BINOMIAL THEOREM

EXERCISE – I HINTS & SOLUTIONS

Sol.1 C

$$(1 + x)^n = \sum_{r=0}^{n} {}^nC_r x^r = ({}^nC_0x^0 + {}^nC_2x^2 + \ldots\ldots)$$

$$+ ({}^nC_1x^1 + {}^nC_3x^3 + \ldots\ldots)$$

$$= (b + a) \qquad \begin{cases} T_2 + T_4 + T_6 + \ldots\ldots = b \\ T_1 + T_3 + T_5 + \ldots\ldots = a \end{cases}$$

$$\therefore\ (1 - x)^n = ({}^nC_0x^0 + {}^nC_2x^2 + \ldots\ldots) - ({}^nC_1x^1 + {}^nC_3x^3 + \ldots\ldots) = b - a$$

$$(1 - x^2)^n = (1 + x)^n (1 - x)^n = (a + b)(a - b) = b^2 - a^2$$

Sol.2 C

$$\left(x^{\frac{1}{3}} - x^{-\frac{1}{2}}\right)^{15}$$

$$T_{r+1} = {}^{15}C_r\left(x^{\frac{1}{3}}\right)^{15-r}\left(-x^{-\frac{1}{2}}\right)^r$$

$$T_{r+1} = {}^{15}C_r(-1)^r (x)^{\frac{15-r}{3}-\frac{r}{2}} = {}^{15}C_r(-1)^r (x)^{\frac{30-5r}{6}}$$

Given if $\frac{30-5r}{6} = 0$ then $T_{r+1} = 5m,\ m \in N$

$\Rightarrow \quad r = 6 \quad \Rightarrow \quad T_7 = 5m$

$$T_7 = {}^{15}C_6(-1)^6 = \frac{15\cdot14\cdot13\cdot12\cdot11\cdot10}{6\cdot5\cdot4\cdot3\cdot2}$$

$= 5\cdot7\cdot13\cdot11\cdot = 5\cdot(1001) \Rightarrow m = 1001$

Sol.3 B

7^{th} term of $\left(2^{\frac{1}{3}} + 3^{-\frac{1}{3}}\right)^n$ is $T_7 = {}^nC_6\, 2^{\frac{n-6}{3}}\, 3^{-2}$

From begining

7^{th} term of $\left(2^{\frac{1}{3}} + 3^{-\frac{1}{3}}\right)^n$ from the end

$= 7^{th}$ term of $\left(3^{-\frac{1}{3}} + 2^{\frac{1}{3}}\right)^n$ from the begining

$$= T_7' = {}^nC_6\, 3^{-\left(\frac{n-6}{3}\right)}\, 2^2$$

given that $\frac{T_7}{T_7'} = \frac{1}{6}$

$$\Rightarrow \frac{{}^nC_6\, 2^{\frac{n-6}{3}}\, 3^{-2}}{{}^nC_6\, 3^{-\left(\frac{n-6}{3}\right)}\, 2^2} = \frac{1}{6} \quad \Rightarrow \quad \frac{2^{\frac{n-6}{3}-2}}{3^{2-\left(\frac{n-6}{3}\right)}} = \frac{1}{6}$$

$$\Rightarrow \frac{1}{(2.3)^{2-\left(\frac{n-6}{3}\right)}} = \frac{1}{6} \Rightarrow 2 - \frac{n-6}{3} = 1$$

$\Rightarrow 3 = n - 6 \quad \Rightarrow n = 9$

Sol.4 A

$$\left(1+\frac{1}{4n}\right)^{4n} = {}^{4n}C_0\left(\frac{1}{4n}\right)^1 + {}^{4n}C_2\left(\frac{1}{4n}\right)^2 + \ldots\ldots$$

$$+ {}^{4n}C_{4n}\left(\frac{1}{4n}\right)^{4n}$$

$$= 1 + 1 + \frac{1}{2!}^{\left(1+\frac{1}{4n}\right)} + \ldots\ldots + \frac{1}{4n!}^{\left(1-\frac{1}{4n}\right)\left(1-\frac{2}{4n}\right)\ldots\ldots\left(1-\frac{4n-1}{4n}\right)}$$

$$< 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \ldots\ldots \frac{1}{(4n)!}$$

$$\left(1+\frac{1}{3n}\right)^{3n} = 1 + 1 + \frac{1}{2!}^{\left(1-\frac{1}{3n}\right)} + \ldots\ldots$$

$$+ \frac{1}{(3n)!}^{\left(1-\frac{1}{3n}\right)\left(1-\frac{2}{3n}\right)\ldots\ldots\left(1-\frac{3n-1}{3n}\right)}$$

$$< 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \ldots\ldots + \frac{1}{(3n)!}$$

$$\left(1+\frac{1}{2n}\right)^{2n} = 1 + 1 + \frac{1}{2!}^{\left(1-\frac{1}{2n}\right)} + \ldots\ldots$$

$$+ \frac{1}{(2n)!}^{\left(1-\frac{1}{2n}\right)\left(1-\frac{2}{2n}\right)\ldots\ldots\left(1-\frac{2n-1}{2n}\right)}$$

$$< 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \ldots\ldots + \frac{1}{(2n)!}$$

$$\left(1+\frac{1}{n}\right)^n = 1+1+\frac{1}{2!}\left(1-\frac{1}{n}\right)+\ldots\ldots$$

$$+\frac{1}{(n)!}\left(1-\frac{1}{n}\right)\left(1-\frac{2}{n}\right)\ldots\ldots\left(1-\frac{n-1}{n}\right)$$

$$< 1+1+\frac{1}{2!}+\frac{1}{3!}+\ldots\ldots+\frac{1}{(2n)!}$$

$$\left(1+\frac{1}{n}\right)^n < \left(1+\frac{1}{2n}\right)^{2n} < \left(1+\frac{1}{3n}\right)^{3n} < \left(1+\frac{1}{4n}\right)^{4n}$$

Sol.5 C

$$T_{r+1} = {}^nC_r(2)^{n-r}\left(\frac{x}{3}\right)^r = {}^nC_r\frac{2^{n-r}}{3^r}x^r$$

Coeff $T_8 = T_9 \quad \Rightarrow {}^nC_7\frac{2^{n-7}}{3^7} = {}^nC_8\frac{2^{n-8}}{3^8}$

$$\Rightarrow \frac{{}^nC_8}{{}^nC_7} = \frac{3.2}{1} \quad \Rightarrow \frac{n-8+1}{8} = 6$$

$\Rightarrow n - 7 = 48 \quad \Rightarrow n = 55$

Sol.6 D

$$\frac{1}{\sqrt{4x+1}}\left[\left(\frac{1+\sqrt{4x+1}}{2}\right)^7 - \left(\frac{1-\sqrt{4x+1}}{2}\right)^7\right]$$

$$= \frac{1}{2^7\sqrt{4x+1}}\left[\sum_{r=0}^{7}{}^7C_r(1)^{7-r}\left(\sqrt{4x+1}\right)^r\right.$$

$$\left.-\sum_{r=0}^{7}{}^7C_r(1)^{7-r}\left(-\sqrt{4x+1}\right)^r\right]$$

$$= \frac{1}{2^7\sqrt{4x+1}}[T_1+T_2+T_3+\ldots+T_8-T_1+T_2-T_3+\ldots+T_8]$$

$$= \frac{1}{2^7\sqrt{4x+1}}[2(T_2+T_4+T_6+T_8)]$$

$$= \frac{1}{2^6\sqrt{4x+1}}\left[{}^7C_1\sqrt{4x+1}+{}^7C_3\left(\sqrt{4x+1}\right)^3\right.$$

$$\left.+\,{}^7C_5\left(\sqrt{4x+1}\right)^5+{}^7C_7\left(\sqrt{4x+1}\right)^7\right]$$

$$= \frac{1}{2^6}\left[{}^7C_1+{}^7C_3(4x+1)\right.$$

$$\left.+\,{}^7C_5(4x+1)^2+{}^7C_7(4x+1)^3\right]$$

= is the polynomial in x of degree 3

Sol.7 B

G.T. is $T_{r+1} = {}^{100}C_r(2)^{\frac{100-r}{2}}(3)^{\frac{r}{4}}$

The above term will be rational if exponent of 2 & 3 are integers.

i.e. $\frac{100-r}{2}$ and $\frac{r}{4}$ must be integers

the possible set of r is = {0, 4, 8, 16,……, 100}
no. of rational terms is 26

Sol.8 B

If $n \in N$ & n is even then

$$\frac{1}{1\cdot(n-1)!}+\frac{1}{3!(n-3)}+\frac{1}{5!(n-5)}+\ldots+\frac{1}{(n-1)!\,1!}$$

$$= \frac{1}{n!}\left[{}^nC_1+{}^nC_3+{}^nC_5+\ldots\ldots+{}^nC_{n-1}\right]$$

n is even $\Rightarrow$ n – 1 is odd
${}^nC_{n-1}$ second Binomail coeff. from the end

$$= \frac{1}{n!}[C_1+C_3+C_5+\ldots\ldots+C_{n-1}]$$

$$= \frac{1}{n!}\cdot 2^{n-1} = \frac{2^{n-1}}{n!}$$

Sol.9 B

$(1^2 + 1)1! + (2^2 + 1)2! + (3^2 + 1)3! + \ldots\ldots$
$+ (n^2 + 1)\cdot n!$

$$T_n = \sum_{n=1}^{n}(n^2+1)n!$$

$$= \sum_{n=1}^{n}\left[n^2+3n+2-3n-1\right]n!$$

$$= \sum_{n=1}^{n}\left[(n+2)(n+1)-3(n+1)+2\right]n!$$

$$= \sum_{n=1}^{n}\left[(n+2)\;!\;-3(n+1)!+2n!\right]$$

$= 3! + 4! + 5! + \ldots\ldots + n! + (n + 1)! + (n + 2)!$
$- 3[2! + 3! + 4! + 5! + \ldots\ldots + n! + (n + 1)!]$
$+ 2[1! + 2! + 3! + \ldots\ldots + n!]$
$= [(n + 2)! + (n + 1)! - 3(n + 1)!$
$- 3.2! + 2.1! + 2.2!]$
$= (n + 2)! - 2(n + 1)! - 2! + 2.1!$
$= (n + 1)!\, [n + 2 - 2]$
$= (n + 1)! \cdot n$
$= n \cdot (n + 1)!$

Sol.10 D

$3^{400} = (3^2)^{200} = (9)^{200} = (10 - 1)^{200}$
$= {}^{200}C_0\, 10^{200} + {}^{200}C_1\, 10^{199} + {}^{200}C_2\, 10^{198} + \ldots\ldots + {}^{200}C_{199}\, 10^1 + {}^{200}C_{200}\, 10^0$

$$= 100\left[{}^{200}C_0 10^{198} + {}^{200}C_1 10^{197} + {}^{200}C_2 10^{196} + \ldots + {}^{200}C_{198}\right] + {}^{200}C_{199}10^1 + {}^{200}C_{200}10^0$$

$= (k)100 + 200\,(10) + 1(1)$
$= (k + 20)\,100 + 01$
so last two digits is 01

Sol.11 A

$C_0 + C_1 + C_2 + \ldots\ldots + C_n = 2^n = 256$
$\Rightarrow\ 2^n = 2^8 \ \Rightarrow\ n = 8$

$$T_{r+1} = {}^8C_r(2x)^{8-r}\left(\frac{1}{x}\right)^r = {}^8C_r\, 2^{8-r}\, x^{8-2r}$$

For Constant term $\Rightarrow\ 8 - 2r = 0 \Rightarrow r = 4$

$$= {}^8C_4 2^4 = \frac{8\times7\times6\times5}{4\times3\times2}2^4 = 70\times16 = 1120$$

Sol.12 A

sum of coeff of $(1 - 2x + 5x^2)^n = a$
sum of coeff of $(1 + x)^{2n} = b$
put x = y = 1
$a = (1 - 2 + 5)^n = 4^n$ & $b = (1 + 1)^{2n} = 2^{2n} = 4^n$
a = b

Sol.13 B

Let $(2x^2 - 3x + 1) = a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots\ldots + a_{22}x^{22}$ … (1)
Put x = –1
$\Rightarrow a_0 - a_1 + a_2 - a_3 + \ldots + a_{22}$
$= (2 + 3 + 1)^{11} = 6^{11}$ … (2)
Put x = 1
$\Rightarrow a_0 + a_1 + a_2 + a_3 + \ldots + a_{22} = 0$ … (3)
adding (2) & (3)
$\Rightarrow\ 2[a_0 + a_2 + a_4 + \ldots\ldots + a_{22}] = 6^{11}$

$$\Rightarrow a_0 + a_2 + a_4 + \ldots + a_{22} = \frac{6^{11}}{2} = \frac{6.6^{10}}{2} = 3.6^{10}$$

Sol.14 C

${}^{18}C_{r-2} + 2 \cdot {}^{18}C_{r-1} + {}^{18}C_r \geqslant {}^{20}C_{13}$
$\Rightarrow\ {}^{18}C_{r-2} + {}^{18}C_{r-1} + {}^{18}C_{r-1} + {}^{18}C_r \geqslant {}^{20}C_{13}$
$\Rightarrow\ {}^{19}C_{r-1} + {}^{19}C_r \geqslant {}^{20}C_{13} \ \Rightarrow\ {}^{20}C_r \geqslant {}^{20}C_{13}$
$\therefore\ {}^{20}C_{10} > {}^{20}C_{11} > {}^{20}C_{12} > {}^{20}C_{13}$
& ${}^{20}C_{10} > {}^{20}C_9 > {}^{20}C_8 > {}^{20}C_7$
r = 7, 8, 9, 10, 11, 12, 13 $\Rightarrow$ Total 7 elements

Sol.15 C

$(2x + 5y)^{13}$ greatest form for x = 10, y = 2

$$\frac{n+1}{\left|\frac{x}{y}\right|+1} - 1 \leqslant r \leqslant \frac{n+1}{\left|\frac{x}{y}\right|+1}$$

$$\Rightarrow\ \frac{14}{\left|\frac{2x}{5y}\right|+1} - 1 \leqslant r \leqslant \frac{14}{\left|\frac{2x}{5y}\right|+1}$$

$$\Rightarrow\ \frac{14}{3} - 1 \leqslant r \leqslant \frac{14}{3} \quad \Rightarrow\ \frac{11}{3} \leqslant r \leqslant \frac{14}{3}$$

$\Rightarrow\ 3.66 \ldots\ldots \leqslant r \leqslant 4.666 \Rightarrow r = 4$
$\Rightarrow\ T_5 = {}^{13}C_4\,(20)^9\,(10)^4$

Sol.16 D

$$\left(x^k + \frac{1}{x^{2k}}\right)^{3n},\ \ n \in N \qquad \text{Independent of } x$$

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

$= {}^{3n}C_r\, x^{3nk - rk - 2kr} = {}^{3n}C_r\, x^{3k(n - r)}$
For Constant term $\Rightarrow\ 3k\,(n - r) = 0 \Rightarrow n = r$
$\therefore\ T_{r+1} = {}^{3n}C_n$ true for any real k or $K \in R$

Sol.17 B

$$\frac{C_0}{1} + \frac{C_1}{2} + \frac{C_2}{3} + \ldots\ldots + \frac{C_{10}}{11}$$

$$\sum_{r=0}^{10} T_{r+1} = \sum_{r=0}^{10} \frac{{}^{10}C_r}{r+1}$$

$$= \sum_{r=0}^{10} \frac{1}{(10+1)} \cdot \frac{10+1}{r+1} \cdot {}^{10}C_r = \frac{1}{11}\sum_{r=0}^{10} {}^{11}C_{r+1}$$

$$= \frac{1}{11}\left[{}^{11}C_1 + {}^{11}C_2 + \ldots\ldots + {}^{11}C_{11}\right]$$

$$= \frac{1}{11}\left[{}^{11}C_0 + {}^{11}C_1 + {}^{11}C_2 + \ldots + {}^{11}C_{11} - {}^{11}C_0\right]$$

$$= \frac{1}{11}\left[2^{11} - 1\right] = \frac{2^{11}-1}{11}$$

Sol.18

P + f = $\left(5+2\sqrt{6}\right)^n$, P, n $\in$ N, 0 < f < 1

Let f' = $\left(5-2\sqrt{6}\right)^n$ = |rational – irrational|^n < 1

P + f + f' = 2 [Integer] = even integer

$\because$ f + f' = 1 $\Rightarrow$ (f – 1) = –f'

Now f^2 – f + Pf – P = f(f – 1) + P(f – 1)

= (f – 1) (P + f) = –f' (P + f)

$= -\left(5-2\sqrt{6}\right)^n\left(5+2\sqrt{6}\right)^n = -[5^2 - 2^2 \cdot 6]^n$

$= -[25-24]^n = -1$ = negative Interger

Sol.19 B

$(x+2)^{n-1} + (x+2)^{n-2}(x+1) + (x+2)^{n-3}$
$(x+1)^2 + \ldots\ldots + (x+1)^{n-1}$
$= a^{n-1} + a^{n-2}b + a^{n-3}b^2 + \ldots\ldots + b^{n-1}$

$$= a^{n-1}\left[1 + \left(\frac{b}{a}\right) + \left(\frac{b}{a}\right)^2 + \ldots\ldots + \left(\frac{b}{a}\right)^{n-1}\right]$$

$$= a^{n-1}\frac{1\cdot\left[\left(\frac{b}{a}\right)^n - 1\right]}{\frac{b}{a}-1} = a^{n-1}\,\frac{a^n - b^n}{a-b}\cdot\frac{a}{a^n}$$

$$= \frac{(x+2)^n - (x+1)^n}{x+2-x-1} = (2+x)^n - (1+x)^n$$

T_{r+1} term is ${}^nC_r\, 2^{n-r} x^r - {}^nC_r\, x^r$
coeff of x^r is ${}^nC_r\,(2^{n-r} - 1)$

Sol.20 A

$(1+x+x^2)^{25} = a_0 + a_1x + a_2x^2 + \ldots\ldots a_{50}x^{50}$
put x = 1
$a_0 + a_1 + a_2 + a_3 + \ldots\ldots + a_{49} + a_{50} = 3^{25}$ …(i)
put x = –1
$a_0 - a_1 + a_2 - a_3 + \ldots + a_{49} + a_{50} = (1-1+1)^{25}$…(ii)
adding (i) & (ii)
$2[a_0 + a_2 + a_4 + \ldots\ldots + a_{50}] = 3^{25} + 1$

$$a_0 + a_2 + a_4 + \ldots\ldots + a_{50} = \frac{3^{25}+1}{2} = \frac{(4-1)^{25}+1}{2}$$

$= {}^{25}C_0\, 4^{25} - {}^{25}C_1\, 4^{24} + {}^{25}C_2\, 4^{23} - \ldots\ldots$
$+ {}^{25}C_{24}\, 4^1 - 1 + 1$

$$= \frac{4\left[{}^{25}C_0 4^{24} - {}^{25}C_1 4^{23} + \ldots\ldots\ {}^{25}C_{24}\right]}{2}$$

Sol.21 D

coef of x^4 in $(1-x+2x^2)^{12}$
$= {}^{12}C_0\,(1-x)^{12}(2x^2)^0 + {}^{12}C_1\,(1-x)^{11}(2x^2)$
$+ {}^{12}C_2\,(1-x)^{10}(2x^2)^2$ + above x^4 powers
terms of x^4
$= {}^{12}C_0 \cdot {}^{12}C_4\,(-x)^4 + {}^{12}C_1\,{}^{11}C_2\,(-x)^2\, 2x^2$
$+ {}^{12}C_2\,{}^{10}C_0\, 4x^4$
$= {}^{12}C_4 + 12 \cdot {}^{11}C_2 \cdot 2 + {}^{12}C_2 \cdot 4$

$= {}^{12}C_4 + 2.3 \cdot \frac{12}{3}\ {}^{11}C_2 + {}^{12}C_2 \cdot 4$

$= {}^{12}C_3 + {}^{12}C_2 + 3\left({}^{12}C_2 + {}^{12}C_3\right) + {}^{12}C_3 + {}^{12}C_3 + {}^{12}C_4$

$= {}^{12}C_3 + 3({}^{12}C_2 + {}^{12}C_3) + {}^{12}C_2 + {}^{12}C_3 + {}^{12}C_3 + {}^{12}C_4$

$= {}^{12}C_3 + 3\,{}^{13}C_3 + {}^{13}C_3 + {}^{13}C_4$

$= {}^{12}C_3 + 3\,{}^{13}C_3 + {}^{14}C_4$

Sol.22 B

$$\sum_{k=1}^{n-r} {}^{n-k}C_r = {}^xC_y$$

L.H.S. $= {}^{n-1}C_r + {}^{n-2}C_r + {}^{n-3}C_r + \ldots\ldots + {}^rC_r$
$= {}^rC_r + {}^{r+1}C_r + \ldots\ldots\ {}^{n-2}C_r + {}^{n-1}C_r$

$$\left\{{}^rC_r = \frac{r+1}{r+1}{}^rC_r = {}^{r+1}C_{r+1}\right\}$$

$= {}^{r+1}C_{r+1} + {}^{r+1}C_r + {}^{r+2}C_r + \ldots\ldots + {}^{n-1}C_r$
$= {}^{r+2}C_{r+1} + {}^{r+2}C_r + \ldots\ldots + {}^{n-1}C_r$
$= {}^{r+2}C_{r+1} + \ldots\ldots + {}^{n-1}C_r$
$= {}^{n-1}C_{r+1} + {}^{n-1}C_r$
$= {}^nC_{r+1} = {}^xC_y \Rightarrow$ x = n, y = r + 1

Sol.23 B

Coeff of α^t in

$(\alpha + p)^{m-1} + (\alpha + p)^{m-2}(\alpha + q) + (\alpha + p)^{m-3}(\alpha + q)^2$

$\ldots\ldots + (\alpha + q)^{m-1}$

$\because \quad a \neq -q, \quad p \neq q$

Let $\alpha + P = x$ & $\alpha + q = y$

$= x^{m-1} + x^{m-2}y + x^{m-3}y^2 + \ldots\ldots y^{m-1}$

$$= x^{m-1}\left[1 - \left(\frac{y}{x}\right) + \left(\frac{y}{x}\right)^2 + \ldots\ldots + \left(\frac{y}{x}\right)^{m-1}\right]$$

$$= x^{m-1}\frac{\left[1 - \left(\frac{y}{x}\right)^m\right]}{\left(1 - \frac{y}{x}\right)}$$

$$= \frac{x^{m-1}}{x^m}\frac{x^m - y^m}{x - y}\cdot x = \frac{(\alpha + p)^m - (\alpha + q)^m}{\alpha + p - \alpha - q}$$

$$= \frac{1}{(p - q)}\left[(\alpha + p)^m - (\alpha + q)^m\right]$$

$$= \text{coeff of } \alpha^t = \left(\frac{{}^mC_t\, p^{m-t} - {}^mC_t\, q^{m-t}}{p - q}\right)$$

Sol.24 B

$(1 + x + x^2 + \ldots\ldots + x^9)^{-1} \qquad (|x| < 1)$

$$= \left[\frac{1\cdot(1 - x^{10})}{1 - x}\right]^{-1} = \frac{(1 - x)}{(1 - x^{10})} = (1 - x)(1 - x^{10})^{-1}$$

$= (1 - x)\,[1 + (x^{10}) + (x^{10})^2 + (x^{10})^3 + \ldots\ldots \infty]$

$= (1 - x)\,[1 + x^{10} + x^{20} + x^{30} + x^{40} + \ldots\ldots + x^{400}$

$+ x^{410} + \ldots\ldots \infty]$

$=$ coeff of x^{401} is (-1)

Sol.25 C

$3^{1/3}$	$7^{1/7}$	1
0	0	10
3	0	7
6	0	4
9	0	1
3	7	0
0	7	3

$\therefore$ no. of terms are 6

Alter : ${}^{10}C_r\left(1 + 3^{\frac{1}{3}}\right)^{10-0} \Rightarrow {}^{10}C_r\left(1 + 3^{\frac{1}{3}}\right)^r$

should be r = 0, 3,6, 9

$\left(1 + 3^{\frac{1}{3}}\right)^{10-7} \Rightarrow {}^{10}C_r\left(3^{\frac{1}{3}}\right)^r$ r shoule be r = 0, 3

corresponding $\left(7^{\frac{1}{7}}\right)^0 \left(3^{\frac{1}{3}}\right)^r$

value of r = 0, 3, 6, 9 = 4 values

corresponding $\left(7^{\frac{1}{7}}\right)^0 \left(3^{\frac{1}{3}}\right)^r$

value of r = 0, 3 = 2 values

Total 6 values

Sol.26 C

Sum of the coeff of degree r is

$(1 + x)^n (1 + y)^n (1 + z)^n$

$$= \left(\sum_{f=0}^{n} {}^nC_k x^k\right)\left(\sum_{s=0}^{n} {}^nC_s y^s\right)\left(\sum_{t=0}^{n} {}^nC_t z^t\right)$$

$$= \sum_{0\leqslant k,s,t\leqslant n} \left({}^nC_k\right)\left({}^nC_s\right)\left({}^nC_t\right)x^k y^s z^t$$

degree m = k + s + t = r

sum of coeff $= \sum_{k,s,t\geqslant 0} {}^nC_k \cdot {}^nC_s \cdot {}^nC_t$

= the number of way of choosing a total number r balls out of n white, n block and n red balls.

$= {}^{3n}C_r$