

# Assignment-1

AI24BTECH11019-PRATHEEK

## C.MULTEPE 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 – 1Mark))
  - a)  $\frac{405}{256}$
  - b)  $\frac{504}{259}$
  - c)  $\frac{450}{263}$
  - d) none of these
- 3) The expression  $\left(x + (x^3 - 1)^{\frac{1}{2}}\right)^5 + \left(x - (x^3 - 1)^{\frac{1}{2}}\right)^5$  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  $2 \leq r \leq n$ ,  $\binom{n}{r} + 2\binom{n}{r-1} + \binom{n}{r-2} =$   
(2000S)
  - a)  $\binom{n+1}{r-1}$
  - b)  $2\binom{n+1}{r+1}$
  - c)  $2\binom{n+2}{r}$
  - d)  $\binom{n+2}{r}$
- 6) In the binomial expansion of  $(a-b)^n, n \geq 5$ , the sum 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  $\sum_{i=0}^9 \binom{10}{i} \binom{20}{m-i}$ , (where  $\binom{p}{q} = 0$  if  $p < q$ ) is maximum when  $m$  is  
(2002S)
  - a) 5
  - b) 10
  - c) 15
  - d) 20
- 8) Coefficient of  $t^{24}$  in  $(1+t^{12})(1+t^{12})(1+t^{24})$  is  
(2003S)
  - a)  ${}^{12}C_6 + 3$
  - b)  ${}^{12}C_6 + 1$
  - c)  ${}^{12}C_6$
  - d)  ${}^{12}C_6 + 2$
- 9) If  ${}^{n-1}C_r = (k^2 - 3) {}^nC_{r+1}$  then  $(k \in )$   
(2004S)
  - a)  $(-8, -2]$
  - b)  $[2, \infty)$
  - c)  $[-\sqrt{3}, \sqrt{3}]$
  - d)  $(\sqrt{3}, 2]$
- 10) The value of  $\frac{\binom{30}{0}\binom{30}{10}}{\binom{30}{1}\binom{30}{11}} + \frac{\binom{30}{2}\binom{30}{12}}{\binom{30}{1}\binom{30}{11}} \cdots \frac{\binom{30}{20}\binom{30}{30}}{\binom{30}{1}\binom{30}{11}}$  is where  $\binom{n}{r} = {}^nC_r$   
(2005S)
  - a)  $\binom{30}{10}$
  - b)  $\binom{30}{15}$
  - c)  $\binom{60}{30}$
  - d)  $\binom{31}{10}$
- 11) For  $r = 0, 1, \dots, 10$ , 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  $\sum_{r=1}^{10} A_r(B_{10}B_r - C_{10}A_r)$  is equal to  
(2010)

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

12) Coefficient of  $x^{11}$  in the expansion of  $(1+x^2)^4 (1+x^3)^7 (1+x^4)^{12}$  is  
 . (JEEAdv.2014)

- a) 1051      c) 1113  
 b) 1106      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  $\frac{2(\frac{n}{2}!)(\frac{n}{2}!)}{n!} [C_0^2 - 2C_1^2 + 3C_2^2 - \dots + (-1)^n (n+1) C_n^2]$ , where n is an even positive integer is equal to  
 (1992 – 2Marks)

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

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