

ROJGAR WITH ANKIT

Number System

PART-13

* No. of zeroes:

$$1 \times 2 \times 3 \times 4 \times 5$$

$\downarrow$
 $2 \rightarrow 3 \quad (2 \times 2)$
 $5 \rightarrow 1$

$\Rightarrow$ 1 Ans

* क्रमगुणित/Factorial:

$\downarrow$
अंतिम सं को 2 से
Divide करें, जब तक
Divide होना बंद
न हो जाए।

Factorial के case में,
2 की counting
नहीं करनी है।

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 = 6!$$

$$1 \times 2 \times 3 \times 4 \dots 7 \times 8 = 8!$$

$$15! = 1 \times 2 \times 3 \times 4 \dots \times 15$$

$$1 \times 2 \times 3 \times 4 \dots 100 = 100!$$

~~$$\begin{array}{r} 100 \\ 2 \\ \hline 50 \\ 2 \\ \hline 25 \\ 2 \\ \hline 12 \\ 2 \\ \hline 6 \\ 2 \\ \hline 3 \\ 2 \\ \hline 1 \\ 2 \\ \hline \end{array}$$~~

$$\begin{array}{r} 100! \\ 5 \\ \hline 20 \\ 5 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ + 4 \\ \hline \end{array}$$

$$2 \rightarrow 97$$

$$5 \rightarrow \boxed{24}$$

$$\begin{array}{r} 3 \\ 2 \\ \hline \end{array} + 1$$

$1 \times 2 \times 3 \times 4 \dots 300$ OR $300!$

$$\begin{array}{r} 300! \\ 5 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 60 \\ 5 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 12 \\ 5 \\ \hline \end{array} + 2$$

$$\boxed{74}$$

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$1 \times 2 \times 3 \dots 78$ or $78!$; शून्यों की सं. ?

$$\begin{array}{r} 78! \quad 15 \\ \hline 5 \\ \hline 15 \quad + 3 \\ \hline 2 \quad \boxed{18} \end{array}$$

$1 \times 2 \times 3 \times \dots 23 \times 24 \times 25 \times 26 \times 27 \times \dots 182$; शून्यों की सं. हैं -

$$\begin{array}{r} 23 \quad \boxed{4 \text{ zero}} \\ \hline 5 \\ \hline 182 \quad 36 \\ \hline 5 \\ \hline 36 \quad 7 \\ \hline 5 \\ \hline 7 \quad + 1 \\ \hline 5 \quad 44 - 4 = \boxed{40} \text{ Ans} \end{array}$$

$1 \times 2 \times 3 \times 4 \times \dots 980$ or $980!$

$$\begin{array}{r} 980! \quad 196 \\ \hline 5 \\ \hline 196 \quad 39 \\ \hline 5 \\ \hline 39 \quad 7 \\ \hline 5 \\ \hline 7 \quad + 1 \\ \hline 5 \quad \boxed{243} \end{array}$$

$1 \times 2 \times 3 \dots \times 36 \times 37 \times 38 \times 39 \times \dots 837$

$$\begin{array}{r} 36! \quad 7 \\ \hline 5 \\ \hline 7 \quad + 1 \\ \hline 5 \quad 8 \end{array} \quad \begin{array}{r} 837 \quad 167 \\ \hline 5 \\ \hline 167 \quad 33 \\ \hline 5 \\ \hline 33 \quad 6 \\ \hline 5 \\ \hline 6 \quad + 1 \\ \hline 5 \quad 207 - 8 \Rightarrow \boxed{199} \text{ Ans} \end{array}$$

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1024! में शून्यों की सं० ?

$$\frac{1024}{5} = 204$$

$$\frac{204}{5} = 40$$

$$\frac{40}{5} = 8$$

$$\frac{8}{5} = 1$$

$$253$$

Ans

~~$$\begin{aligned} \# & 2 \times 4 \times 6 \times 8 \\ & 2[1 \times 2 \times 3 \times 4] \\ & = 48 \end{aligned}$$~~

$$2^4[1 \times 2 \times 3 \times 4]$$

$$16 \times 24$$

$$384$$

$$\# 2 + 4 + 6 + 8$$

$$2[1 + 2 + 3 + 4]$$

$$= 20$$

$2 \times 4 \times 6 \times 8 \times 10 \times \dots \times 100$ में शून्यों की संख्या बता करें—

$$2^{50}[1 \times 2 \times 3 \times 4 \times 5 \dots 50]$$

$$2^{50} \left[\frac{50!}{5} \right] 10$$

$$\frac{10}{5} = 2$$

$$12$$

Ans

$2 \times 4 \times 6 \times 8 \dots 220$ में शून्यों की संख्या?

$$2^{110}[1 \times 2 \times 3 \times 4 \dots 110^2]$$

~~$$2^{110} \left[\frac{110!}{5} \right] 22$$~~

$$\frac{22}{5} = 4$$

$$26$$

Ans

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$3 \times 6 \times 9 \times 12 \times 15$ $\xrightarrow{\quad\quad\quad} \frac{81}{243}$ में शून्यों की सं.?

$$3^{81} [1 \times 2 \times 3 \times 4 \times 5 \xrightarrow{\quad\quad\quad} 81]$$

$$\cancel{3^{81}} \left[\frac{\cancel{81!}}{\cancel{5}} \right] 16$$

$$\frac{\cancel{16}}{\cancel{5}} + 3 = \boxed{19} \text{ Ans}$$

$5 \times 10 \times 15 \times 20$ $\xrightarrow{\quad\quad\quad} \frac{43}{215}$ में शून्यों की सं.?

$$5^{43} [1 \times 2 \times 3 \times 4 \xrightarrow{\quad\quad\quad} 43]$$

$$5^{43} \left[\frac{\cancel{43!}}{\cancel{5}} \right] 8$$

$$\frac{\cancel{8}}{\cancel{5}} + 1 = 9$$

$$5 \rightarrow 43 + 9 = \cancel{52}$$

$$2 \rightarrow \boxed{39} \text{ Ans}$$

$$\frac{\cancel{43}}{\cancel{2}} 21$$

$$\frac{\cancel{21}}{\cancel{2}} 10$$

$$\frac{\cancel{10}}{\cancel{2}} 5$$

$$\frac{\cancel{5}}{\cancel{2}} 2$$

$$\frac{\cancel{2}}{\cancel{2}} + 1 = 39$$

$10 \times 20 \times 30 \times 40 \times \dots$ $\xrightarrow{\quad\quad\quad} \frac{91}{910}$ में शून्यों की सं.?

$$10^{91} [1 \times 2 \times 3 \times 4 \xrightarrow{\quad\quad\quad} 91]$$

$$\frac{\cancel{91}}{\cancel{5}} 18$$

$$\frac{\cancel{18}}{\cancel{5}} + 3$$

$$21 + 91 = \boxed{112}$$