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 − 1$Mark$)

   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 − 2$Marks$)

   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 − 2$Marks$)

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

5) For $2 \leq r \leq n$, ${}^nC_r + 2^nC_{r-1} + {}^nC_{r-2} =$ (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 $(a - b)^n$,$n \geq 5, t$ the sum of of the 5^{th} and 6^{th} terms is zero.Then a/b equals (2001S)

   a) $(n - 5)/6$
   b) $(n - 4)/5$
   c) $5/(n - 4)$
   d) $6/(n - 5)$

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 $\left(1 + t^{2^{12}}\right)\left(1 + t^{12}\right)\left(1 + t^{24}\right)$ 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 $r = 0, 1 \cdots, 10$, 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 $\sum_{r=1}^{10} A_r\left(B_{10}B_r - C10A_r\right)$ is equal to (2010)

a) $B_{10} - C_{10}$
b) $A_{10}\left(B_{10}^2C_{10}A_{10}\right)$
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 ($JEEAdv$.2014)

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

D.MCQs with One or More than One Correct

1) If c_r stands for ${}^nC_r$,the 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 – 2$Marks$)

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 – 2$Marks$)

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