

# Assignment-1

AI24BTECH11019-PRATHEEK

## C.MULTEPLE 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  $(a-b)^n, n \geq 5, t$  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  $(k \in \mathbb{R})$   
(2004S)
  - (a)  $(-8, -2]$
  - (b)  $[2, \infty)$
  - (c)  $[-\sqrt{3}, \sqrt{3}]$
  - (d)  $(\sqrt{3}, 2]$
- 10) The value of  $\binom{30}{0}\binom{30}{10} - \binom{30}{1}\binom{30}{11} + \binom{30}{2}\binom{30}{12} - \dots + \binom{30}{15}\binom{30}{30}$  is where  
(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)  $B_{10} - C_{10}$
  - (b)  $A_{10} (B_{10}^2 C_{10} A_{10})$
  - (c) 0
  - (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  
(JEE Adv. 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