Assignment-1

AI24BTECH11019-PRATHEEK

C.Multipe Choice Questions

1) Given positive integers $r > 1, n > 2$ and that coefficient of $(3r)$ th terms in the binomial expansion of $(1+x)^{2n}$ are equal. Then (1983-1Mark)

a) $n = 2r$
b) $n = 2r + 1$
c) $n = 3r$
d) none of these

2) The coefficient of x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is (1983-1 Mark)

a) $\frac{405}{256}$
b) $\frac{504}{259}$
c) $\frac{450}{263}$
d) none of these

3) The expression $\left(x + \left(x^3 - 1\right)^{\frac{1}{2}}\right)^5 + \left(x - \left(x^3 - 1\right)^{\frac{1}{2}}\right)^5$ is a polynomial of degree(1992-2Marks)

a) 5
b) 6
c) 7
d) 8

4) If in the expansion of $(1+x)^m (1-x))^n$,the coefficients of x and x^2 are 3 and -6 respectively, then m is (1999-2Marks)

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

5) For $2 \le r \le n$, ${}^nC_r + 2\ {}^nC_{r-1} + {}^nC_{r-2} =$ (2000S)

a) ${}^{n+1}C_{r-1}$
b) $2\ {}^{n+1}C_{r+1}$
c) $2\ {}^{n+2}C_r$
d) ${}^{n+2}C_r$

6) In the binomial expansion of $(a-b)^n$, $n \ge 5$, the sum of the 5^{th} and 6^{th} terms is zero. Then a/b equals (2001S)

a) $\frac{n-5}{6}$
b) $\frac{n-4}{5}$
c) $\frac{5}{n-4}$
d) $\frac{6}{n-5}$

7) The sum $\sum_{i=0}^{9} {}^{10}C_i\, {}^{20}C_{m-i}$, (where ${}^pC_q = 0$ if $p < q$) is maximum when m is (2002S)

a) 5
b) 10
c) 15
d) 20

8) Coefficient of t^{24} in $\left(1+t^2\right)^{12}\left(1+t^{12}\right)\left(1+t^{24}\right)$ is (2003S)

a) ${}^{12}C_6+3$
b) ${}^{12}C_6+1$
c) ${}^{12}C_6$
d) ${}^{12}C_6+2$

9) If

$$^{n-1}C_r = \left(k^2-3\right){}^nC_{r+1}$$

then $(k \in$) (2004S)

a) $(-8,-2]$
b) $[2,\infty)$
c) $\left[-\sqrt{3},\sqrt{3}\right]$
d) $(\sqrt{3},2]$

10) The value of ${}^{30}C_0{}^{30}C_{10}$-${}^{30}C_1{}^{30}C_{11}$+${}^{30}C_2{}^{30}C_{12}\ldots{}^{30}C_{20}{}^{30}C_{30}$ is where ${}^nC_r = {}^nC_r$(2005S)

a) ${}^{30}C_{10}$
b) ${}^{30}C_{15}$
c) ${}^{60}C_{30}$
d) ${}^{31}C_{10}$

11) For $r = 0, 1 \ldots, 10$, let A_r, B_r and C_r denote,respectively the coefficients of x^r in the expansions of $(1+x)^{10}$,$(1+x)^{20}$and $(1+x)^{30}$.Then $\sum_{r=1}^{10} A_r\left(B_{10}B_r - C_{10}A_r\right)$ is equal to (2010)

a) $B_{10}-C_{10}$
b) $A_{10}\left(B_{10}^2 C_{10}A_{10}\right)$
c) 0
d) $C_{10}-B_{10}$

12) Coefficient of x^{11} in the expansion of $\left(1+x^2\right)^4\left(1+x^3\right)^7\left(1+x^4\right)^{12}$ is (JEE Adv. 2014)

a) 1051
b) 1106
c) 1113
d) 1120

D.MCQs with One or More than One Correct

1) If c_r stands for ${}^nC_r$, then the sum of the series $\frac{2\left(\frac{n}{2}!\right)\left(\frac{n}{2}!\right)}{n!}\left[C_0^2 - 2C_1^2 + 3C_2^2 - \cdots + (-1)^n (n+1) C_n^2\right]$, where n is an even positive integer is equal to (1992-2Marks)

a) 0
b) $(-1)^{\frac{n}{2}}(n+1)$
c) $(-1)^{\frac{n}{2}}(n+2)$
d) $(-1)^n n$
e) none of these

2) If $a_n = \sum_{r=0}^{n} \frac{1}{{}^nC_r}$,then $\sum_{r=0}^{n} \frac{r}{{}^nC_r}$ equals (1998-2Marks)

a) $(n-1)\,a_n$
b) na_n
c) $\frac{1}{2}na_n$
d) None of The above