Course on Probability class 6

Special class

Ankur Bansal • Aug 18, 2021

7 black
3 Red
5 white

a) all the three balls are Red ✓

b) At least 2 balls are black ✓

c) Balls are of Different color

BRW BWR
WRB WBR
RWB RBW

$6\left(\frac{7}{15} \times \frac{3}{14} \times \frac{5}{13}\right)$

d) One White & 2 Red

WRR RRW
RWR

$\left(\frac{5}{15} \times \frac{3}{14} \times \frac{2}{13}\right)^3$

Same Question but with Replacement

unacademy

GATE CHEMICAL ENGINEERING

Probability classes

Ankur Bansal

unacademy | GATE & ESE | Search | 0 minutes today

Ankur Bansal

#1 Educator in Chemical Engineering - GATE & ESE

Working in the field of gate chemical engineering from last 10 years, completed my Masters from IIT Delhi. Am very passionate about teaching

7M Watch mins | **2M** Watch mins (last 30 days) | **3K** Followers | **331** Dedications

GATE & ESE

SEE ALL

HINDI CHEMICAL ENGINEERING

Complete Course on Heat Transfer Operations

Lesson 29 • Jul 19, 2021 6:00 PM

Ankur Bansal

HINGLISH CHEMICAL ENGINEERING

Complete Course on Mass Transfer Operations

Lesson 19 • Jul 19, 2021 6:00 AM

Ankur Bansal

HINDI CHEMICAL ENGINEERING

Complete Course on Chemical Technology

Ended on Dec 29, 2020 • 12 lessons

Ankur Bansal

Educator highlights

- Worked at **The Gate Coach**
- Studied at **IIT Delhi**
- Taught over 10000+ students of chemical engineering in the duration of 8 years with a qualifying gate percentage of more than 85% HOD of the chemical engineering in the last institute i worked on.
- Lives in **Delhi Cantt., Delhi, India**

unacademy

OFFER ALERT

GATE & ESE

12+2 + 3

Get 2 months extra on the 12-month subscription with 3 months of competitive programming subscription to aid your placement prep.

Pay ~ ₹27k
Get value worth ~ ₹55k
& SAVE ~ 51%

24+4+6

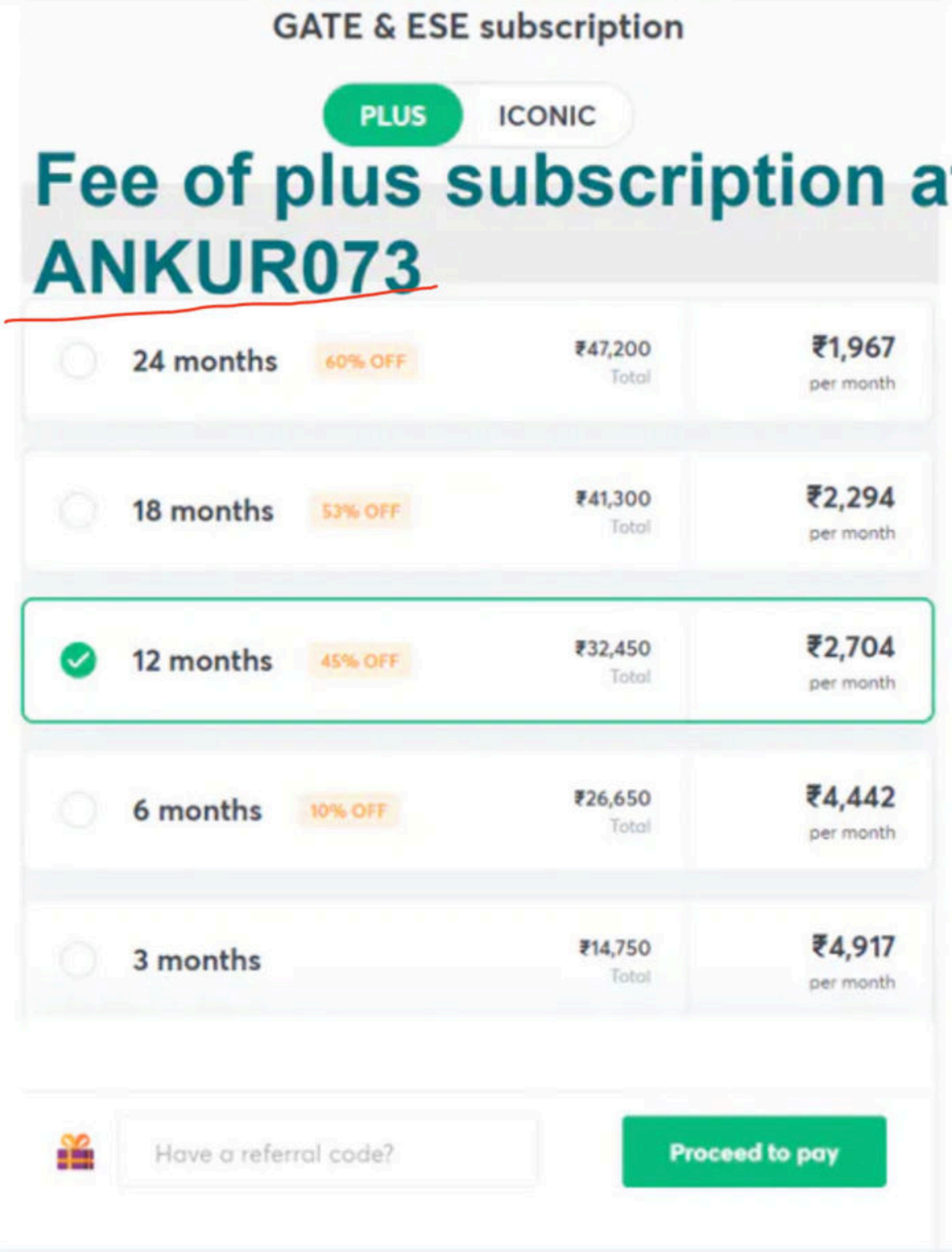
Get 4 months extra on the 24-month subscription with 6 months of competitive programming subscription to aid your placement prep.

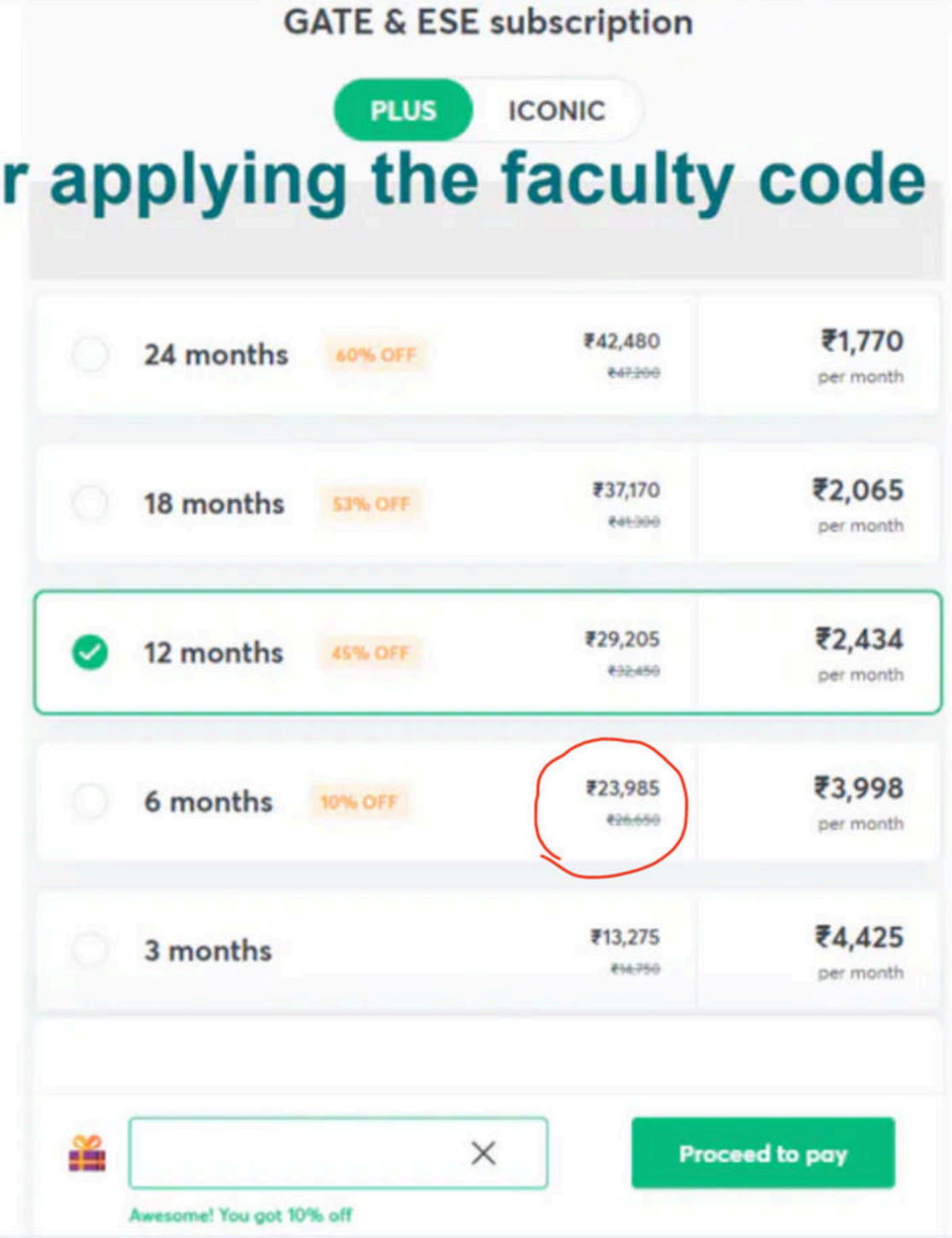
Pay ~ ₹39k
Get value worth ~ ₹89k
& SAVE ~ 56%

DURATION	1 Year	2 Years
GATE & ESE Subscription	₹ 30,250	₹ 44,000
Additional Month Subscription	₹ 9,167	₹ 18,333
Competitive Programming Subsription	₹ 16,000	₹ 27,000
Total Value Offering	₹ 55,417	₹ 89,333
Referal Code discount	₹ 3,025	₹ 4,400
What you Pay	₹ 27,225	₹ 39,600
What you Save	₹ 28,192 (51%)	₹ 49,733 (56%)

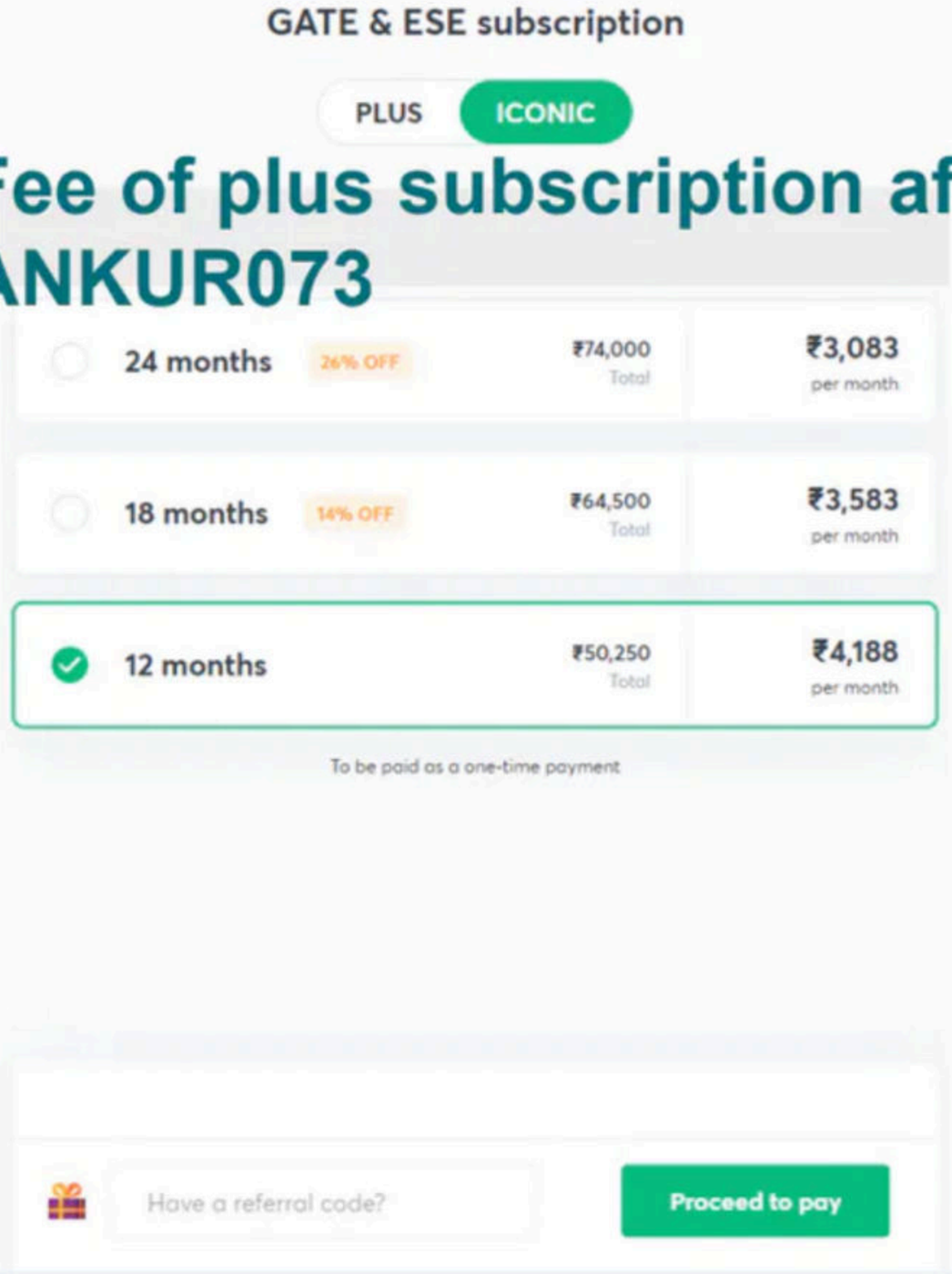
SUBSCRIBE NOW!

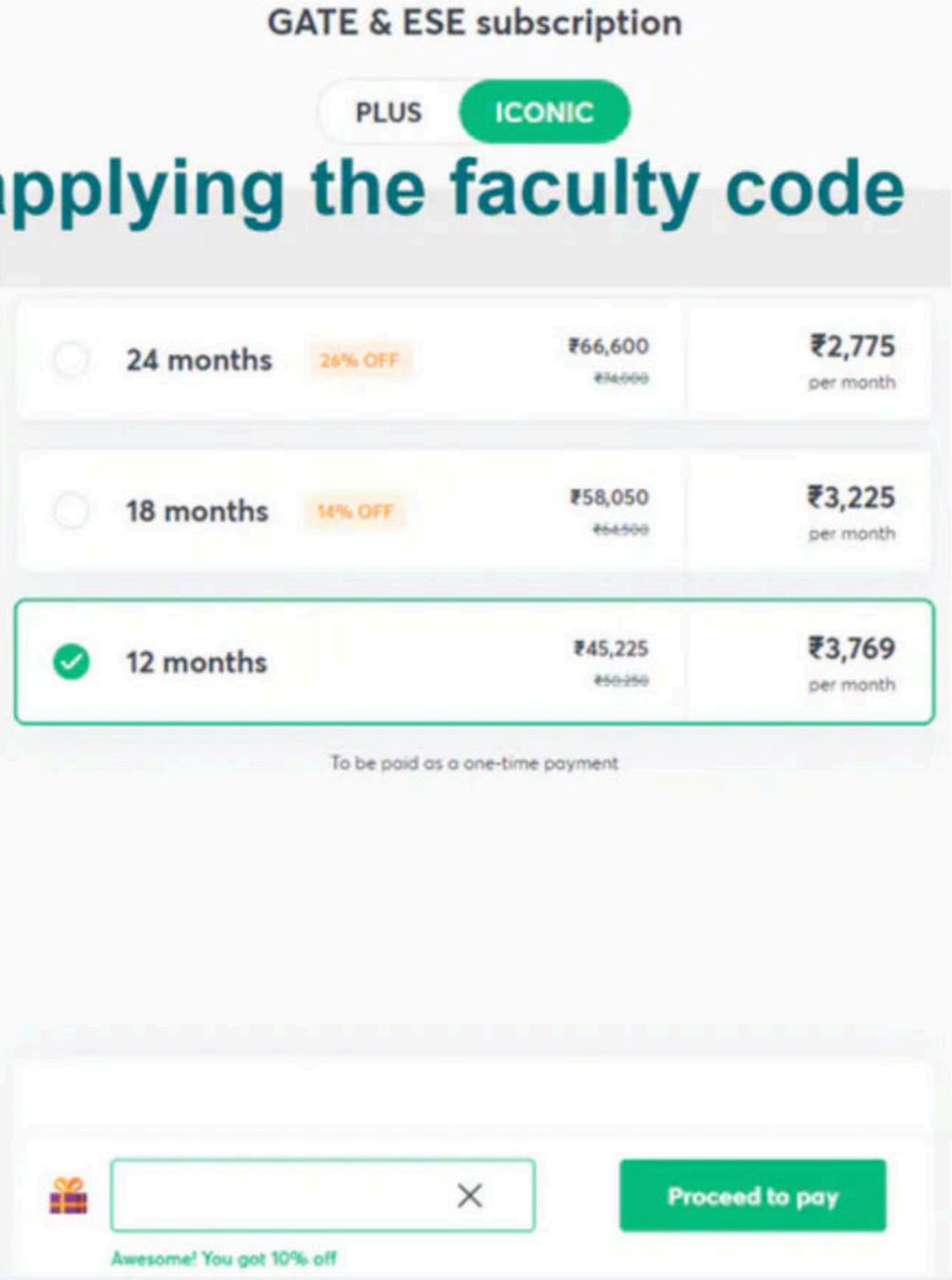
Fee of plus subscription after applying the faculty code ANKUR073





Fee of plus subscription after applying the faculty code ANKUR073





Join my telegram Channel 'Chemical engineering with Ankur sir' (t.me/ankur073)

June 2021
Every Saturday
09:30 AM – 12:30 PM
Marathon practice session

5th June Heat Transfer
12th June Instrumentation and process control
19th June Mass transfer
26th June Mechanical operation and Plant economics

Use CODE ankur073 to subscribe and to unlock the free plan.

BATCH - N

NEW BATCH ALERT

EVOLVE FOR GATE 2022

CHEMICAL ENGINEERING


ANKUR BANSAL


SHAILENDRA KUMAR


DEVENDRA POONIA


PRAVEEN KULKARNI


SUMIT PRAJAPATI


MANISH RAJPUT


YOGESH TYAGI

WE START WITH

MASS TRANSFER OPERATIONS

by Devendra Poonia

06 : 00 AM

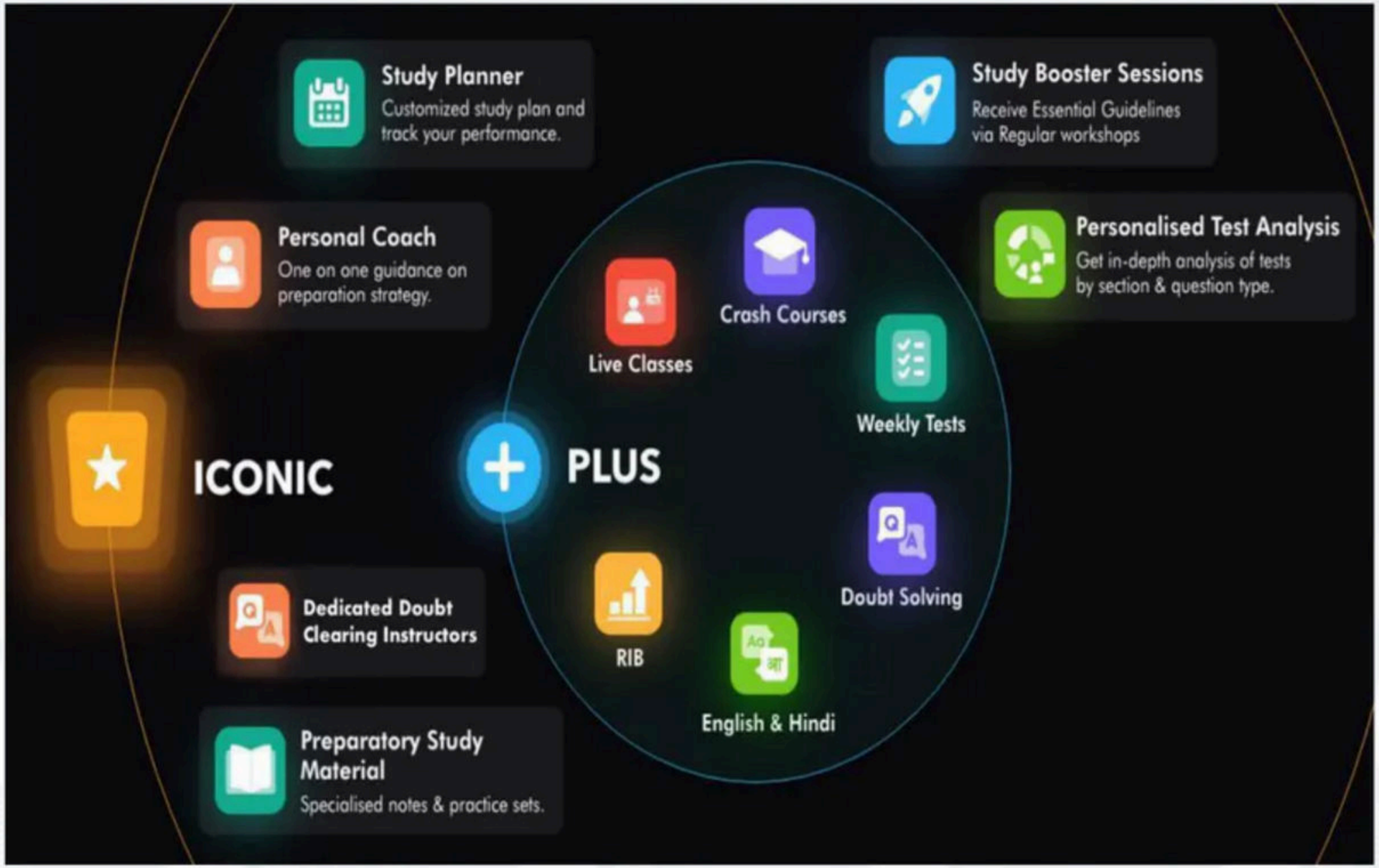
START DATE

04 AUG 2021

FOR 10% DISCOUNT

USE CODE

ANKUR073



unacademy

Most important topics of Mass transfer | CH

Timetable for Ankur Bansal

	09:00 PM	
5th July	Two film theory	Link of the class
6th July	Minimum reflux ratio	Link of the class
7th July	Single stage extraction	Link of the class
8th July	Counter current Absorption	Link of the class
9th July	Time of Drying	Link of the class

Join my telegram group 'Chemical engineering with Ankur sir' (t.me/ankur073)

June Plan	
5th June	GATE Exam & Benefits
6th June	Top Colleges for M.Tech
8th June	GATE Preparation Strategy & Planning
10th June	PSUs via GATE
12th June	Detailed analysis of Mass transfer operation
13th June	Detailed analysis of Heat transfer operation
15th June	PYQs of Heat Transfer
17th June	PYQs of Heat Transfer
19th June	Detailed analysis of Instrumentation and Process Control
20th June	Detailed analysis of Fluid Mechanics
22th June	PYQs of Heat Transfer
24th June	PYQs of Heat Transfer
26th June	Detailed analysis of Thermodynamics
27th June	Ask Me Anything
29th June	PYQs of Heat Transfer

GATEWAY to GATE for Chemical engineers (GuidANCE for every chem engg)

Watch these sessions now on youtube

Use CODE **ANKUR073** to subscribe and avail my guidance

Join my telegram group 'Chemical engineering with Ankur sir' (t.me/ankur073)

Popular Playlist of Ankur Bansal

You can find the series of Most important tips for gate preparation series , Mass transfer practice questions series, Interview guidance and preparation series and also the mock interview sessions for PSU.

Complete series of Mass transfer PYQs

Mass transfer PYQs

Ankur sir's probability course

1 Lecture 1
2 Lecture 2
3 Lecture 3
4 Lecture 4
5 Lecture 5
6 Lecture 6
7 Lecture 7
8 Lecture 8
9 Lecture 9
10 Lecture 10

Watch the free series of engineering mathematics

Complete course on laplace Transforms

Complete course on first order differential equation

Complete course on Vectors

Complete course on Numerical methods

Use CODE **ANKUR073** to subscribe and avail my guidance

Feedbackward versus feedforward control strategy

Practice questions on Laplace Transforms

Fertilizer Industry

Cascade Control Strategy

Natural product industry

Peterochemical industry

Concept of HTU and NTU

Peterochemical industry cont.

Mass Transfer practice questions

Oil AND Fats Industry

Direct and indirect acting control valve part 1

Direct and indirect acting control valve part 2

- Fourier number (N_{Fo}): $k\theta/\rho C_p L^2$ is the ratio of the rate of heat transfer by conduction to the rate of energy storage in the system.
- Prandtl number (N_{Pr}): $C_p\mu/k$ is the ratio of momentum diffusivity (μ) and thermal diffusivity. Since it is a material property, Prandtl number depends only on the physical conditions (temperature and pressure) that a material is held at, not on the system in which it is placed.
- Peclet number ($N_{Re} \times N_{Pr}$): $DV\rho C_p/k$ is the convective transport/diffusive transport.
- Nusselt number (N_{Nu}): hD/k is the ratio of convective heat transfer to conductive heat transfer in the fluid perpendicular to flow direction. Measures enhancement of heat transfer from a surface that occurs in a real situation compared to heat transferred if only conduction occurred. Nusselt number conveys how important convection is compared to conduction. It involves a heat transfer coefficient and a characteristic length, both of which depend on the type of system one is using.
- Grashof number (N_{Gr}): $L^3\rho^2\beta g\,\Delta t/\mu^2$ is the ratio of buoyancy force to viscous force acting on a fluid. L is characteristic length. It is generally used to model natural convection.
- Rayleigh number (N_{Ra}): $N_{Gr} \times N_{Pr} = L^3\rho^2 g\beta C_p \Delta T/\mu\alpha$ is the quantity that governs natural convection heat transfer.
- Graetz number (N_{Gz}): $WC_p/kL = D_i/LN_{Re} \times N_{Pr}$ characterizes laminar flow in a conduit. Ratio of the sensible heat change of the flowing fluid to the rate of heat conduction through a film of thickness D or L.
- Biot number (N_{Bi}): hL/k is the ratio of the internal thermal resistance to the external thermal resistance. It represents the relative importance of the thermal resistance within a solid body.
- Stanton number (N_{St}): $h/C_pV\rho = N_{Nu}/N_{Re} \times N_{Pr}$ measures the ratio of the heat transferred into a fluid to the thermal capacity of the fluid. Used in forced convection.

Probability

c) Balls are of Different Colors

W R B

$$6\left(\frac{5}{15}\times\frac{3}{15}\times\frac{7}{15}\right)$$

d) one white 2 are Red

W R R

$$3\left(\frac{5}{15}\times\frac{3}{15}\times\frac{3}{15}\right)$$

Combination / selection

$${}^{n}C_{r} = \frac{\lfloor n}{\lfloor r \, \lfloor n-r}$$

$${}^{n}C_{r} = {}^{n}C_{n-r}$$

$${}^{100}C_{98} = {}^{100}C_{100-98} = {}^{100}C_{2} = \frac{100 \times 99}{2 \times 1}$$

$${}^{5}C_{2} = \frac{\lfloor 5}{\lfloor 2 \, \lfloor 5-2} = \frac{\lfloor 5}{\lfloor 2 \, \lfloor 3} = \frac{5 \times 4 \times \lfloor 3}{\lfloor 2 \, \lfloor 3} = \frac{5 \times 4}{2 \times 1}$$

$${}^{7}C_{3} = \frac{7 \times 6 \times 5}{3 \times 2 \times 1}, \quad {}^{11}C_{4} = \frac{11 \times 10 \times 9 \times 8}{4 \times 3 \times 2 \times 1}$$

$5C_0 = 1$

$5C_1 = 5$

$5C_2 = \frac{5 \times 4}{2 \times 1} = 10$

$5C_3 = 10$

$5C_4 = 5$

$5C_5 = 1$

$6C_0 = 1$

$6C_1 = 6$

$6C_2 = \frac{6 \times 5}{2 \times 1} = 15$

$6C_3 = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$

$6C_4 = 15$

$6C_5 = 6$

$6C_6 = 1$

$7C_0 = 1$

$7C_1 = 7$

$7C_2 = \frac{7 \times 6}{2 \times 1} = 21$

$7C_3 = \frac{7 \times 6 \times 5}{3 \times 2 \times 1} = 35$

$7C_4 = 35$

$7C_5 = 21$

$7C_6 = 7$

$7C_7 = 1$

Ques:- same last question

Balls are drawn together ?

7 B
3 R
5 W

a) ALL the Balls are Red

$$P = \frac{{}^{3}C_{3}}{{}^{15}C_{3}} = \frac{3\times2\times1}{15\times14\times13}$$

b) Atleast two balls are black

$$P = \frac{{}^{7}C_{2} \times {}^{8}C_{1}}{{}^{15}C_{3}} + \frac{{}^{7}C_{3}}{{}^{15}C_{3}}$$

(2 B, 3 B)

$$= \frac{\frac{7\times6}{2\times1} \times 8}{\frac{15\times14\times13}{3\times2\times1}} + \frac{7\times6\times5}{15\times14\times13}$$

$$\frac{7\times6\times8}{15\times14\times13} \times 3$$

c) Balls are of Different Color

$$P = \frac{{}^{7}C_1 \times {}^{3}C_1 \times {}^{5}C_1}{{}^{15}C_3}$$

$$\frac{7 \times 3 \times 5 \times 3 \times 2}{15 \times 14 \times 13}$$

d) 2 Red & one white

$$P = \frac{{}^{3}C_2 \times {}^{5}C_1}{{}^{15}C_3}$$ ✓

Balls are drawn Together	Balls are drawn one by one
selection	Selection
Arrangement X	Arrangement ✓
Combination Rule	Fractional Rule
Widout Replacement	Widout Replacement → Default
With Replacement X	With Replacement
Default ✓	Default X

Ques:-1:- Cards Problem

A deck of 52 cards is well shuffled and then 4 cards cards are drawn from it. Calculate the Probability of drawing

a) 4 kings

b) 2 kings & 2 queens

c) one Ace, one, Jack & 2 queens

d) Face card

a) $P = \frac{^{4}C_{4}}{^{52}C_{4}}$

b) $P = \frac{^{4}C_{2} \times ^{4}C_{2}}{^{52}C_{4}}$

c) $P = \frac{^{4}C_{1} \times ^{4}C_{1} \times ^{4}C_{2}}{^{52}C_{4}}$

d) $P = \frac{^{13}C_{4}}{^{52}C_{4}}$

Ques 8 Arrangement Problem

Find the Probability that in a random arrangement of the letters of the word 'ARRANGEMENT' Vowels occur Together?

⇒ Fundamental Rule of Permutation

* n things can arrange themselves in $n!$ number of ways. Provided all of them are distinct.

* Out of n things if P are of one kind & Q are of other kind then the arrangement of n things will be $\frac{n!}{P!\,Q!}$

A R R A N G E M E N T

11 letters can ARRange themselves in $\frac{\lfloor 11}{\lfloor 2 \lfloor 3 \lfloor 2 \lfloor 3}$

Favourable

Vowels should occur Together

Jinhe sath Rakhna hai, Unhe ek Maan lenge

(A A E E) R R N G M N T

8 letters arrange themselves $= \frac{\lfloor 8}{\lfloor 3 \times \lfloor 2} \times \frac{\lfloor 4}{\lfloor 3 \lfloor 2}$