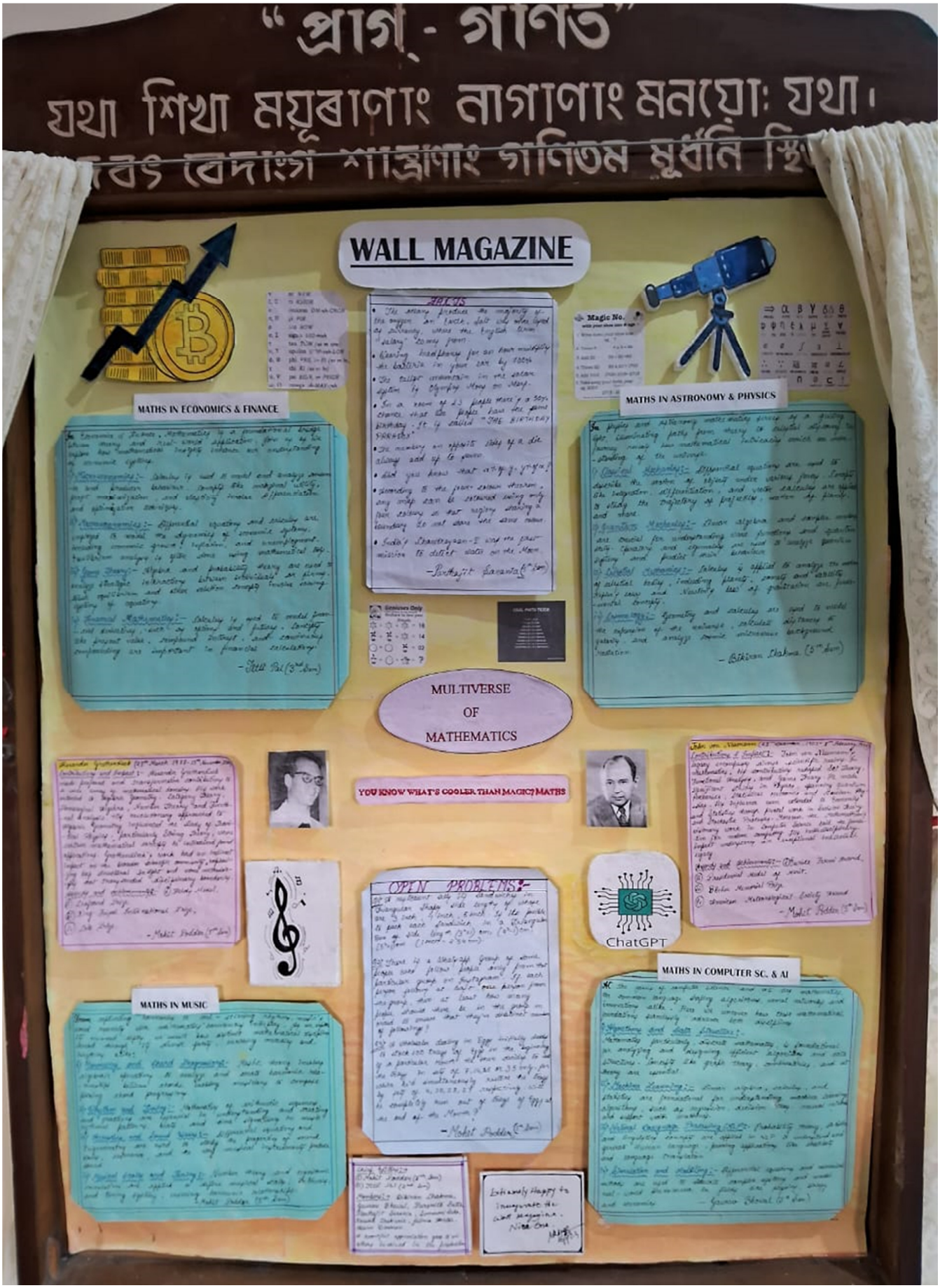
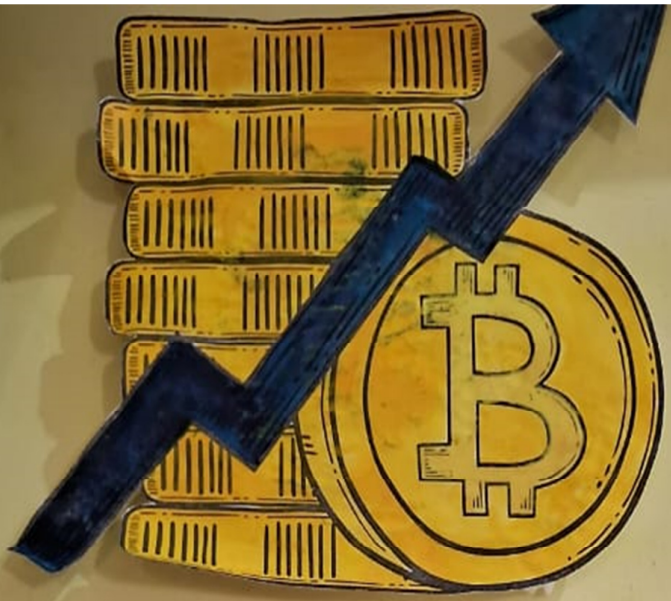
DEPARTMENT OF MATHEMATICS





ν	nu NEW
ξ, Ξ	xi KSIGH
ο	omicron OM-uh-CRON
π, Π	pi PIE
ρ	rho ROW
σ, Σ	sigma SIG-muh
τ	tau TOW (as in cow)
υ, Υ	upsilon OOP-suh-LON
φ, Φ	phi FEE, or FI (as in hi)
χ	chi KI (as in hi)
ψ, Ψ	psi SIGH, or PSIGH
ω, Ω	omega oh-MAY-guh

MATHS IN ECONOMICS & FINANCE

In Economics & Finance, Mathematics is a foundational bridge between theory and real-world application. Join us as we explore how mathematical insights enhance our understanding of economic systems.

i) Microeconomics :- Calculus is used to model and analyze consumer and producer behaviour. Concepts like marginal utility, profit maximization, and elasticity involve differentiation and optimization techniques.

ii) Macroeconomics :- Differential equations and calculus are employed to model the dynamics of economic systems, including economic growth, inflation, and unemployment. Equilibrium analysis is often done using mathematical tools.

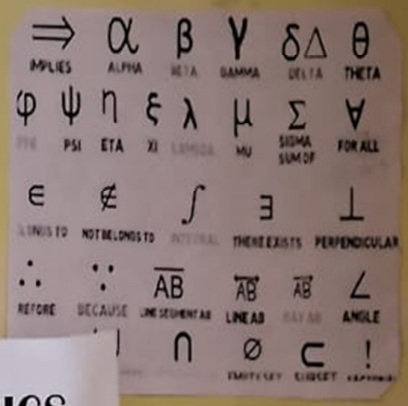
iii) Game Theory :- Algebra and probability theory are used to analyze strategic interactions between individuals or firms. Nash equilibrium and other solution concepts involve solving systems of equations.

iv) Financial Mathematics :- Calculus is used to model financial derivatives, such as options and futures. Concepts like present value, compound interest, and continuous compounding are important in financial calculations.

- Titli Pal (3rd Sem).

Magic No.
with your shoe size & age

1. Write down your shoe size
   eg. 7
2. Times 5 — 7 x 5 = 35
3. Add 50 — 35 + 50 = 85
4. Times 20 — 85 x 20 = 1700
5. Add 1018 — 1700+1018= 2718
6. Take away your birth year
   eg. 2003
   2718



MATHS IN ASTRONOMY & PHYSICS

In physics and Astronomy mathematics serves as a guiding light, illuminating paths from theory to celestial discovery. Our journey reveals how mathematical intricacies enrich our understanding of the universe.

i) **Classical Mechanics:-** Differential equations are used to describe the motion of objects under various forces. Concepts like integration, differentiation, and vector calculus are applied to study the trajectory of projectiles, motion of planets, and more.

ii) **Quantum Mechanics:-** Linear algebra and complex numbers are crucial for understanding wave functions and quantum states. Operators and eigenvalues are used to analyze quantum systems and predict their behaviour.

iii) **Celestial Mechanics:-** Calculus is applied to analyze the motion of celestial bodies, including planets, comets and satellites. Kepler's laws and Newton's law of gravitation are fundamental concepts.

iv) **Cosmology:-** Geometry and calculus are used to model the expansion of the universe, calculate distances to galaxies, and analyze cosmic microwave background radiation.

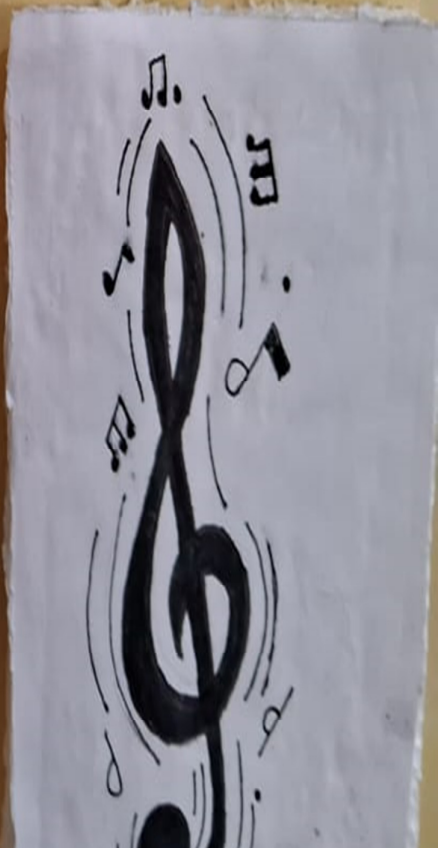
– Bikiran Chakma (5th Sem)

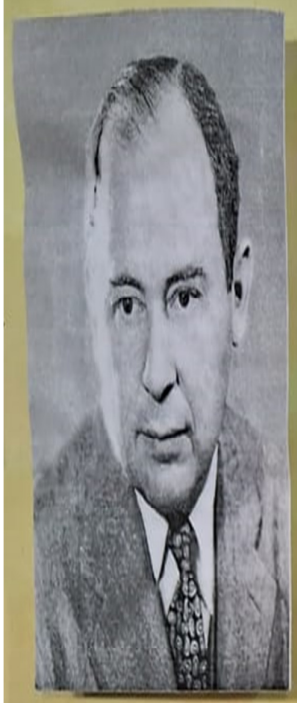
Alexander Grothendieck (28th March 1928 - 13th November, 2014)

Contributions and Impact :- Alexander Grothendieck made profound and transformative contributions to a wide array of mathematical domains. His work extended to Algebric Geometry, Category Theory, Homological Algebra, Number Theory and Functional Analysis. His revolutionary approached to Algebric Geometry influenced the study of Theoritical Physics, particularly String Theory, where certain mathematical concepts he introduced found applications. Grothendieck's work had an indirect impact on the broader scientific community, emphasizing deep structural insight and novel methodologies that transcended disciplinary boundaries.

Awards and Achievements :- (i) Fields Medal,
(ii) Crafoord Prize,
(iii) King Faisal International Prize,
(iv) Cole Prize.

- Mohit Podder (5th Sem)



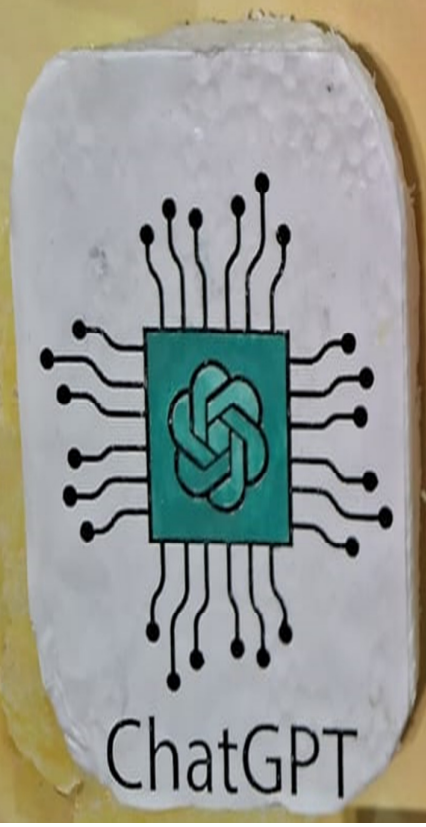


John von Neumann (28th December, 1903 - 8th February, 1957)

Contributions & Impact:- John von Neumann's legacy encompasses diverse scientific realms. In mathematics, his contributions reshaped Set Theory, Functional Analysis, and Game Theory. He made significant strides in Physics, spanning Quantum Mechanics, Statistical Mechanics and Nuclear Physics. His influence even extended to Economics and Statistics through pivotal work in Decision Theory and Stochastic Processes. Moreover, the Mathematician's visionary work in Computer Science laid the foundation for modern computing. His interdisciplinary impact underscores an exceptional intellectual legacy.

Awards and Achievements:- (i) Enrico Fermi Award,
(ii) Presidential Medal of Merit.
(iii) Bôcher Memorial Prize.
(iv) American Meteorological Society Award.

- Mohit Bodder (5th Sem)



WALL MAGAZINE

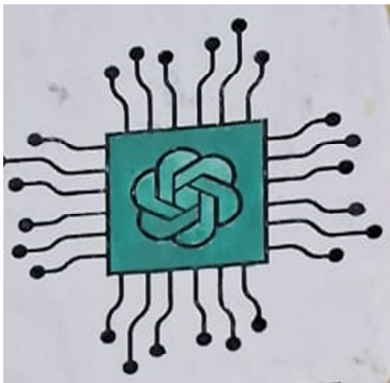
FACTS

- The oceans produce the majority of the oxygen on Earth. Salt was once used as currency, where the English term "salary" comes from.
- Wearing headphones for an hour multiplies the bacteria in your ear by 700%.
- The tallest mountain in the solar system is Olympus Mons on Mars.
- In a room of 23 people there's a 50% chance that two people have the same birthday. It is called "THE BIRTHDAY PARADOX".
- The numbers on opposite sides of a die always add up to seven.
- Did you know that $x\%$ of $y = y\%$ of x?
- According to the four-colour theorem, any map can be coloured using only four colours so that regions sharing a boundary do not share the same colour.
- India's Chandrayaan-I was the first mission to detect water on the Moon.

-Parthajit Sarania (5th Sem)

(ii) Prepa...
(iii) Bôcher Memorial Prize.
(iv) American Meteorological Society Award.

- Mohit Podder (5th Sem



MATHS IN COMPUTER SC. & AI

At the nexus of computer science and AI lies mathematics, the common language shaping algorithms, neural networks and innovations alike. Here we uncover how these mathematical foundations seamlessly advance both disciplines.

(i) Algorithms and Data Structure :-
Mathematics particularly, discrete mathematics, is foundational for analyzing and designing efficient algorithms and data structures. Concepts like graph theory, combinatorics, and set theory are essential.

(ii) Machine Learning :- Linear algebra, calculus, and statistics are foundational for understanding machine learning algorithms, such as regression, decision trees, neural networks and support vector machines.

(iii) Natural Language Processing (NLP) :- Probability theory, statistics and linguistics concepts are applied in NLP to understand and generate Human language, powering applications like chat-bots and language translation.

(iv) Simulation and Modeling :- Differential equations and numerical methods are used to simulate complex systems and model real-world phenomena in fields like physics, biology and economics.

— Gaurav Bhowal (5th Sem)

MATHS IN MUSIC

From captivating harmonies to soul-stirring rhythms, music's world resonates with mathematics' harmonious interplay. As we explore its nuanced depths, we unveil how distinct mathematical disciplines thread through its diverse facets, enriching melodies and rhythms alike:

i) Harmony and Chord Progressions:- Music theory involves algebraic operations to analyze and create harmonic relationships between chords, enabling musicians to compose pleasing chord progressions.

ii) Rhythm and Timing:- Mathematics of arithmetic sequences and fractions are essential in understanding and creating rhythmic patterns, beats, and time signatures in music.

iii) Acoustics and Sound Waves:- Differential equations and trigonometry are used to study the properties of sound waves, resonance, and the way musical instruments produce sound.

iv) Musical Scales and Tuning:- Number theory and logarithmic calculations are applied to define musical scales, intervals, and tuning systems, unveiling harmonic relationships.

-Mohit Podder (5th Sem).

OPEN PROBLEMS:-

Q1) A restraunt sells its sandwiches in Triangular Shaped. Side lengths of whose are 3 inch, 4 inch, 5 inch. Is it's possible to pack each sandwich in a Triangular Box of side length (3^2+1) cm, (4^2-1) cm, (5^2+1) cm. (1 inch = 2.54 cm).

Q2) There is a Whatsapp group of some people who follow people only from that particular group on Instagram. If each person follows at least one person from the group, then at least how many people should there be in the group in order to ensure that they've distinct number of followings?

Q3) A wholesaler dealing in Eggs initially decides to stock 100 trays of Eggs in the beginning of a particular Month. He then decides to sell the trays in sets of 7, 14, 25 or 35 only, for which he'd simultaneously restore the trays by sets of 4, 20, 28, 29 respectively. Will he completely run out of trays of Eggs at the end of the Month?

- Mohit Podder (5th Sem)

Chief Editors:-
(i) Mohit Podder (6th Sem)
(ii) Yitli Pal (3rd Sem)

Members:- Bikiram Chakma, Gaurav Bhowal, Paromita Dutta, Parthajit Sarania, Sonmoni Deka, Koushik Thakuria, Julima Akhtar, Ashim Barman.

Extremely Happy to inaugurate the wall Magazine. Nice One.