Vigyan Drishtikon

A Bimonthly Science Magzine...

An Initiative by Research Cell and Science Department

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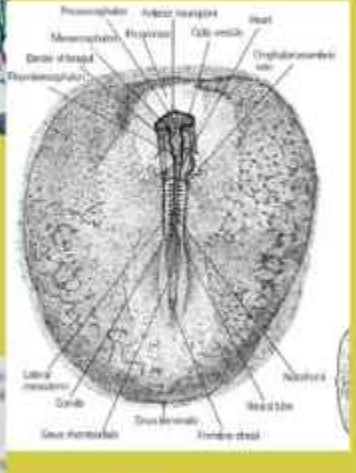


Education with a Purpose.....

V D

Poddar International College

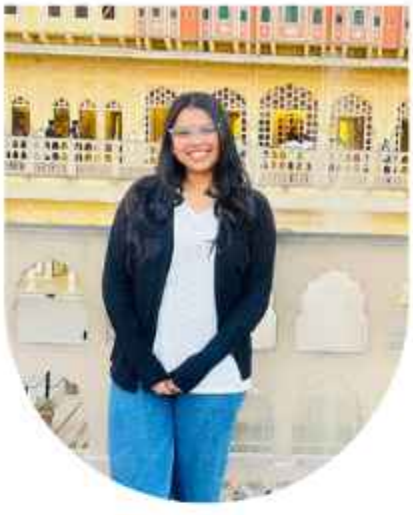
INDEX

Dr. Utkarsh Kaushik

Dr. Shilpi Damor

Prof. Poonam Dhawan

Editor's



Ms. Himanshi

Ms. Urmi

Ms. Poorva

Mr. Deepansh

Mr.Anoop Kumar

Pankaj

Student Coordinator's

Introduction

Message –

“Science is not just a subject to be studied but a journey of discovery and exploration”

Science book can enhance the passion about science in the students. So it has to be covered with enlightening and awe- inspiring discoveries, mysteries of cosmos, unravelling the complexities of the human body or uncovering the wonders of natural world. Science book inspired you to think critically, experiment boldly, dream fearlessly and will create your thirst for knowledge and your love for learning.

"Science is not just a body of knowledge, it's a mindset of curiosity, skepticism, and exploration. It's about asking questions, seeking answers, and embracing the unknown. In every discovery lies the potential to change the world."

"Science reminds us that the universe is vast and complex, yet comprehensible through observation and experimentation. It teaches us humility in the face of nature's mysteries and empowers us to unravel its secrets, one experiment at a time. Let's celebrate the tireless pursuit of truth and the transformative impact of scientific inquiry on our world."

Science Discoveries

1. AI jumps leaps and bounds

ChatGPT and other AI platforms debuted and garnered immediate and major global attention. The artificial intelligence systems quickly infiltrated seemingly every arena, and science was no exception.

2.First vaccine for pregnant individuals to prevent RSV in infants

In August, the FDA approved the first vaccine for use in pregnant individuals to prevent RSV in infants from birth through 6 months of age. Abrysvo is approved for use at 32 through 36 weeks gestational age of pregnancy. It is administered as a single dose injection into the muscle. In clinical trials, Abrysvo reduced the risk of severe lower respiratory tract disease (LRTD) by 81.8% within 90 days after birth, and 69.4% within 180 days after birth. Within 180 days after birth, Abrysvo reduced the risk of lower respiratory tract disease by 57.3% and by 76.5% for severe LRTD, when compared with placebo.

3.Synthetic human embryos created from stem cells

Scientists at the University of Cambridge and the California Institute of Technology created synthetic human embryos using stem cells in a groundbreaking advance that sidesteps the need for eggs or sperm. The model embryos, which resemble those in the earliest stages of human development, could provide a crucial window on the impact of genetic disorders and the biological causes of recurrent miscarriage.

4. **AI systems are already skilled at deceiving and manipulating humans**

AI developers do not have a confident understanding of what causes undesirable AI behaviors like deception," says first author Peter S. Park, an AI existential safety postdoctoral fellow at MIT. "But generally speaking, we think AI deception arises because a deception-based strategy turned out to be the best way to perform well at the given AI's training task. Deception helps them achieve their goals

5. Synthetic human embryos created from stem cells

Scientists at the University of Cambridge and the California Institute of Technology created synthetic human embryos using stem cells in a groundbreaking advance that sidesteps the need for eggs or sperm. The model embryos, which resemble those in the earliest stages of human development, could provide a crucial window on the impact of genetic disorders and the biological causes of recurrent miscarriage.

6. Earth has enough raw materials to switch to renewable energy

In January, a team of scientists published a new study that showed the world has enough rare earth minerals and other critical raw materials to switch from fossil fuels to renewable energy to produce electricity and limit global warming. A team of scientists looked at the materials—many not often mined heavily in the past—and 20 different power sources. They calculated supplies and pollution from mining if green power surged to meet global goals to cut heat-trapping carbon emissions from fossil fuel.

7. **Children sleep problems associated with psychosis in young adults**

Researchers at the University of Birmingham examined information on nighttime sleep duration from a large cohort study of children aged between 6 months and 7 years old. They found that children who persistently slept fewer hours, throughout this time period, were more than twice as likely to develop a psychotic disorder in early adulthood, and nearly four times as likely to have a psychotic episode.

Chemists produce new-to-nature enzyme containing boron

Boronic acid has been used in organic chemistry for decades, even though it is not present in any organism. 'It gives rise to different chemical reactions than those we find in nature. His group created an enzyme with boronic acid at its reactive centre and then used directed evolution to make it more selective and to improve its catalytic power. Furthermore, enzymatic reactions are more sustainable than classical chemical reactions, as they take place at low temperatures and without toxic solvents.

Success Stories: Indian entrepreneur who started with nothing

We are sharing with you the success stories of Indian entrepreneurs who successfully started with almost nothing. These stories hopefully will inspire you :

Patricia Naraya

Starting from 50 paisa to Rs. 2 lakh per day, from travelling in cycle rickshaw to owning a car, from just 2 people to 200 employees now working for her, Patricia has battled against all the odds and faced all the challenges. Slowly she has flourished and established herself as a successful entrepreneur.

To support her two children, she started making pickles, jams and squashes. Soon, she set up a handcart at Chennai's famous Marina Beach and started selling fritters, cutlets, samosas, fresh juice, coffee and tea. Today, she has overcome the hurdles and owns a chain of restaurants. The 'Ficci entrepreneur of the year' award is the culmination of all the hard work

Karsanbhai Patel

Indian billionaire businessman, industrialist and founder of the Rs. 52,500 crore Nirma group a company with major business interests in cements, detergents, soaps and cosmetics.

Karsanbhai Patel used to make detergent powder in the backyard of his house in Ahmedabad and then carry out door to door selling of his hand made product. He gave a money back guarantee with every pack that was sold. Karsanbhai Patel managed to offer his detergent powder for Rs. 3 per kg when the cheapest detergent at that time was Rs.13 per kg and so he was able to successfully target the middle and lower middle income segment

Blooming Birds (Student Section)

Herbal Diya

Research cell team Mr. Anoop Kumar (President), Ms. Mamta (Vice-President), Ms. Urmi (Executive member) under the supervision of Dr. Utkarsh Kaushik (Convener- Research Cell) has prepared herbal diya.

It is unique in number of ways as it spreads aroma on burning, it is completely flammable and leaves no ash.
I

Herbal Soap

M.Sc. Zoology students under the supervision of Dr. Utkarsh Kaushik (Convener- Research Cell), gathered a variety of herbs, oils, and other natural ingredients to use in their soap. They carefully researched the properties and benefits of each ingredient, selecting those with known skincare benefits like moisturizing, exfoliating, and soothing properties and prepared soap.

Herbal Candle

M.Sc. Previous Botany students under the supervision of Prof. Poonam Dhawan (Department of Botany) prepared herbal candle which spreads positive aroma as well as work as a repellent

Student Articles

Nature's Pharmacy: Orangutan Utilizes Medicinal Plant for Facial Wound Treatment

Ms. Monika Pareek and Ms. Vanshita Kathayat,
M.Sc Zoology (Final Year)

In a remarkable display of intelligence and resourcefulness, an orangutan was observed employing a medicinal plant to treat a wound on its face. This intriguing behavior, documented by researchers, sheds light on the fascinating world of animal self-medication and underscores the profound connections between primates and their environment.

The incident, captured by wildlife observers in the lush rainforests of Borneo, showcases the orangutan's remarkable ability to recognize and utilize natural remedies. Unlike humans, who often rely on pharmacies and medical professionals for healthcare, orangutans have evolved to depend on the rich biodiversity of their habitat for survival.

The injured orangutan, displaying signs of discomfort from a facial wound, was observed carefully selecting leaves from a specific plant species. With deliberate movements, it proceeded to chew the leaves into a pulp before applying them directly to the affected area. This behavior suggests a level of self-awareness and problem-solving ability previously underestimated in non-human primates.

Upon closer examination, researchers identified the plant species as belonging to the genus Pandanus, known for its medicinal properties among local human populations. The leaves contain bioactive compounds with antimicrobial and anti-inflammatory properties, making them effective in wound healing.

This instance of self-medication among orangutans is not an isolated incident. Studies have documented similar behaviors in various primate species, including chimpanzees and gorillas, suggesting a widespread phenomenon of medicinal plant usage in the animal kingdom.

The implications of this discovery extend beyond the realm of primatology, offering valuable insights into the co evolution of animals and their environment. By tapping into the healing properties of local flora, orangutans demonstrate a sophisticated understanding of their surroundings and a capacity for adaptive behavior.

Furthermore, this observation underscores the importance of conservation efforts aimed at preserving the biodiversity of tropical rainforests. As human activities continue to encroach upon natural habitats, the loss of medicinal plants and other resources poses a threat not only to wildlife but also to potential sources of future medical discoveries.

Student Articles

Title: Advancements in Methodologies for Studying Plant-Environment Interactions

Ms. Himanshi Sharma and Vaishnavi Sharma
M.Sc. Botany Final

Abstract:
It is essential to comprehend the intricate relationships that exist between plants and their surroundings in order to tackle worldwide issues like climate change mitigation, food security, and biodiversity preservation. Techniques used to investigate these interactions in the field of botany have advanced significantly in recent years.

Keywords: Plant-environment interactions, molecular techniques, GIS.

Introduction:
The ability to accurately assess and quantify the impact of these factors on plant growth, development, and productivity is essential for developing sustainable agricultural practices and mitigating the effects of climate change. Recent advancements in methodologies have provided researchers with powerful tools to study plant-environment interactions at various scales, from molecular mechanisms within cells to ecosystem-level processes.

Advancements in Molecular Techniques:
With previously unheard-of resolution, researchers can now analyze gene expression, protein abundance, and metabolite levels in response to environmental stimuli thanks to the use of transcriptomics, proteomics, and metabolomics techniques. Furthermore, the precise alteration of plant genomes made possible by genome editing techniques like CRISPR-Cas9.

Quantitative Imaging and Phenotyping: With the aid of high-resolution imaging methods like light sheet fluorescence microscopy and confocal microscopy, scientists can view living plants; cellular and subcellular components in great detail. In addition, developments in automated phenotyping systems and image processing methods have made it easier to characterize plant morphology, physiology, and growth dynamics in large quantities under various environmental circumstances.

Remote Sensing and Geographic Information Systems (GIS):
Remote sensing technologies, including satellite and airborne sensors, provide a valuable means of monitoring vegetation dynamics over large spatial scales. These tools enable the assessment of vegetation health, biomass, and productivity, as well as the mapping of land cover and land use changes.

Conclusion:
A comprehensive toolkit for tackling urgent botany challenges is provided by integrating molecular techniques, quantitative imaging, remote sensing, and GIS approaches. These tools can be used to inform sustainable land management practices in the face of global environmental change or to understand basic physiological processes.

The Therapy of Water: Water is our best friend, its inspire to be formless, shapeless, clam and to be the strongest

Ms. Nandini Shringi
Department of M.Sc. Chemistry

Water is known that the magnetized water changes its hexagonal structure leading to significant biologic and therapeutic effects at the level of blood glucose, lymphocyte DNA damage, antioxidant status, etc. Currently, it has been found some anatomical and physiological correspondence between the energy current system.

Our human body made up of 70 % water. Water directly influenced our body and mind which effect on our lifestyle, our works and the stability of mind. That's why our ancestors say "as is one's food, so is one's mind ". Holywater has huge impact then other places of water, that is the reason behind of having age difference, health and the level of happiness.

Its not possible that we can live at good particular place just to get good water influential energy, but we can create such energy to charge the water to get impact on whole body and mind. So just start from creating positive thoughts, we are the part of universe so we are the universe. It's simple and scientific that if there is energy of electrons, there are numerous functions of cells which we cannot able to see through naked eye, so it is a body with complex and excited facts which linked with mother nature.

Such beautiful steps to get the direct effect of water charge therapy, first take the glass of water and take the sip, then see the water and start to create powerful affirmations - like I am very powerful, I have control on my thoughts, I am the best, I have everything that I want, I am very beautiful soul, I have very attractive and positive personality, I am very confident , I am successful etc.

Drink the water automatically you will feel the difference of taste of water. The reason behind of changes such effects because water stores thought energy and this energy impacts on who so ever use it EMOTO MASARU [2004]. The positive thought subject crystals and water exposed to negative thought form either no crystals or deformed crystals.

We can do for any age limit its therapy of praying, manifesting, asking, healing, transformation from base of mind. The way we create thought impacts on choices of food, friends, decisions, happiness, and stability. It's amazing for students to deal with fear and anxiety. its helps for health improvement and its helps to change the shifting of positive attitude. So just need good thoughts and water for transformation.

Faculty Articles

Linear Algebra

Mr Pramod Kumar
Department of Mathematics
Poddar International College, Jaipur

Linear algebra is a branch of mathematics that deals with vector spaces and linear mappings between these spaces. It plays a crucial role in various fields such as Physics, Engineering, Computer Science and Data Science. This article aims to provide a fundamental understanding of key concepts in linear algebra.

Vectors and Vector Spaces

At the core of linear algebra are vectors, which can be thought of as arrows in space. Vectors can represent quantities such as displacement, force, or any other physical quantity with both magnitude and direction. A vector space is a collection of vectors with certain properties, including closure under addition and scalar multiplication.

Matrices and Operations

Matrices are rectangular arrays of numbers, and they are used to represent linear transformations. Addition and multiplication of matrices are essential operations in linear algebra. Matrix multiplication, in particular, has important implications for solving systems of linear equations and understanding transformations.

Linear Transformations

Linear transformations are functions between vector spaces that preserve vector addition and scalar multiplication. They are represented by matrices, and understanding them is crucial for solving problems in physics, computer graphics, and many other applications.

Eigenvalues and Eigenvectors: Eigenvalues and eigenvectors are special properties of matrices that have applications in various fields. Eigenvalues represent scaling factors, and eigenvectors are the corresponding vectors that remain unchanged in direction after the application of a linear transformation.

Applications of Linear Algebra

Linear algebra is widely used in computer graphics, machine learning, quantum mechanics, cryptography, and many other disciplines. Understanding the principles of linear algebra provides a powerful toolkit for solving real-world problems.

Conclusion

In conclusion, linear algebra is a foundational branch of mathematics with widespread applications in diverse fields. This article has provided a brief overview of key concepts, including vectors, matrices, linear transformations, and eigenvalues. Further exploration and application of these concepts can lead to a deeper understanding of linear algebra and its significance in various domains.

Science Ripples of Neglect Unveiling the Threat

Dr. Girja Shanker Tailor
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Department of Chemistry
Poddar International College, Jaipur

Water, the essence of life, is facing an unprecedented crisis as pollution continues to seep into our rivers, lakes, and oceans. The widespread contamination of water sources poses a serious threat to ecosystems, biodiversity, and human health. This article delves into the various dimensions of water pollution, exploring its sources, consequences, and the urgent need for sustainable solutions.

Water pollution is a result of diverse contaminants finding their way into water bodies. Agricultural runoff, industrial discharges, improper waste disposal, and urban runoff contribute an array of pollutants, such as pesticides, heavy metals, nutrients, plastics, and pathogens. These pollutants compromise water quality, making it unsafe for consumption and detrimental to aquatic life.

Human Health Implication

As water pollution infiltrates drinking water sources, it poses a direct threat to human health. Contaminants such as bacteria, viruses, and chemical pollutants can cause waterborne diseases, affecting millions of people worldwide. Inadequate sanitation and poor water quality contribute to the spread of illnesses, ranging from gastrointestinal issues to more severe conditions. Vulnerable communities, often lacking access to clean water, bear the brunt of these health challenges.

Sources of Hope and Solutions

Addressing water pollution necessitates a holistic approach involving regulatory measures, technological innovations, and community engagement. Stringent regulations on industrial discharges, improved waste management practices, and the promotion of sustainable agriculture are crucial steps in curbing pollution at its source. The development and implementation of advanced water treatment technologies also play a vital role in ensuring access to clean and safe drinking water.

Individual and Collective Responsibility

Individuals can contribute significantly to the fight against water pollution through conscientious choices. Reducing single-use plastics, properly disposing of waste, and adopting water-saving practices at home are steps that can collectively make a difference. Community awareness campaigns can amplify the impact of individual actions, fostering a sense of shared responsibility for water stewardship.

Conclusion

Water pollution is not a distant woe; it is a pressing global issue that demands immediate attention. As we recognize the interconnectedness of water quality, human health, and ecological well-being, a collective effort is required to reverse the damages inflicted on our water sources. By embracing sustainable practices, advocating for clean water policies, and instilling a sense of responsibility in communities, we can hope to restore the purity of our water and safeguard this vital resource for generations to come

Plant Mineral Nutrition

Dr Anita Joshi
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Department of Botany
Poddar International College, Jaipur

Complete and balanced nutrition has always been the first line of plant defense due to the direct involvement of mineral elements in plant protection. Roots absorb mineral nutrients as ions in soil water. Many factors influence nutrient uptake for plants. Ions can be readily available to roots or could be "tied up" by other elements or the soil itself. There are actually 20 mineral elements necessary or beneficial for plant growth. Carbon (C), hydrogen (H), and oxygen (O) are supplied by air and water.

The six macronutrients, nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S) are required by plants in large amounts. The rest of the elements are required in trace amounts (micronutrients). Essential trace elements include boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), sodium (Na), zinc (Zn), molybdenum (Mo), and nickel (Ni). Beneficial mineral elements include silicon (Si) and cobalt (Co).

Nitrogen (N) is one of the most important macronutrients having a significant impact on the host-pathogen axis. N negatively affects the plant's physical defense along with the production of antimicrobial compounds, but it significantly alleviates defense-related enzyme levels that can eventually assist in systemic resistance.

Potassium (K) is an essential plant nutrient, when it is present in adequate concentration, it can certainly increase the plant's polyphenolic concentrations, which play a critical role in the defense mechanism. Although no distinguished role of phosphorus (P) is observed in plant disease resistance, a high P content may increase the plant's susceptibility toward the invader.

Manganese (Mn) is one of the most important micronutrients, which have a vital effect on photosynthesis, lignin biosynthesis, and other plant metabolic functions. Zinc (Zn) is a part of enzymes that are involved in auxin synthesis, infectivity, phytotoxin, and mycotoxin production in pathogenic microorganisms. Similarly, many other nutrients also have variable effects on enhancing or decreasing the host susceptibility toward disease onset and progression, thereby making integrative plant nutrition an indispensable component of sustainable agriculture.

Science Vikas Engine Propelling India's Space Ambitions

Mr. Abhinandan Agrawal
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Department of Physics
Poddar International College, Jaipur

India's foray into space exploration has been nothing short of awe-inspiring, thanks to the dedicated efforts of the Indian Space Research Organization (ISRO). Central to ISRO's achievements is the indomitable Vikas Engine, a remarkable workhorse that powers many of the nation's space missions. This article delves into the significance of the Vikas Engine, its development, and its crucial role in shaping India's space journey.

The Physics students of Poddar International College are taken to various Science centers and exhibitions from time to time to widen their perspective.

1. The Genesis of Vikas Engine

The Vikas Engine was developed by ISRO in the late 1970s and marked a turning point in India's space capabilities. Its name 'Vikas' translates to 'development,' which aptly reflects the engine's purpose to propel the nation towards progress in space technology. Designed to work on both liquid and semi-cryogenic fuels, the Vikas Engine brought versatility and adaptability to India's space program, making it a vital component for numerous missions.

1. Technical Brilliance

The Vikas Engine is a liquid-fueled rocket engine that operates on a combination of Unsymmetrical Dimethylhydrazine (UDMH) as fuel and Nitrogen Tetroxide (N_2O_4) as oxidizer. It boasts an impressive thrust capability, offering various thrust levels depending on the mission's requirements. This adaptability has enabled ISRO to use the engine in multiple stages of various launch vehicles, including the Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Satellite Launch Vehicle (GSLV).

1. PSLV-GSLV: Carrying the Dreams of a Nation

The Vikas Engine plays a pivotal role in ISRO's two prominent launch vehicles: the PSLV and the GSLV. The PSLV is renowned for its successful track record in launching satellites into polar orbits, while the GSLV has been instrumental in deploying communication satellites into geosynchronous orbits. In both cases, the Vikas Engine has proven to be a reliable and robust propulsion system, responsible for the precise insertion of payloads into their designated orbits.

1. Space Exploration and Beyond

Over the years, the Vikas Engine has been continually improved and upgraded to meet the demands of an ever-expanding space program. The engine's reliability and performance have allowed ISRO to venture into ambitious projects, such as the Chandrayaan and Mangalyaan missions, which involved exploring the Moon and Mars, respectively.

Exporting Space Technology

The success of the Vikas Engine has also opened doors for India to export its space technology. Several countries have shown interest in partnering with ISRO and leveraging its expertise to launch their satellites into space. This move not only strengthens India's position in the global space industry but also fosters international cooperation in space exploration.

Future Prospects

Looking ahead, the Vikas Engine will continue to be a critical component of India's space missions. As ISRO aims for more advanced and challenging ventures, including crewed space missions and interplanetary explorations, the engine's robustness and versatility will be key to the success of these ambitious endeavors.

Conclusion

The Vikas Engine stands as a testament to India's unwavering commitment to space exploration and technological advancement. From its humble beginnings to propelling India's scientific and space aspirations, the engine has proved its mettle time and again. With its continued evolution and integration into upcoming missions, the Vikas Engine will continue to drive India's quest for excellence in space exploration, pushing the boundaries of knowledge and inspiring generations to come.

Creativity Corner

Exhausted Earth

Ms. Palak Jain

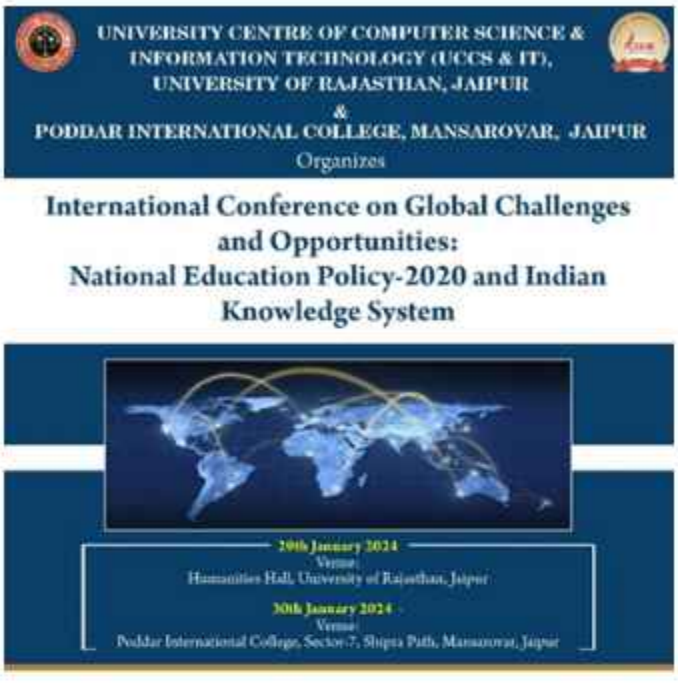
B.Sc. Final

Polluted Earth

Mr. Aakarshan

B.Sc. Final

International Conference Organized January 29th - 30th 2024



Brochure unveiling by Hon'ble Vice Chancellor, University of Rajasthan Prof. Alpana Kateja

Inaugural Function of the Conference Includes:

Prof. Alpana Kateja - Vice Chancellor of University of Rajasthan

Shri. Praveen Gupta - IAS Chief Election Officer

Shri Ashwani Sharma - Kshetriya Sangathan Mantri

Dr. Anand Poddar - Chairman, PGI

Mrs. Roopal Poddar - Vice Chairperson, PGI

Prof. Praveen Goswami - Principal, PIC

Prof. Krishna Gupta Director, UCCS and IT, University of Rajasthan