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// mathongo Q13 (2) thongo /// mathongo Q15 (4) athongo /// mathongo /// mathongo Q9 (2) athongo /// ma Q10 (3) /// mathongo Q11 (1) athongo /// mcQ12 (2) /// mathongo $Q_5(2)$ athongo W ma $Q_6(4)$ W mathongo $Q_7(1)$ athongo W mc $Q_8(3)$ W mathongo $\mathbf{Q}\mathbf{1}$ (1) athongo $\mathbf{Q}\mathbf{2}$ (2) $\mathbf{Q}\mathbf{1}$ mathongo $\mathbf{Q}\mathbf{3}$ (1) athongo $\mathbf{Q}\mathbf{4}$ (9) $\mathbf{Q}\mathbf{4}$ (9) $\mathbf{Q}\mathbf{4}$ Answer Key Answer Keys and Solutions

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Q1 (1) O(1) Mathongo Mathon

Coefficient of T_r^{th} term = coefficient of $T_{r+\tau}^{th}$ term = coefficient of $T_{r+\tau}^{th}$ term = $\int_{0}^{1-\tau} \int_{0}^{1-\tau} t \, dt$ for morphong with term = $\int_{0}^{1-\tau} \int_{0}^{1-\tau} t \, dt$ for morphong with the second secon

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.. T_{30} and T_{31} are two consecutive terms whose coefficients are same.

Q2 (2)

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Since there is no constant term the coefficient of $8^{\rm th}$ and $19^{\rm th}$ term are same as the binomial coefficients of $8^{\rm th}$

and 19^{th} term.

 $uC_7=u$ $C_{18}\Rightarrow n=7+18=25$

 $L^{u+1}=_{52}C^{u}\left(x_{rac{9}{4}}
ight)_{52-u}\left(u_{-rac{1}{2}}
ight)_{u}$ watyoudo watyou

 $\sum_{\Sigma^0} x \, \frac{1}{2} \sum_{(\Sigma^0 - 1) - \frac{\Sigma^0}{4}}$ mathongo mathongo mathongo

To be independent of x, $\frac{100-5r}{6}=q \Leftrightarrow r=20$

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Answer Keys and Solutions

// mathongo // mathongo // mathongo // mathongo // mathongo // mathongo The general term of the expansion $(2^{1/4} + 3^{1/10})^{55}$ is given by (2) 20 $ext{0} = 0$ t = 1 t = 1 t = 1ognothongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo ognorism /// ognorism // $\int_{0}^{1} \frac{1}{2} \int_{0}^{1} \frac{1}{2} \int_{0}^{1}$ (6) 4Q mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo $= 8 + n^2 - 9n + 8 = 1$ mathongo /// mathongo /// mathongo ognodisca /// ognodisca /// ognodisca /// ognodisca /// mathongo /// mathongo /// mathongo $\Rightarrow 3(2n^{1/2}) = 2n^2 - 3n^2 + 4$ mathongo /// mathongo /// mathongo $(\digamma + n \pounds - ^2 n 4) n £ = (\lnot - n 4) n 6$ ognorism mathongo ma ognorion // ognorion // ognorion // ognorion // $\frac{(z-n\zeta)(1-n\zeta)n\zeta}{\partial} + n\zeta = \left(\frac{(1-n\zeta)n\zeta}{\zeta}\right)\zeta \Leftarrow$ $\sum_{i \in I} \frac{z_n i}{|z|} + \frac{z_n i}{|z|} = \left(\frac{z_n i}{|z|} \frac{z_n i}{|z|}\right) \le \frac{z_n i}{|z|} = \left(\frac{z_n i}{|z|} \frac{z_n i}{|z|}\right) \le \frac{z_n i}{|z|} = \frac{z_n i}{|z|}$ $\Rightarrow \Sigma^{2n} C_2 =^{2n} C_1 +^{2n} C_3 \cdots [2b=a+c]$ arothongo when go an arrivongo when the property of the second contract of the second co Since, coefficients of 2nd, 3rd and 4th terms are in A.P. Coefficients of 2^{nd} , 3^{rd} and 4^{th} terms in $(1+x)^{2n}$ are $^{2n}\mathrm{C}_1$, $^{2n}\mathrm{C}_2$ and $^{2n}\mathrm{C}_3$ respectively.. $\frac{1}{63}$ (1) mathongo $\frac{1}{1}$ mathongo $\frac{1}{1}$ mathongo $\frac{1}{1}$ mathongo $\frac{1}{1}$ mathongo

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$$\Gamma_{r+1} = 55 C_r(2) \left(\frac{4}{56-r} \right) \left(\frac{3}{r} \right)$$
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If a term is rational, then both of $\left(\frac{55-r}{4}\right)$ and $\left(\frac{r}{10}\right)$ should be equal to integers.

 $\frac{55-1}{4}$ is an integer. mathongo /// mathongo /// mathongo /// mathongo

$$\frac{1}{2} = \frac{10 \, k}{4} = \frac{4 \, k' + 2}{4}$$
 mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo

There is not a single possible integral value of r such that $\frac{55-r}{4}$ as well as $\frac{r}{10}$ is an integer. Mathongo mathongo

/// mathongo /// mathongo /// mathongo /// mathongo /// mathongo Number of irrational terms in the given expansion is equal to 56.

The term independent of x is mathongo w mathongo w mathongo w mathongo w

$$2 \cdot {}^{9}C_{3}\left(\frac{3}{2}\right)^{3}\left(\frac{-1}{2}\right)^{6} + a \cdot {}^{9}C_{2}\left(\frac{3}{2}\right)^{2}\left(\frac{-1}{2}\right)^{7}$$
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Last digit of
$$(2017)^{2018}$$
 is 9, last digit of $(2018)^{2019}$ is 2, last digit of $(2019)^{2020}$ is 1. So remainder on division with 5 will be 4,2 and 1 respectively.

So remainder on division with 5 will be 4,2 and 1 respectively.

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Overall remainder will be (4+2+1)%5=2 methongo % methongo %

We have $2^{2000} = (2^4)^{500} = (17-1)^{500}$ mathongo $^{1/2}$ mathongo $^{1/2}$ mathongo $^{1/2}$ mathongo $^{1/2}$ mathongo $^{1/2}$ mathongo $^{1/2}$ mathongo $^{1/2}$

=17m+1, where m is some positive integer. Hongo m mathongo m mathongo m mathongo

 $\Rightarrow 2^{2003} = 8 \left(2^{2000}\right) = 8(17 \text{ m} + 1) = 17(8 \text{ m}) + 8$ This show that the required remainder is 8.

(2) 60 (2)

Let $(k+1)^{th}$ term be independent of x mathongo m mathon m mathongo m mathon m mathon m mathon m mathon m mathon m mathongo m mathon m

 $= \frac{1}{2} C^F a^{0-k} b^k x \left(\frac{6}{3-k} - \frac{3}{2}\right)$ $= \frac{1}{2} C^F a^{0-k} b^k x \left(\frac{6}{3-k} - \frac{3}{2}\right)$ $= \frac{1}{2} C^F a^{0-k} b^k x \left(\frac{6}{3-k} - \frac{3}{2}\right)$ $= \frac{1}{2} C^F \left(ax \frac{6}{3}\right)^{3-k} \left(bx - \frac{3}{2}\right)^k$ $= \frac{1}{2} C^F \left(ax \frac{6}{3}\right)^{3-k} \left(bx - \frac{3}{2}\right)^k$

For this to be independent of x, mathongo \sim mathongo \sim mathongo \sim mathongo \sim

 $\frac{9-k}{6}-\frac{k}{3}=0\Rightarrow\frac{9}{6}\Rightarrow\frac{k}{6}+\frac{k}{3}=\frac{k}{2}\Rightarrow k=3.$

 $\Rightarrow L^{k+1} = {}_9 C^3 a_e p_3 = 8 rac{\sqrt{a_5 p}}{2} e^{-\sqrt{a_5 p}}$ we undersoon the first provided the second contraction of the second contraction

Using $A.M. \geq G.M$, we get $rac{a^2+b}{2} > \sqrt{a^2b}$ and mornoon $rac{A}{2} > \sqrt{a^2b}$ methongo

 $\frac{\sqrt{a_5 p}}{\sqrt{a_5 p}} \le 1$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$

t = t + t = 84 wathongo /// mathongo /// mathongo /// mathongo /// mathongo

Q10 (3) athongo /// mathongo /// mathongo /// mathongo /// mathongo

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Coefficient of x^{10} in the given expansion Q12 (2) Mathongo /// mathongo /// mathongo /// mathongo /// mathongo -72+36=-36 mathongo % mathongo % mathongo % mathongo % $\frac{1}{\sqrt{1}}$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo Required ans. $= rac{1}{60} imes (02-) imes rac{1}{60}$ $\Rightarrow 4{f r}=20 \Rightarrow {f r}=5$ mathongo /// mathongo /// mathongo /// mathongo $\mathrm{T}_6 = {}^6 \mathrm{C}_5 \cdot 2^1 \cdot (-1) \cdot 3^5 \cdot \mathrm{x}^{-8}$ For term of x^{-8} 12-4r=-8 12-4r=-8 12-4r=-8 methongo m methongo mCase-II :thongo /// mathongo /// mathongo /// mathongo /// mathongo $T_4=-^6C_3 imes 2^3 imes 3^3x^6=-20 imes 2^3 imes 3^3$ $12-4r=0 \Rightarrow r=3$ mathongo $ho_{
m M}$ mathongo $ho_{
m M}$ mathongo $ho_{
m M}$ mathongo For term independent of x is Case-Lithongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo T_{r+1} in $\left(2x^2-rac{3}{x^2}
ight)^6$ will be $T_{r+1}={}^6C_r(2x^2)^{6-r}(-1)^r imes 3^r imes x^{12-2r-2r}$ methongo metho ognorism wy ognorism wy ognorism whongo with mathongo with mathon mathon with mathon mathon with mathon mathon mathon with mathon math $\frac{1}{60} imes ag{2} imes ag{2} imes ag{2} ag{2}$ term independent of x will be $\left(\frac{1}{80} - \frac{8}{18} \frac{1}{18}\right) \cdot \left(\frac{2}{18} - \frac{3}{18}\right) \cdot \left(\frac{1}{18} - \frac{1}{18}\right)$ OII (I) athongo /// mathongo /// mathongo /// mathongo /// mathongo Hence, required remainder = 3 mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ when (1!+2!+3!+4!=33) is divided by 15. : 5!, 6!, 7!, 8!, ... 175! are each multiple of 15 therefore, the required remainder is obtained

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 $= \frac{12}{12}C_{10} + \frac{12}{12$

 $= \frac{31}{10}C_{10} + \frac{11}{11}C_{10} + \dots + \frac{14}{14}C_{10} + \frac{15}{10}C_{10} + \dots + \frac{30}{10}C_{10}) - \left(\frac{10}{10}C_{10} + \frac{11}{11}C_{10} + \dots + \frac{14}{14}C_{10}\right) - \left(\frac{10}{10}C_{10} + \frac{11}{11}C_{10} + \dots + \frac{14}{14}C_{10}\right)$ $= \frac{31}{10}C_{10} + \frac{11}{11}C_{10} + \dots + \frac{14}{14}C_{10} + \frac{15}{11}C_{10} + \dots + \frac{14}{14}C_{10}$ $= \frac{31}{10}C_{11} - \frac{15}{10}C_{11}$ $= \frac{31}{1$

O13 (2) athongo /// mathongo /

when divided by 9 is equivalent to the division of ngo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$ mathongo $\frac{1}{2}$

i.e. remainder= -1+9=8 rongo /// mathongo /// mathongo /// mathongo

ognotion $^{\prime\prime\prime}$ ognotion $^{\prime\prime\prime}$ ognotion $^{\prime\prime\prime}$ ognotion $^{\prime\prime\prime}$ ognotion $^{\prime\prime\prime}$ ognotion $^{\prime\prime\prime}$ ognotion $^{\prime\prime\prime}$

when divided by 9 is equivalent to the division of ngo // mathongo // mathongo

 $3^{11}=(9)^5 \times 3$ // mathongo // mathongo

... 11¹⁰¹¹ + 1011¹¹¹ has same remainder as 8, thongo // mothongo // mothongo

Old (2) athongo /// mathongo /// mathongo /// mathongo /// mathongo

General term of $\left(\frac{5}{2}x^3 - \frac{1}{5x^2}\right)^{11}$ is morning an inchange in morning in the proof of $\left(\frac{5}{2}x^3 - \frac{1}{5x^2}\right)^{11} = \frac{11}{11}C_r(-1)^r \cdot \frac{5^{11-2r}}{9^{11-r}} \cdot x^{33-5r}$

The term independent of x in the expansion of $(1-x^2+3x^3)\left(\frac{5}{2}x^3-\frac{1}{5x^2}\right)^{11}$ will be the coefficient of x^0 in

 $\left(\frac{5}{5}x^3 - \frac{1}{5x^2}\right)^{11}$ coefficient of x^{-2} in $\left(\frac{5}{2}x^3 - \frac{1}{5x^2}\right)^{11} + 3 \times$ coefficient of x^{-3} in $\left(\frac{5}{2}x^3 - \frac{1}{5x^2}\right)^{11}$ normongo

ognorism \mathbb{M} ognorism \mathbb{M} ognorism \mathbb{M} opnorism $\mathbb{M$ =1000m + 681 /// mathongo /// mathongo /// mathongo /// mathongo = 1000I + 128 (290) (18415 - 1) + 1 methongo /// methongo /// methongo $=10001+^{128}C_{2}(290)^{2}-^{128}C_{1}(290)+1$, where I is an integer one mathon We can have $17^{256}=(290-1)^{128}$ /// mathongo /// mathongo /// mathongo wathongo /// mathongo /// mathongo /// mathongo /// mathongo $=-_{11}C_{7}(-1)^{7} \cdot \frac{2^{4}}{5^{-3}} = \frac{5^{3} \cdot 2^{4}}{330} = \frac{200}{330}$ mathongo mat JEE Main 2023 Crash Course Answer Keys and Solutions **Binomial Theorem** DPP 1

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