

Iit Topper (1993 Batch) Praseon Visits Dps Bokaro, Shares Success Mantra



Bokaro: The excitement among the students was palpable as Praseon Kumar Jha, AIR-1 (IIT-JEE) 1993 visited his Alma Mater. Currently working as the Principal Architect, Head of Technology, Wipro, Praseon who illuminated DPS Bokaro on the academic map of India, shared his success mantra.

Interacting with the students he stressed on the importance of self study, perseverance, sincerity, humility and practice of writing skills that ensures success. He emphasized on the concept of 'unified studies' and added that no subject can be ignored. He expressed his gratitude for the school and the teachers especially Mr. A. S. Gangwar who was then his chemistry teacher for laying down a solid foundation of his school education which played an instrumental role in his career building. He said that he is a lifelong learner and shall always remain so. Praseon shared that he tried his best to keep concepts clear by writing and solving problems on a regular basis apart from having regular discussions with his mates. Responding to the curiosity of the students, Praseon said that to achieve success in life one must always remain humble through odds and evens and take lessons from failures which leads to success.

He advised students to cultivate the habit of talking to parents, teachers and friends as every problem in life has a solution. One must not lose patience even in the darkest hour as every cloud has a silver lining. Along with right education, right guidance and proper help are also necessary for the all-round development of an individual.

Principal A.S. Gangwar expressed his happiness and said that it is indeed overwhelming to see students excel in their fields of choice and come back to nourish their roots. He extended his best wishes for the glorious future of Praseon.

Cow Dung Can Be Used To Remove Heavy Metals From Water And Also As An Energy Storage Device



by Ashis Sinha



With the dual objective of ensuring water decontamination as well as energy conservation a team of researchers of Dhanbad-based premiere technical cradle IIT (ISM) is working on the development of Cowdung derived cost-effective adsorbent to remove heavy metals from water and adsorbent later can also be used develop an energy storage device.

The research team was led by Brijesh Kumar Mishra, Associate Professor of the Department of Environmental Engineering, assisted by Ganesh Chandra Nayak, Associate professor of Department of Chemistry and Dr Sonalika, research associate of Environmental Engineering department which began the three-year research worth Rs 36.16 lakh funded by DST-SEED (Science for Equity, Empowerment & Development)/SUTRA (Scientific Utilization through Research Augmentation) during the last year have already collected and identified the cow dung sample and are in process of Characterization of sample for desired modification for adsorbent development, informed Rajni Singh. Dean, Media & Branding of ISM.

The research project which also fulfills the objective of the Gobardhan Framework of the Swachh Bharat Mission meant to support villages in effectively managing their cattle and biodegradable waste is also in accordance with the objectives of the Swajal Scheme of the Central Government meant to provide clean and safe drinking water to the rural population.

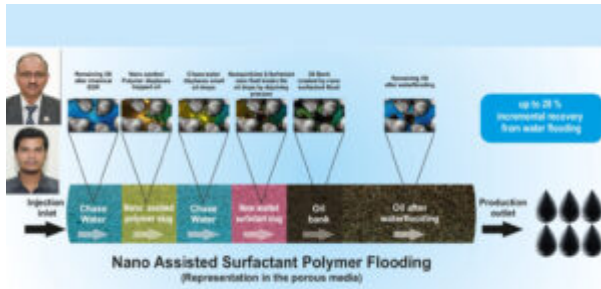
Divulging details, Brijesh Kumar Mishra said 'Toxic heavy metal ions such as (Cadmium) Cd, Cr (Chromium), Pb (Lead) Ni (Nickel), Cu (Copper), Zn (Zinc) etc., are released into water bodies by industrial as well as mining units in excess of permissible limit".

Citing some examples of very high quantities of heavy metals release into the water, Mishra said "High amount of heavy metals like 500 mg/L (microgram per liter) of Lead in released in battery wastewater, 38.4 mg/L) of Zinc in washings of dye manufacturing, 45.58 mg/L of Copper in textile effluents, and 35.4 mg/L) of Chromium from paper mill and paint manufacturing industry.

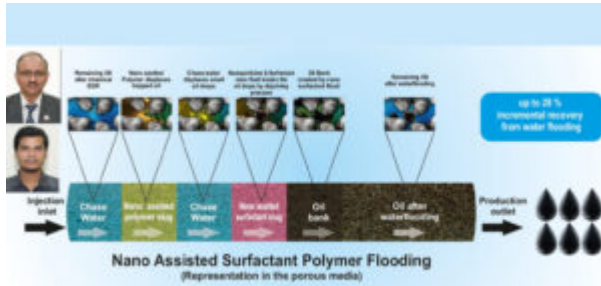
"Cow dung is composed of several mineral types such as phosphorus, nitrogen and carbon, which mainly come from lignin, cellulose and hemicellulose," said Mishra while throwing light about the significance of cowdung-derived adsorbents and added in countries such as India, Bangladesh and Malaysia that focus on agriculture and also cattle rearing cow dung is a viable option for generating energy storage device as each cattle can generate approximately 9–15 kg of cow dung per day.

Regarding the other part of their research with regard to the usage of cow dung-derived adsorbent for the development of Electrodes as the energy storage devices, Mishra said, "These energy storage devices, being developed from waste materials, would be very cheap and can be integrated with solar panels in rural areas, which can be used to light up homes, roads, public toilets etc" and added that this type of device would be affordable, sustainable and cleaner with no impact on the environment.

Usage Of Nanoparticles Can Increase Reservoir Oil Recovery By 7 Per Cent : Research



by Ashis Sinha



IIT (ISM) Researchers found that by using Nanoparticles oil recovery from reservoirs can be enhanced by 7 per cent.

A team of researchers of the Petroleum Engineering Department of Dhanbad-based premiere technical cradle, IIT (ISM) has conducted research that can ensure enhanced recovery of oil lying trapped in the pores of rock using Nanoparticles.

The findings of research conducted at a cost of Rs 39 lakh funded by the Institute of Reservoir Studies (IRS), ONGC Ahmedabad by the three-member team of IIT (ISM) led by Ajay Kumar Mandal, Head of the Department of Petroleum Engineering and assisted by Neetish Kumar Maurya, assistant professor and Dinesh Modi, Junior Research Fellow (JRF) during 2019-21 revealed that use of Nanoparticles can increase oil recovery up to the tune of 7% or more.

Divulging details about the research, Dr Ajay Kumar Mandal, said, "Only around 20-30% of oil can be recovered easily from the reservoir while the recovery of remaining 70-80% trapped oil requires additional impetus in the form of water, chemical injection or thermal methods.

"Oil stuck up in the pores of rocks turns immobile- thus the usage of Nanoparticles which can travel deep into the rocks enhances recovery of such stuck up oil by mobilizing the oil droplets into the production well" further explained Dr Mandal and added that the research team visited the IRS ONGC Ahmedabad thrice during the course of research to collect information and also to collect crude oil, formation water and rock samples.

Divulging more details about the step-by-step progress of the research, Dr Mandal said, In the first step experimental investigation to screen suitable nanoparticle for enhanced oil recovery (EOR) was carried out during which its interaction with crude oil, formation water and rock surfaces were carried out.

"The team found that silica nanoparticle Nanofluid is stable at oil reservoir condition as it provides favourable interaction with reservoir rock and fluid for Enhanced Oil Recovery", added Dr Mandal.

"In the second step, we designed the chemical slug to be injected in the oil reservoir as nanoparticles can be injected in the oil reservoir alone or in synergy with surfactant and other chemicals. The chemical slugs were then tested for wettability improvement, Interfacial tension reduction and other Enhanced Oil Recovery design criteria "further explained DrMandal.

"In the final step, actual potential of incremental oil recovery was established by injecting these chemical slugs in core flooding experiment," said Assistant professor Neetish Kumar Maurya and added that Small rock samples, representative of reservoir rocks, were placed in core holders.

"Outcome of this research established that we can further improve the efficiency of the chemical injection process in oilfields by using nanomaterial for enhanced oil recovery," said

Maurya.

Regarding the cost-effectiveness of new process of enhanced oil recovery using nanoparticles Maurya said, "We did not perform a cost analysis and only feasibility study was carried out as this technology is still in a nascent stage, however, many researches are working to produce nanomaterial from alternative sources to make the production cheaper and efficient".

Ism Researcher Finds Ways To Prevent Mine Fires, Explosions.



by Ashis Sinha



"How to reduce the risk of fire and explosion in mines and improve overall safety"– the findings of the study that was carried out by a team led by Devi Prasad Mishra, a professor of Mining Engineering Department of IIT-ISM may help in a big way.

Mishra, an Associate Professor of Mining Engineering Department of IIT (ISM) has conducted research on pulverized coal which can help to increase the safety of coal mines from the perspective of spontaneous combustion and explosion and risk management of coal mines.

The outcome of research titled 'Physico-Chemical Characteristics of Pulverized Coal and their interrelations- a spontaneous combustion and explosion perspective' can also have applications with regard to safety and risk management of process industries and utilities sector dealing with pulverized coal.

The research project worth Rs 21.45 lakh, funded by Science and Engineering Board of Department of Science and Technology (DST) has been conducted by Dr Mishra as a team in association with a faculty of Mechanical Engineering Department of IIT (Madras) Dr V Raghavan from 2017-2020.

The research findings helped the team to get knowledge about the particle size, exposed specific surface area and gas adsorption characteristics of coal of various particle sizes that in turn facilitated the mine management to take appropriate measures to prevent the occurrence of spontaneous combustion, mine fires and explosion in coal mines.

The study during which vivid investigation of coal samples collected from different mines of Steel Authority of India Limited (SAIL), Singareni Collieries Company Limited (SCCL) besides the mines owned by different subsidiaries of Coal India Limited (CIL) including Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL), Eastern Coalfields Limited (ECL), Northern Coalfields Limited (NCL), Western Coalfields Limited (WCL), Southeastern Coalfields Limited (SECL), Mahanadi Coalfields Limited (MCL) and Western Coalfields Limited (WCL) were conducted analyzed the interrelations between these parameters from spontaneous combustion

and explosion perspective.

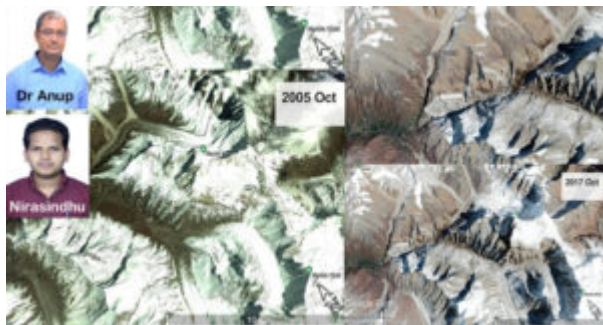
"This research generated insightful coal characteristics data of pulverized coal which can be useful for furthering research on spontaneous combustion and explosion involving pulverized coals" said Dr Mishra whose research interest is in Mine Ventilation & Environmental Engineering; Mine Fire and Explosion; application of CFD in Mine Ventilation & Environmental Engineering; Methane Drainage, CBM, UCG, stowing backfilling with fly ash/pond ash; characterization of fly ash/pond ash.

"This research can be extended to coarser mine size coals, which are generally found in goaf (mined out) areas of underground mines, coal stacks and waste dumps and prone to spontaneous combustion" further opined Dr Mishra while highlighting the need for further research in the area.

Elaborating about the advantages of the research Dr Mishra said, "This unique study which led to better understanding of the physio-chemical characteristics of pulverized coal also revealed the variations of bulk density, specific surface area and gas adsorption characteristics of coal with particle size".

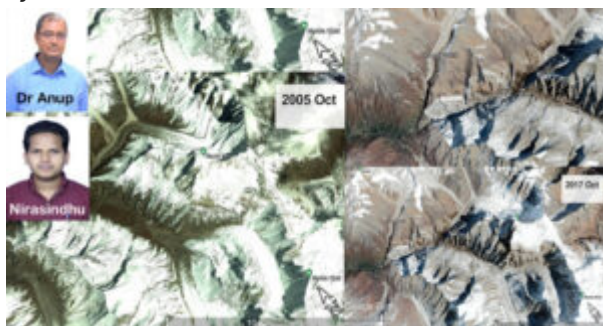
"The relationship developed in this research can help to determine the bulk density and specific surface area of pulverized coal of known particle size" summed up Dr Mishra adding that they visited several mines across the country during the course of research to analyze the pulverized coal.

Iit-ism Researcher's Call For Co2 Capture Technology In Oil, Gas & Coal Thermal Units



#Snow covers depleting in Hindu Kush Himalayan region

by Ashis Sinha



Giving a clarion call for the implementation of Carbon Capture Technology in the oil and gas sectors, IIT-ISM, Dhanbad researchers appealed for efforts to reduce the emission of greenhouse gases.

In an 'eye opener' research conducted by a team of the tech cradle IIT (ISM), Dhanbad reveals a significant decrease in snow cover in the low altitudinal region of the Hindu Kush Himalayan (HKH) region.

Recent research conducted by the Department of Applied Geology of one of the oldest premier technical institutes of the country, IIT (ISM) Dhanbad, indicated a significant decline in the snow cover (from 5-15%) in the central zone and eastern zone of Hindu Kush Himalayan Region.

The study conducted by the department as part of the research of Ph.D. scholar Nirasindhu Desinayak under the guidance of Dr Anup Krishna Prasad, associate professor of the Applied Geology Department, attributed the depletion of snow cover and melting of glaciers, including others, to the warming tendency of the atmosphere (troposphere) over the Himalayas, informed

Rajni Singh, Dean Media and Branding, IIT (ISM).

The research, based on the analysis of seismic data of the regions from 2000-to 2017 further calls for the initiation of efforts to reduce or control the emission of greenhouse gases like Carbon oxide (CO₂) and Methane (CH₄).

The findings of the research also highlighted the need for implementing Carbon Capture Technologies in the Oil and Gas sector and Coal Fired Thermal Power Plants.

The research also underlined the need for the usage of low carbon energy sources besides the development of hydro, solar and wind power and, at the same time, lays stress on the capture of Carbon through afforestation and algal farming (biofuels).

The research was conducted with the additional guidance of three USA based experts, including Professor Hesham El Askary of Centre of Excellence in Earth Systems Modelling and Observations, Schmid College of Science and Technology, Chapman University, USA; Professor Menas Kafatos, Director of the same institute at Chapman University besides Ghassem R Arsar, Senior Vice President for Science, Universities Space Research Association (USRA), Columbia.

The five-year research conducted from 2015 onwards on the basis of analysis of seismic data sets from the HKH region from 2000 to 2017 describes long term altitudinal variations and variability in coverage of snow and glaciers of the world's greatest mountain region Hindu Kush Himalayas.

Elaborating on the findings of the research Dr Anup Krishna Prasad said, "The western zone or High altitude Region (above 6000 meters) of HKH exhibit no significant loss in snow cover in the same period of 2000-2017 when the central zone witnessed a significant decline of snow cover.

"Such large, anomalous, and significant changes in snow cover in the HKH region and particularly in the central region of 2000-6000 meter altitude indicate an immediate impact on river discharge, which is anticipated to raise the level of major rivers of Asia," added Dr Prasad.

"The rising loss of snow cover in relatively low altitude regions (2000- 6000 meters), which can reach as high as 15% in some regions, necessitates the monitoring of all such zones," opined Dr Prasad.

The challenges posed by the depleting snow cover, Prasad said, "It is likely to increase the number of natural snow melt lakes in Himalaya which pose a risk to the downstream settlements due to possibility of rapid bursting." "The losses due to glacial melt lakes can be minimised through mapping of these melt lakes," explained Prasad.

Moreover, with the snow cover over the HKH region known to influence the monsoon over the Indian Subcontinent, these relatively quick changes (significant loss of snow cover) are expected to influence the monsoon rainfall distribution across India.

Researchers Find Ways To Optimise Seismic Energy During Mine Blasting



by Ashis Sinha



A research team of IIT-ISM Dhanbad successfully carried out research to optimise seismic energy released during blasting in mines in a bid to minimize its adverse effects.

In the midst of the COVID pandemic's social, economical, and psychological impacts, a team of mining engineers from IIT (ISM) Dhanbad conducted a study to investigate solutions to reduce the effects of blasting in mines, such as house collapse and habitat discomfort, produced by ground vibration.

The team comprises a PhD student of the Mining Engineering department, Anurag Agarwal, a native resident of Chhattisgarh who carried out the research under the guidance of his faculty members, including his research guide Dr. B.S. Choudhary and senior faculty Dr. VMSR Murthy, from March 2020 to December 2020 in the coal mines of Jharia, the dolomite stone mines of Gaya in Bihar, and the limestone mines of Rajasthan, proposed a blasting design that can help to reduce blasting-induced environmental issues, informed Rajni Singh, Dean Media and Branding, IIT (ISM).

In his nine-month survey and data analysis, Agarwal found out that the average percentage of explosive energy conversion into seismic energy is higher (6.12 per cent) in dolomite mines than in coal mines (around 3.1 per cent).

The analysis of blast vibrations, which was also performed with MATLAB, revealed that seismic energy dissipated into rock masses correlates with radial distance after using the modified seismic energy prediction equation.

"Explosives used in mines are primarily aimed at the fragmentation of rocks for mineral excavation, but despite significant technological development in this area, explosive utilisation efficiency has not been increased," said Agarwal, adding that under current blasting practices, only less than 30% of explosive energy is used for breakage and displacement of rock masses in mines, while the remainder is wasted in unwanted effects such as ground vibration, fly rock or air overpressure, noise light etc.

Such unintended consequences of blasting frequently result in the relocation of people from mining areas, and sometimes law and order issues arise as a result of protests by blast victims. After conducting extensive research on mine blasting, Seismic energy prediction in bench blasting is the key to its optimization, so our study was conducted to predict the mine blast, induced seismic energy, which was analysed using Peak Particle Velocity (PPV)," added Agarwal.

A modified equation to predict the conversion of explosive energy into seismic energy has been proposed as part of the research, said Agarwal adding, "the blast design proposed as part of the research, as well as the modified equation, can aid in the optimization of seismic energy released during mine blasting."

Acic Inaugurated At Iit (Ism) Dhanbad To Foster, Support Innovative Ideas



by Ashis Sinha



JNS: Aiming to foster and support innovative ideas that can grow into big ideas and help to transform society for a better tomorrow, the Atal Community Innovation Centre (ACIC) was inaugurated at IIT (ISM) Dhanbad on Friday.

ACIC, a section 8 SPV that has been established in the name of the ACIC IIT (ISM) Foundation, will work as an umbrella body to nurture and promote the objectives and activities of the innovation center, informed Rajni Singh, Dean, Media & Branding of ISM.

The Foundation is financially supported by NITI Aayog and IIT (ISM) Dhanbad for a period of five years, she said.

“Though the company has been operational since November 2020 at the IIT(ISM) campus, however, the permanent office was inaugurated on Friday. The office is located at Centre of Research Excellence (CRE) building, 4th Floor, IIT(ISM) Dhanbad,” added Singh.

Dr. Chintan Vaishnav, Mission Director, Atal Innovation, Niti Ayog virtually inaugurated the office of the ACIC while Professor Rajiv Shekhar, Director, IIT(ISM) Dhanbad, Amit Shukla, CEO, ACIC, IIT(ISM) Foundation and other esteemed guests graced the occasion physically.

Besides office space, the Natural Plant-based product development division, Rural Livelihood Laboratory, Mechanical Fabrication Lab and ICT, Design & Thinking Lab, established under the aegis of ACIC IIT(ISM) Foundation were also inaugurated.

The companies incubated under ACIC also displayed their products during the inaugural session.

Iit-IsM Inaugurates Rows To Convert Solid Organic Waste Into Organic Fertilizer



by Ashis Sinha



JNS: “Rapid Organic Waste Stabilizer” (ROWS) – A Patented Technology for Converting Solid Organic Waste into Organic Fertilizer was inaugurated at IIT(ISM) Dhanbad on Thursday.

The ROWS is a machine designed to convert solid organic waste into a nutrient-rich organic fertilizer rapidly. It takes around 4 to 6 hours to convert the solid organic waste into a completely dried powder form end product rich in NPK– Nitrogen (N), Phosphorus (P), and potassium (K), informed Professor SK Gupta.

“Around 20 – 25 kg of organic fertilizer could be produced by feeding 100 kg of the Solid Organic Waste (SOW),” he added.

Notably, the ROWS is designed by Professor S. K. Gupta and Nitin Kumar, Research Scholar, Department of Environmental Science and Engineering (ESE), ISM Dhanbad, to rapidly convert solid organic waste into a nutrient-rich organic fertilizer.

Briefing about ROWS Professor Gupta said, the working of the rapid organic waste stabilizer (ROWS) is based on novel thermal digestion technique in which the waste is shredded into a particle size < 10mm and then uniformly heated at a temperature around 150oC through convection mode of heating. “This process digests the organics and converts the nutrients into a simpler and plant available form which can directly be used for agricultural purposes,” he added.

Professor Gupta said this technology could prove to be a milestone for recycling nutrients, i.e., “From the Nature to the Nature”.

He said, that the “Swaach Bharat Mission” phase II, encourages the bulk waste generators to use mechanized composters for the treatment of the solid organic waste.

Speaking on the occasion Professor Rajiv Shekhar, Director ISM, talked about the ways the IIT(ISM) Campus is administering towards conservation of environment such as commencing ROWS at 48 quarter for the treatment of all the solid organic waste.

He said, ISM is also conserving the water through rain water harvesting system. “The sewage treatment plants in the campus treat all the waste water generated within the campus and the treated water is being used for the horticulture need,” he added.

Deputy Commissioner, Dhanbad Sandeep Singh, said that Dhanbad is generating about 162 tonnes of municipal solid waste (MSW) per day and approx. 50 – 60 per cent of the MSW consisted of solid organic waste. “We need to scale up such technologies for the sustainable management of MSW,” he added.

Rajni Singh, Dean Media and Branding of ISM said, a pilot scale plant has already been installed at the 48 Quarters of the IIT(ISM), Dhanbad. The future plan includes the installation of such more plants at the municipality levels.

“Discussion with various municipalities and industries is going on to commercialise this technology,” she added.



Iit-Ism Signs Mou With Jindal Stainless For Joint R&D Work



by Ashis Sinha



Dhanbad: Aiming to carry out research and development work jointly on various projects Indian Institute of Technology (ISM) Dhanbad and Jindal Stainless (JSL) signed a MoU on Wednesday.

The MoU was signed virtually by Professor Rajiv Shekhar, Director, IIT-ISM Dhanbad and Awanindra Kumar Singh, Vice President, SMS, JSL, informed Rajni Singh, Dean Media and Branding of IIT-ISM.

Additionally, both IIT-ISM Dhanbad and JSL will profit from offering paid summer internships to students as well as offering positions on a merit-based basis to graduates, she said.

The MoU also states Executive Development Programs for the technical heads of JSL as and when required, she said.

Iit-Ism Dhanbad To Host “Winter Challenge 1.0”



by Ashis Sinha



For the first time, the Student Innovation Council (SIC), Naresh Vashisht Centre for Tinkering and Innovation (NVCTI), IIT-ISM Dhanbad in collaboration with Intel under their Student Ambassador all set to host “Winter Challenge 1.0” for all engineering students of Eastern Zone.

NVCTI’s vision is to identify and foster an ingenious solution to complex challenges, to create an ecosystem where ideas lead to innovation. Keeping in step with this vision, this event is designed to be an innovation challenge that pushes young minds to turn their ideas into reality by infusing them with a culture of innovation and creativity, informed Rajni Singh, Dean and Media Cell Chairperson, IIT-ISM.

It is one of the most significant events in the eastern zone of India that provides a unique opportunity to students from various engineering colleges, including students from IIT-ISM Dhanbad, to compete with each other, she said.

The Winter Challenge 1.0 is a multilevel competition. Based on the event’s themes, the participants will have to pitch an idea and realize that idea into an actual project that will help solve real-world problems. The event will be held in multiple stages, each testing the talent and knowledge of the students related to their projects.

The event will be held over a three-month period commencing from 05 January to 15 March this year. The competition is for all engineering colleges in the eastern zone of India. It includes the following states: Jharkhand, Bihar, West Bengal, Sikkim, Orissa, Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Tripura, and Nagaland and will be open to all B. Tech, M. Tech, and Ph D students.

The registration phase is ongoing and the last date to register has been extended to 07 February 2022. There will be a screening phase for the participants from all colleges, and the selected submissions will qualify for the next phase of the event.

The winner, Runner-up, Second Runner-up, will get Rs 25,000, 15,000 and 10,000 cash, respectively, with a certificate and an alluring memento. To encourage students to keep innovating, consolation prizes will also be given to other participants.

Top three teams may get an opportunity to be incubated under CIIE, IIT-ISM Dhanbad with the support of incubation seed money of up to Rs 15 Lakhs each team. Further, the top 10 teams will get reimbursement for product development costs up to Rs10 thousand.