

**SOPHIA GIRLS' COLLEGE**  
**(AUTONOMOUS), AJMER**



**DEPARTMENT OF MATHEMATICS**

**2020-21**

# 1. Spin Wheel Quiz Competition

**DEPARTMENT OF  
MATHEMATICS AND PHYSICS**

**KALAM-THE SCIENCE FORUM**

*Sophia Girls' College  
(Autonomous)  
Ajmer*

**is Organizing  
a  
Spin Wheel Quiz Competition**

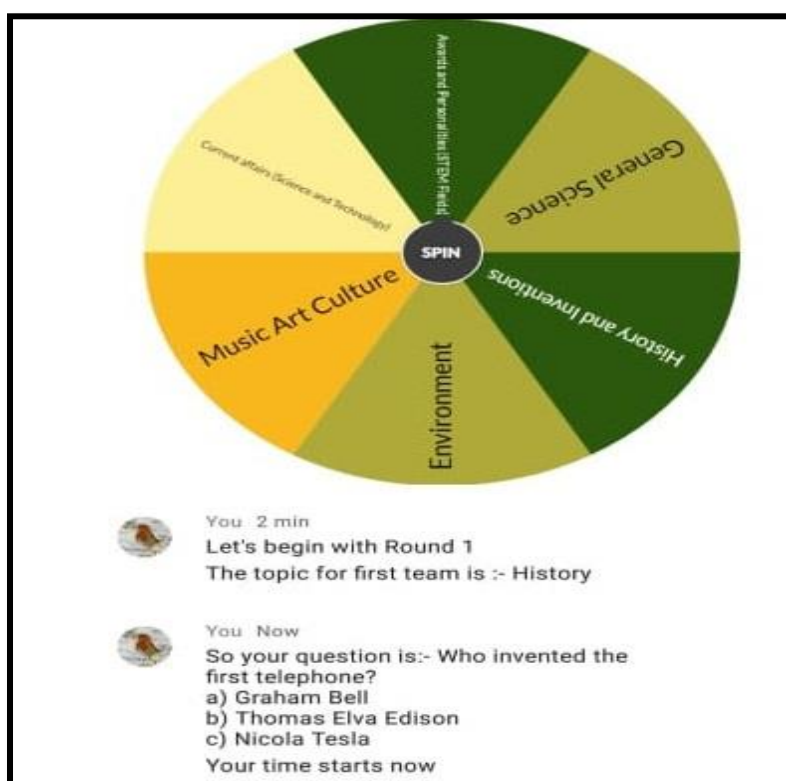
**The Spinning Wheel**  
Spin the wheel for points, questions or topics

**Date: 8th August 2020**  
**Time: 9:00 a.m.**

**Online - Google Meet**

- **Date:** 8August 2020
- **Level:** College Level
- **Total Number of the Students:** 35
- **Mode:** Online (Google Meet)
- **Learning Outcome:** To Prepare students for higher Competitions

- **Report:** A Spin Wheel online quiz competition was organised by the ‘Kalam The Science Forum’ during Corona Pandemic in 8 August 2020. 35 Students of B.Sc. II year participated in this competition. This activity was a great adventure as this was 1<sup>st</sup> on line quiz which covers not only science topics but also from G. K.



## **2. Presentation on Nano Technology**



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**is Organizing  
a  
Presentation on Nano Technology**

**Date: 19th August 2020** **Online - Google Meet**  
**Time: 12: 00 Noon**

- **Date:** 19 August 20
- **Level:** College Level
- **Total Number of the Students:** 47
- **Mode:** Online (Google Meet)

- **Learning Outcome:** To aware about career opportunities in Nano Particles
- **Report:** A Presentation on Nano Technology under 'Kalam the Science Forum' was held on 19<sup>th</sup> August 2020. As Nano Technology is a widely spreading technology in today's world. Total 47 students took active participation in the presentation. Due to Covid presentation was done online through Google Meet.

## NANOTECHNOLOGY

### INTRODUCTION

Nanotechnology is the study of manipulating matter on an atomic scale.

Nanotechnology refers to the constructing and engineering of the functional systems at very micro level or we can say at atomic level.



### HISTORY

The first ever concept was presented in 1959 by the famous professor of physics **Dr. Richard P. Feynman**.

The term "Nanotechnology" had been coined by Norio Taniguchi in 1974.

### TIME LINE

1 <sup>st</sup> Passive nanostructures	2 <sup>nd</sup> generation products
<ul style="list-style-type: none"> <li>Dispersed and coated nanostructures. Ex: aerosols, colloids</li> <li>Products incorporating nanostructures. Ex: coatings, nanoparticle reinforced composites, nanostructured metals, polymers, ceramics.</li> </ul>	
~2000	2 <sup>nd</sup> Active nanostructures
	<ul style="list-style-type: none"> <li>Bio-active, health affects. Ex: targeted drugs, biosensors</li> <li>Physico-chemical active. Ex: 3D transistors, amplifiers, actuators, adaptive structures.</li> </ul>
~2005	3 <sup>rd</sup> Systems of nanosystems
	Ex: parallel assembly, 3D networking and new hierarchical architectures, robotics, evolutionary
~2010	4 <sup>th</sup> Molecular nanosystems
	Ex: molecular devices by design, DNA nano-logic, molecular farming, etc.
	~2015

### APPLICATION OF NANOTECHNOLOGY



#### Nanotechnology in Drugs (cancer)

- Enable drugs to be delivered to precisely the right location in the body and release drug does on a predetermined schedule for optimal treatment.
- Attach the drug to a nanosized carrier. They become localized at the disease site, i.e. cancer tumour. Then they release

#### medicine that kills the tumour. Current treatment is through radiotherapy or chemotherapy.

- Nanobots can clear the blockage in arteries.



#### Nanotechnology in Electronics

- Nanowires is used electrodes and transistors, that are assembled on glass or thin films of flexible plastic.
- Nanolithography is used for fabrication of chips.
- E-paper, displays on sunglasses and map on car windshields.



#### The silicon transistor in your computer may be replaced by transistors based on carbon nanotubes.



#### Nanotechnology in India

- IIT Mumbai is the premier organization in the field of nanotechnology.
- Research in the field of health, environment, medicines are still on.
- Stating in 2001 the Government of India launched the Nano Science and Technology Initiative (NSTI).



#### Possibilities for the future

- Nanotechnology may make it possible to manufacture lighter, stronger and programmable materials that
- The future of nanotechnology could very well include the use of nanorobotics.
- The rebuilding of the depleted ozone layer could potentially be able to be performed.



#### Nanotechnology in Fabrics

- For example, some clothing manufacturers are making water and stain repellent clothing using nano-sized whiskers in the fabric that cause water to bead up on the surface.
- In manufacturing bullet proof jackets.
- Making spill and dirt resistant, antimicrobial, antibacterial fabrics.



#### Nanotechnology in Mobile

- Morph, a nanotechnology concept developed by Nokia Research Center (NRC) and the University of Cambridge (UK).
- The Morph will be super hydrophobic making it extremely dirt repellent.



#### Nanotechnology in Computers



➤ Submitted by-  
Anit George (group leader), Kavita, Kirti, Krishna, Nandini, Nirmala, Priyanka Sekhawat, Ruchika, Sonali Sharma



### **3.Flex & Poster making competition on ‘Mathematics is all around us’**



- **Date:** 10 September 20
- **Level:** College Level
- **Total Number of the Students:** 41

- **Mode:** Online (Google Meet)
- **Learning Outcome:** Importance and Fun with Mathematics
- **Report:** An online Flex and Post making competition was organised for B.Sc. students on 10<sup>th</sup> September 2020. 41 students participated on this competition. Girls have prepared flex or poster on the different topics of Mathematics and application of Mathematics on our daily life.

## GOLDEN RATIO



### INTRODUCTION

In mathematics, two quantities are in the golden ratio if their ratio is the same as the ratio of their sum to the larger of the two quantities. Expressed algebraically, for quantities  $a$  and  $b$  with  $a > b > 0$


$$\frac{a}{b} = \frac{a+b}{a} = \Phi, \phi$$

where the Greek letter phi ( $\phi$ ) or represents the golden ratio. It is an irrational number that is a solution to the quadratic equation  $x^2 - x - 1 = 0$ , with a value of  $\phi = 1.6180339887$


The golden ratio is also called the golden mean or golden section


- Le Corbusier took suggestion of the golden ratio in human proportions to an extreme.




- The golden ratio is used in the proportions of playing cards, postcards, posters, light switch plates, and widescreen televisions.




- The golden ratio plays a role in human perception of beauty. While Fechner found a preference for rectangle ratios centered on the golden



- Specific proportions in the bodies of many animals (including humans) and parts of the shells of mollusks





- In Nature and logo




### In Mathematics uses

#### Golden Rectangle

A golden rectangle with longer side  $a$  and shorter side  $b$ , when placed adjacent to a square with sides of length  $a$ , will produce a similar golden rectangle with longer side  $a + b$  and shorter side  $a$ . This illustrates the relationship  $\frac{a}{b} = \frac{a+b}{a} = \Phi, \phi$





- ODOM'S construction  
George Odom has given a remarkably simple construction for  $\phi$  involving an equilateral triangle:



### APPLICATIONS AND OBSERVATIONS

- Great Mosque of Kairouan found ratios close to the golden ratio in the overall layout and in the dimensions of the prayer space, the court, and the minaret.





#### **4. Flex Making Competition on Sanitizing Machine**



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**is Organizing  
a  
Flex Making Competition on  
"Sanitizing Machine"**

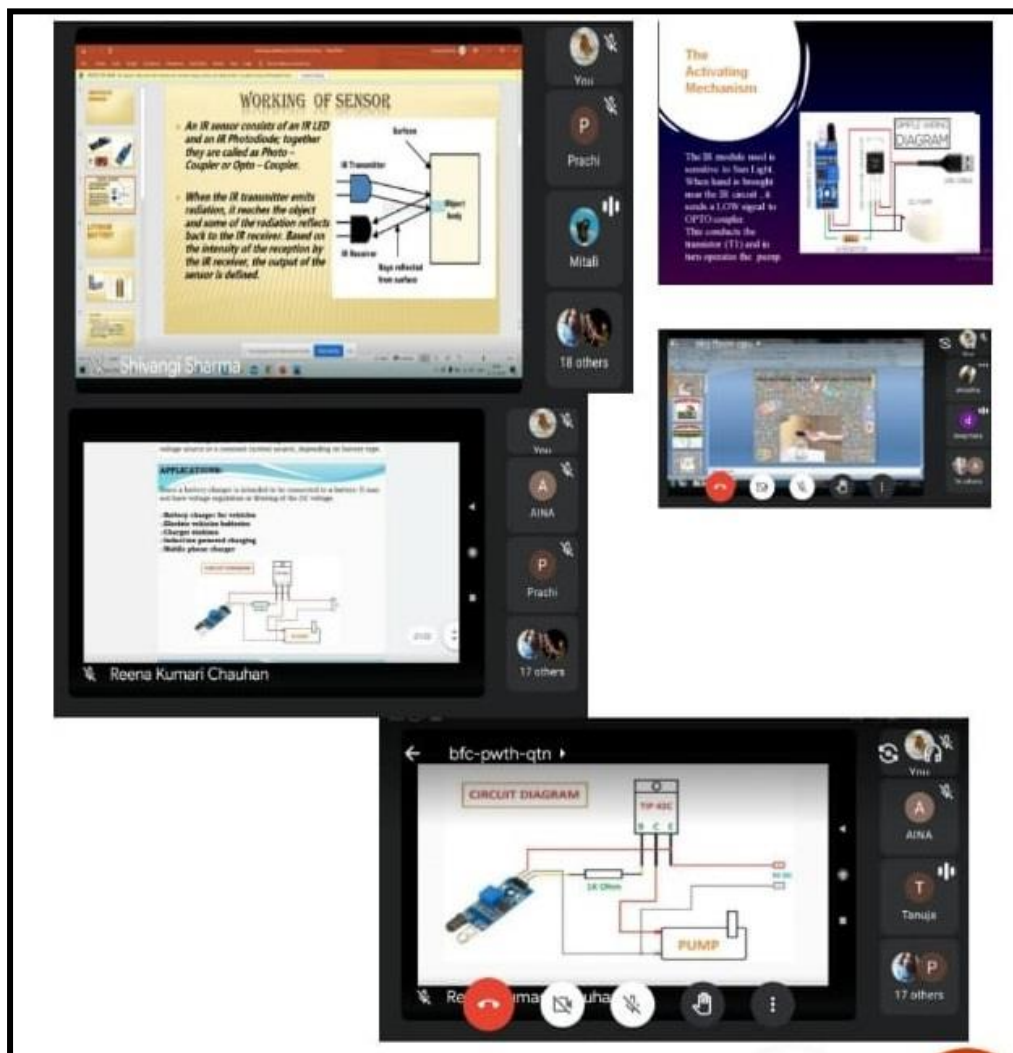
**Date: 15th September 2020  
Time: 10: 00 a.m.**

**Online - Google Meet**

- **Date:** 15 September 20
- **Level:** College Level
- **Total Number of the Students:** 38



- **Mode:** Online (Google Meet)
- **Learning Outcome:** Knowledge about Sanitizing Machine
- **Report:** A Flex competition was organised online on 15<sup>th</sup> September 2020 for the students of B.Sc. Maths. Flex were made on different types of Sanitizing Machine. 38 students showed their interest in this competition by taking part in competition. Students made their flex and uploaded them online which was also a new experience for the students.

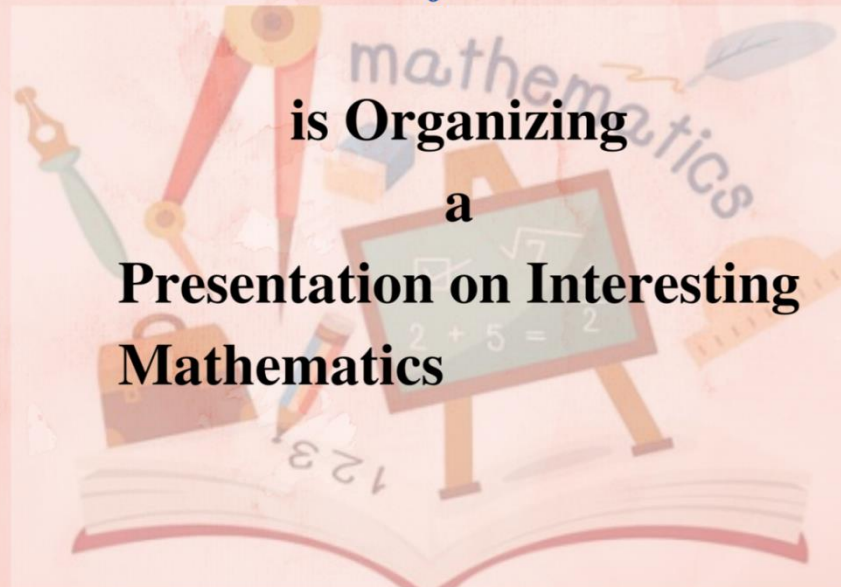


## **5.Presentation on Interesting Mathematics**



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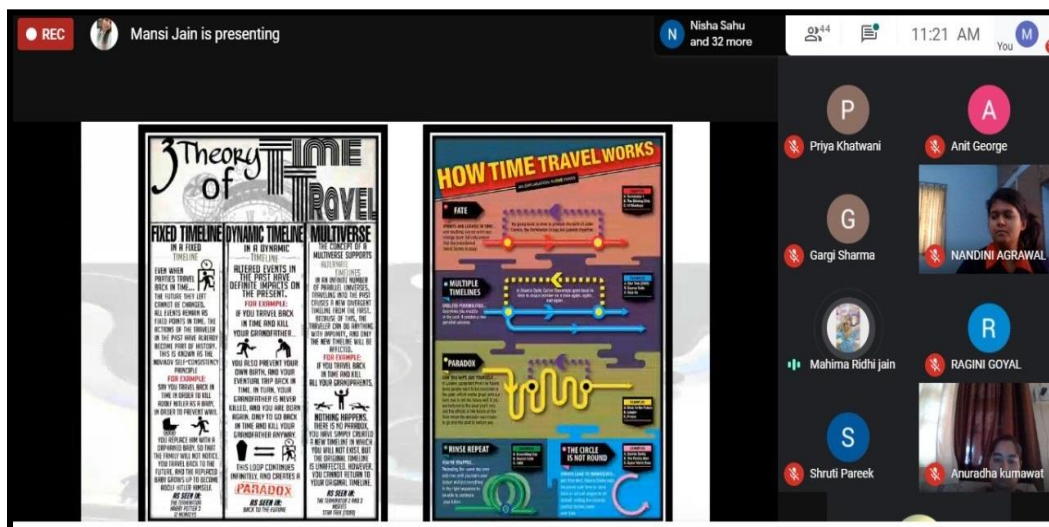
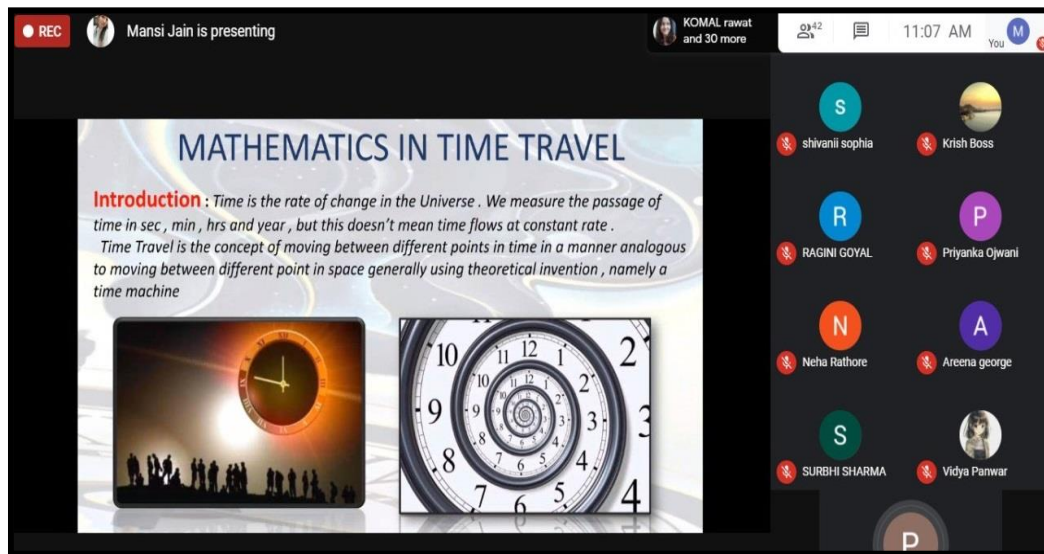
**Date: 25th November 2020**

**Time: 9: 00 a.m.**

**Online - Google Meet**

- **Date:** 25 November 20
- **Level:** College Level
- **Total Number of the Students:** 48

- **Mode:** Online (Google Meet)
- **Learning Outcome:** Enhancement in the confidence and develop the interest of students in the subject
- **Report:** A Presentation was held on the topic ‘Interesting Mathematics’ for the students of B.Sc. Mathematics on 25<sup>th</sup> November 2020. Due to Covid the presentation was organised online through Google Meets. 48 students joined for the presentation through Google Meet.



## **6. Presentation on Career Opportunities in Mathematics**



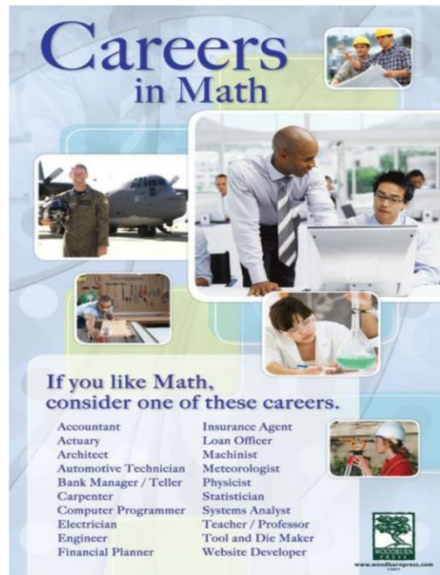
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**Online - Google Meet**

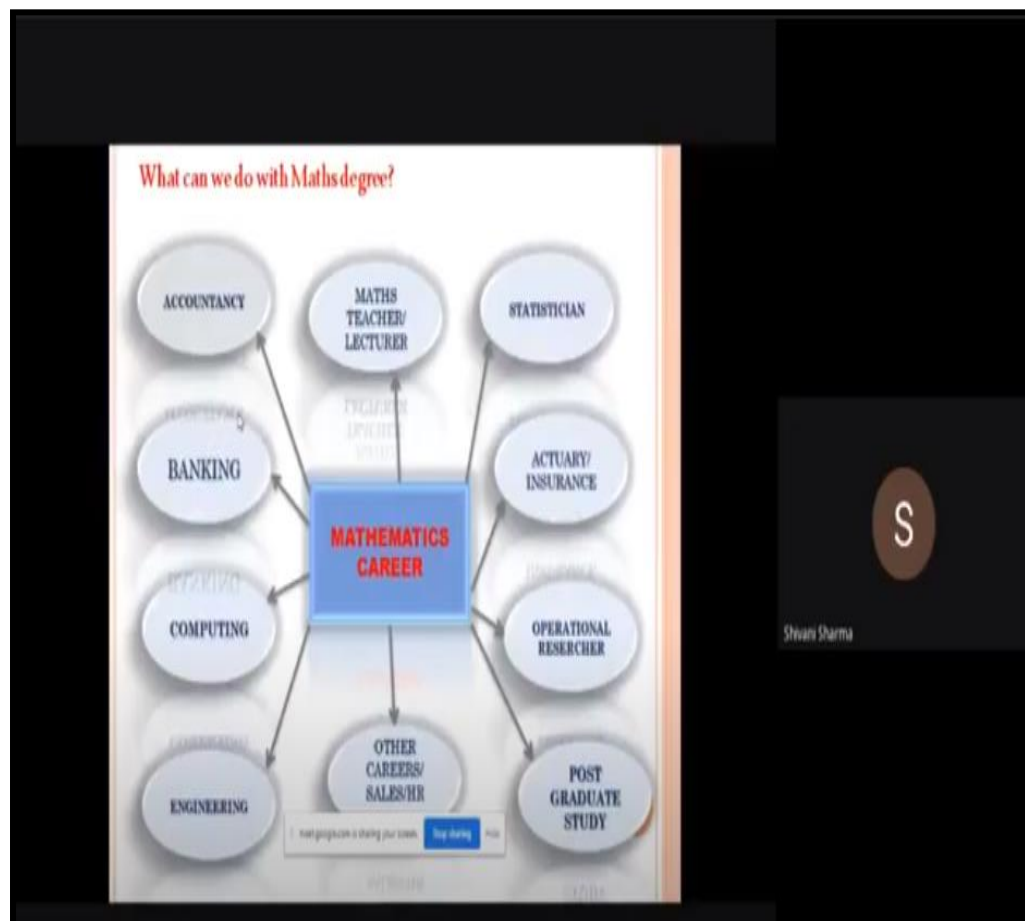
**Date: 27th November 2020**

**Time: 9: 00 a.m.**

- **Date:** 27 November 20
- **Level:** College Level
- **Total Number of the Students:** 43



- **Mode:** Online (Google Meet)
- **Learning Outcome:** Students able to take decisions regarding their field of interest for the career
- **Report:** A Career selection is one of the toughest tasks for every student. So for students of B.Sc. Mathematics a presentation was organised on ‘Career opportunities in Mathematics’ by the Kalam -The Science Forum.Total 43 students attended the presentation.



## INDIAN ARMED FORCES



The Indian Armed Forces are the military forces of the Republic of India. It consists of three professional uniformed services: the Indian Army, Indian Navy, and Indian Air Force.<sup>[1]</sup> Additionally, the Indian Armed Forces are supported by the Indian Coast Guard and paramilitary organisations



If you have done Bsc in any stream of it, then you have already fulfilled one of the requirements since there are many graduate level entries through which you can join Indian Air Force as an Officer. Also there are some instances where an individual join Indian Air Force as an airman through Air Force X And Y group exam, but here you have to fulfill the age criteria also because it is a 10+2 based entry. **individual completed his Bsc he would have crossed the age limit.**

S

shwang labhara

**7. Presentation on Application of Mathematics in  
Different Fields**



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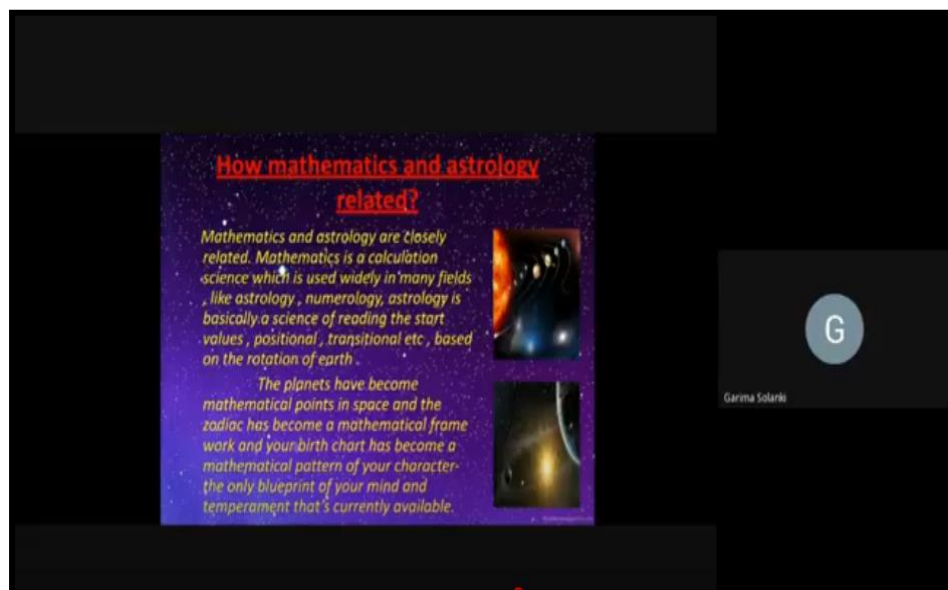
**Date: 4th December 2020**

**Time: 11: 00 a.m.**

**Online - Google Meet**

- **Date:** 4 December 20
- **Level:** College Level

- **Total Number of the Students:** 33
- **Mode:** Online (Google Meet)
- **Learning Outcome:** Enhancement in the confidence and develop the interest of students in the subject
- **Report:** Contribution of Mathematics in every field is vast. Hence the application of Mathematics in different field has to be made known to the students. Hence a presentation was organised on ‘Application of Mathematics in different fields’ on 4<sup>th</sup> December 2020. Total 33 students took part in the presentation. Presentation was held on online mode through Google Meet.





**8. Poster Competition on Impact of COVID -19 on  
Various Aspects of Life**



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**is Organizing  
Poster Competition on  
Impact of COVID-19 on Various  
Aspects of Life**

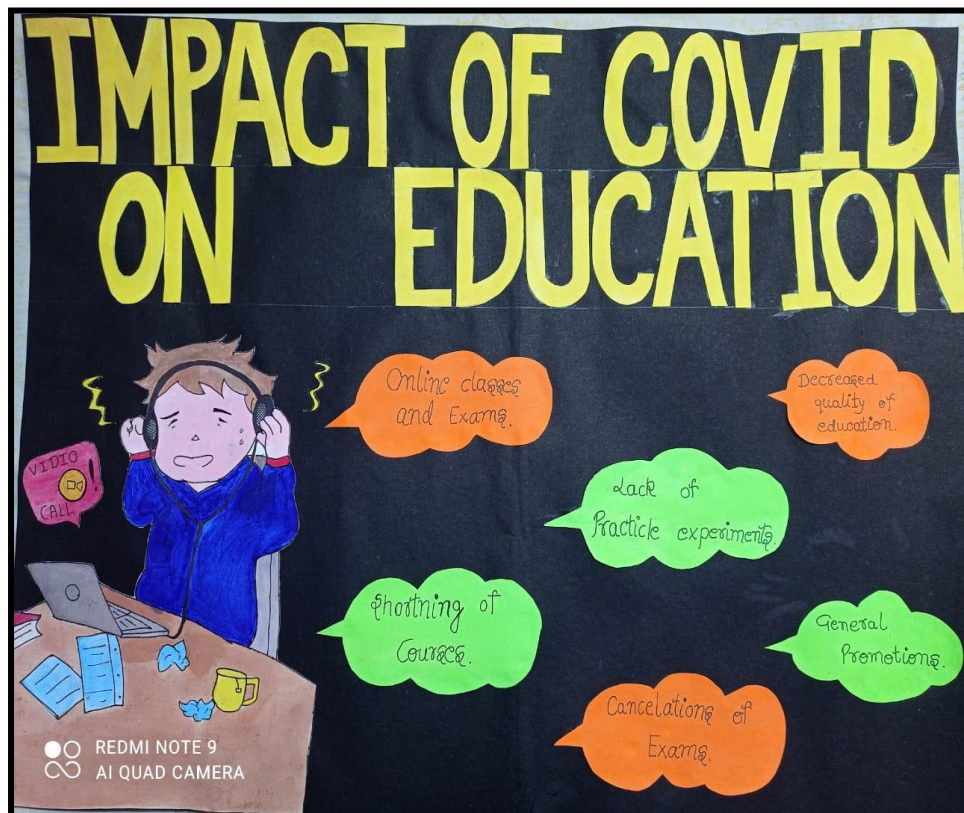
**Date: 21st December 2020**

**Time: 11: 00 a.m.**

**Online - Google Meet**

- **Date:** 21 December 20
- **Level:** College Level

- **Total Number of the Students:** 32
- **Mode:** Online (Google Meet)
- **Learning Outcome:** Knowledge about impact of Covid-19
- **Report:** A poster making competition was organised by the Kalam the science forum on 21<sup>st</sup> December 2020 for the topic 'Impact of Covid 19 on various aspects of life. Total 32 students took part in the competition. Competition was organised online through Google Meet. All students took active participation in the competition and they enjoyed the competition.



## **9. Webinar on Career Opportunities in Biophysics**



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**is Organizing  
a  
Webinar On Career  
Opportunities in Biophysics**

**Date: 22nd April 2021  
Time: 10: 00 a.m.**

**Online - Google Meet**

- **Date:** 22 April 2021
- **Level:** National Level
- **Total Number of the Students:** 69

- **Mode:** Online (Google Meet)
- **Learning Outcome:** Develop Interest in Biophysics
- **Resource person :**Dr. Aprajita Krishna, Associate Professor and Head  
Patna Women College (Autonomous), Patna

Contact Number: 943163251

- **Report:** Biophysics is the innovative Topic of Physics where students can approach for wide range of Job opportunities also. Dr. Aprajita Krishna Ma'am was the resource person for this seminar. She highlighted the Career opportunities in the field of Biophysics. All the students appreciated the events. With this seminar students developed an interest for the Biophysics. Total 69 students attended the seminar and it was held online through Google Meet.



## **10. Talent Hunt Competition**



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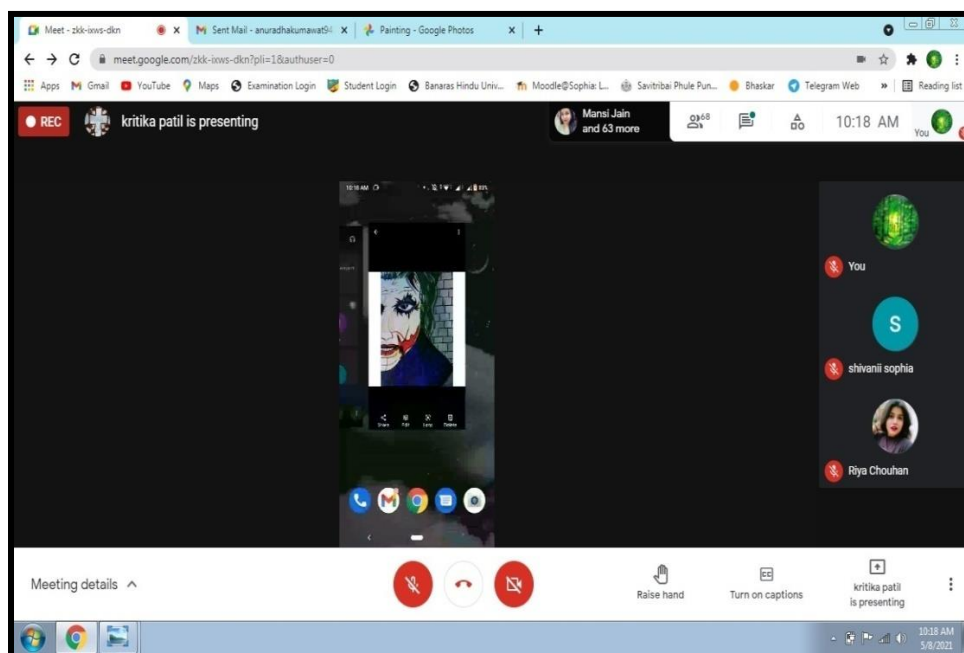
**is Organizing  
a  
Talent Hunt Competition**

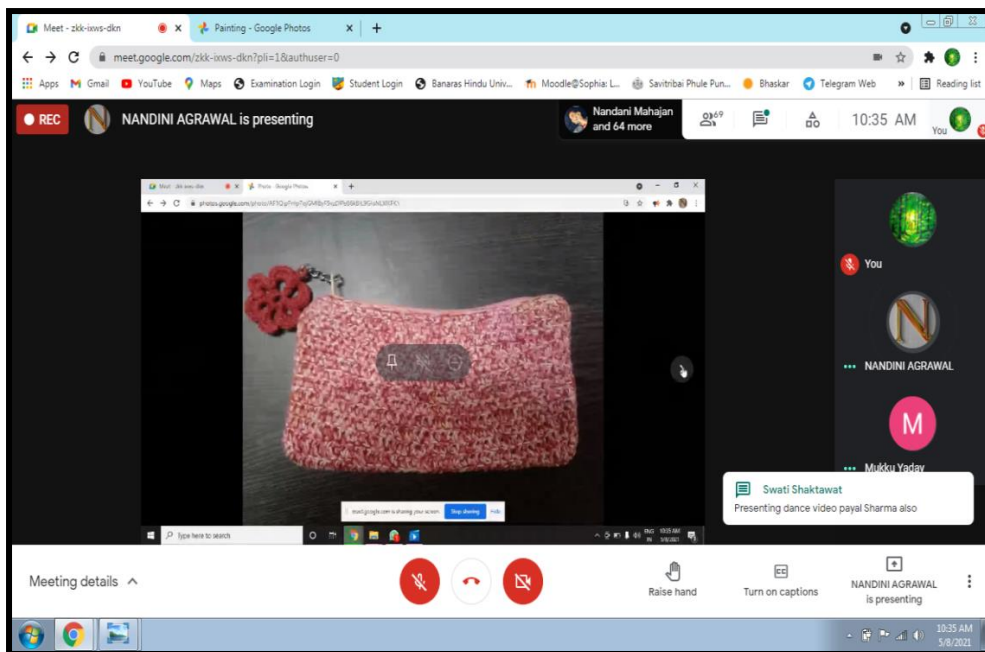
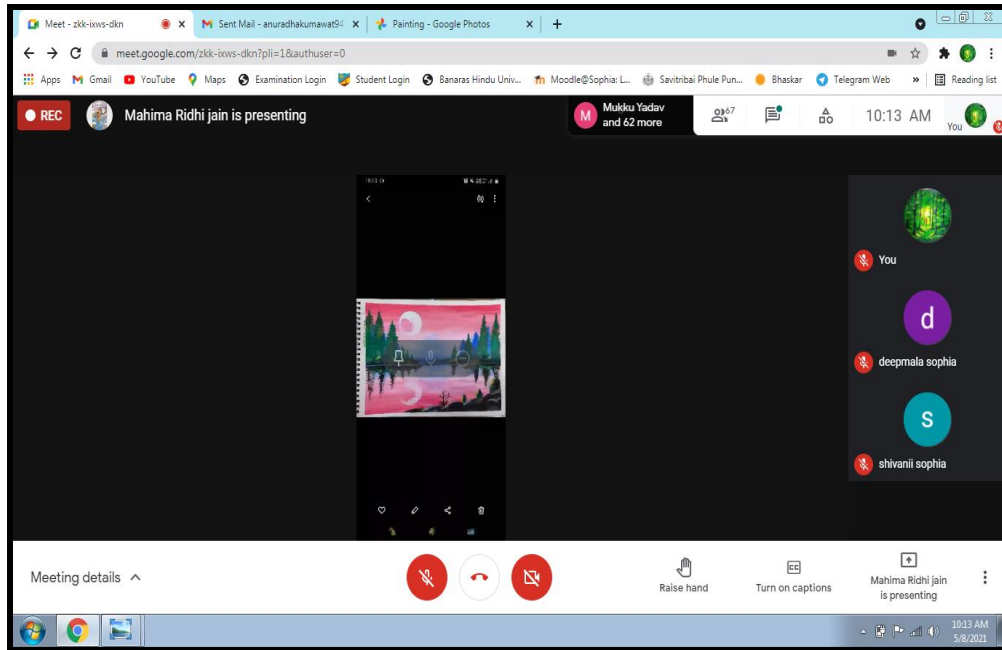
**Date: 8th May 2021  
Time: 11: 00 a.m.**

**Online - Google Meet**

- **Date:** 8 May 21
- **Level:** College Level

- **Total Number of the Students:** 75
- **Mode:** Online (Google Meet)
- **Learning Outcome:** To overcome stress due to Lockdown
- **Report:** A Competition named as ‘TALENT HUNT’ was organised by Kalam – The Science Forum on 8<sup>th</sup> May 2021. Students were at home because of lockdown during the Covid. So this was a small effort by the departmental teachers for the students to overcome their stress. For the first time, students showed their talent using virtual platform by presenting their paintings, craft, dance, poem, mimicry, monoacting etc. through Google Meet. All the students took part in this event enthusiastically. Total 75 students of BSc I,II and III year participated in this competition.





## 11. Activity on Reimagine, Recreate and Restore



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is Organizing  
an activity on  
**Reimagine, Recreate and Restore**

**Date: 5th June 2021**  
**Time: 10: 00 a.m.**

**Online - Google Meet**

- **Date:** 5 June 2021
- **Level:** College Level
- **Total Number of the Students:** 97



- **Mode:** Online (Google Meet)
- **Learning Outcome:** Environmental Consciousness
- **Report:** Students of 'Kalam -The Science Forum' organised a presentation on World Environment Day. In this presentation students were asked to do a project in which they have to plant a seed of any fruit or vegetables a month ago and they have to capture the pictures of their growth stages every week. Then on World Environment Day, they prepared the presentation of the grown plant with its growing stages and shared it online. All the students planted many types of fruits and vegetables which made their presentation a colourful one. All enjoyed this project. Total 97 students took part in this project. Presentation was held online through Google Meet.

