $\left(\frac{x\sqrt{y}}{3}-\frac{3}{y\sqrt{x}}\right)^{12}$?

   (A) C(12, 7) $x^3\ y^{-3}$ (B) C(12, 6) $x^{-3}\ y^3$ (C) C(12, 7) $x^{-3}\ y^3$ (D) C(12, 6) $x^3\ y^{-3}$

6. Number of irrational terms in the expansion of $\left(5^{\frac{1}{6}}+2^{\frac{1}{8}}\right)^{100}$ is:

   (A) 96 (B) 97 (C) 98 (D) 99

7. If tr is the rth term in the expansion of (1+ x)101, then what is the ratio $\frac{t20}{t19}$ equal to?

   (A) $\frac{20x}{19}$ (B) $83x$ (C) $19x$ (D) $\frac{83x}{19}$

8. r and n are positive integers r > 1, n > 2 and coefficient of (r+2)th term and 3rth term in the expansion of $(1 + x)^{2n}$ are equal, then n equals:

   (A) 3r (B) 3r + 1 (C) 2r (D) 2r + 1

9. The coefficient of the term independent of x in the expansion of $\left(\frac{\sqrt{x}}{3}+\frac{3}{2x^2}\right)10$ is:

   (A) $\frac{5}{4}$ (B) $\frac{7}{4}$ (C) $\frac{9}{4}$ (D) None of these

10. The coefficient of the middle term in the expansion of (2 + 3x)4 is:

    (A) 5! (B) 6 (C) 216 (D) 8!

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

(A) 152 (B) 142 (C) 124 (D) 162

12. The coefficient of x - 12 in the expansion of $\left(\frac{x+y}{x3}\right)^{20}$ is:

(A) $^{20}C_8$ (B) $^{20}C_8\, y^8$ (C) $^{20}C_{12}$ (D) $^{20}C_{12}$ y12

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

(A) 1365 (B) -1365 (C) 3003 (D) -3003

14. If the coefficients of 2nd, 3rd and the 4th terms in the expansion of (1 + x)n are in A.P., then value of n is:

(A) 3 (B) 7 (C) 11 (D) 14

15. The sum of the coefficient in the expansion of $(x + y)^n$ is 4096. The greatest coefficient in the expansion is:

(A) 1024 (B) 924 (C) 824 (D) 724

16. The value of $\sum_{r=0}^{n} a_{2r-1}$ is:

(A) 9^n - 1 (B) 9^n + 1 (C) 9^n - 2 (D) 9^n + 2

17. Number of rational terms in the expansion of $\left(\sqrt{2} + \sqrt[4]{3}\right)^{100}$ is:

(A) 25 (B) 26 (C) 27 (D) 28

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

(A) 3 (B) 4 (C) 5 (D) None of these.

19. The coefficient of $x^8\, y^{10}$ in the expansion of $(x + y)^{18}$ is:

(A) $^{18}C_8$ (B) $^{18}p_{10}$ (C) 2^{18} (D) None of these.

20. The coefficient of x^3 in $\left(\sqrt{x^5} + \frac{3}{\sqrt{x^3}}\right)^5$ is:

(A) 0 (B) 120 (C) 420 (D) 540

21. Expand the following binomials: $(x - 3)^5$

(A) $x^5 + 25x^4 + 90x^3 - 270x^2 + 405x - 243$ (B) $x^5 - 15x^4 + 90x^3 - 270x^2 - 405x - 243$

(C) $x^5 - 15x^4 + 80x^3 - 270x^2 + 405x - 243$ (D) $x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$

22. The number of terms in the expansion of $[(a + 4b)^3 (a - 4b)^3]^2$ are:

(A) 6 (B) 7 (C) 8 (D) 32

23. The coefficients of the expansions are arranged in an array. This array is called .....

(A) Pascal's Triangle

(B) Binomial Triangle (C) Fibonacci Triangle (D) Pingla Triangle

24. $^{15}C_3 + {}^{15}C_5 + ... + {}^{15}C_{15}$ will be equal to:

(A) 2^{14} (B) $2^{14} - 15$ (C) $2^{14} + 15$ (D) $2^{14} - 1$

25. If the 4th term in the binomial expansion of (p + 1)n is $\frac{5}{2}$ then:

(A) $n = 8, p = 6$ (B) $n = 8, p = \frac{1}{2}$ (C) $n = 6, p = \frac{1}{2}$ (D) $n = 6, p = 6$

26. The total number of terms in the expansion of $(x+a)^{100} + (x-a)^{100}$ after simplification is:

(A) 202 (B) 51 (C) 50 (D) None of these.

27. The number of rational terms in the expansion of $(9^{\frac{1}{4}} + 8^{\frac{1}{6}})^{1000}$ is:

(A) 500 (B) 400 (C) 501 (D) None of the above

28. If the fifth term of the expansion $\left(a^{\frac{2}{3}} + a^{-1}\right)^n$ does not contain 'a'. Then n is equal to:

(A) 2 (B) 5 (C) 10 (D) None of these.

29. The coefficient of x^3y^4 in $(2x + 3y^2)^5$ is:

(A) 360 (B) 720 (C) 240 (D) 1080

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

(A) $\frac{405}{256}$ (B) $\frac{504}{259}$ (C) $\frac{450}{263}$ (D) None of these.

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

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

32. Using binomial theorem, the value of $(0.999)^3$ correct to 3 decimal places is:

(A) 0.999 (B) 0.998 (C) 0.997 (D) 0.995

33. The number of terms with integral coefficient in the expansion of $\left(17^{\frac{1}{3}} + 32^{\frac{1}{2}}\right)^{300}$ is:

(A) 50 (B) 100 (C) 150 (D) 51

34. If x4 occurs in the rth term in the expansion of $(x^4 + \frac{1}{x^3})15$, then what is the value of r?

(A) 4 (B) 8 (C) 9 (D) 10

35. 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:

(A) 9 (B) 0 (C) 5 (D) 10

36. The coefficient of x^4 in the expansion of $(1 - 2x)^5$ is equal to:
(A) 40 (B) 320 (C) -320 (D) 80

37. The 4th term from the end in the expansion of $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^7$ is:
(A) 35x (B) $70x^2$ (C) $35x^2$ (D) 70x

38. The sum of the coefficients of all the even powers of x in the expansion of $(2x^2 - 3x + 1)^{11}$ is:
(A) 2.6^{10} (B) 3.6^{10} (C) 6^{11} (D) None of the above

39. How many terms are there in the expansion of $(1 + 2x + x^2)^{10}$?
(A) 11 (B) 20 (C) 21 (D) 30

40. The coefficient of x^{-3} in the expansion of $\left(x - \frac{m}{x}\right)^{11}$ is:
(A) $-924m^7$ (B) $-792m^5$ (C) $-792m^6$ (D) $-330m^7$

41. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1+x)^n, n \in \mathbb{N}$ are in A.P. then n =
(A) 7 (B) 14 (C) 2 (D) None of these.

42. [AS 1] If $A = \frac{1}{3}B$ and $B = \frac{1}{2}C$, then A : B : C = ..
(A) 1 : 3 : 6 (B) 2 : 3 : 6 (C) 3 : 2 : 6 (D) 3 : 1 : 2

43. If the sum of the binomial coefficients of the expansion $\left(2x + \frac{1}{x}\right)^n$ is equal to 256, then the term independent of x is:
(A) 1120 (B) 1020 (C) 512 (D) None of these.

44. If in the expansion of $\left(x - \frac{1}{3x^3}\right)^9$, the term independent of x is:
(A) T_3 (B) T_4 (C) T_5 (D) None of these.

45. In the expansion of $\left(\frac{\sqrt[3]{x}}{3} - \frac{\sqrt{3}}{x}\right)10$, x > 0, the constant term is:
(A) -70 (B) 70 (C) 210 (D) -210

46. The total number of terms in the expansion of $(x + a)^{100} + (x - a)^{100}$ after simplification is:
(A) 202 (B) 51 (C) 50 (D) 49

47. The approximate value of $(7.995)^{\frac{1}{3}}$ correct to 4 decimal places is:
(A) 1.9995 (B) 1.9996 (C) 1.9990 (D) 1.9991

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

(A) 20 (B) 40 (C) 80 (D) 120

49. The 4th term in the expansion of $\left(\sqrt{x}+\frac{1}{x}\right)^{12}$ is:

(A) $110x^{\frac{3}{2}}$ (B) $220x^{\frac{3}{2}}$ (C) $220x^2$ (D) $110x^2$

50. Sum of the coefficients of (1 - x)^{25} is:

(A) -1 (B) 1 (C) 0 (D) 2^{25}

51. If $C_0, C_1, C_2, \ldots\ldots, C_n$ are the binomial coefficients, then $2.C_1 + 2^3.C_3 + 2^5.C_5 + \ldots.$ equals

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

52. If $(1+x)^n = C_0 + C_1x + C_2x^2 + \ldots. + C_nx^n$, 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) $\frac{(2n)!}{(n-1)!(n+2)!}$

53. $\frac{1}{1!(n-1)!} + \frac{1}{3!(n-3)!} + \frac{1}{5!(n-5)!} + \ldots. =$

(A) $\frac{2^n}{n!}$; for all even values of n

(B) $\frac{2^{n-1}}{n!}$; for all values of n i.e., all even odd values

(C) 0

(D) None of these

54. $\frac{C_0}{1} + \frac{C_1}{2} + \frac{C_2}{3} + \ldots. + \frac{C_n}{n+1} =$

(A) $\frac{2^n}{n+1}$ (B) $\frac{2^n-1}{n+1}$ (C) $\frac{2^{n+1}-1}{n+1}$ (D) None of these

55. $\frac{C_0}{1} + \frac{C_2}{3} + \frac{C_4}{5} + \frac{C_6}{7} + \ldots.$ =

(A) $\frac{2^{n+1}}{n+1}$ (B) $\frac{2^{n+1}-1}{n+1}$ (C) $\frac{2^n}{n+1}$ (D) None of these

56. $C_1 + 2C_2 + 3C_3 + 4C_4 + \ldots. + nC_n =$

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

57. If the sum of the coefficients in the expansion of $(x+y)^n$ is 1024, then the value of the greatest coefficient in the expansion is

(A) 356 (B) 252 (C) 210 (D) 120

58. The term independent of y in the expansion of $(y^{-1/6} - y^{1/3})^9$ is

(A) 84 (B) 8.4 (C) 0.84 (D) -84

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

(A) 4^{th} (B) 3^{rd} (C) 10^{th} (D) None of these

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

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

61. 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

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

(A) 128 (B) 129 (C) 130 (D) 131

63. If the coefficients of x^2 and x^3 in the expansion of $(3+ax)^9$ are the same, then the value of a is

(A) $-\frac{7}{9}$ (B) $-\frac{9}{7}$ (C) $\frac{7}{9}$ (D) $\frac{9}{7}$

64. If the coefficients of second, third and fourth term in the expansion of $(1+x)^{2n}$ are in $A.P.$, then $2n^2-9n+7$ is equal to

(A) -1 (B) 0 (C) 1 (D) $\frac{3}{2}$

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

(A) ${}^{51}C_5$ (B) ${}^{9}C_5$ (C) ${}^{31}C_6-{}^{21}C_6$ (D) ${}^{30}C_5+{}^{20}C_5$

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

(A) -7 (B) 7 (C) 14 (D) -14

67. If x^moccurs in the expansion of $\left(x+\frac{1}{x^2}\right)^{2n}$, then the coefficient of x^m is

(A) $\frac{(2n)!}{(m)!\,(2n-m)!}$ (B) $\frac{(2n)!\,3!\,3!}{(2n-m)!}$ (C) $\frac{(2n)!}{\left(\frac{2n-m}{3}\right)!\left(\frac{4n+m}{3}\right)!}$ (D) None of these

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

(A) 7 only (B) 14 only (C) 7 or 14 (D) None of these

69. 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) $12a^{11}b^{11}$

70. 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) $2/3$ and 9 (D) $3/2$ and 6

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

(A) 2 (B) $1/2$ (C) 3 (D) 4

72. If x^4 occurs in the r^{th} term in the expansion of $\left(x^4+\frac{1}{x^3}\right)^{15}$, then $r=$

(A) 7 (B) 8 (C) 9 (D) 10

73. If coefficient of $(2r+3)^{th}$ and $(r-1)^{th}$ terms in the expansion of $(1+x)^{15}$ are equal, then value of r is

(A) 5 (B) 6 (C) 4 (D) 3

74. In $\left(\sqrt[3]{2}+\frac{1}{\sqrt[3]{3}}\right)^{n}$ if the ratio of 7^{th} term from the beginning to the 7^{th} term from the end is $\frac{1}{6}$, then $n=$

(A) 7 (B) 8 (C) 9 (D) None of these

75. If the coefficients of r^{th} term and $(r+4)^{th}$ term are equal in the expansion of $(1+x)^{20}$, then the value of r will be

(A) 7 (B) 8 (C) 9 (D) 10

76. If the ratio of the coefficient of third and fourth term in the expansion of $\left(x-\frac{1}{2x}\right)^{n}$ is $1:2$, then the value of n will be

(A) 18 (B) 16 (C) 12 (D) -10

77. 6^{th} term in expansion of $\left(2x^2-\frac{1}{3x^2}\right)^{10}$ is

(A) $\frac{4580}{17}$ (B) $-\frac{896}{27}$ (C) $\frac{5580}{17}$ (D) None of these

78. The last digit in 7^{300} is

(A) 7 (B) 9 (C) 1 (D) 3

79. The number of non-zero terms in the expansion of $(1+3\sqrt{2}x)^9+(1-3\sqrt{2}x)^9$ is

(A) 9 (B) 0 (C) 5 (D) 10

*** Given section consists of questions of 2 marks each.** **[8]**

80. Using binomial theorem, evaluate: $(101)^4$

81. Using Binomial Theorem, indicate which number is larger $(1.1)^{10000}$ or 1000.

82. Which term in the expansion of $\left\{\left(\frac{x}{\sqrt{y}}\right)^{\frac{1}{3}}+\left(\frac{y}{x^{\frac{1}{3}}}\right)^{\frac{1}{2}}\right\}^{21}$ contains x and y to one and the same power?

83. Find the coefficient of:

x in the expansion of $(1-2x^3+3x^5)\left(1+\frac{1}{x}\right)^8$.

*** Given section consists of questions of 3 marks each.** **[48]**

84. Expand the given expression $(1 - 2x)^5$

85. Expand the given expression $\left(x+\frac{1}{x}\right)^6$

86. Find $(a + b)^4 - (a - b)^4$. Hence, evaluate $(\sqrt{3}+\sqrt{2})^4-(\sqrt{3}-\sqrt{2})^4$

87. Show that $9^{n+1} - 8n - 9$ is divisible by 64 whenever n is a positive integer.

88. Find n, if the ratio of the fifth term from the beginning to the fifth term from the end in the expansion of $\left(\sqrt[4]{2}+\frac{1}{\sqrt[4]{3}}\right)^n$ is $\sqrt{6}:1$.

89. If 3rd, 4th, 5th and 6th terms in the expansion of be $(x+a)^n$ respectively a, b, c and d. prove that $\frac{b^2-ac}{c^2-bd}=\frac{5a}{3c}$.

90. Using binomial theorem write down the expansions of the following:

$\left(ax-\frac{b}{x}\right)^6$

91. Find the 4th term from the end in the expansion of $\left(\frac{4x}{5}-\frac{5}{2x}\right)^9$

92. Find the middle term in the expansion of:

$\left(\frac{2}{3}x-\frac{3}{2x}\right)^{20}$

93. Find the middle terms(s) in the expansion of:
$(1+3x+3x^2+x^3)^{2n}$

94. If in the expansion of $(1+x)^n$ the coefficients of three consecutive terms are 56, 70 and 56, then find n and the position of the terms of these coefficients.

95. Find the value of r, if the coefficients of $(2r + 4)^{th}$ and $(r - 2)^{th}$ terms in the expansion of $(1 + x)^{18}$ are equal.

96. If p is a real number and if the middle term in the expansion of $\left(\frac{p}{2}+2\right)^8$ is 1120, find P.

97. If the coefficient of second, third and fourth terms in the expansion of $(1 + x)^{2n}$ are in A.P. Show that $2n^2 - 9n + 7 = 0$.

98. Find the coefficient of x^{15} in the expansion of $(x - x^2)^{10}$.

99. Find n in the binomial $\left(3\sqrt{2}+\frac{1}{3\sqrt{3}}\right)^n$ if the ratio of 7^{th} term from the beginning to the 7^{th} term from the end is $\frac{1}{6}$.

*** Given section consists of questions of 5 marks each.** **[65]**

100. Find a, b and n in the expansion of $(a + b)^n$ if the first three terms of the expansion are 729, 7290 and 30375 respectively.

101. Find the coefficient of x^5 in the product $(1 + 2x)^6 (1 - x)^7$ using binomial theorem.

102. Evaluate the following:

$(0.99)^5 + (1.01)^5$

103. Find a, b and n in the expansion of $(a+b)^n$, if the first three terms in the expansion are 729, 7290 and 30375 respectively.

104. If the term from x in the expansion of $\left(\sqrt{x} - \frac{k}{x^2}\right)^{10}$ is 405, find the value of k.

105. Find n in the binomial $\left(\sqrt[3]{2} + \frac{1}{\sqrt[3]{3}}\right)^n$, if the ratio of 7th term from the beginning to the 7th term form the end is $\frac{1}{6}$.

106. If the seventh term from the beginning and in the binomial expansion of $\left(\sqrt[3]{2} + \frac{1}{\sqrt[3]{3}}\right)^n$ are equal, is the 7th term from the end.

107. Show that $2^{4n+4} - 15n - 16,$ where $n \in N$ is divisible by 225.

108. If in the expansion of $(1+x)^n$, the coefficients of pth and qth term are equal, prove that $p + q = n + 2,$ where $p \neq q.$

109. Find the coefficients of a^4 in the product $(1+2a)^4(2-a)^5$ using binomial theorem.

110. Evaluate the following:

$$\left\{a^2 + \sqrt{a^2-1}\right\}^4 + \left\{a^2 - \sqrt{a^2-1}\right\}^4$$

111. If x^p occurs in the expansion of $\left(x^2 + \frac{1}{x}\right)^{2n}$, prove that its coefficient is $\frac{2n!}{\left(\frac{4n-p}{3}\right)!\left(\frac{2n+p}{3}\right)!}$.

112. Find the sixth term of the expansion $\left(y^{\frac{1}{2}} + x^{\frac{1}{3}}\right)^n$, if the binomial coefficient of the third term from the end is 45.
[**Hint:** Binomial coefficient of third term from the end = Binomial coefficient of third term from beginning = ${}^nC_2$.]

----- "Take the attitude of a student, never be too big to ask questions, never know too much to learn something new -----