# Exercise-1

**Marked Questions may have for Revision Questions.**

## OBJECTIVE QUESTIONS

### Section (A) : Expansion of $(x + a)^n$, general term, middle term and coefficient of $x^k$

**A-1.** $^{15}C_{3r} = {}^{15}C_{r+3}$ then value of r is
(1) 3 (2) 4 (3) 5 (4) 8

**A-2.** $^{2n}C_3 : {}^nC_2 = 44 : 3$ then value of $^nC_3$ is
(1) 20 (2) 35 (3) 56 (4) 10

**A-3.** The value of $^{15}C_3 + {}^{15}C_{13}$ is
(1) $^{16}C_3$ (2) $^{30}C_{16}$ (3) $^{15}C_{10}$ (4) $^{16}C_{13}$

**A-4.** In the expansion of $(3x + 4y)^{17}$, $7^{th}$ term from begining is
(1) $^{17}C_7(3x)^7 (4y)^{10}$ (2) $^{17}C_6(3x)^{11} (4y)^6$ (3) $^{17}C_{10}(3x)^{10} (4y)^7$ (4) $^{17}C_8(3x)^8 (4y)^9$

**A-5.** In the expansion of $\left(2a + \frac{b}{2}\right)^{11}$ the $6^{th}$ term from the end is
(1) $2\ {}^{11}C_5\, a^5b^6$ (2) $\frac{1}{2}\ {}^{11}C_5\, a^5b^6$ (3) $2\ {}^{11}C_5\, a^6b^5$ (4) $\frac{1}{2}\ {}^{11}C_6\, a^6b^5$

**A-6.** In the expansion of $\left(3x + \frac{1}{x}\right)^{13}$ coefficient of $x^7$ is-
(1) $^{13}C_5\,(3)^8$ (2) $^{13}C_4\,3^9$ (3) $^{13}C_3\,3^{10}$ (4) $^{13}C_{10}\,3^3$

**A-7.** The coefficient of $x^5$ in the expansion of $(2 + 3x)^{12}$ is-
(1) $^{12}C_5 2^5.3^7$ (2) $^{12}C_6 2^6.3^6$ (3) $^{12}C_5 2^7.3^5$ (4) None of these

**A-8.** The term containing x in the expansion of $\left(x^2 + \frac{1}{x}\right)^5$ is -
(1) $2^{nd}$ (2) $3^{rd}$ (3) $4^{th}$ (4) $5^{th}$

**A-9.** The term independent of x in the expansion of $\left(\sqrt{\frac{x}{3}} + \frac{3}{2x^2}\right)^{10}$ is-
(1) 3/2 (2) 5/4 (3) 5/2 (4) None of these

**A-10.** The (m + 1)th term of $\left(\frac{x}{y} + \frac{y}{x}\right)^{2m+1}$ is:
(1) independent of x (2) a constant
(3) dependent on the ratio x/y and m (4) none of these

**A-11.** The total number of terms in the expansion of, $(x + a)^{100} + (x - a)^{100}$ after simplification is :
(1) 50 (2) 202 (3) 51 (4) none of these

**A-12.** If the 6th term in the expansion of the binomial $\left[\frac{1}{x^{8/3}} + x^2 \log_{10} x\right]^8$ is 5600, then x =
(1) 10 (2) 8 (3) 11 (4) 9

**A-13.** In the expansion of $\left(3 - \sqrt{\frac{17}{4} + 3\sqrt{2}}\right)^{15}$ the 11th term is a:
(1) positive integer (2) positive irrational number
(3) negative integer (4) negative irrational number.

**A-14.** If the second term of the expansion $\left[a^{1/13} + \frac{a}{\sqrt{a^{-1}}}\right]^n$ is $14a^{5/2}$, then the value of $\frac{{}^nC_3}{{}^nC_2}$ is:
(1) 4 (2) 3 (3) 12 (4) 6

**A-15.** In the expansion of $(7^{1/3} + 11^{1/9})^{6561}$, the number of terms free from radicals is:
(1) 730 (2) 729 (3) 725 (4) 750

**A-16.** The middle term in the expansion of $(1 - 3x + 3x^2 - x^3)^6$ is-
(1) ${}^{18}C_{10}x^{10}$ (2) ${}^{18}C_9(-x)^9$ (3) ${}^{18}C_9x^9$ (4) $-{}^{18}C_{10}x^{10}$

**A-17.** If $k \in R$ and the middle term of $\left(\frac{k}{2} + 2\right)^8$ is 1120, then value of k is:
(1) 3 (2) 2 (3) − 3 (4) − 4

**A-18.** The term with coefficient ${}^6C_2$ in the expansion of $(1 + x)^6$ is-
(1) $T_1$ and $T_3$ (2) $T_2$ and $T_4$ (3) $T_3$ and $T_5$ (4) None of these

**A-19.** The co-efficient of x in the expansion of $(1 - 2x^3 + 3x^5)\left(1 + \frac{1}{x}\right)^8$ is :
(1) 56 (2) 65 (3) 154 (4) 62

**A-20.** Given that the term of the expansion $(x^{1/3} - x^{-1/2})^{15}$ which does not contain x is 5 m, where $m \in N$,then m=
(1) 1100 (2) 1010 (3) 1001 (4) none

**A-21.** The term independent of x in the expansion of $\left(x - \frac{1}{x}\right)^4\left(x + \frac{1}{x}\right)^3$ is:
(1) − 3 (2) 0 (3) 1 (4) 3

**A-22.** Let the co-efficients of $x^n$ in $(1 + x)^{2n}$ & $(1 + x)^{2n-1}$ be P & Q respectively, then $\left(\frac{P + Q}{Q}\right)^5$ =
(1) 9 (2) 27 (3) 81 (4) none of these

**A-23.** If $(1 + by)^n = (1 + 8y + 24y^2 + ....)$ where $n \in N$ then the value of b and n are respectively-
(1) 4, 2 (2) 2, – 4 (3) 2, 4 (4) – 2, 4

**A-24.** The value of $\frac{18^3 + 7^3 + 3 \cdot 18 \cdot 7 \cdot 25}{3^6 + 6 \cdot 243 \cdot 2 + 15 \cdot 81 \cdot 4 + 20 \cdot 27 \cdot 8 + 15 \cdot 9 \cdot 16 + 6 \cdot 3 \cdot 32 + 64}$, is :
(1) 1 (2) 2 (3) 3 (4) none

**A-25.** The coefficient of $x^{52}$ in the expansion $\sum_{m=0}^{100} {}^{100}C_m (x - 3)^{100-m} \cdot 2^m$ is :
(1) ${}^{100}C_{47}$ (2) ${}^{100}C_{48}$ (3) $-{}^{100}C_{52}$ (4) $-{}^{100}C_{100}$

**A-26.** The co-efficient of $x^5$ in the expansion of $(1 + x)^{21} + (1 + x)^{22} + \ldots\ldots + (1 + x)^{30}$ is :
(1) ${}^{51}C_5$ (2) ${}^{9}C_5$ (3) ${}^{31}C_6 - {}^{21}C_6$ (4) ${}^{30}C_5 + {}^{20}C_5$

**A-27.** The term independent of x in $(1 + x)^m \left(1+\frac{1}{x}\right)^n$ is
(1) ${}^{m-n}C_n$ (2) ${}^{m+n}C_n$ (3) ${}^{m+1}C_n$ (4) ${}^{m+n}C_{n+1}$

**A-28.** $(1 + x)(1 + x + x^2)(1 + x + x^2 + x^3)\ldots\ldots (1 + x + x^2 + \ldots\ldots + x^{100})$ when written in the ascending power of x then the highest exponent of x is
(1) 5000 (2) 5030 (3) 5050 (4) 5040

## Section (B) : Remainder and Divisibility problems

**B-1.** The remainder when $17^{10}$ is divided by 9 is :
(1) 8 (2) 7 (3) 2 (4) 1

**B-2.** The remainder when $7^{98}$ is divided by 5 is
(1) 4 (2) 0 (3) 2 (4) 3

**B-3.** The remainder when $2^{2003}$ is divided by 17 is :
(1) 1 (2) 2 (3) 8 (4) none of these

**B-4.** If $\{x\}$ denotes the fractional part of '$x$', then $\left\{\frac{3^{1001}}{82}\right\}$ =
(1) 9/82 (2) 81/82 (3) 3/82 (4) 1/82

**B-5.** The last three digits of $3^{50}$ will be
(1) 249 (2) 259 (3) 349 (4) 241

**B-6.** The last two digits of the number $3^{400}$ are:
(1) 81 (2) 43 (3) 29 (4) 01

**B-7.** The last three digits in 10 ! are :
(1) 800 (2) 700 (3) 500 (4) 600

**B-8.** If $n \in N$ then $10^n + 5$ is divisible by-
(1) 3 (2) 7 (3) 9 (4) 2

## Section (C) : Sum of series, Product and division of binomial coefficients, Reverse Expansion

**C-1.** If $(1 + x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + \ldots\ldots + C_nx^n$, then the value of $C_1 + C_2 + C_3 + \ldots + C_n$ is-
(1) $2^{n+1}$ (2) $2^{n-1}$ (3) $2^n + 1$ (4) $2^n - 1$

**C-2.** If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \ldots + C_n.x^n$ then the value of $C_0 + 3C_1 + 5C_2 + \ldots\ldots + (2n + 1)C_n$ is-
(1) $n.2^n$ (2) $(n - 1).2^n$ (3) $(n + 2).2^{n-1}$ (4) $(n + 1).2^n$

**C-3.** The value of $\sum_{r=1}^{10} r \cdot \frac{{}^{n}C_{r}}{{}^{n}C_{r-1}}$ is equal to

(1) 5 (2n – 9) (2) 10 n (3) 9 (n – 4) (4) none of these

**C-4.** If $(1 + x)^n = \sum_{r=0}^{n} a_r x^r$ and $b_r = 1 + \frac{a_r}{a_{r-1}}$ and $\prod_{r=1}^{n} b_r = \frac{(101)^{100}}{100!}$, then n equals to :

(1) 99 (2) 100 (3) 101 (4) none of these

**C-5.** $\sum_{r=0}^{n-1} \frac{{}^{n}C_{r}}{{}^{n}C_{r} + {}^{n}C_{r+1}}$ =

(1) $\frac{n}{2}$ (2) $\frac{n+1}{2}$ (3) $(n+1)\frac{n}{2}$ (4) $\frac{n\ (n-1)}{2\ (n+1)}$

**C-6.** $\frac{{}^{11}C_0}{1} + \frac{{}^{11}C_1}{2} + \frac{{}^{11}C_2}{3} + \ldots\ldots + \frac{{}^{11}C_{10}}{11}$ =

(1) $\frac{2^{11}-1}{11}$ (2) $\frac{2^{11}-1}{6}$ (3) $\frac{3^{11}-1}{11}$ (4) $\frac{3^{11}-1}{6}$

**C-7.** The value of $\frac{C_0}{1.3} - \frac{C_1}{2.3} + \frac{C_2}{3.3} - \frac{C_3}{4.3} + \ldots\ldots\ldots + (-1)^n \frac{C_n}{(n+1)\ .\ 3}$ is :

(1) $\frac{3}{n+1}$ (2) $\frac{n+1}{3}$ (3) $\frac{1}{3(n+1)}$ (4) none of these

**C-8.** The sum of the coefficients of even powers of x in the expansion of $(1 + x + x^2 + x^3)^5$ is -

(1) 512 (2) – 512 (3) 215 (4)

**C-9.** The value of the expression ${}^{47}C_4 + \sum_{j=1}^{5} {}^{52-j}C_3$ is equal to:

(1) ${}^{47}C_5$ (2) ${}^{52}C_5$ (3) ${}^{52}C_4$ (4) ${}^{49}C_4$

**C-10.** The value of the expression $\left(\sum_{r=0}^{10} {}^{10}C_r\right)\left(\sum_{K=0}^{10} (-1)^K \frac{{}^{10}C_K}{2^K}\right)$ is :

(1) $2^{10}$ (2) $2^{20}$ (3) 1 (4) $2^5$

**C-11.** The value of $\binom{50}{0}\binom{50}{1} + \binom{50}{1}\binom{50}{2} + \ldots\ldots\ldots + \binom{50}{49}\binom{50}{50}$ is, where ${}^{n}C_r = \binom{n}{r}$

(1) $\binom{100}{50}$ (2) $\binom{100}{51}$ (3) $\binom{50}{25}$ (4) $\binom{50}{25}^2$

**C-12.** If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \ldots + C_n.x^n$ then for n odd, $C_1^2 + C_3^2 + C_5^2 + \ldots\ldots + C_n^2$ is equal to

(1) $2^{2n-2}$ (2) $2^n$ (3) $\frac{(2n)!}{2(n!)^2}$ (4) $\frac{(2n)!}{(n!)^2}$

**C-13.** If $a_n = \sum_{r=0}^{n} \frac{1}{{}^{n}C_{r}}$, the value of $\sum_{r=0}^{n} \frac{n-2r}{{}^{n}C_{r}}$ is :

(1) $\frac{n}{2} a_n$ (2) $\frac{1}{4} a_n$ (3) $na_n$ (4) 0

**C-14.** In the expansion of $(1+x)^n\left(1+\frac{1}{x}\right)^n$, the term independent of x is-

(1) $C_0^2 + 2\,C_1^2 + .....+ (n+1)\,C_n^2$ (2) $(C_0 + C_1 + ....+ C_n)^2$

(3) $C_0^2 + C_1^2 + .....+ C_n^2$ (4) None of these

## Section (D) : Binomial Theorem for negative and fractional index

**D-1.** If $|x| < 1$ then $7^{th}$ term in the expansion of $(1-x)^{-2}$ is

(1) $7x^7$ (2) $6x^7$ (3) $7x^6$ (4) $6x^6$

**D-2.** $\left(x^2+\frac{1}{x}\right)^{-4/3}$ can be expanded by binomial theorem if

(1) $x < 1$ (2) $|x| < 1$ (3) $x > 1$ (4) $|x| > 1$

**D-3.** If $|x| < 1$, then the co-efficient of $x^n$ in the expansion of $(1 + x + x^2 + x^3 + .....)^2$ is

(1) n (2) n − 1 (3) n + 2 (4) n + 1

**D-4.** The coefficient of $x^4$ in the expression $(1 + 2x + 3x^2 + 4x^3 + .....\text{up to } \infty)^{1/2}$ (where $|x| < 1$) is

(1) 1 (2) 3 (3) 2 (4) 5

**D-5.** The coefficient of $x^4$ in $(1 - x)^{-3}$ (where $|x| < 1$) is

(1) 10 (2) 15 (3) 9 (4) 6

**D-6.** If x is so small such that $x^3$ and higher power of x may be neglected, then $\frac{(1+x)^{3/2}-(1+\frac{1}{2}x)^3}{(1-x)^{1/2}}$ may be approximated as

(1) $\frac{-3}{8}x^2$ (2) $\frac{x}{2}-\frac{3}{8}x^2$ (3) $1-\frac{3}{8}x^2$ (4) $3x+\frac{3}{8}x^2$

# Exercise-2

**Marked Questions may have for Revision Questions.**

## PART - I : OBJECTIVE QUESTIONS

**1.** Number of elements in set of value of r for which, ${}^{18}C_{r-2} + 2.\,{}^{18}C_{r-1} + {}^{18}C_r \geq {}^{20}C_{13}$ is satisfied :

(1) 4 elements (2) 5 elements (3) 7 elements (4) 10 elements

**2.** The number of values of ' r ' satisfying the equation, ${}^{39}C_{3r-1} - {}^{39}C_{r^2} = {}^{39}C_{r^2-1} - {}^{39}C_{3r}$ is :

(1) 1 (2) 2 (3) 3 (4) 4

**3.** In the expansion of $\left(x^3-\frac{1}{x^2}\right)^n$, $n \in N$, if the sum of the coefficients of $x^5$ and $x^{10}$ is 0, then n is :

(1) 25 (2) 20 (3) 15 (4) None of these

**4.** In the expansion of $\left(\sqrt[3]{4}+\frac{1}{\sqrt[4]{6}}\right)^{20}$
(1) the number of irrational terms is 19 (2) middle term is irrational
(3) the number of rational terms is 2 (4) All of these

**5.** The coefficient of the term independent of x in the expansion of $\left(\frac{x+1}{x^{\frac{2}{3}}-x^{\frac{1}{3}}+1}-\frac{x-1}{x-x^{\frac{1}{2}}}\right)^{10}$ is :
(1) 70 (2) 112 (3) 105 (4) 210

**6.** The term in the expansion of $(2x - 5)^6$ which has greatest binomial coefficient is
(1) $T_3$ (2) $T_4$ (3) $T_5$ (4) $T_6$

**7.** $7^9 + 9^7$ is divisible by :
(1) 7 (2) 24 (3) 64 (4) 72

**8.** The last three digits of the number $(27)^{27}$ is
(1) 805 (2) 301 (3) 503 (4) 803

**9.** Let $f(n) = 10^n + 3.4^{n+2} + 5$, $n \in N$. The greatest value of the integer which divides f(n) for all n is :
(1) 27 (2) 9 (3) 3 (4) None of these

**10.** The sum $\frac{1}{1!\,(n-1)!}+\frac{1}{2!\,(n-2)!}+.....\frac{1}{1!\,(n-1)!}$ is equal to :
(1) $\frac{1}{n!}(2^{n-1}-1)$ (2) $\frac{2}{n!}(2^n-1)$ (3) $\frac{2}{n!}(2^{n-1}-1)$ (4) none

**11.** The sum ${}^{10}C_3 + {}^{11}C_3 + {}^{12}C_3 + ..... + {}^{20}C_3$ is equal to
(1) ${}^{21}C_4$ (2) ${}^{21}C_4 - {}^{10}C_4$ (3) ${}^{21}C_4 - {}^{11}C_4$ (4) ${}^{21}C_{17}$

**12.** The sum of the series $\sum_{r=1}^{n}(-1)^{r-1}.\ {}^{n}C_r(a-r)$ is equal to :
(1) $n \cdot 2^{n-1} + a$ (2) 0 (3) a (4) None of these

**13.** The sum of series $3.{}^nC_0 - 8.{}^nC_1 + 13.{}^nC_2 - 18.{}^nC_3 + ....$ upto (n+1) terms where $n > 1$, is :
(1) zero (2) 1 (3) 2 (4) none of these

**14.** If $(1 + x + x^2)^n = a_0 + a_1x + a_2x^2 + ..... + a_{2n}x^{2n}$, then $a_0 + a_2 + a_4 + ..... + a_{2n}$
(1) $\frac{3^n-1}{2}$ (2) $\frac{3^n+1}{2}$ (3) $\frac{3^n-2}{2}$ (4) $\frac{3^n-5}{2}$

**15.** The sum of the coefficients of all the integral powers of x in the expansion of $\left(1+2\sqrt{x}\right)^{40}$ is :
(1) $3^{40} + 1$ (2) $3^{40} - 1$ (3) $\frac{1}{2}(3^{40}-1)$ (4) $\frac{1}{2}(3^{40}+1)$

**16.** Coefficient of sum of odd powers of x in expansion of $(9x^2 + x - 8)^6$ is
(1) 512 (2) 64 (3) 0 (4) 32

**17.** The sum $\sum_{r=0}^{n}(r+1)\,C_r^2$ is equal to :
(1) $\frac{(n+2)(2n-1)!}{n!\,(n-1)!}$ (2) $\frac{(n+2)(2n+1)!}{n!\,(n-1)!}$

(3) $\frac{(n+2)(2n+1)!}{n!\,(n+1)!}$ (4) $\frac{(n+2)(2n-1)!}{n!\,(n+1)!}$

**18.** The number of terms in the expansion of $\left(x^2+1+\frac{1}{x^2}\right)^n$, $n \in N$, is :
(1) 2n (2) 3n (3) 2n + 1 (4) 3n + 1

**19.** $(1 + x + x^2 + x^3)^5 = a_0 + a_1x + a_2x^2 + \ldots\ldots\ldots\ldots + a_{15}x^{15}$, then $a_{10}$ equals to :
(1) 99 (2) 101 (3) 100 (4) 110

**20.** Coefficient of $x^{n-1}$ in the expansion of, $(x + 3)^n + (x + 3)^{n-1}(x + 2) + (x + 3)^{n-2}(x + 2)^2 + \ldots.. + (x + 2)^n$ is :
(1) ${}^{n+1}C_2(3)$ (2) ${}^{n-1}C_2(5)$ (3) ${}^{n+1}C_2(5)$ (4) ${}^{n}C_2(5)$

**21.** The coefficient of $x^4$ in $\left(\frac{1+x}{1-x}\right)^2$, $|x| < 1$, is
(1) 4 (2) –4 (3) $10 - {}^4C_2$ (4) 16

## PART - II : MISCELLANEOUS QUESTIONS

### Section (A) : ASSERTION/REASONING

**DIRECTIONS :**
**Each question has 4 choices (1), (2), (3) and (4) out of which ONLY ONE is correct.**
(1) Both the statements are true.
(2) Statement-I is true, but Statement-II is false.
(3) Statement-I is false, but Statement-II is true.
(4) Both the statements are false.

**A-1.** **Statement - 1 :** The term independent of x in the expansion of $\left(x+\frac{1}{x}+2\right)^m$ is $\frac{(2m)!}{(m!)^2}$.
**Statement - 2 :** The coefficient of $x^b$ in the expansion of $(1 + x)^n$ is ${}^nC_b$.

**A-2.** **Statement - 1 :** If n is even, then ${}^{2n}C_1 + {}^{2n}C_3 + {}^{2n}C_5 + \ldots\ldots\ldots + {}^{2n}C_{n-1} = 2^{2n-1}$.
**Statement - 2 :** ${}^{2n}C_1 + {}^{2n}C_3 + {}^{2n}C_5 + \ldots\ldots\ldots + {}^{2n}C_{2n-1} = 2^{2n-1}$.

### Section (B) : MATCH THE COLUMN

**B-1.**

| | Column-I | | Column-II |
|---|---|---|---|
| **(P)** | If sum of the coefficients of the first, second and third terms in the expansion of $\left(x^2+\frac{1}{x}\right)^n$ is 46 then value of n is | (1) | 8 |
| **(Q)** | The number of integral terms in the expansion of $\left(5^{\frac{1}{2}}+7^{\frac{1}{8}}\right)^{1024}$ is abc where abc is a three digit number then (a + b + c – 10) is | (2) | 9 |
| **(R)** | coefficient of $x^{103}$ in $(1 + x + x^2 + x^3 + x^4)^{199}(x - 1)^{201}$ is | (3) | 2 |
| **(S)** | The last digit of the number $2^{999}$ is | (4) | 0 |

**Codes :**

| | P | Q | R | S |
|---|---|---|---|---|
| (1) | 2 | 3 | 4 | 1 |
| (2) | 2 | 1 | 4 | 3 |
| (3) | 1 | 3 | 2 | 4 |

(4) 1 2 3 4

**B-2.** If $(1 + x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + \ldots\ldots\ldots + C_nx^n$ then

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| **(P)** | The value of $C_0 + 2C_1 + 3C_2 + \ldots\ldots\ldots + (n+1)C_n$ is | (1) | $\frac{1}{2}\left(2^n + C_{n/2}\right)$ |
| **(Q)** | The value of $C_0 + C_1 + C_2 + \ldots\ldots\ldots + C_{n/2}$ is (where n is even) | (2) | $^{2n}C_{n-2}$ |
| **(R)** | The value of $2C_0 + \frac{2^2}{2}C_1 + \frac{2^3}{3}C_2 + \ldots\ldots\ldots + \frac{2^{n+1}}{n+1}C_n$ is | (3) | $2^{n-1}(n+2)$ |
| **(S)** | The value of $^nC_n\ ^nC_2 + {}^nC_{n-1}\ ^nC_3 + {}^nC_{n-2}\ ^nC_4 + \ldots\ldots\ldots + {}^nC_2\ ^nC_n$ is | (4) | $\left(\frac{3^{n+1}-1}{n+1}\right)$ |

**Codes :**

| | P | Q | R | S |
|---|---|---|---|---|
| (1) | 1 | 3 | 4 | 2 |
| (2) | 3 | 1 | 2 | 4 |
| (3) | 1 | 2 | 3 | 4 |
| (4) | 3 | 1 | 4 | 2 |

## Section (C) : ONE OR MORE THAN ONE OPTIONS CORRECT

**C-1.** Let $a_n = \frac{1000^n}{n!}$ for $n \in N$, then $a_n$ is greatest, when

(1) n = 997 (2) n = 998 (3) n = 999 (4) n = 1000

**C-2.** The coefficient of the middle term in the expansion of $(1 + x)^{2n}$ is

(1) $^{2n}C_n$ (2) $2^n \frac{1.3.5.\ldots\ldots(2n-1)}{n\ !}$

(3) $2.6.\ldots\ldots(4n-2)$ (4) none of the above

**C-3.** Which of the following is/are correct ?

(1) $101^{50} - 99^{50} > 100^{50}$ (2) $101^{50} - 100^{50} > 99^{50}$

(3) $(1000)^{1000} > (1001)^{999}$ (4) $(1001)^{999} > (1000)^{1000}$

**C-4.** In the expension of $\left(4^{\frac{1}{3}} + 6^{-\frac{1}{4}}\right)^{20}$

(1) The number of rational terms is 4 (2) The number of irrational terms is19

(3) The middle term is irrational (4) The number of irrational terms is 17

**C-5.** The numbers $101^{100}-1$ is divisible by

(1) 100 (2) 1000 (3) 10,000 (4) 100000

# Exercise-3

**Marked Questions may have for Revision Questions.**

*** Marked Questions may have more than one correct option.**

## PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

**1.** The coefficient of $x^5$ in $(1 + 2x + 3x^2 + \ldots\ldots)^{-3/2}$ is : **[AIEEE-2002, (3,1), 225]**

(1) 21 (2) 25 (3) 26 (4) none of these

**2.** The number of integral terms in the expansion of $\left(\sqrt{3} + \sqrt[8]{5}\right)^{256}$ is : **[AIEEE-2003, (3,1), 225]**

(1) 32 (2) 33 (3) 34 (4) 35.

**3.** If x is positive, the first negative term in the expansion of $(1+x)^{\frac{27}{5}}$ is : **[AIEEE-2003, (3,1), 225]**
(1) 7th term (2) 5th term (3) 8th term (4) 6th term.

**4.** The coefficient of the middle term in the binomial expansion in powers of x of $(1 + \alpha x)^4$ and of $(1 - \alpha x)^6$ is the same, if α equals : **[AIEEE-2004, (3,1), 225]**
(1) $-\frac{5}{3}$ (2) $\frac{10}{3}$ (3) $-\frac{3}{10}$ (4) $\frac{3}{5}$

**5.** The coefficient of $x^n$ in the expansion of $(1 + x)(1 - x)^n$ is- **[AIEEE-2004, (3,1), 225]**
(1) (n – 1) (2) $(-1)^n (1 - n)$ (3) $(-1)^{n-1}(n - 1)^2$ (4) $(-1)^{n-1} n$

**6.** If $s_n = \sum_{r=0}^{n} \frac{1}{{}^nC_r}$ and $t_n = \sum_{r=0}^{n} \frac{r}{{}^nC_r}$, then $\frac{t_n}{s_n}$ is equal to- **[AIEEE-2004, (3,1), 225]**
(1) $\frac{n}{2}$ (2) $\frac{n}{2} - 1$ (3) n – 1 (4) $\frac{2n-1}{2}$

**7.** If the coefficients of $r^{th}$, $(r + 1)^{th}$ and $(r + 2)^{th}$ terms in the binomial expansion of $(1 + y)^m$ are in AP, then m and r satisfy the equation : **[AIEEE 2005, (3, 1), 225]**
(1) $m^2 - m(4r - 1) + 4r^2 + 2 = 0$. (2) $m^2 - m(4r + 1) + 4r^2 - 2 = 0$.
(3) $m^2 - m(4r + 1) + 4r^2 + 2 = 0$. (4) $m^2 - m(4r - 1) + 4r^2 - 2 = 0$.

**8.** The value of $^{50}C_4 + \sum_{r=1}^{6} {}^{56-r}C_3$ is : **[AIEEE 2005, (3, 1), 225]**
(1) $^{56}C_4$ (2) $^{56}C_3$ (3) $^{55}C_3$ (4) $^{55}C_4$

**9.** If x is so small that $x^3$ and higher powers of x may be neglected, then $\frac{(1+x)^{3/2} - \left(1+\frac{1}{2}x\right)^3}{(1-x)^{1/2}}$ may be approximated as : **[AIEEE 2005, (3, 1), 225]**
(1) $\frac{x}{2} - \frac{3}{8}x^2$ (2) $-\frac{3}{8}x^2$ (3) $3x + \frac{3}{8}x^2$ (4) $1 - \frac{3}{8}x^2$

**10.** If the expansion in powers of x of the function $\frac{1}{(1-ax)(1-bx)}$ is $a_0 + a_1x + a_2x^2 + a_3x^3 + .....$, then $a_n$ is : **[AIEEE-2006, (3,1), 225]**
(1) $\frac{a^n - b^n}{b - a}$ (2) $\frac{a^{n+1} - b^{n+1}}{b - a}$ (3) $\frac{b^{n+1} - a^{n+1}}{b - a}$ (4) $\frac{b^n - a^n}{b - a}$

**11.** For natural numbers m, n if $(1 - y)^m (1 + y)^n = 1 + a_1y + a_2y^2 + .....$ and $a_1 = a_2 = 10$, then (m, n) is : **[AIEEE-2006, (3,1), 225]**
(1) (35, 20) (2) (45, 35) (3) (35, 45) (4) (20, 45)

**12.** The sum of the series $^{20}C_0 - {}^{20}C_1 + {}^{20}C_2 - {}^{20}C_3 + ..... + {}^{20}C_{10}$ is **[AIEEE 2007 (3, –1), 120]**
(1) $-{}^{20}C_{10}$ (2) $\frac{1}{2}{}^{20}C_{10}$ (3) 0 (4) $^{20}C_{10}$

**13.** In the binomial expansion of $(a - b)^n$, $n \geq 5$, the sum of 5th and 6th term is zero, then $\frac{a}{b}$ equals **[AIEEE 2008 (3, –1), 105]**
(1) $\frac{n-4}{5}$ (2) $\frac{5}{n-4}$ (3) $\frac{6}{n-5}$ (4) $\frac{n-5}{6}$

**14.** **Statement-1 :** $\sum_{r=0}^{n}(r+1)\,{}^nC_r = (n+2)\,2^{n-1}$ **[AIEEE 2008 (3, –1), 105]**

**Statement-2 :** $\sum_{r=0}^{n}(r+1)\,{}^nC_r\,x^r = (1+x)^n + nx\,(1+x)^{n-1}$

(1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

**15.** Let $S_1 = \sum_{j=1}^{10} j\,(j-1)\,{}^{10}C_j$, $S_2 = \sum_{j=1}^{10} j\,{}^{10}C_j$ and $S_3 = \sum_{j=1}^{10} j^2\,{}^{10}C_j$. **[AIEEE 2009 (4, –1), 144]**

**Statement -1 :** $S_3 = 55 \times 2^9$ .

**Statement -2 :** $S_1 = 90 \times 2^8$ and $S_2 = 10 \times 2^8$.

(1) Statement -1 is true, Statement-2 is true ; Statement -2 is not a correct explanation for Statement -1.
(2) Statement-1 is true, Statement-2 is false.
(3) Statement -1 is false, Statement -2 is true.
(4) Statement -1 is true, Statement -2 is true; Statement-2 is a correct explanation for Statement-1.

**16.** The coefficient of $x^7$ in the expansion of $(1 - x - x^2 + x^3)^6$ is : **[AIEEE 2011 (4, –1), 120]**

(1) 144 (2) – 132 (3) – 144 (4) 132

**17.** If n is a positive integer, then $\left(\sqrt{3}+1\right)^{2n} - \left(\sqrt{3}-1\right)^{2n}$ is : **[AIEEE-2012, (4, –1)/120]**

(1) an irrational number (2) an odd positive integer
(3) an even positive integer (4) a rational number other than positive integers

**18.** The term independent of x in expansion of $\left(\frac{x+1}{x^{2/3}-x^{1/3}+1} - \frac{x-1}{x-x^{1/2}}\right)^{10}$ is : **[AIEEE - 2013, (4, – 1) 120 ]**

(1) 4 (2) 120 (3) 210 (4) 310

**19.** The sum of coefficients of integral powers of x in the binomial expansion of $(1 - 2\sqrt{x})^{50}$ is : **[JEE(Main)2015,(4,–1), 120]**

(1) $\frac{1}{2}(3^{50}+1)$ (2) $\frac{1}{2}(3^{50})$ (3) $\frac{1}{2}(3^{50}-1)$ (4) $\frac{1}{2}(2^{50}+1)$

**20.** If the number of terms in the expansion of $\left(1-\frac{2}{x}+\frac{4}{x^2}\right)^n$, $x \neq 0$, is 28, then the sum of the coefficients of all the terms in this expansion, is **[JEE(Main)2016,(4, – 1), 120]**

(1) 2187 (2) 243 (3) 729 (4) 64

**21.** The value of $({}^{21}C_1 - {}^{10}C_1) + ({}^{21}C_2 - {}^{10}C_2) + ({}^{21}C_3 - {}^{10}C_3) + ({}^{21}C_4 - {}^{10}C_4) + \ldots\ldots + ({}^{21}C_{10} - {}^{10}C_{10})$ is **[JEE(Main)2017,(4, – 1), 120]**

(1) $2^{21} - 2^{11}$ (2) $2^{21} - 2^{10}$ (3) $2^{20} - 2^9$ (4) $2^{20} - 2^{10}$

**22.** The sum of the co-efficients of all odd degree terms in the expansion of $\left(x+\sqrt{x^3-1}\right)^5 + \left(x-\sqrt{x^3-1}\right)^5$, $(x > 1)$ is : **[JEE(Main) 2018, (4, – 1), 120]**

(1) 1 (2) 2 (3) –1 (4) 0

## PART - II : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

**1.** The sum $\sum_{i=0}^{m} \binom{10}{i}\binom{20}{m-i}$, (where $\binom{p}{q} = 0$, if $p < q$) is maximum when ' m ' is: **[IIT-JEE 2003, Scr, (3, – 1), 90]**

(A) 5 (B) 10 (C) 15 (D) 20

**2.** Coefficient of $t^{24}$ in $(1 + t^2)^{12} (1 + t^{12}) (1 + t^{24})$ is: **[IIT-JEE 2003, Scr, (3, – 1), 84]**

(A) ${}^{12}C_6 + 3$ (B) ${}^{12}C_6 + 1$ (C) ${}^{12}C_6$ (D) ${}^{12}C_6 + 2$

**3.** If ${}^{(n-1)}C_r = (k^2 - 3)\,{}^nC_{r+1}$, then an interval in which k lies is **[IIT-JEE 2004, Scr, (3, – 1), 84]**

(A) $(2, \infty)$ (B) $(-\infty, -2)$ (C) $\left[-\sqrt{3}, \sqrt{3}\right]$ (D) $\left(\sqrt{3}, 2\right]$

**4.** The value of **[IIT-JEE 2005, Scr, (3, – 1), 84]**

$$\binom{30}{0}\binom{30}{10} - \binom{30}{1}\binom{30}{11} + \binom{30}{2}\binom{30}{12} - \ldots\ldots\ldots + \binom{30}{20}\binom{30}{30} \text{ is :}$$

(A) $\binom{60}{20}$ (B) $\binom{30}{10}$ (C) $\binom{30}{15}$ (D) None of these

**5.** For r = 0, 1, ...., 10, let $A_r$, $B_r$ and $C_r$ denote, respectively, the coefficient 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 **[IIT-JEE 2010, Paper-2, (5, –2)/79]**

(A) $B_{10} - C_{10}$ (B) $A_{10}\,(B^2_{10} - C_{10}\,A_{10})$ (C) 0 (D) $C_{10} - B_{10}$

# Answers

## EXERCISE # 1

### Section (A) :

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A-1.** | (1) | **A-2.** | (1) | **A-3.** | (1) | **A-4.** | (2) | **A-5.** | (2) | **A-6.** | (3) | **A-7.** | (3) |
| **A-8.** | (3) | **A-9.** | (2) | **A-10.** | (3) | **A-11.** | (3) | **A-12.** | (1) | **A-13.** | (2) | **A-14.** | (1) |
| **A-15.** | (1) | **A-16.** | (2) | **A-17.** | (2) | **A-18.** | (3) | **A-19.** | (3) | **A-20.** | (3) | **A-21.** | (2) |
| **A-22.** | (4) | **A-23.** | (3) | **A-24.** | (1) | **A-25.** | (2) | **A-26.** | (3) | **A-27.** | (2) | **A-28.** | (3) |

### Section (B) :

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **B-1.** | (4) | **B-2.** | (1) | **B-3.** | (3) | **B-4.** | (3) | **B-5.** | (1) | **B-6.** | (4) | **B-7.** | (1) |
| **B-8.** | (1) | | | | | | | | | | | | |

### Section (C) :

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **C-1.** | (4) | **C-2.** | (4) | **C-3.** | (1) | **C-4.** | (2) | **C-5.** | (1) | **C-6.** | (2) | **C-7.** | (3) |
| **C-8.** | (1) | **C-9.** | (3) | **C-10.** | (3) | **C-11.** | (2) | **C-12.** | (3) | **C-13.** | (4) | **C-14.** | (3) |

### Section (D) :

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **D-1.** | (3) | **D-2.** | (4) | **D-3.** | (4) | **D-4.** | (1) | **D-5.** | (2) | **D-6.** | (1) |

## EXERCISE # 2

### PART - I

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | 2. | (2) | **3.** | (3) | **4.** | (4) | **5.** | (4) | **6.** | (2) | **7.** | (3) |
| **8.** | (4) | **9.** | (2) | **10.** | (3) | **11.** | (2) | **12.** | (3) | **13.** | (1) | **14.** | (2) |
| **15.** | (4) | **16.** | (4) | **17.** | (1) | **18.** | (3) | **19.** | (2) | **20.** | (3) | **21.** | (4) |

### PART - II

### Section (A) :

| | | | |
|---|---|---|---|
| **A-1.** | **(1)** | **A-2.** | **(3)** |

### Section (B) :

| | | | |
|---|---|---|---|
| **B-1.** | (1) | **B-2.** | (4) |

### Section (C) :

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **C-1.** | (3,4) | **C-2.** | (1,2) | **C-3.** | (1,2,3) | **C-4.** | (2,3) | **C-5.** | (1,2,3) |

## EXERCISE # 3

### PART - I

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (4) | **2.** | (2) | **3.** | (3) | **4.** | (3) | **5.** | (2) | **6.** | (1) | **7.** | (2) |
| **8.** | (1) | **9.** | (2) | **10.** | (3) | **11.** | (3) | **12.** | (2) | **13.** | (1) | **14.** | **(1)** |
| **15.** | (2) | **16.** | (3) | **17.** | (1) | **18.** | (3) | **19.** | (1) | **20.** | **(3) or Bonus** | | |
| **21.** | (4) | **22.** | (2) | | | | | | | | | | |

### PART - II

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **1.** | (C) | **2.** | (D) | **3.** | (D) | **4.** | (B) | **5.** | (D) |

## Additional Problems For Self Practice (APSP)

## PART - I : PRACTICE TEST PAPER

***This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.***

**Max. Marks : 120** **Max. Time : 1 Hr.**

**Important Instructions :**

**1.** The test is of **1 hour** duration and max. marks 120.

**2.** The test consists **30** questions, **4 marks** each.

**3.** Only one choice is correct **1 mark** will be deducted for incorrect response. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

**4.** There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 3 above.

**1.** If the $6^{th}$ term in expansion of $\left(2x^2+\frac{1}{3x^2}\right)^{10}$ is $\frac{a}{b}$ where a & b are coprime natural numbers then a +b =

(1) 896 (2) 27 (3) 923 (4) 869

**2.** If the $25^{th}$ and $26^{th}$ terms in the expansion of $(1-x)^{44}$ are same then value of x is

(1) $\frac{5}{3}$ (2) $-\frac{5}{3}$ (3) $-\frac{3}{5}$ (4) $-\frac{5}{4}$

**3.** If the sum of the coefficient of $1^{st}.2^{nd}$ & $3^{rd}$ terms in the expansion of $\left(x^2+\frac{1}{x}\right)^m$ is 46 then constant term of expansion is

(1) 80 (2) 82 (3) 78 (4) 84

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

(1) 9 (2) 8 (3) 5 (4) 6

**5.** If the coefficient of $(2r-1)^{th}$ & $(r+3)^{th}$ terms in the expansion of $(1+x)^{15}$ are equal then sum of all possible value of r is

(1) 8 (2) 9 (3) 10 (4)12

**6.** The coefficient of $a^3b^4c^5$ in the expansion of $(ab+bc+ca)^6$ is

(1) 80 (2) 50 (3) 60 (4) 70

**7.** The value of $\frac{1}{1!(n-1)!}+\frac{1}{3!(n-3)}+\frac{1}{5!(n-5)!}+$ ..... is

(1) $\frac{2^n}{(n-1)!}$ (2) $\frac{2^n}{n!}$ (3) $\frac{2^{n-1}}{(n-1)!}$ (4) $\frac{2^{n-1}}{n!}$

**8.** If the sum of the coefficients in expansion of $(a^3x^2-2a^2x+1)^{51}$ vanishes, then possible value of a can be

(1) 1 (2) $\frac{1+\sqrt{5}}{2}$ (3) $\frac{1-\sqrt{5}}{2}$ (4) all of these

**9.** If the middle term in the expansion of $\left(x^2+\frac{1}{x}\right)^n$ is $924x^6$ then value of n is
(1) 10 (2) 12 (3) 14 (4) 16

**10.** If the sum of coefficient in the expansion of $(x-2y+3z)^n$ is128 then the greatest coefficient in the expansion of $(1+x)^{2n}$ is
(1) ${}^{14}C_7$ (2) ${}^{7}C_4$ (3) ${}^{7}C_3$ (4) ${}^{16}C_8$

**11.** If the coefficient of three consecutive terms in the expansion of $(1+x)^n$ are 165,330 and 462 respectively then value of ${}^nC_2$ can be
(1) 55 (2) 45 (3) 66 (4) 78

**12.** The last two digits of $17^{256}$ is
(1) 18 (2) 81 (3) 71 (4) 17

**13.** The value of $\left\{\frac{3^{2003}}{28}\right\}$, where {.} denotes the fractional part, is
(1) $\frac{17}{28}$ (2) $\frac{19}{28}$ (3) $\frac{23}{28}$ (4) $\frac{25}{28}$

**14.** The degree of the polynomial $\frac{1}{\sqrt{4x+1}}\left\{\left(\frac{1+\sqrt{4x+1}}{2}\right)^7-\left(\frac{1-\sqrt{4x+1}}{2}\right)^7\right\}$ is
(1) 1 (2) 2 (3) 3 (4) 4

**15.** For each $n\in N$, $49^n+16n-1$ is divible by
(1) 64 (2) 32 (3) 16 (4) All of these

**16.** If $T_0, T_1, T_2, T_3, \ldots$ represent the terms in the expansion of $(x+a)^n$, then the value of $(T_0-T_2+T_4-T_6+\ldots)^2+(T_1-T_3+T_5-T_7+\ldots)^2$, $n\in N$ is
(1) $(x^2+a^2)^{n/2}$ (2) $(x^2+a^2)^n$ (3) $(x^2-a^2)^n$ (4) $(a^2-x^2)^n$

**17.** If the numerically greatest term in the expansion of $(3-5x)^{15}$ when $x=\frac{1}{5}$ is $455\times3^n$, $n\in N$ then value of $\frac{{}^nC_2}{2}$ is
(1) 66 (2) 33 (3) 22 (4) 55

**18.** If x+y = 1 then value of $\sum_{r=0}^{n} r\ {}^nC_r x^r y^{n-r}$ is
(1) $\frac{n(n-1)}{2}x^2$ (2) nx (3) $\frac{nx}{2}$ (4) $n(n-1)x^2$

**19.** The co-efficient of x in the expansion of $(1-2x^3+3x^5)\left(1+\frac{1}{x}\right)^8$ is :
(1) 56 (2) 65 (3) 154 (4) 62

**20.** The value of $\sum_{r=0}^{n} {}^{n+r}C_r$ is
(1) ${}^{2n+1}C_n$ (2) ${}^{2n}C_{n+1}$ (3) ${}^{2n}C_n$ (4) ${}^{2n+1}C_{n-1}$

**21.** The sum of $1-\frac{1}{8}+\frac{1.3}{8.16}-\frac{1.3.5}{8.16.24}+\ldots\ldots$ is

(1) $\frac{2}{\sqrt{5}}$ (2) $\frac{\sqrt{5}}{2}$ (3) $\frac{\sqrt{3}}{2}$ (4) $\frac{2}{\sqrt{3}}$

**22.** The coefficient of $x^n$ in the expansion of $(1-9x+20x^2)^{-1}$ is

(1) $5^n - 4^n$ (2) $5^{n-1} - 4^{n-1}$ (3) $5^{n+1} - 4^{n+1}$ (4) 0

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

(1) 5 (2) 97 (3) 95 (4) 6

**24.** The coefficient of $x^{50}$ in $(1+x)^{101}(1-x+x^2)^{100}$ is

(1) 0 (2) 41 (3) 50 (4) 1

**25.** If the last term in the binomial expansion of $\left(2^{\frac{1}{3}} - \frac{1}{\sqrt{2}}\right)^n$ is $\left(\frac{1}{3^{5/3}}\right)^{\log_3 8}$ then the $5^{th}$ term of expansion is

(1) 210 (2) 420 (3) 105 (4) 425

**26.** The sum of $^{20}C_0 - {}^{20}C_1 + {}^{20}C_2 - {}^{20}C_3 + .... + {}^{20}C_{10}$ is

(1) $\frac{^{20}C_{10}}{2}$ (2) 0 (3) $^{20}C_{10}$ (4) $-{}^{20}C_{10}$

**27.** The number of values of r satisfying the equation $^{69}C_{3r-1} - {}^{69}C_{r^2} = {}^{69}C_{r^2-1} - {}^{69}C_{3r}$ is

(1) 1 (2) 2 (3) 3 (4) 7

**28.** If R is remainder when $6^{83} + 8^{83}$ is divided by 49 then $\frac{R}{5}$ =

(1) 35 (2) 7 (3) 28 (4) 4

**29.** The largest real value of x such that $\sum_{k=0}^{4} \frac{3^{4-k}}{(4-k)!}\left(\frac{x^k}{k!}\right) = \frac{32}{3}$ is

(1) 1 (2) 2 (3) 3 (4) 4

**30.** Let $R = (5\sqrt{5} + 11)^{2n+1}$ and $f = R - [R]$ where [.] denotes the greatest integer function then value of Rf is

(1) $2^{2n+1}$ (2) $4^{2n+1}$ (3) $2^{4n+1}$ (4) $4^{2n}$

**Practice Test (JEE-Main Pattern)**
**OBJECTIVE RESPONSE SHEET (ORS)**

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | | | | | | | | | | |
| Que. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Ans. | | | | | | | | | | |
| Que. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | | | | | | | | | | |

## PART - II : PRACTICE QUESTIONS

**1.** If the sum of the co-efficients in the expansion of $(1 + 2x)^n$ is 6561, then the greatest term in the expansion for x = 1/2 is :

(1) $4^{th}$ (2) $5^{th}$ (3) $6^{th}$ (4) none of these

**2.** The expression, $\left(\sqrt{2x^2+1}+\sqrt{2x^2-1}\right)^6+\left(\frac{2}{\sqrt{2x^2+1}+\sqrt{2x^2-1}}\right)^6$ is a polynomial of degree

(1) 5 (2) 6 (3) 7 (4) 8

**3.** Co-efficient of $x^5$ in the expansion of $(1 + x^2)^5 (1 + x)^4$ is :

(1) 40 (2) 50 (3) 30 (4) 60

**4.** Co-efficient of $x^{15}$ in $(1 + x + x^3 + x^4)^n$ is :

(1) $\sum_{r=0}^{5} {}^nC_{15-3r}\,{}^nC_r$ (2) $\sum_{r=0}^{5} {}^nC_{5r}$ (3) $\sum_{r=0}^{5} {}^nC_{3r}$ (4) $\sum_{r=0}^{3} {}^nC_{3-r}\,{}^nC_{5r}$

**5.** The term independent of x in the expansion of $( 1 + x + 2x^2)\left(3x^2-\frac{1}{3x^2}\right)^4$ is

(1) 10 (2) 2 (3) 0 (4) 6

**6.** If n is even natural and coefficient of $x^r$ in the expansion of $\frac{(1+x)^n}{1-x}$ is $2^n$, (|x| < 1), then –

(1) $r \le n/2$ (2) $r \ge (n-2)/2$ (3) $r \le (n+2)/2$ (4) $r \ge n$

**7.** The coefficient of $x^9$ in the expansion of $(1 + x) (1 + x^2) (1 + x^3) .....(1 + x^{100})$ is

(1) 6 (2) 7 (3) 8 (4) 9

**8.** If the sum of the coefficients in the expansion of $(2 + 3cx + c^2x^2)^{12}$ vanishes, then c equals to

(1) –1, 2 (2) 1, 2 (3) 1, –2 (4) –1, –2

**9.** The coefficient of $x^n$ in polynomial $(x + {}^{2n+1}C_0) (x + {}^{2n+1}C_1).....(x + {}^{2n+1}C_n)$ is -

(1) 2n + 1 (2) $2^{2n+1} - 1$ (3) $2^{2n}$ (4) none of these

**10.** The coefficient of $x^8$ in the expression $(2 + x)^2 (3 + x)^3 (4 + x)^4$ must be

(1) 26 (2) 27 (3) 28 (4) 29

**11.** The coefficient of $x^{19}$ in the expression $(x - 1)(x - 2^2)(x - 3^2) \ldots\ldots\ldots (x - 20^2)$ must be

(1) 2870 (2) 2800 (3) –2870 (4) – 4100

**12.** The value of $\binom{50}{0}\binom{50}{1} + \binom{50}{1}\binom{50}{2} + \ldots\ldots\ldots + \binom{50}{49}\binom{50}{50}$ is, where ${}^nC_r = \binom{n}{r}$

(1) $\binom{100}{49}$ (2) $\binom{100}{26}$ (3) $\binom{50}{25}$ (4) $\binom{50}{25}^2$

**13.** ${}^nC_0 - 2.3\,{}^nC_1 + 3.3^2\,{}^nC_2 - 4.3^3\,{}^nC_3 + \ldots\ldots\ldots + (-1)^n (n+1)\,{}^nC_n\,3^n$ is equal to

(1) $(-1)^n 2^n\left(\frac{3n}{2}+1\right)$ (2) $2^n\left(n+\frac{3}{2}\right)$ (3) $2^n + 5n\,2^n$ (4) $(-2)^n$.

**14.** For any positive integer m, n (with $n \geq m$), let $\binom{n}{m} = {}^nC_m$,

$\binom{n}{m} + 2\binom{n-1}{m} + 3\binom{n-2}{m} + \ldots + (n - m + 1)\binom{m}{m} =$

(1) ${}^{n+2}C_{m+1}$ (2) ${}^{n+2}C_{m+2}$ (3) ${}^{n-1}C_{m-2}$ (4) ${}^{n+2}C_m$

# Binomial Theorem

## APSP Answers

### PART - I

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (4) | **3.** | (4) | **4.** | (1) | **5.** | (2) | **6.** | (3) | **7.** | (4) |
| **8.** | (4) | **9.** | (2) | **10.** | (1) | **11.** | (1) | **12.** | (2) | **13.** | (2) | **14.** | (3) |
| **15.** | (4) | **16.** | (2) | **17.** | (2) | **18.** | (2) | **19.** | (3) | **20.** | (1) | **21.** | (1) |
| **22.** | (3) | **23.** | (2) | **24.** | (1) | **25.** | (1) | **26.** | (1) | **27.** | (2) | **28.** | (2) |
| **29.** | (1) | **30.** | (2) | | | | | | | | | | |

### PART - II

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (2) | **3.** | (4) | **4.** | (1) | **5.** | (4) | **6.** | (4) | **7.** | (3) |
| **8.** | (4) | **9.** | (3) | **10.** | (4) | **11.** | (3) | **12.** | (1) | | | | |