



ISSN 2277-8950

AUGUST-SEPTEMBER 2020



<https://apod.nasa.gov/apod/ap200810.html>

PHYSICS NEWS

Scientists create compact particle accelerators that drive electron beams nearer speed of light

Scientists have successfully developed a pocket-sized particle accelerator capable of projecting ultra-short electron beams with laser light at more than 99.99% of the speed of light. To achieve this result, the researchers have had to slow down light to match the speed of the electrons using a specially designed metallic structure lined with quartz layers thinner than a human hair. This huge leap forward simultaneously offers the ability to both measure and manipulate particle bunches on time scales of less than 10 femto-seconds. This will enable them to create strobe photographs of atomic motion. This successful demonstration paves the way to the development of high-energy, high-charge, high-quality Terahertz (THz) driven accelerators, which promise to be cheaper and more compact. Reducing the size and cost of accelerator technology, will open up these incredible machines to a much wider range of applications.

Read more at : <https://phys.org/news/2020-08-scientists-compact-particle-electron-nearer.html>

Original paper : *Nature Photonics* (2020). DOI: [10.1038/s41566-020-0674-1](https://doi.org/10.1038/s41566-020-0674-1)

Scientists propose a novel method for controlling fusion reactions

Scientists have found a novel way to prevent pesky magnetic bubbles in plasma from interfering with fusion reactions delivering a potential way to improve the performance of fusion energy devices. And it comes from managing radio frequency (RF) waves to stabilize the magnetic bubbles, which can expand and create disruptions that can limit the performance of ITER, the international facility under construction in France to demonstrate the feasibility of fusion power. Researchers at the U.S. Department of Energy's (DOE) Princeton Plasma Physics Laboratory (PPPL) have developed the new model for controlling these magnetic bubbles, or islands. The novel method modifies the standard technique of steadily depositing radio (RF) rays into the plasma to stabilize the islands - a technique that proves inefficient when the width of an island is small compared with the characteristic size of the region over which the RF ray deposits its power.

Read more at : <https://phys.org/news/2020-08-scientists-method-fusion-reactions.html>

Original paper: *Physics of Plasmas* (2020). DOI: [10.1063/5.0007861](https://doi.org/10.1063/5.0007861)

ISOLDE reveals fundamental property of astatine, the rarest element on Earth

A team of researchers using the ISOLDE nuclear-physics facility at CERN has measured for the first time the so-called electron affinity of the chemical element astatine, the rarest naturally occurring element on Earth. As well as giving access to hitherto unknown properties of this element and allowing theoretical models to be tested, the finding is of practical interest because astatine is a promising candidate for the creation of chemical compounds for cancer treatment by targeted alpha therapy.

Read more at : <https://phys.org/news/2020-07-isolde-reveals-fundamental-property-astatine.html>

Original paper: *Nature Communications* (2020). DOI: [10.1038/s41467-020-17599-2](https://doi.org/10.1038/s41467-020-17599-2)

X-rays indicate that water can behave like a liquid crystal

Scientists at Stockholm University have discovered that water can exhibit a similar behavior to that of a liquid crystal when illuminated with laser light. This effect originates by the alignment of water molecules, which exhibit a mixture of low- and high-density domains that are more or less prone to alignment. The results are based on a combination of experimental studies using X-ray lasers and molecular simulations. Liquid crystals work by applying an electric field, which makes the neighboring molecules of a liquid align, in a way that resembles a crystal. Water too can be distorted towards a liquid crystal, when illuminated with laser light. It is known that the electric field of the laser can align the water molecules for less than a billionth of a second.

Read more at : <https://phys.org/news/2020-08-x-rays-liquid-crystal.html>

Original paper: *Physical Review Letters* (2020) DOI: [10.1103/PhysRevLett.125.076002](https://doi.org/10.1103/PhysRevLett.125.076002)

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BULLETIN OF INDIAN ASSOCIATION OF PHYSICS TEACHERS (ISSN 2277-8950)

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The Bulletin is the official organ of the IAPT. It is a monthly journal devoted to upgrading physics education at all levels through dissemination of didactical information on physics and related areas. Further, the Bulletin also highlights information about the activities of IAPT.

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EDITORIAL

Friends

As you know, these are difficult times. The Covid Pandemic has (or, had) brought to a halt all the normal life activities – school, office, market, industry, transport... The Bulletin also became a victim of times. Four issues - April to July - could not be printed. Instead, two combined issues, April-May and June-July, were prepared and put on IAPT website. Sure, many of you have visited the website and seen them.

The situation seems to be easing now. The press has agreed to print and the post office is willing to accept the Bulletin (7000) copies for delivery. Though the train services have been resumed only partially, the postal department has assured us of the postal delivery. They seem to have made alternate arrangements for the same.

So, let us hope that you will receive the current issue - August-September combined – in reasonable time.

They say – come what may, the show must go on. And, so does IAPT. In these trying times, we have had a fairly reasonable number of activities, the details of which you will find in this issue. Of course, all these activities were online – had to be. One, requiring a lot of planning and manpower was the execution of screening test of the annual event NAEST (National Anveshika Experimental Skill Test) in which over 48000 students enrolled. We have also had, a successful EC meeting, a memorial lecture delivered, a lecture series executed, a host of webinars on diverse topics by some RCs and the NGPE Part C (lab skills test) which also required a good deal of preparation and planning, conducted with great success.

It all shows the grit and determination of IAPT members and their unfailing love for the subject.

IAPT is alive, and kicking.

U S Kushwaha

**DATE EXTENDED FOR
ESSAY SUBMISSION.....
See Page No. 177**

Science Teaching in Schools: Issues Raised 150 Years Back

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Abstract

The discussion and debate about the problems science teaching in schools and the suggestions about the ways for its improvement is an ongoing process. Interestingly this issue is possibly as old as science teaching in schools and started in the West in the nineteenth century. In our country the concern for the quality of science teaching in schools began in 1960s when the science teaching in schools began to take its roots here. One particular article published more than 150 years back in 1869, in the first issue of the journal Nature is quite significant in this regard. The content of the article may be considered as a benchmark of an academician's concern for science teaching in schools at that time. Here an attempt has been made to look at the problems of teaching of school science now we talk about with that backdrop. Efforts have also been made to throw some light on the widely lamented issue why our schools are not coming up with the high quality of science teaching.

Introduction

How old is the teaching of science in schools? Or for that matter when did science become the part of school curriculum? Did Galileo Galilei in his school days attend any class known as 'science class' or for that matter did he come across any person who was known as a science teacher? Or did it happen with Sir Isaac Newton? Well, now we know that the answers to these questions cannot be affirmative as the subjects now we know as 'science' did not emerge with the present names at that point of time. So the teaching of science was not introduced formally in schools during the time of Galileo or Newton i.e. during the seventeenth century in continental Europe or in England. 'Natural philosophy'

that may be termed as a precursor of science of course emerged at that time but school curriculum did not include that.

Initiation of science teaching in schools in the West

Around second quarter of nineteenth century science as a subject was introduced in the school level through the English Public Schools and we find by 1860s may be by 1870s concerned people started talking about the 'problems' of science teaching in schools. It was not that the people were talking about the problem only they were actually expressing their concern about the nature of science teaching and other aspects particularly about the hands on training and of course about their improvement. This was because as all of us know that the knowledge in the domains of science and of course technology at that time was actually expanding at a pace that may only be compared to the exponential growth. Science was seen as a laboratory based subject right from the beginning and the people in the West had special interest and possibly respect for this. Because it was a time where science was really taking shape in a big way. New principles were getting identified, new species were coming to the light, and innovative instruments were developed for the scientific studies of various areas and all these were actually making the people very enthusiastic about science. Technology that was intimately connected with the science was coming up with new inventions to influence different spheres of social and cultural lives along with the economy and of course these were giving an entirely new shape to the Western society. We shall take up this discussion on Europe particularly on England but before that let us also take a look at the

status of science teaching in schools in this country. That is likely to help us to appreciate why the issue that has been raised.

Scenario in our country during British rule

Our country was under British colonial rule for nearly 200 years and the entire nineteenth century is included in that period. Well, we have been able to produce a few world class scientists before independence most of whom were actually born in the nineteenth century but spent their active life in the twentieth century. All of whom were introduced to science only when they reached the college level. They were proficient in mathematics in their school days but were not exposed to science formally through classes and text books. At the time of independence we did not have science as a discrete subject in our school curriculum. Even till 1960 we did not have it as a separate subject in schools that used to impart education up to 10th grade. Intermediate classes in science that used to be held in colleges with the aspiring students of medical, engineering or the so called 'pure science' did have physics or chemistry or botany and zoology along with mathematics as subjects but there was no laboratory component for the science subjects. There were some classroom demonstrations where the students could 'see' the 'happenings' in science but they did not have the opportunity to do the things by their own hand and get the right kind of feeling and exposure. However this aspect of academic scenario is somewhat understandable considering the socio-economic set-up of a newly independent nation after nearly 200 years of colonial rule. In fact, the overhauling of the entire education system was a challenge to the leaders of a newly independent country.

School science teaching in independent India

If we consider the fact that a newly independent nation turned out to be a country that got fragmented through the partition and the economic and social situations to put it very mildly were extremely stressful. The luxury

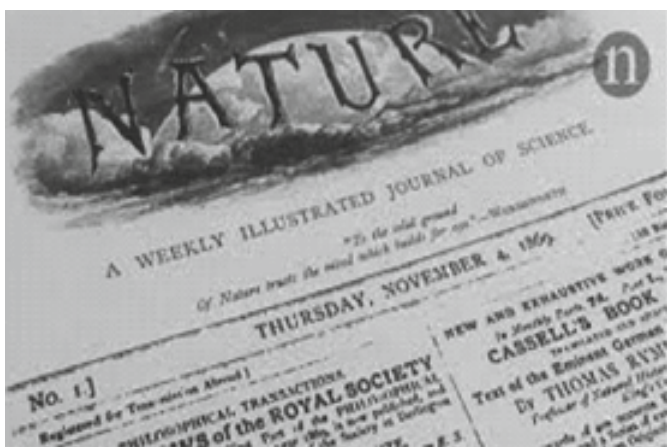
of investing in the science education was possibly in the minds of the leaders of the newly independent nation but economy was not permitting. So we had to wait for that. We could not encourage science education in general for nearly first fifteen years of independence. Moreover the society had role models in the form of government servants, lawyers, teachers and other professionals virtually none of them were the students of science except possibly the physicians. Before independence there was not much of an encouragement for pursuing science at the school level as it was felt that the subjects would not find many applications and hence would not lead to the suitable jobs. Of course the students entering into the UG classes had the option, albeit at very limited places to pursue science and can go for master's degree. Yet all these began after 1920 or so.

All these factors not only made us late starters but possibly hesitant starters so far as the science education in schools was concerned. Fortunately the new government did put stress on technical education whose root was very much connected to science education. And we got first Indian Institute of Technology (IIT Kgp, 1951) barely four years after the independence. We had the advantage that our leaders were exposed to Western education and their scientific and technological development. However here we are no more going to talk about the situations we were having in hand but would like to focus our attention towards the scenario in England 150 years back. This will give us an idea why the quality training in science in schools is quite challenging.

The quality of science teaching in nineteenth century England

Let us go back to the scenario that existed in England not at the time our independence but much earlier. We know the very reputed high impact factor scientific journal 'Nature' has completed 150 years of its first publication in 2019. It actually started its journey in 1869, to be precise on November 4 of that year. Since

it was celebrating 150th year of its existence, people were naturally curious about its first issue. What were its contents? Who were the people wrote there? Since it was a publication from well known publisher Macmillan it was expected to come up with high quality content. And interestingly the first issue of Nature had an article that addressed this purpose. In this context let me mention that the same group of publishers still publishes this weekly science magazine that attracts the scientists as well as people curious about science and its development and issues concerning it.



In the **first issue of nature** Rev W. Tuckwell wrote on 'The Problems of Science Teaching in Schools' covering the various aspects of the issue. Rev William Tuckwell has been described in Wikipedia as a “Victorian clergyman well-known on political platforms for his experiments in allotments, his advocacy of land nationalisation, and his enthusiasm for Christian Socialism. He was an advocate of teaching science in the schools”. He was running the King's College at Taunton from 1864 as its Principal and it was well known that under his leadership the school had improved a lot. There were number of this type of schools in England in late nineteenth century. Rev Tuckwell delivered a speech in the meeting of the British Association, a body of educated liberals that had a concern for the betterment of British science, technology and of course education in general. Tuckwell in his stressed upon the need for more hands

on training for the 'boys'. Please note that that the students in these schools were only boys at that time. So he talked about his concern for the boys. Let me quote a few lines from his write up that was based on his talk. *“The subjects which naturally suggest themselves as most essential are Experimental mechanics, Chemistry and Physiology. But it has been urged by the high authority, familiar to the members of this Association (the article was a part of Tuckwell's talk at British Association) that between Chemistry and Physiology Systematic Botany should be interposed, as well because of the charm of this science lends to daily life, as from its cultivating peculiarly the habit of observation and illustrating a class of natural objects which are touched indirectly or not at all by the other sciences named.”*

Concern for the improvement

We possibly nowadays do not look at the quality of laboratories in a reputed school but like to know about the facilities like swimming pool, tennis court, gymnasium, auditorium etc or may be about the performance of he students of the school in Board examination and various entrance tests. Rev Tuckwell was aware of this at that time he wrote; *“The subject of books and apparatus, involving as it does the question of expenses, is of highest practical importance. Apparatus need not cost much; but it may and if possible it should cost a great deal. While poor and struggling schools may begin cheaply and proceed gradually, the institutions which can spend money on racket courts and gymnasiums ought not to grudge it on museums and botanic gardens.”* He went to describe every component of the laboratory like lab tables, cupboards etc mentioning the prices of that time. That showed that the furniture for the laboratory were not that expensive. He had his own suggestions related to the physics and its laboratory though the subject was taught with the help of a book called “Natural Philosophy” by Neweth. In his talk Rev Tuckwell admitted *“We have taught mechanics efficiently that is to say, we have passed on our classes for last three years to the Oxford local with a good air-*

a set of pulleys, models of force-pump and the common pump... we have lost no opportunity of making the boys acquainted with machinery; from the crane and water-mill of our daily walks, to steam engine and the spinning jenny of the manufactory; for he who has not examined engines at work will never understand them clearly, or describe them correctly.

After giving his outlook about what a school must have for teaching of science, like laboratory, herbarium, museum, botanic garden apart from the instruments like microscope, human skeleton, meteorological apparatus, astronomical apparatus he talked at length about their uses. And in each case he not only mentioned the prices of them but also gave the names of the manufacturers or suppliers for each of them. But near the end he raises another very important issue and what he said is here. *“It remains only to examine the mode of obtaining teaching power; a point which presses heavily on many head-masters who have themselves no knowledge of science. That all head-masters should have such knowledge is a fact which if science is to be taught at all trustees and governing bodies must come to recognise before long: meanwhile every school which teaches science thoroughly is training skilled teachers for not a distant generation”*. After his suggestions of offering higher salaries to more qualified teachers who are the *'bachelors of science or first class Oxford of Cambridge men'* he also had a word of caution. Let me quote him once again. *“The man who knows science admirably, but knows nothing else prepares boys well for the examination but the teaching does not stick. The man of wide culture and refinement brings fewer pupils up to a given mark within a given time: but what he has taught remains with them; they never forget or fall back.”* And in the very next sentence he added, *“I am not sure that I understand the phenomenon, but I have noted it repeatedly.”*

Concluding remarks

It is possibly a bit surprising that this caution is really important even today in the context of our country. Through all sorts of discussions, debates at various

levels, and in the seminars, conferences, workshops at different locations and of course through the writings in various newspapers, magazines and social media the issue of teaching of school science continues to occupy the centre stage. Our learning in science is often getting too bookish in the schools and that now often fetches high marks, may be provides the entrance opportunity to elite institutions for a miniscule percentage of students. But the application of the knowledge when the situation demands is really lacking. This is one of the very significant problems in science teaching though we have large number of qualified and efficient teachers. We do have teachers who can motivate and are capable of taking the learning beyond the classroom. But the barriers come in the form of syllabus, demand and desire for high marks irrespective of learning, attitude of the authority, insistence and unjust demand from the guardians for cutting short of hands on trainings and of course the outlook of the society at large giving the topmost priority to the so called 'success' in some entrance tests. But we should not forget that the acquired knowledge in the school classroom takes a student a long way if he or she looks for their applications in the real life. And the students trained in science are expected to do that. It is this process that charts their route to higher goals and science can become an everyday component in our life.

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Measurement of Surface tension of water – experiment with mm scale (sitting in one's home and observing the rain drops hanging from the window bars)

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What is described here is the result of an observation and a simple calculation to determine the Surface tension of water while sitting in one's home watching the rain drops that are settled on the window bars in one's flat .

The beautiful rows of identical rain drops clinging to the window bars (picture given below), suggest that one could make a measurement of Surface tension of water with just one length measurement.

The surface of a liquid behaves like a stretched elastic membrane that is under tension. Both tend to shrink to get minimum area under given circumstance. Drops of rain water falling freely under gravity are spherical in shape. Sphere is the geometry that has minimum surface area for a given volume. It is well known that tiny drops of mercury on a flat surface take spherical in shape. Tiny drops of water on the leaves of water

plants like lotus and water lily are also spherical. Water spilled on a dusty surface does not wet the surface but collects as tiny spherical drops. Described in this write-up is an interesting observation.

Rain drops clinging on to window bars like what you see in the photograph below are hemispherical in shape. All drops are identical in shape and size. The balancing forces on the drops are,

- (i) The weight of the drop acting downwards, $W = (1/2) (4/3) \pi r^3 \rho g$, where r is the radius of the drop that is half of the thickness 't' of the Bar, ρ the density of water and g , the acceleration due to gravity,
- (ii) The surface tension force acting upwards along the rim of the drop $= 2\pi r T$, T being the surface tension.





A close up view of one of the drops

Equating the two,

$$(2/3)\pi r^3 \rho g = 2\pi r T,$$

$$T = (r^2 \rho g)/12$$

Substituting, $g = 9.81 \text{ m/s}^2$, $r = t/2$, $t = 10^{-2} \text{ m}$, $\rho = 10^3 \text{ kg/m}^3$,

We get,

$$T = 80 \text{ mN/m (approx.)}$$

The only measurement made was the thickness of the bar (10mm)!

ARTICLE

NAEST-2020 - Online Screening (Braving the Covid Pandemic)

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1 Introduction

National Anveshika Experimental Skill Test (NAEST) is one of the National competitions conducted annually by IAPT. It is a unique kind of competition in which thousands of school and college students participate and the evaluation is based on their skills to perform physics experiments. The test is conducted every year by National Anveshika Network of India (NANI) under the guidance of Prof. Dr. H. C Verma. The 26 Anveshikas all over the country work actively and help in the conduction of this exam.

2. General Format

There are five rounds which a student has to clear in this exam. The first round is the screening round in which thousands of students from schools and colleges of India participate. Last year 25,726 students from all over the country participated in the screening round. Active involvement of the Anveshika coordinators with the schools/colleges made this possible. In the screening round there is a written quiz based on very short videos from real life events/experiments which tests the ability to observe an experiment, some times to make some measurements on the video, and to analyse it using right concepts of physics of the participating students.

In each of the screening round centres, arrangements are made by the respective Anveshika of that region where around 300-

400 students are shown these videos and the quiz conducted meticulously in big halls or auditoriums. Around ten percent of the students are then selected on the basis of their performance for the next round which is the Prelims round. This round is held by the local Anveshika in their labs. In this round the selected students have to perform three experiments designed by NANI. Judgement is done on the basis of their skills of doing the experiments and analysing the data. Further rounds (i.e. the quarter final, semifinal and final) are then held in Kanpur under the direct guidance of Dr. H. C. Verma. In all these rounds the selected students from the previous round have to perform the newly designed ingenious experiments and 3 National winners are declared.

3. NAEST 2020

This year it was a challenge to conduct this exam amidst the Covid pandemic. NANI proposed for a collaboration with Center of Continued Education, IITK which they gladly accepted. The online portal MOOKIT of IIT Kanpur was made available to the students all over the country for the screening round of NAEST. A website nani.hcverma.in was made by IITK Software team at MOOKIT and registrations were invited. Active campaigns by Dr. H C Verma through youtube channel, facebook page, and by Anveshika coordinators and other active Physics teachers in contact with NANI led to a

registration of more than 48,000 students on the website of this portal. The registrations were opened on July 1, 2020 whereas the Screening round was announce to start of August 9,2020.

3.1 Eligibility

Students studying in Std 9 – 12, BSc and MSc students of any Indian institutions were eligible. However many students and teachers enrolled at the website as there were other perks involved.

3.2 Bonus activities

Students who registered early on the website were given a variety of Physics activities. Most important was the facility to ask questions and reply them. Extensive discussion on various topics of physics took place among the students in the “FORUM” section of the website. Some of their Physics queries were answered by Dr. Verma and other instructors.

A number of video experiments were uploaded at the site time to time which the students enjoyed and learned physics. Several previous years NAEST videos were also uploaded in the resource section to give them a feel of what kind of questions will be asked in the Screening.

The site is still available to the students (though the screening test is over on 19th August) and at the time of my writing this article 6,300 students are on the site learning Physics through questioning and answering to each other.

4. Plan to conduct screening

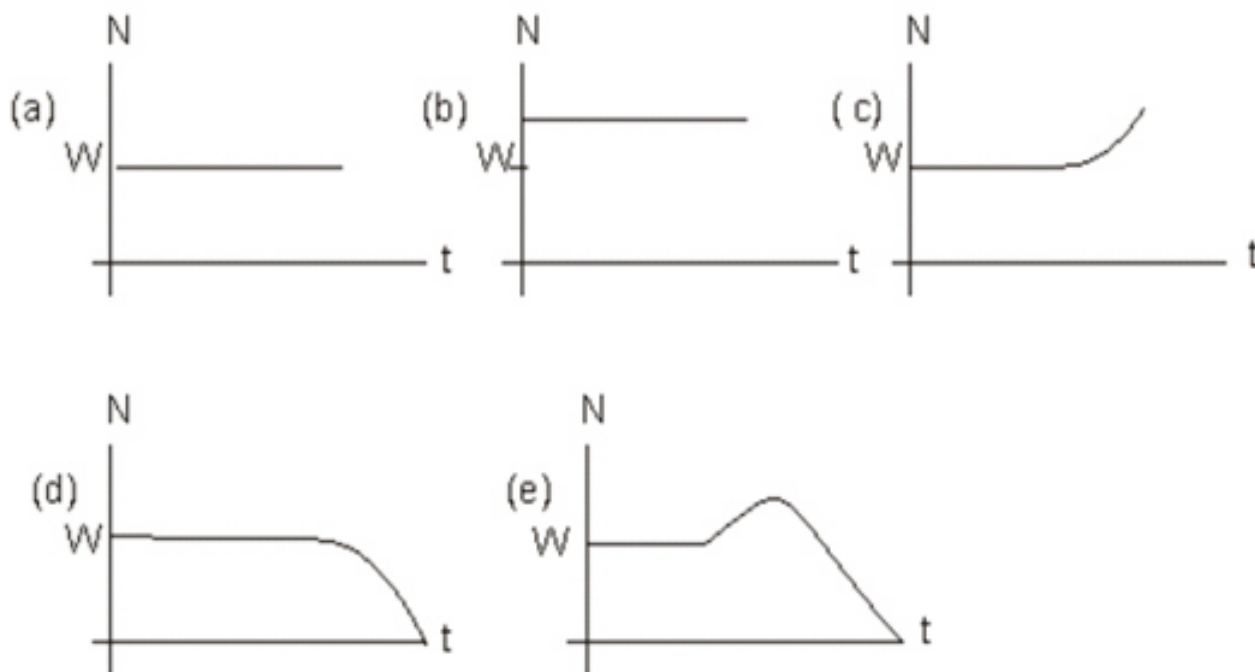
It was a totally new kind of challenge and we had no experience

of conducting such online examinations. A small committee comprising of four Senior NANI workers Mr. Amit Bajpai, Ms. Pragya Nopany, Mr. Mukul Rathi and Ms. Smita Fangaria along with Dr. H. C.Verma were set up to spearhead question paper setting and conducting the screening round. It met regularly on Zoom and chalked out the plan.

4.1 Question paper

To account for the connectivity problems, it was decided that there would be five different time slots in which the quiz would be held in the screening round. This required five different question papers and making of about 45-50 videos as against 10 videos in the previous years for the round. This was a big task. All the Anveshika co-ordinators were asked to send some videos together with possible multiple choice questions. Ideas from the videos received were used to shoot and reshoot final videos at Sopan Ashram in Kanpur. Mr. Amit Bajpai along with Mr. Vipin Sharma shot them with perfection at Kanpur. Dr. Verma formulated beautiful and very creative physics questions on these videos. All the committee members then individually analysed these questions and concepts behind them.

The videos and questions were then segregated into 5 slots such that each slot had a good and similar mix of questions from various topics of physics. Similar difficulty level was also maintained in all the slots. Each slot had 9 videos and 18-20 questions. Also the number of correct options was kept the same in all the slots.



Once the slots were segregated, meetings among the committee members were organised for each slot. In these meetings each and every question of that slot was reanalysed to check the correctness of the options and the implications of the language of the question. Many aspects came up in the meetings. The videos were as simple as a person mopping the floor, wheel chair being dragged, water bottle falling, grains of millets popping up when heated and many more from real life but the questions based on them delved deep into the physics of them. Some videos had to be reshot to fit the question, some questions were reframed and some more questions were added. It was very intensive work. The meetings stretched late into the evenings and had to be started again early in the morning. But it was a great learning exercise and a very enjoyable experience where everyone discovered and rediscovered the physics in these videos from real life.

A sample question of the screening round:

VideoLink: <https://youtu.be/QOgorM5Lw80>

Consider a particular grain of weight W initially at the bottom which pops up vertically without breaking. Take $t=0$ at a time well before the grain starts popping up. Which of the graphs below best represents variation of normal force on the grain by the vessel?

भार W वाले किसी एक दाने पर विचार करें जो शुरू में बर्तन की पेंदी पर था तथा बिना टूटे उर्ध्वदिश में ऊपर की ओर उछलता है। समय $t = 0$, दाने के ऊपर की ओर उछलना शुरू करने से काफी पहले के किसी समय को लें। निम्नलिखित में से कौन सा ग्राफ बर्तन के द्वारा दाने पर लगाये जाने वाले अभिलंब बल को सबसे सटीक तरीके से निरूपित कर रहा है?

Thus each question had a video link and then MCQ. In the final figures a total of 91 ingenious questions based on 45 videos were made. Each question had an English as well as Hindi version. Questions of each slot had 26 correct options. The marking scheme was, +2 for every correct option ticked and -2 for every wrong option ticked. Zero for unmarked options. So the maximum possible score of a student attempting any slot would be 52.

4.2 Mock Test

In order to test the feasibility of the portal in handling a large number of students, and also other issues that may come up during exams, we decided to give a Mock test. Also we wanted the students to understand the technical details in answering and submitting the quiz. Two question papers were made to conduct the exam in two slots on 9th August 2020. In this mock exercise, the technical team of IIT Kanpur realised that the portal could handle a maximum of 7000 students in one slot. We also got some experience of selecting students for prelims through this mock test. A total of about 14,000 students

appeared in the mock.

4.3 Screening in 5 slots

Originally we had decided to conduct the quiz in 5 slots to address the slow mobile networks. In the mock, we had advised all students to appear in the first slot and only if they fail to submit in the first slot, the second slot was like a back up. Similar were our ideas for the actual test. But from the experience of mock, we formalised the 5 slots and asked the students to choose their own time slot with a maximum of 5000 in any slot.

Finally on 16th August, 2020 two slots of the quiz could be conducted while on 17th, 18th and 19th August one slot each was conducted. Students who had problems in login due to connectivity problems were accommodated in the later slots. There were 11,430 submissions of the quiz in total. The scores of the students were declared in the evening of 19th August after the final slot was held.

Extensive solution of the questions of each of the slots was then uploaded on the website so that the students could understand and discuss the correct physics behind each video.

5. Selection for the next round

The next round is Prelims in which the skills to perform and analyze experiments is tested. This exercise is also to be done in REMOTE MODE as we cannot call the students in Anveshikas to do the experiments. This is also a big challenge but our immediate task was to select students for the Prelims. The database of all students with the marks obtained was analyzed state wise. There were several states where we don't have Anveshika but there are good number of students. Another committee was formed with Ms. Sharmistha Basu as the leader to formulate the policy for selection.

The guidelines were made after extensive discussion among the committee members through a series of Zoom meeting. A cutoff was decided for each state depending on the participation and level of performance. Around 10-15 percent of the students of screening round were selected for the prelim round with a cut off of 10 out of 52 barring few states/UTs. Our task is now to examine about 1000 students in Prelims. They will be given 3-5 experiments to perform in their houses and send us relevant report as photographs, scanned documents and short videos. Another Committee is being planned to lead this exercise.

6. Acknowledgements

NANI expresses highest appreciation of the IITK team lead by Professor T V Prabhakar, Ms Revethy who spearheaded all technical proceedings. They handled all hurdles meticulously and sailed the exam through. We acknowledge huge contribution from a number of Physics Teachers apart from the tremendous efforts by the Anveshika coordinators.

A National webinar on 'Physics education post covid era'

Venue : Zoom Meet online webinar **Date :** 21st and 22nd July 2020

Organized by : IAPT RC08 Maharashtra **Number of Participants :** 217

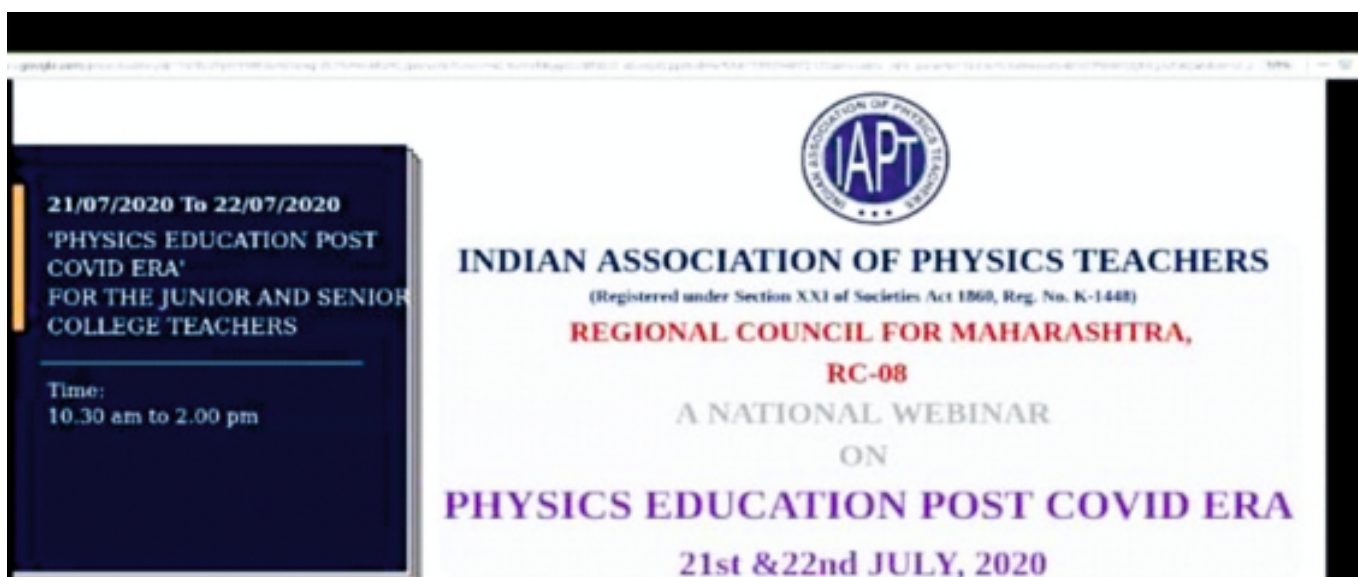
Resource persons :

1. Dr. H C Verma, Eminent Physicist and Educationalist.
2. Dr. Bhushan Kelkar, Neuflex Talent Solutions Pvt. Ltd.
3. Dr Kishore Rewatkar, Asso. Prof. Dr. Ambedkar College, Nagpur.
4. Dr P S Tambade, Vice Principal, Prof. Ramkrishna More Arts, Commerce and Science College, Akurdi, Pune.
5. Dr. A. K. Srivastava, Secretary RC10.

A two days National webinar on 'Physics education post covid era' was organised by Maharashtra RC 08 on 21st and 22nd July 2020. The webinar was inaugurated by Dr H C Verma. In his inaugural speech Dr Verma talked about the 'NANI-Anveshika' program of IAPT. He explained the challenges and benefits of online physics education in the post covid-19 era. According to

him in the online physics education, life skill issues must be given importance. He said that Physics teachers are expected not only to teach content, should also teach, how to apply the content in the day to day life. The inaugural function was chaired by Dr Ajay Lad, president RC08. Dr Nitin Shinde secretary welcomed all the distinguished guests and participants of the webinar. Dr S B Mane, member Central EC IAPT, encouraged and supported activities of RC08. Professor Rekha Ghorpade anchored the inaugural function. Prof. Bharat Kangude, President, Pune sub RC proposed vote of thanks. In the second session Dr. Bhushan Kelkar, an industry expert deliberated on the topic industry 4.0, the new technological revolution in the 21st century and role of Physics teachers, to make themselves and students aware of it.

On second day, in the third session Dr Kishore Rewatkar emphasized the role of 'virtual labs' and associated technologies in physics education. In the fourth session, Dr P S Tambade, demonstrated how to create a physics e-content using simple software available. All the four sessions were highly appreciated by participant teachers from junior and





Panelist, Guests and Participants in the webinar

senior colleges. The Sessions were chaired by Dr. Sachin Pawar, Dr R M Shevale and Dr Atul Mody. Dr Rekha Ghorpade and Dr Lata Jadhav anchored the program.

In the valedictory function Dr A K Srivastava, was the chief guest. He appreciated efforts undertaken by RC08 for organizing such an online activity. A total of 217 participants from six different states registered for the national webinar. The technical support was provided by Whitecode Technology Solutions private limited. EC members of Pune sub RC were

instrumental in the organization of the webinar. Pune, Kolhapur and Mumbai Sub RC actively participated in this webinar. The webinar was supported by Amaravati University Physics Teachers Association, Physics Teachers Association of Shivaji University, Vidarvha University physics Teachers Association and Society of Technologically Advanced Materials of India.

Nitin Shinde
Secretary, RC-08

DATE EXTENDED FOR ESSAY SUBMISSION

IAPT National Competition on Essay Writing in Physics (NCEWP - 2020)

Writing makes one perfect, essay writing more so...

In view of the current Covid-19 pandemic situation, it has now been decided to **extend the essay submission deadline to 31st Oct 2020**. This deadline is applicable for both 'Teacher' & 'Student' categories. Rest of the details/information for NCEWP, that appeared earlier in the bulletin and was also published on the IAPT website, remains unchanged.

Meanwhile, all RC Presidents, Secretaries and EC members are requested to ensure that we get good number of entries for the competition. Your efforts shall be crucial in ensuring a successful NCEWP - 2020.

S. K. JOSHI
Coordinator, NCEWP-2020
E-mail: joshisantoshk@yahoo.com

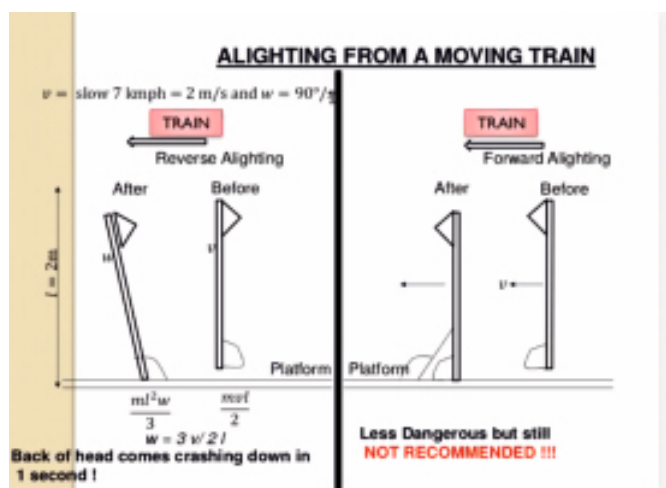
Online Lecture Series (held during June-July 2020)

Every year IAPT Mumbai Sub-RC conducts summer programme for undergraduate students on problem solving, of duration 2 to 3 weeks. This year due to COVID-19, this activity could not be conducted. So we conducted online lecture series, from June 11 to July 9. HVPS' RJ College, Ghatkopar, Mumbai came forward to co-host it on Zoom platform and Dept of Physics provided active support in organizing and conducting the programme. Simultaneously, series was also broadcasted on YouTube and recording is available on YouTube.

Lecture 1: June 11

Title : Physics and the City of Mumbai
by Prof. Vijay Singh, President, IAPT.

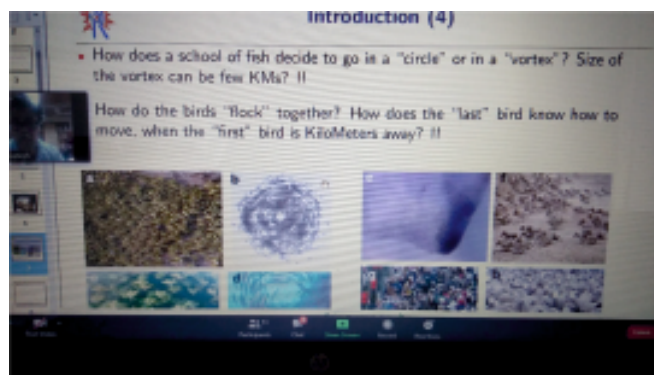
In this talk everyday occurrences in Mumbai and those interesting facts that we often miss in the hustle-bustle of daily life were discussed.



Lecture 2: June 16

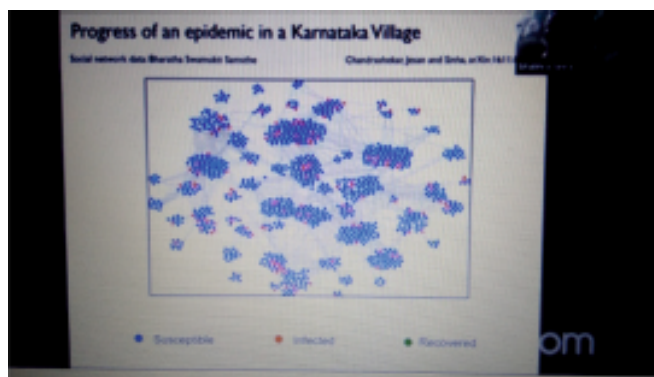
Title : Patterns in nature : Who designed them?
by Prof. Rajaram Ganesh, Institute of Plasma Research, Bhat, Gandhinagar

Prof. Ganesh discussed physics and mathematical modelling of patterns in natural phenomenon like spots on a Leopard or a Zebra (stationary designer patterns!), moving designer patterns when a flock of birds in the evening sky suddenly changing directions, bacteria on liquid surface and many more.



Lecture 3 : June 18

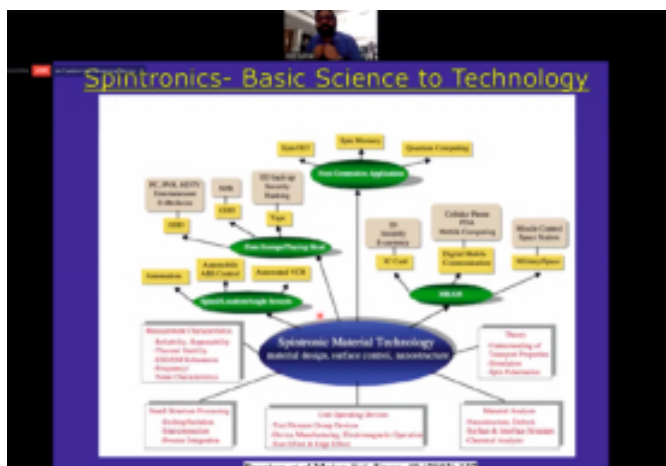
Title: Epidemics, networks and games
by Prof. Sitabhra Sinha, The Institute of Mathematical Sciences, Chennai



In this talk the mathematics behind vaccination and using the language of game theory, when individuals are influenced in their decision to get vaccinated by the cost associated with vaccination (e.g., either the effort involved in getting vaccinated or any real or imagined side-effects) as well as the perceived risk of being infected with the disease etc. were discussed.

Lecture 4: June 23

Title : Introduction to Spintronics
By Prof. P. S. Anil Kumar, Department of Physics, Indian Institute of Sciences, Bangalore.



In this lecture how spintronics or magneto-electronics is an area of active research because of the tremendous potential both in terms of fundamental physics and technology and how spintronics combining with standard microelectronics with spin-dependent effects can influence future generation technology was discussed.

Lecture 5: June25

Title : LIGO-India: Beyond discovery of Gravitational waves
by Prof. Tarun Souradeep, Inter-University Centre for Astronomy and Astrophysics, Pune



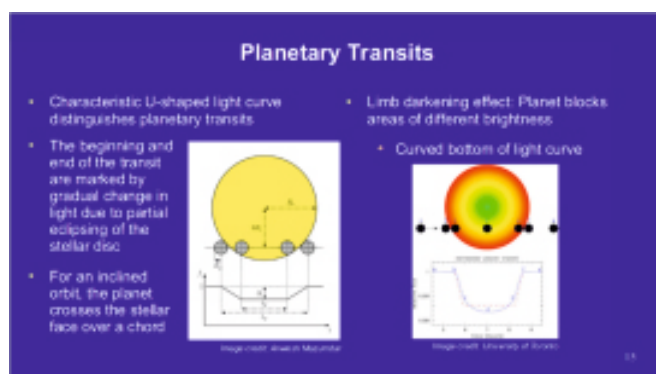
In this lecture, the historic discovery of gravitational waves through direct detection by the LIGO observatories in the USA, IAPT Bulletin, August-September 2020

and the potential of gravitational-wave astronomy and the promise of LIGO-India were discussed

Lecture 6: June30

Title: Exoplanets

By Dr. Anwesh Mazumdar Faculty, Homi Bhabha Centre for Science Education, TIFR and
National coordinator, Science Olympiads in India

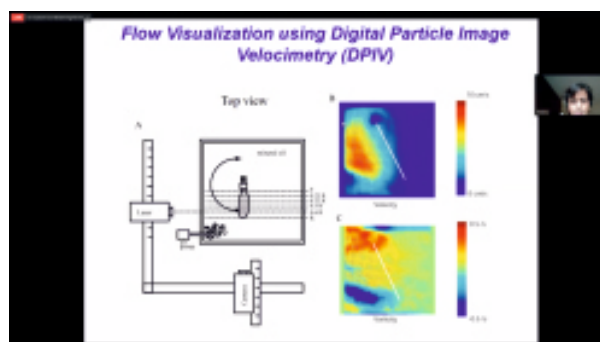


In this lecture, one of the most fascinating questions whether we are alone in the Universe, or whether there are other instances of life, or even intelligent life, elsewhere in the Universe and that life might exist in planets orbiting other stars (EXO-Planets) in our galaxy itself and how physics helps us finding and understanding these planets was discussed.

Lecture 7: July2

Title : Mechanics of insect flight

By Dr. Sanjay Sane, Faculty, National Centre for Biological Sciences





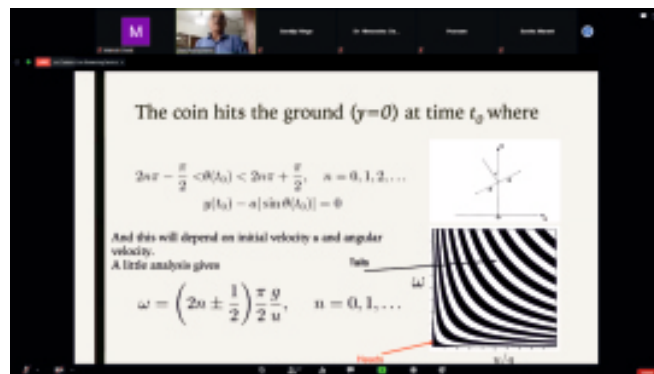
In this lecture mechanics of how insects fly and how it is studied and how insects migrate over vast areas and long distances along with the recent discoveries on the aerodynamics and biomechanics of insect flight were discussed.

Lecture 8: July 7

Title : The Search for new physics

by Dr. Nishita Desai, Tata Institute of Fundamental Research

In this talk, an overview of our current state of the art understanding of particle physics - the Standard Model - and how all its components were discovered, were presented. There is about five times more invisible matter in the Universe than what we can see. How modern experiments like Large Hadron Collider (LHC) experiment currently running at CERN in Geneva aims at discovering dark matter and other kinds of new physics were discussed.



Lecture 9: July 9

Title : Chance and Chaos

by Prof. R. Ramaswamy, Indian Institute of Technology, Delhi

This talk, started with an analysis of the physical act of tossing a coin to understand how chance comes about, and gave a brief introduction to the idea of unpredictability and how this is linked to nonlinear dynamics and chaos. Using simple examples, the existence of different asymptotic states (or attractors) and discuss how chance can arise when there are several possible attractors, each corresponding to a distinct outcome were discussed.

The lecture series introduced students to frontline areas of research that students can think of pursuing. At the same time students as well as teachers got an opportunity to see how simple physics they deal with, at undergraduate level, is directly connected with physical phenomenon and frontline area of research.

Atul Mody

President, Mumbai Sub RC

To our readers

For change of address and non-receipt of the Bulletin, please write (only) to:
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The Managing Editor

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Online Webinars

Webinar-1

Organized by: Maharani Lakshmi Ammanni College, Mumbai (Autonomous).

Anchor: Ms Anupama, HOD Physics **Platform:** Zoom Meetings

Date: 27 Apr 2020 **Time:** 3.30 to 5.30 pm **No. of teachers and students:** 100

Class: BSc III **Topic:** Quantum Harmonic Oscillator

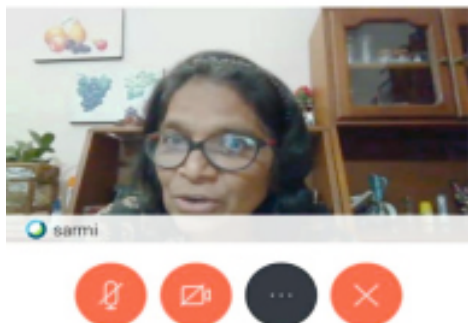
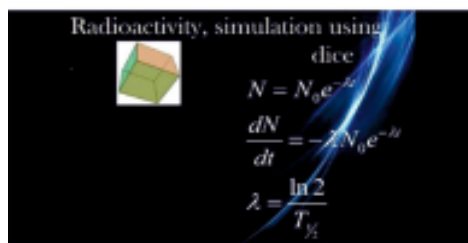
Resource Person: Sarmistha Sahu

The call for online classes was very professionally managed by the heads of the departments, and quick arrangements were made to get the students ready for online classes. Teaching with chalk and blackboard was changed to screens and connectivity. A computational physics work was displayed for the students to learn with animation and analysis. In the question hour session students and the teachers around actively participated in the discussion.

Webinar-2

Organized by: GVG College, Udumalpet **Platform:** Cisco Webex

Date: 5 May 2020 **Time:** 3 to 5 pm **No. of teachers:** 28 **No of Students:** 175



Class: BSc and MSc

Topic: “Learning Physics through Simulations”

Resource Person: Sarmistha Sahu

The department of Physics of Sri GVG Visalakshi College for Women, Udumalpet, Tamil Nadu, organised a series of Webinars for the students to facilitate inclusive learning opportunities during the period of sudden and unprecedented educational disruption due to the lockdown caused by COVID-19 pandemic. To engage the students in a constructive activity and to lift their spirit, the department organised the webinars on many topics “Learning Physics through Simulations”, “Awareness on COVID -19”, “E-Safety: Internet and Mobile Phones”, “Staying Active during Lockdown: Tips for Research” and “Figment of Imagination in Physics via Simulations”. Dr.Sarmishta Sahu, Retd. Professor of Physics, Maharani Lakshmi Ammanni College for Women, Bangalore, Dr. Daniel Chellappa, Eminent Nuclear Scientist, BARC , Dr. E. Karthikeyan, Head of the Department of Computer Science, Government Arts College, Udumalpt, Dr. Haresh Pandya, Head of the Department of Physics, Chikkanna Government Arts College, Tiruppur and Dr. Raju Panthagani and Dr.J.Shankar from Geethanjali College of Engineering and Technology, Hyderabad addressed the students in online platform. More than 175 students and faculty members from various colleges joined the webinar virtually and benefited.

In the National Webinar organised on 4th May 2020, **Sarmishta Sahu**, enlightened the students on “**Learning Physics through Simulations**”. She explained different types of lasers, lasing action, decay constant and half-life period of a radioactive element and projectile motion. She explained in detail how to record the experimental observations, how to plot graphs in excel, interpreting the graphs and also the importance of Simulations in learning Physics. Earlier Mrs. B. Nirmala, Associate Professor of

Physics and Coordinator of the programme, welcomed the resource person and the participants. Dr S Aram Associate Professor of Physics and organizing Secretary introduced the chief guest. Dr. B. Kavitha, Assistant Professor of Physics and Convener of the Webinar proposed vote of thanks. Mrs T V Banumathi, Head of the Department of Physics and other faculty members organised the Webinar.

Webinar-3

Organized by: Majlis, Delhi **Platform:** Zoom Meetings

Date: 26 June 2020 **Time:** 3.30 to 5.30 pm

No. of teachers: 40 **Participants:** School teachers of Delhi

Topic: Multiple reflection and angles-Physics-n-Maths.

Resource Person: Sarmistha Sahu

Schools and colleges are doing well with online classes. One such webinar was conducted by Majlis, a group of Physics teachers, meeting, discussing, demonstrating new concepts, posting problems to each other and solving it together. The atmosphere of each-one-teach-many survives here.

The organizers conduct online meetings, and this was one of it. The teachers identify a cosy corner of their homes and sit with mirrors, cello-tape and protractor to play out the concepts of multiple reflections, bold and clear. In the process of playing with mirrors, they come out with valid observations and relations of variables. A plot on the graph sheet of their experimental data and they come with a general formula of the variables. They did not stop here; they extended the activity to find a general formula in steradians and were amazed to see the similarity with planar angles. And the best, the participants were ready to measure the space angles by simply counting the number of images through plane mirrors, a revelation! They went ahead and verified with different conditions till they were convinced that they are at the right POST! Pedagogy of creating your own knowledge by self-experimentation.

The feedback from the participants and organizers were very heartening and the time well spent.

Webinar-4

Organized by: BVN Anveshika, Delhi

Coordinator: Ms Pragya Nopany

Platform: Zoom Meetings **Date:** 6 July 2020

Time: 3pm to 5 pm

No. of teachers: 28 **Class:** School teachers of Delhi

Topic: Multiple reflection and Space angles- Activity based

Resource Person: Sarmistha Sahu

Teachers came with simple material for doing the activities along with the facilitator. The simple mirror reflections helped to observe, experiment, infer after various trials, the link between the inclination of mirrors and multiple images. The hypothesis was verified and confirmed with solid experimentation by the participants themselves. Reaffirming with graphical representation, like true experimentalists, relation between the space angles and the general formula was established. Furthermore, a couple of mirrors were used to find the planar angles without a standard measuring device. The active participation and sharing of ideas were noteworthy.

The knowledge was extended to space angles and very quickly the active teachers could identify the similarity of the situations and spell out the general formula of the number of the images and the solid angle. They went back satisfied with a device in hand to measure the space angles in any situation.

The response and interaction of the participants was impressive.

Sarmistha Sahu
Coordinator

8th Prof. Ved Ratna Memorial Lecture



PROF. VED RATNA
(1.1.1932-15.4.2012)

Prof. Ved Ratna retired from NCERT as professor. He was deeply interested in experimental physics, devised many demonstration experiments and kits for use in schools. He obtained six patents, for one of which he got a national award (1967). He was a reputed amateur astronomer too, won the title 'Veteran Astronomer of Northern India' in 1997. A reputed teacher, he telecast many lessons from Delhi

Doordarshan. An ardent IAPT enthusiast, he was instrumental in putting IAPT in Delhi on a firm footing and held several senior positions in IAPT at national level.

Regional Council (Delhi & Haryana) organised its 8th Prof. Ved Ratna Memorial Lecture on 6th June 2020 at 11 am through online mode. The event was originally planned for 18th April 2020, in face-to-face mode as in previous years but due to prevailing pandemic, we had to postpone it and organise it online.

This year the memorial lecture was delivered by Dr D K Aswal, Director, National Physical Laboratory, New Delhi on “**Revised SI Units of Measurements and their Implications**”.

The event started with a welcome address by Dr M S Bhandari, Secretary, IAPT(RC1). He gave a brief introduction about IAPT and activities conducted by it. Prof. V P Srivastava, President, RC-1 introduced Dr. Aswal.

Dr Aswal started his lecture by mentioning seven SI units, namely metre(m), kilogram(kg), second(s), ampere(A), Kelvin(K), and candela(cd) and said that these SI units have been redefined in terms of fundamental constants, and the new definition is in effect from May 2019. He talked about the importance of SI units in the context

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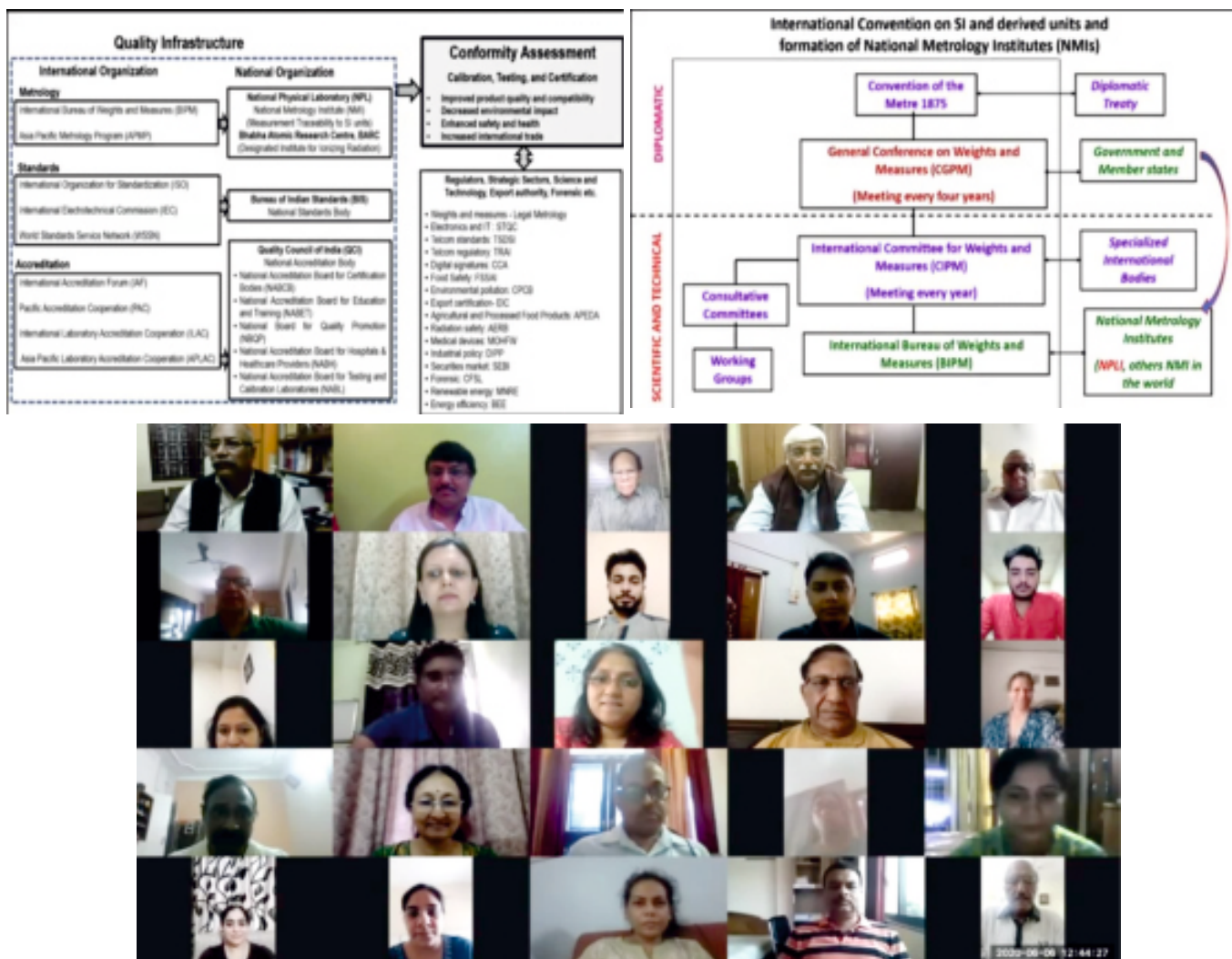


Dr. D.K. Aswal
Director, National
Physical Laboratory

of the “**Seventeen Global Goals for Sustainable Development**”, defined by the United Nations to achieve three extraordinary things in next 15 years. They are: (1) End extreme poverty, (2) Fight Inequality & Injustice and (3) Fix climate change. He highlighted that one of the 17 goals is, “Industry, Innovation and Infrastructure.” Using a chart, he showed that how, “High income and high quality” of life is dependent on four pillars, namely (1) Industry, (2) Government, (3) Civil Society & Media, and (4) Universities, Science, Technology and Society. In India people do not understand what binds these four pillars together and often it is found that these sectors end up blaming each others. As defined by the United Nations Industrial Development Organisation (UNIDO), “**Quality Infrastructure**” is the binding force among these four pillars. *Quality Infrastructure allows us to give accurate measurements.* Quoting a UNIDO report, Dr. Aswal noted that,

- “Developing countries often do not have a functional quality infrastructure in place that can help products to be listed and certified through assessment procedures compliant with the requirements from developed markets/consumers, etc.
- Local certifications/conformity assessment procedures are not mutually /multilaterally recognised.
- Double testing/certifications
- Cannot meet Technical Barrier to Trade(TBT)/Sanitary and phytosanitary measures(SPS) requirements of WTO, which results as a barrier to trade,

In this context, Prof Aswal further explained the role of *International Organisations like International Bureau of Weights and Measures (BIPM) and Asia Pacific Metrology Programmes* at International Level and corresponding Organisations in India, National Physical laboratory(NPL), Bhabha Atomic Research Centre(BARC), Bureau of Indian Standards (BIS) and Quality Council of India (QCI). These



organisations, working at International and National level help us in “Confirmatory Assessment”. Therefore quality Infrastructure is required by every sector, be it Regulators, Strategic Sectors, Science & Technology, Export Authority or Forensic. Using a chart, Prof Aswal explained that Quality Infrastructure(QI) is directly related to economy and quality of life. According to a parameter devised in Germany to quantify QI of a country, India's score is much less than that of USA, Germany and China. From a chart he explained that Export from a country is directly dependent on QI. Higher the QI, higher is the value of export from a country. This explains the importance of QI and he emphasised that India should work more for QI to achieve the goal of “Atamirbhar Bharat”. Giving an example of solar panels imported from China, he said

that we are being cheated because we do not have capacity to measure 'annual degradation’ rate of solar panels which determines the average age of a solar panel. In this context, he explained the recent efforts of NPL to develop Certified Reference Materials (CRM) required in QI. He noted that every year India imports CRMs worth several hundred of crores for use in the sectors of Food, Fuels, Materials, Textiles and Cements; Water and Fluids; Instruments and Ore, Minerals. The NPL has also developed 72 Indian Certified Reference Materials (Bhartiya Nirdeshika Dravya,BND). Finally he said that we need to worry about Quality Infrastructure which requires accurate measurement. To summarize he said that Accurate measurements make

- Science **scientific**

- Technology **perfect**
- Environment **clean**
- Energy **sustainable**
- Healthcare **affordable**
- Cyber-security **strong**
- International trade **barrier less**
- Policies **nation –building.**

After the lecture, Dr Aswal replied to questions put up by the participants. Due to large number of questions and time available (about 30 minutes), only limited number of questions could be taken up. The Q & A session was co-ordinated by Dr. Yogesh Kumar. Dr Aswal also provided his email id to participants for further interactions with him on this topic.

After the lecture, Shri Shruti Bodh Agarwal, son of late Prof.

Ved Ratna and presently Deputy Director (North), Directorate of Education, Govt. of NCT of Delhi shared his memories about his father's dedication to promotion of practical work in science.

At the end, Shri R.K. Tewary, Vice-President, IAPT(RC1) proposed vote of thanks. The event was compered by Ms. Vandana Banga, Joint Secretary, IAPT(RC1). It was successfully hosted by the RC1 webinar team comprising Dr. Yogesh Kumar and Ms. Vandana Banga.

E-certificates were given to participants who joined the event live and filled the google attendance form.

V.P. Srivastava
President, RC-01

IAPT AFFAIR

National Graduate Physics Examination – 2020 Part C (An Examination in Experimental skill)

NGPE – 2020 Part C (an Examination in Experimental skill) has been conducted online on 23.08.2020 and five recipients of NGPE – 2020 Gold Medal has been identified as follows:

Centre Code	Roll No.	Name	Centre
1. G-1111	20509	MANAV BENIWAL	St. STEPHEN'S COLLEGE, DELHI UNIVERSITY, DELHI.
2. G-4213	20023	JOHANN FERNANDES	IISER PUNE.
3. G-7104	20013	AYSHI MUKHERJEE	St. XAVIER'S COLLEGE, KOLKATA.
4. G-7113	20003	DEBSUBHRACHAKRABORTY	RKM VIDYAMANDIRA BELURMATH, HOWARH.
5. G-7120	20030	SUDIP CHAKRABARTY	RKM VIDYAMANDIRA BELURMATH, HOWARH.

This is important to note that due to Covid – 19 the experimental test is held online on the student's own desk. A kit of the complete set of apparatus was sent to each student and he was directed through video's to set up and perform the experiments. A team of 18 teachers headed by Prof B.P. Tyagi, Dr Anil Kumar Singh and Prof S.C. Samanta worked hard for about a month to bring the whole program to a success. Dr Pradipta Panchadhyayee at P K College Contai (WB) coordinated the entire program.

Anil Kumar Singh
Coordinator NGPE

B.P. Tyagi
Chief Coordinator (Examination)

The Minutes of the IAPT Central EC ONLINE Meeting (held on June 25, 2020)

A meeting of the Executive Council (Central EC) of the IAPT was held online, on Thursday June 25, 2020. The meeting commenced at 10.00 am, and continued till about 1.30 pm.

The members including the invitees present online were as follows.

1. Prof. Vijay Singh, President
2. Prof. K. N. Joshipura, General Secretary
3. Prof. Manjit Kaur, Vice President North Zone
4. Prof. J. D. Dubey, Vice President East Zone
5. Prof. A. K. Jain, Vice President Central Zone
6. Prof. Arun Kulkarni, Vice President West Zone
7. Prof. P. Nagaraju, Vice President South Zone
8. Prof. H. C. Verma, Vice President (General)
9. Dr. Oum Prakash Sharma, Member RC-01
10. Dr. Jaswinder Singh, Member RC-02
11. Dr. Pawan Kumar, RC-03
12. Dr. Anil Kumar Singh, Member RC-04
13. Dr. Anand Singh Rana, RC-05
14. Prof. R. K. Khanna, RC-06
15. Prof. Viresh H. Thakkar, Member RC-07
16. Dr. S. B. Mane, Member RC-08
17. Dr. P. K. Dubey, Member RC-09
18. Dr. S. K. Patel, RC-10
19. Dr. S. Sanyasiraju, RC-11
20. Dr. M. S. Jogad, Member RC-12
21. Dr. Jerome Das, RC-13
22. Prof. S. Sankararaman, RC-14
23. Dr. Saswati Dasgupta, RC-15
24. Dr. Kishore Chandra Dash, RC-16
25. Dr. Swapan Mazumdar, Member RC-18
26. Dr. Himanshu Pandey, Member RC-19

27. Dr. Shyam Rajnan Kumar, RC-20

28. Dr. K. Venu Gopal Reddy, RC-22

Ex-Officio members

29. Prof. H. C. Pradhan, Immediate-past President

30. Prof. Bhupati Chakrabarti, Immediate-past Secretary

31. Prof. U. S. Kushwaha, Chief Editor Bulletin

32. Prof. B.P. Tyagi, Chief Coordinator of Exams

33. Dr. Sanjay Kr Sharma, Secretary (Ex officio)

34. Dr. D. C. Gupta, Treasurer (Ex officio)

Co-opted members

35. Dr. T. R. AnanthaKrishnan

36. Dr. S. C. Samanta

37. Dr. Arundhati Mishra

Invited members

38. Dr. Ravi Bhattacharjee, Coordinator APhO Delhi

39. Dr. Anand Singh Rana, Coordinator NSE

40. Prof. Rekha Ghorpade, Coordinator NCIEP

41. Prof. S. K. Joshi, Coordinator NCEWP

42. Prof. R. M. Dharkar,

43. Prof. M. L. Oglapurkar,

44. Prof. J. P. Gadre, Special Invitee

The meeting started with a brief welcome from the President Prof. Vijay Singh. He said, "We are meeting under difficult circumstances. The COVID-19 related crisis is upon us. The world is confronting a pandemic. We are staring at an economic downturn. The educational impoverishment of the vast hinterlands of rural India is getting further exacerbated. But these events may also open up unexpected vistas. Hygiene, something which our ancients and the father of our nation Mahatma Gandhi stressed, and which we sadly neglected, occupies a well- deserved important place for many of us now. Economic downturn may prompt self- reliance. As teachers we

will devise innovative methods of education. I can already see examples of this. A large number of seminars ("webinars") are being organized by IAPT in many parts of our nation. I was recently part of one organized by RC-19 and another by sub-RC Mumbai. Teachers have taken to online teaching and some of us very successfully. The crisis has not dented our spirit. Various competitions – NAEST, the essay competition (NCEWP), the experimental and the computational competitions will all take place albeit in a modified form. The National Standards Examination is also slated to happen. The Bulletin is being published albeit electronically and bi-monthly. In ways small but strong we have persevered. We are not daunted and I salute the voluntary spirit and enthusiasm of my colleagues. Coming to today's meeting, the time is limited. We are experimenting with a new form of communication. I request all to maintain discipline, be brief and to the point. Thank you!"

Item-wise Agenda proceedings

1. To read and confirm the Minutes of the previous EC meeting held at Allahabad-Prayagraj on October 12, 2019, and to discuss matters that may arise from the same. The Minutes were published in the IAPT Bulletin of December 2019 issue, page no. 355. There was a mistake in reporting, and so a correction is required as follows. „The Report of the RC-22 (Telangana) was presented by the RC President Prof. Rajeshwar Rao.“ No other suggestions or comments were received on the report. The minutes were confirmed by the EC.

2. To receive and approve a brief outline of the IAPT accounts for FY 2019-2020 as also the IAPT budget proposal for FY 2020-2021. The brief outline was circulated to the members in advance. It was presented online in some details by Dr. Sanjay Kr. Sharma and Dr. D. C. Gupta. The statement of receipts and payments during the FY 2019-2020 was displayed in the excel table. There was some discussion, as Prof. Bhupati Chakrabarti sought clarification about „Advance paid to Branch“. He basically suggested changing the two jargons that were a bit misleading, and added that, for each RC the „Annual Seed money'

(the annual grant) and the „additional fund' should be mentioned separately. The statements from the other IAPT Accounts and also from RCs are yet to come. The Kanpur office

requested all RCs to submit audited accounts at the earliest possible. The Report was accepted by the EC.

3. To receive and consider the associated suggestions on the brief reports (circulated in advance) to be presented by (a) The General Secretary Prof. K. N. Joshipura, and (b) The Chief Coordinator of Exams, Prof. B. P. Tyagi.

(a) The General Secretary's report

Welcoming all on the flat screens of the computers and mobiles, Prof. Joshipura said that, although the EC meeting scheduled to be on May 2-3 could not be held in view of the covid-19 situation, we were not late, as was pointed out by Prof. Bhupatiji. The gap between two successive EC meetings should not exceed 8 calendar months.

Between Dec-2019, and mid-March 2020, academic programmes of various RCs, Anveshikas and other institutions went on very well. The IInd National Lecture, under the PRL-IAPT Dr. Vikram Sarabhai Lecture series, was organized on January 27, 2020, at PRL Ahmedabad, wherein Dr. R. D. Deshpande of PRL gave an informative and thought provoking lecture

on „Water Resources in India, challenges and solutions“. Full text of the lecture will be published in the annual magazine, Pragaami Tarang – 2020. You will find reports of all these activities in our Bulletin.

We are thankful to Prof. J. P. Gadre and the Constitution Review Committee, for meticulously reviewing the IAPT Constitution, which we are going to discuss now.

Our website Indapt.org has improved greatly and is quite active now with necessary updates regularly, thanks to Prof. B. P. Tyagi and team of Dehradun.

Thanks to Prof. Kushwaha and team, our Monthly Bulletin continued publishing the hard copies up to March „20, but the April-May issue combined is published online, and is available on the website.

The updated Membership list is available from the Kanpur Office, in the excel format.

The CCE office is now at Dehradun and Prof. Tyagi is actively planning for the NSEs for this year. I wish to thank Dr.

G. Venkatesh, for his prompt work in closing down the Bank accounts at Bangalore.

Soon after mid-March, we were in an unfortunate, unprecedented situation created by covid-19 pandemic. But our enthusiastic members have continued academic exchange through webinars for students and teachers. IAPT issued a Statement of solidarity in support of the countrywide efforts to fight the pandemic.

Prof. Ravi Bhattacharjee has sent documents on the APhO-2022 proposed to be held in India.

Prof. Arun Kulkarni has sent a proposal for holding UG Students' camp in summer 2021.

Prof. H. C Verma has informed us all that the National Anveshika Experimental Skill Test NAEST would be conducted online this year in association with IITK.

Prof. S. C. Samanta has sent the Report and details of the CSC Midnapore, WB.

For a specific academic activity, the RCs should apply to Kanpur office, in a given format.

The GS thanked members for individual donations to IAPT (at the Dehradun Bank A/c), for the covid-19 Relief Fund, and also thanked Dr. Anand Singh Rana (Dehradun) for looking after this task.

He ended by thanking our President Prof. Vijay Singh, our Kanpur Office team and all the in the EC for the excellent support.

(b) The CCE Prof. Tyagi's Report

"NSE – 2019, the examination was conducted well at 1590 centres on Nov 24 for seniors and at 858 centres on Nov 17 for juniors. There is increase in enrolment in all the subjects. A large number of student's queries were looked into and resolved before publishing the final result. The lists of students who scored above MAS, was posted on the web www.iapt.org.in. Summary of data was published in Bul. March 2020.

Now, preparations are going on for NSE-2020 to be held on Nov 22, 2020 for seniors (class XII & XI) and on Nov 29, 2020 for Juniors (class X, IX and VIII). To initiate the process for NSE - 2020, the literature will be dispatched to about 7500 centers throughout the country by mid-July 2020. Online center registration shall begin from August 1, 2020 and enrolment of students from August 21, 2020. The last date for student enrolment is Sept 14, 2020. The fee shall be deposited online by the centre in-charge latest by Sept 16, 2020. A booklet with a poster and the students' brochure has been prepared to post to school principals and all centre in-charges of the past two years. We assume that the Covid-19 problem might go to downtrend by this time. However a special note is given on the booklet that any change due to Covid-19 shall be communicated on the website, www.iapt.org.in. Everyone is advised to keep in touch. All members of this august body are requested to keep a special watch in their own area so that the students do not have any problem in their enrolment for NSE-2020.

I express thanks to the EC and the RCs and all those who have helped us for the smooth conduct of NSE – 2019. My thanks are to Dr AS Rana, the NSE Coordinator and Dr V V Soman the NSE-JS Coordinator for standing beside me throughout the process of examination."

This was followed by a brief report of Dr. Anil Kumar Singh, Coordinator NGPE. This year, there were as many as 118 national toppers; the list was published in the Bul. April/May, 2020. On the basis of the marks of Parts A and B, the top 27 students were shortlisted for NGPE Part C. However, due to Covid – 19, it could not materialize. The S. N. Bose Centre Kolkata has accepted top 28 students of B. Sc. III for admission to integrated Ph. D. program. Two-week summer camp at IIT Guwahati for NGPE toppers was also cancelled due to the pandemic. He felt helpless to declare that it was not possible to identify even the Gold Medallists for NGPE – 2020. The probable dates for NGPE – 2021 were announced in the end which are again subject to change, due to Covid – 19.

4. To consider and approve the Amendments in the IAPT constitution; the draft of the Constitution along with a short summary (orientation) of important changes was circulated to the members in advance.

The discussion took place as per the table of changes/modifications made, containing Points no. 1 to 13 as per the paras and the page numbers of the Constitution-draft (version 1) as provided by Prof. Gadre. Quite a few suggestions were received. As regards Point-1 (of Prof. Gadre's table), the word „Amendment“, it was decided to continue with it as per the requirements of the Societies Act. Thus, it would read as, Amendment proposed to be effective from June 01, 2021. On Point-2, no change was suggested, while for Point-3, the accepted version will be, '...the Kanpur district court for all matters except exam related matter; for exam related matter it will be the centre of chief coordinator of exams'. On Point-4, the term „monthly“ will be replaced by „annually“. On the Points- 10,11,12,13 a few suggestions were made by the members. It was felt that the para 72 (v) needed to be redrafted. Prof. Ogalapurkar suggested to drop the category of „sustained member (annual)“ mentioned under Membership, Para 4. (A)(c). Detailed point-wise suggestions were jotted down by Prof. Gadre, Member-Secretary, Constitution Review Committee. The Committee was formed last year and is as follows.

IAPT Constitution Review Committee

1. Dr. J. P. Gadre, (Nagpur) Member-Secretary
2. Dr. Bhupati Chakrabarti, Kolkata
3. Prof. Y. K. Vijay, Jaipur
4. Prof. C. Vijayan, Chennai
5. Dr. Shakuntala Nene, Rajkot
6. Dr. G. Venkatesh, Bangalore

Advisers

1. Prof. B. A. Patki, Nagpur
2. Prof. U. S. Kushwaha, Chandigarh
3. Prof. R. M. Dharkar, Thane-Mumbai

We will consider all these suggestions and produce a revised draft, to be presented to the AGBM.

5. To discuss the following important and urgent issue.

Our Annual (35th) Convention of IAPT, with EC-AGBM, was planned to be organized at Shri Vaishnav Vidyapith University Indore (MP) on Oct-31st, November 1-3, 2020, but it does not

seem to be possible. Therefore, we may consider postponing it to a convenient future date. The GS is in touch with the Organizers of the Convention at Indore, through Dr. P. K. Dubey and Dr. Uttam Sharma to explore if it can be organized sometime in end February, or end Jan 2021. In this regard, it was decided to hold the Convention for two days (instead of the usual three days), with the previous day for the EC meeting. Further, the suggestion from the Secretary RC-9, Dr. Uttam Sharma, to hold it possibly on January 29-31 or Feb 27-28, March 01, 2021, was accepted. The final decision for the same will be taken by December 01, 2020.

At this stage, Prof. S. K. Joshi and Prof. Mrs. Rekha Ghorpade announced that the deadlines of the competitions NCEWP and NCIEP (2020) were extended to August 31st. They appealed to all to encourage participation in the competitions.

6. To take up any other matter from the Chair and/or with the permission from the Chair. Members are requested to mail to the General Secretary in advance, their suggestion in this regard, if any.

Prof. Ravi Bhattacharyjee gave a brief about the APhO-2022 proposed to be organized in India. Prof. Arun Kulkarni made a proposal for organizing UG students' camp in summer 2021. His report of the UG Camp he organized at Goa in December 2019 has appeared in Bul. February issue.

Winding up the meeting the President said, "It is time to say good bye. Thanks to your support, inputs and suggestions, we have had a successful online EC meeting. This is a first for us and I was pleasantly surprised to witness a large attendance. I wish each and every one of you, your family and friends, health and happiness."

The meeting ended with thanks from the GS to all the members, the President, and also

the cohosts Dr. Tushar C. Pandya, Harshal sanghvi from Ahmedabad and Chintan Panchasara from Rajkot, for technical help in conducting the online meeting.

K. N. Joshipura

General Secretary, IAPT

ANNOUNCEMENT

List of National Toppers (top 1%) of NSEJS-2019

Sr. No.	Roll No.	Name of Student	Gen	Centre Code	Centre Code	City
1	AP19000066	J Yashwanth V V S	M	APJ0001	Dr Kkr Gowtham Em High School	Gudivada
2	AP19000079	P Karthikeya	M	APJ0001	Dr Kkr Gowtham Em High School	Gudivada
3	AP19000225	P. Sreenikhitha	F	APJ0004	Narayana Co School	Vijayawada
4	AP19000230	K. Venkata Mokshith Reddy	M	APJ0004	Narayana Co School	Vijayawada
5	AP19000231	M. Venkata Akash	M	APJ0004	Narayana Co School	Vijayawada
6	AP19000232	S. Sai Srinivas	M	APJ0004	Narayana Co School	Vijayawada
7	AP19000233	K. Bharath Kumar Reddy	M	APJ0004	Narayana Co School	Vijayawada
8	AP19000234	M. Jwala Likhitha Reddy	F	APJ0004	Narayana Co School	Vijayawada
9	AP19000235	Y. Naga Sasi Bhushan	M	APJ0004	Narayana Co School	Vijayawada
10	AP19000237	B. Taksheel Naidu	M	APJ0004	Narayana Co School	Vijayawada
11	AP19000238	D. Gayathri	F	APJ0004	Narayana Co School	Vijayawada
12	AP19000256	Aditya Suman	M	APJ0004	Narayana Co School	Vijayawada
13	AP19000257	K. S. V. Krishna Sendhvil	M	APJ0004	Narayana Co School	Vijayawada
14	AP19000259	P. Praveen Kumar Reddy	M	APJ0004	Narayana Co School	Vijayawada
15	AP19000260	V. Vamseedhar	M	APJ0004	Narayana Co School	Vijayawada
16	AP19000262	V. Mokshith Reddy	M	APJ0004	Narayana Co School	Vijayawada
17	AP19000265	V. Ysaswi	M	APJ0004	Narayana Co School	Vijayawada
18	AP19000269	R. Bhavana Chowdary	F	APJ0004	Narayana Co School	Vijayawada
19	AP19000272	B. Rupesh	M	APJ0004	Narayana Co School	Vijayawada
20	AP19000306	Y. Veda Akash Naidu	M	APJ0004	Narayana Co School	Vijayawada
21	AP19000311	C. Lohith Veer	M	APJ0004	Narayana Co School	Vijayawada
22	AP19000312	T. Jeevan Reddy	M	APJ0004	Narayana Co School	Vijayawada
23	AP19000316	M. Pranav Sai	M	APJ0004	Narayana Co School	Vijayawada
24	AP19000317	Shaik Mohammad Sohil	M	APJ0004	Narayana Co School	Vijayawada
25	AP19000318	V. Sai Venkata Ganesh	M	APJ0004	Narayana Co School	Vijayawada
26	AP19000319	Y. Mohan Muralidhar Reddy	M	APJ0004	Narayana Co School	Vijayawada
27	AP19000326	S. Veda Manvith Reddy	M	APJ0004	Narayana Co School	Vijayawada
28	AP19000327	P. Varun Teja	M	APJ0004	Narayana Co School	Vijayawada
29	AP19000328	M. Pranav	M	APJ0004	Narayana Co School	Vijayawada
30	AP19000329	M. Amara Gayathri	F	APJ0004	Narayana Co School	Vijayawada
31	AP19000331	M. Hima Varnika	F	APJ0004	Narayana Co School	Vijayawada
32	AP19000332	T. Venkata Tejaswini	F	APJ0004	Narayana Co School	Vijayawada
33	AP19000333	B. S. P. K. Chaitanya Reddy	M	APJ0004	Narayana Co School	Vijayawada
34	AP19000334	A. Sriya	F	APJ0004	Narayana Co School	Vijayawada
35	AP19000336	S. Lokesh Kumar Reddy	M	APJ0004	Narayana Co School	Vijayawada
36	AP19000337	D. Yashaswi	M	APJ0004	Narayana Co School	Vijayawada
37	AP19000338	G. Om Sai Vignesh	M	APJ0004	Narayana Co School	Vijayawada
38	AP19000339	N. Sai Manoj Bhargav	M	APJ0004	Narayana Co School	Vijayawada
39	AP19000342	D. S. Vaibhavditya	M	APJ0004	Narayana Co School	Vijayawada
40	AP19000343	N. Sai Durga Reddy	M	APJ0004	Narayana Co School	Vijayawada
41	AP19000344	D. Sai Durga Rishi	M	APJ0004	Narayana Co School	Vijayawada
42	AP19000346	Swayam Sarthak	M	APJ0004	Narayana Co School	Vijayawada
43	AP19000348	R. Prem Sai Nath Naik	M	APJ0004	Narayana Co School	Vijayawada

44	AP19000352	B. Maruthi Jaya Chandra	M	APJ0004	Narayana Co School	Vijayawada
45	AP19000356	P. Sai Sireesha	F	APJ0004	Narayana Co School	Vijayawada
46	AP19000357	S. Hansika	F	APJ0004	Narayana Co School	Vijayawada
47	AP19000380	H. Naresh	M	APJ0005	Narayana Em High School	Nellore
48	AP19000381	Sohail Shaik	M	APJ0005	Narayana Em High School	Nellore
49	AP19000382	P. Lohith Aditya Sai	M	APJ0005	Narayana Em High School	Nellore
50	AP19000383	P. Mrudul Krishna Reddy	M	APJ0005	Narayana Em High School	Nellore
51	AP19000386	B. Lalitha Audithya Reddy	M	APJ0005	Narayana Em High School	Nellore
52	AP19000387	M. Sree Vidya Abhilash	M	APJ0005	Narayana Em High School	Nellore
53	AP19000388	P. Abhishek Preetham	M	APJ0005	Narayana Em High School	Nellore
54	AP19000389	Sd. Tousif	M	APJ0005	Narayana Em High School	Nellore
55	AP19000392	K. Rithesh Varma	M	APJ0005	Narayana Em High School	Nellore
56	AP19000393	M. Aravind	M	APJ0005	Narayana Em High School	Nellore
57	AP19000395	K. Arjun	M	APJ0005	Narayana Em High School	Nellore
58	AP19000396	S. Sai Sree Vathsava Reddy	M	APJ0005	Narayana Em High School	Nellore
59	AP19000397	T. Charan Teja	M	APJ0005	Narayana Em High School	Nellore
60	AP19000398	K. Tejesh	M	APJ0005	Narayana Em High School	Nellore
61	AP19000407	P. Sai Mourya	M	APJ0005	Narayana Em High School	Nellore
62	AP19000418	G. Praneeth Sai	M	APJ0005	Narayana Em High School	Nellore
63	AP19000419	T. Pawan Chanukya Reddy	M	APJ0005	Narayana Em High School	Nellore
64	AP19000420	G. Sri Venkata Nivas	M	APJ0005	Narayana Em High School	Nellore
65	AP19000421	V. Kanuj	M	APJ0005	Narayana Em High School	Nellore
66	AP19000427	P. Jaswanth Royal	M	APJ0005	Narayana Em High School	Nellore
67	AP19000428	V. Harshil Sai	M	APJ0005	Narayana Em High School	Nellore
68	AP19000429	Bhuvan. S	M	APJ0005	Narayana Em High School	Nellore
69	AP19000551	Guntamukkala Surya Sai Teja	M	APJ0013	Aditya Talent School	Kakinada
70	AP19000883	Hima Vamsi Menda	M	APJ0036	Sri Chaitanya High School	Vijayawada
71	AP19000905	Jalajakshi Palli	F	APJ0036	Sri Chaitanya High School	Vijayawada
72	AP19000915	Nikhil Kumar Reddy	M	APJ0036	Sri Chaitanya High School	Vijayawada
73	AP19000916	Jasmitha Jajala	F	APJ0036	Sri Chaitanya High School	Vijayawada
74	AP19000920	Pardha Saradhi Dasari	M	APJ0036	Sri Chaitanya High School	Vijayawada
75	AP19000925	Pramod Kumar Reddy Ponnath	M	APJ0036	Sri Chaitanya High School	Vijayawada
76	AP19000931	Raghuveer Bokka	M	APJ0036	Sri Chaitanya High School	Vijayawada
77	AP19000933	Ram Panikar Nerusupalli	M	APJ0036	Sri Chaitanya High School	Vijayawada
78	AP19000937	Reddy Sai Dhanush Thota	M	APJ0036	Sri Chaitanya High School	Vijayawada
79	AP19000938	Jaswanth Routhu	M	APJ0036	Sri Chaitanya High School	Vijayawada
80	AP19000946	Ruthvik Majjada	M	APJ0036	Sri Chaitanya High School	Vijayawada
81	AP19000956	Sai Swapnith Kumar Reddy Sur	M	APJ0036	Sri Chaitanya High School	Vijayawada
82	AP19000960	Ankit Prakash	M	APJ0036	Sri Chaitanya High School	Vijayawada
83	AP19001028	Rushikesh Rathamsetty	M	APJ0036	Sri Chaitanya High School	Vijayawada
84	AP19001030	Sai Charitha Janapati	F	APJ0036	Sri Chaitanya High School	Vijayawada
85	AP19001031	Sai Deepthika Nakka	F	APJ0036	Sri Chaitanya High School	Vijayawada
86	AP19001035	Birjis Subhan Shaik	M	APJ0036	Sri Chaitanya High School	Vijayawada
87	AP19001037	Sandeep Kumar Vennapusa	M	APJ0036	Sri Chaitanya High School	Vijayawada
88	AP19001043	Sri Shraddha Singirikonda	F	APJ0036	Sri Chaitanya High School	Vijayawada
89	AP19001044	Suhana Shaik	F	APJ0036	Sri Chaitanya High School	Vijayawada
90	AP19001045	Suhas Koyyana	M	APJ0036	Sri Chaitanya High School	Vijayawada
91	AP19001050	Varun Guptha Kajjayam	M	APJ0036	Sri Chaitanya High School	Vijayawada

92	AP19001051	Venakata Rishitha Sadam	F	APJ0036	Sri Chaitanya High School	Vijayawada
93	AP19001054	Y N V Hanumath Chunduru	M	APJ0036	Sri Chaitanya High School	Vijayawada
94	AP19001055	Yashwanth Manchineni	M	APJ0036	Sri Chaitanya High School	Vijayawada
95	AP19001057	Deepika Pushadapu	F	APJ0036	Sri Chaitanya High School	Vijayawada
96	AP19001058	Abhishek Sadda	M	APJ0036	Sri Chaitanya High School	Vijayawada
97	AP19001064	Niveditha Muvva	F	APJ0036	Sri Chaitanya High School	Vijayawada
98	AP19001073	Sreehitha Sumanjali Bala	F	APJ0036	Sri Chaitanya High School	Vijayawada
99	AP19001078	Vamshika Syamala	F	APJ0036	Sri Chaitanya High School	Vijayawada
100	AP19001090	Gireesh Khambhampati	M	APJ0036	Sri Chaitanya High School	Vijayawada
101	AP19001209	D Venkata Yugesh	M	APJ0042	Sri Chaitanya Co Olympiad School	Vijayawada
102	AP19001303	Ganesh Maharaj K	M	APJ0042	Sri Chaitanya Co Olympiad School	Vijayawada
103	AP19001314	Niketh Reddy Kodudula	M	APJ0042	Sri Chaitanya Co Olympiad School	Vijayawada
104	AP19001318	Pothuri Vignesh	M	APJ0042	Sri Chaitanya Co Olympiad School	Vijayawada
105	AP19002385	M V V Harshavardhan	M	APJ0149	Narayana Co School	Visakhapatnam
106	AP19002587	P Thanush Kumar Reddy	M	APJ0157	Narayana Em School	Tirupati
107	AP19002588	A Prema Chandra Reddy	M	APJ0157	Narayana Em School	Tirupati
108	AP19002589	G Abhinay	M	APJ0157	Narayana Em School	Tirupati
109	AP19002590	P Sathvik Reddy	M	APJ0157	Narayana Em School	Tirupati
110	AP19002591	C Harshitha	F	APJ0157	Narayana Em School	Tirupati
111	AP19002592	P Shasank Reddy	M	APJ0157	Narayana Em School	Tirupati
112	AP19002593	C Mikhil	M	APJ0157	Narayana Em School	Tirupati
113	AP19002594	K Bhuvan Chandra	M	APJ0157	Narayana Em School	Tirupati
114	AP19002595	Sk Danish	M	APJ0157	Narayana Em School	Tirupati
115	AP19002596	B Krithi	F	APJ0157	Narayana Em School	Tirupati
116	AP19002598	P Vindhya	F	APJ0157	Narayana Em School	Tirupati
117	AP19002599	K Venkata Sujith Royal	M	APJ0157	Narayana Em School	Tirupati
118	AP19002600	S Jeevan Swaroop Raju	M	APJ0157	Narayana Em School	Tirupati
119	AP19002601	M Rishik Preetham	M	APJ0157	Narayana Em School	Tirupati
120	AP19002606	Y Prajwala	F	APJ0157	Narayana Em School	Tirupati
121	AP19002607	M Harshith Reddy	M	APJ0157	Narayana Em School	Tirupati
122	AP19002608	V Bharath Simha Reddy	M	APJ0157	Narayana Em School	Tirupati
123	AP19002961	Syam Sri Dheeraj Kodavati	M	APJ0163	Sri Chaitanya E M School	Rajahmundry
124	AP19002974	M L Ganapathi Siva Manikanta A	M	APJ0163	Sri Chaitanya E M School	Rajahmundry
125	AP19002975	V V S S Manikanta Gokavarapu	M	APJ0163	Sri Chaitanya E M School	Rajahmundry
126	AP19002976	Sai Dileep Naik Banavath	M	APJ0163	Sri Chaitanya E M School	Rajahmundry
127	AP19003923	Bhavya Sri Kottana	F	APJ0174	Sri Chaitanya School	Visakhapatnam
128	AP19004001	Mohith Sai Naidu Dasari	M	APJ0174	Sri Chaitanya School	Visakhapatnam
129	AP19004018	Manohar Naidu Vantaku	M	APJ0174	Sri Chaitanya School	Visakhapatnam
130	AP19004036	Umesh Karthikeya Trasula	M	APJ0174	Sri Chaitanya School	Visakhapatnam
131	AP19004038	Siddhartha Roy Bhyri	M	APJ0174	Sri Chaitanya School	Visakhapatnam
132	AP19004041	Mouli Ambala	M	APJ0174	Sri Chaitanya School	Visakhapatnam
133	AP19004042	Sai Krishna Tenneti	M	APJ0174	Sri Chaitanya School	Visakhapatnam
134	AP19004043	Shaajith Salihundam	M	APJ0174	Sri Chaitanya School	Visakhapatnam
135	AP19004044	Sree Madhu Kiran Lagudu	M	APJ0174	Sri Chaitanya School	Visakhapatnam
136	AP19004046	Pavan Sai Neerasa	M	APJ0174	Sri Chaitanya School	Visakhapatnam
137	AP19004047	Siva Kumar Bhogi	M	APJ0174	Sri Chaitanya School	Visakhapatnam
138	AP19004049	Subhash Teella	M	APJ0174	Sri Chaitanya School	Visakhapatnam
139	AP19004050	Yaswanth Sai Dasari	M	APJ0174	Sri Chaitanya School	Visakhapatnam

140	AP19004051	Ajay Babu Mahanthi	M	APJ0174	Sri Chaitanya School	Visakhapatnam
141	AP19004053	Kiran Sai Srinivas Patnaikuni	M	APJ0174	Sri Chaitanya School	Visakhapatnam
142	AP19004054	Lalith Adithya Lagudu	M	APJ0174	Sri Chaitanya School	Visakhapatnam
143	AP19004060	Sethu Raman Ambati	M	APJ0174	Sri Chaitanya School	Visakhapatnam
144	AP19004128	Venkata Sai Sharmil Kumar Ba	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
145	AP19004136	V R Abhinav Sandilya Palagum	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
146	AP19004137	Anirudh Sanapala	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
147	AP19004144	Mohit Naidu Rongali	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
148	AP19004148	Harshith Pendela	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
149	AP19004172	Krishna Prakash Muddada	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
150	AP19004175	Venkata Sanjeeva Rao Peela	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
151	AP19004182	Sri Chaitanya Byreddi	M	APJ0175	Sri Chaitanya E.M School	Visakhapatnam
152	BR19005835	Aman Kumar	M	BRJ0008	Patna Science College	Patna University
153	BR19005849	Vaibhav Kumar	M	BRJ0008	Patna Science College	Patna University
154	BR19006767	Krish Srivastava	M	BRJ0053	Kendriya Vidyalaya No.I Kankar Bagh	Patna
155	BR19006864	Piyush Kumar	M	BRJ0057	Jawahar Navodaya Vidyalaya Karmalihata	Siwan
156	BR19006870	Vishal Kumar	M	BRJ0057	Jawahar Navodaya Vidyalaya Karmalihata	Siwan
157	BR19006871	Manish Sharma	M	BRJ0057	Jawahar Navodaya Vidyalaya Karmalihata	Siwan
158	BR19006872	Ravi Kumar Ram	M	BRJ0057	Jawahar Navodaya Vidyalaya Karmalihata	Siwan
159	BR19006873	Nitish Kuamr	M	BRJ0057	Jawahar Navodaya Vidyalaya Karmalihata	Siwan
160	BR19006876	Rohan Kumar	M	BRJ0057	Jawahar Navodaya Vidyalaya Karmalihata	Siwan
161	BR19007925	Rishikesh Sahil	M	DLJ0002	Hope Hall Foundation School	New Delhi
162	CH19007795	Harsh Taya	M	CHJ0006	Kendriya Vidyalaya Sector 31 Chandigarh	Chandigarh
163	CH19007813	Vaasu Kansal	M	CHJ0006	Kendriya Vidyalaya Sector 31 Chandigarh	Chandigarh
164	CH19007858	Raghav Goyal	M	CHJ0008	Delhi Public School	Chandigarh
165	DL19008228	Jatan Kumar	M	DLJ0007	Kendriya Vidyalaya Sec.5 Dwarka	New Delhi
166	DL19008463	Sparsh Jain	M	DLJ0015	S M Arya Public School	Punjabi Bagh West
167	DL19008500	Vidit Aggarwal	M	DLJ0015	S M Arya Public School	Punjabi Bagh West
168	DL19008501	Aryan Gupta	M	DLJ0015	S M Arya Public School	Punjabi Bagh West
169	DL19008510	Gaurang Gupta	M	DLJ0015	S M Arya Public School	Punjabi Bagh West
170	DL19009290	Sagnik Pal	M	DLJ0047	Bgs International Public School	New Delhi
171	DL19009329	Pratyush Sinha	M	DLJ0050	Sri Venkateshwar International School	Delhi
172	GJ19009813	Dipen Sojitra	M	GJJ0018	Shri O V Sheth Regional Community Science Center	Rajkot
173	GJ19009815	Dhruvi Kataria	F	GJJ0018	Shri O V Sheth Regional Community Science Center	Rajkot
174	GJ19009947	Anish Singh	M	GJJ0023	Community Science Centre Vadodara	Vadodara
175	GJ19009967	Prakhar Singhal	M	GJJ0023	Community Science Centre Vadodara	Vadodara
176	GJ19010273	Aditi Singh	F	GJJ0045	Vikram A Sarabhai Community Science Centre	Ahmedabad
177	GJ19010284	Gautam Singhavie	M	GJJ0045	Vikram A Sarabhai Community Science Centre	Ahmedabad
178	GJ19010295	Samarth Adalja	M	GJJ0045	Vikram A Sarabhai Community Science Centre	Ahmedabad
179	GJ19010400	Samarth Patel	M	GJJ0045	Vikram A Sarabhai Community Science Centre	Ahmedabad
180	GJ19010592	Nischay Virendra Agarwal	M	GJJ0051	Riverdale Academy English	Surat
181	HR19011404	Anchit Chauhan	M	HRJ0005	Aggarsain Public School	Kurukshetra
182	HR19011465	Ayush Sharma	M	HRJ0006	Modern Vidya Niketan Sr Sec. School Sector 16 Po	Faridabad
183	HR19011468	Naman Goyal	M	HRJ0006	Modern Vidya Niketan Sr Sec. School Sector 16 Po	Faridabad
184	HR19011527	Arnav Kumar Sinha	M	HRJ0009	Kendriya Vidyalaya Hisar Cant.	Hisar
185	HR19011607	Tanishka	F	HRJ0011	Yaduvanshi Shiksha Niketan Sr. Sec. School	Narnaul
186	HR19011610	Sankalp	M	HRJ0011	Yaduvanshi Shiksha Niketan Sr. Sec. School	Narnaul
187	HR19011759	Shashwat Goyal	M	HRJ0021	Delhi Public School	Rewari

188	HR19011806	Satyankar Chandra	M	HRJ0027	Delhi Public School Faridabad	Old Faridabad
189	HR19011875	Ishaan Singal	M	HRJ0039	Narayana Etechno School	Gurgaon
190	HR19011961	Dikshant Kadyan	M	HRJ0041	Rps Public School Surana Narnaul	Narnaul
191	HR19012326	Aditya Mathur	M	HRJ0079	Modern Delhi Public School	Faridabad
192	HR19012636	Sahil	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
193	HR19012637	Aditya Yadav	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
194	HR19012648	Karan Shandilya	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
195	HR19012663	Mayank	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
196	HR19012664	Ankush	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
197	HR19012665	Ashwani	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
198	HR19012666	Manish	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
199	HR19012669	Abhilasha	F	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
200	HR19012672	Rajneesh	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
201	HR19012677	Himanshu	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
202	HR19012682	Yash Yadav	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
203	HR19012683	Lakshay	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
204	HR19012684	Amarjeet	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
205	HR19012685	Jatin	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
206	HR19012688	Utkarsh	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
207	HR19012706	Vinod Kumar Yadav	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
208	HR19012710	Pratham Kaushik	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
209	HR19012711	Nitesh Kumar	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
210	HR19012723	Sourabh	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
211	HR19012734	Rahul Yadav	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
212	HR19012745	Trigya Aggarwal	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
213	HR19012756	Aryan Mittal	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
214	HR19012764	Harish Kumar	M	HRJ0093	Yaduvanshi Shiksha Niketan Sr Sec School	Mahendergarh
215	HR19012767	Pravit Rathaur	M	HRJ0094	Delhi Public School Yamuna Nagar	Jagadhri
216	HR19013081	Vivek Kumar Upadhyay	M	HRJ0111	Snd Public School Palwal	Palwal
217	KA19014818	Lekhya Reddy Mukkara	F	KAJ0020	Sri Chaitanya Techno School	Bangalore
218	KA19014819	Avipsha Nandi	F	KAJ0020	Sri Chaitanya Techno School	Bangalore
219	KA19014861	Lakshmi V	F	KAJ0020	Sri Chaitanya Techno School	Bangalore
220	KA19014862	Kollimarla Venkata Sai Anusri	F	KAJ0020	Sri Chaitanya Techno School	Bangalore
221	KA19014866	Sumedh S S	M	KAJ0021	Jindal Vidya Mandir	Vidyanagar
222	KA19014997	B Haren Sathvik	M	KAJ0032	Narayana Olympiad School	Bangalore
223	KA19015037	Mahedar Reddy M	M	KAJ0034	Sri Chaitanya Techno School	Bengaluru
224	KA19015310	Megha M Hegde	F	KAJ0054	Aecs Magnolia Maaruti Public School	Bangalore
225	KA19015699	Sparsh Pradeep Jain	M	KAJ0077	Sri Sri Ravishankar Vidya Mandir	Bangalore North
226	KA19015714	Deepak Charan S	M	KAJ0077	Sri Sri Ravishankar Vidya Mandir	Bangalore North
227	KA19015814	Vamshi Krishna P	M	KAJ0080	Sri Chaitanya Techno School Jp Nagar	Bengaluru
228	KA19015822	P Dhruv Shivkant	M	KAJ0080	Sri Chaitanya Techno School Jp Nagar	Bengaluru
229	KA19015825	Arjun Rijiesh	M	KAJ0080	Sri Chaitanya Techno School Jp Nagar	Bengaluru
230	KA19015844	Gautham Tathanda	M	KAJ0080	Sri Chaitanya Techno School Jp Nagar	Bengaluru
231	KA19015944	Vrushabh D	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
232	KA19015946	Dhyanam Janardhana	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
233	KA19015948	Shreeram Maraballi	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
234	KA19015950	Venkata Sai Nihar T	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
235	KA19015951	V Mouli Prasanna	M	KAJ0085	Sri Chaitanya Techno School	Bangalore

236	KA19015953	K M Sreekanth Sai	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
237	KA19015954	Santhosh Vodnala	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
238	KA19015968	Pruthvi Raj R Teli	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
239	KA19015979	Raghav Narayanan	M	KAJ0085	Sri Chaitanya Techno School	Bangalore
240	MH19017876	Adwait Pande	M	MHJ0021	Thakur Vidya Mandir High School And Jr College	Mumbai
241	MH19017943	Cezan Vispi Damania	M	MHJ0021	Thakur Vidya Mandir High School And Jr College	Mumbai
242	MH19017962	Aditya Anand Sawant	M	MHJ0021	Thakur Vidya Mandir High School And Jr College	Mumbai
243	MH19017991	Prasham Satra	M	MHJ0021	Thakur Vidya Mandir High School And Jr College	Mumbai
244	MH19018418	Kalash Pankaj Bhaiya	F	MHJ0059	Swami Vivekanand Junior College	Jalgaon
245	MH19018855	Arnav Akshaya Bhate	M	MHJ0105	Apeejay School Nerul	Navi Mumbai
246	MH19019872	Arpan Sandeep Kasat	M	MHJ0241	Aaichi Shala Jr. Science College	Akola
247	MH19020685	Sayali Sunil Mahindrakar	F	MHJ0333	Javaharlal Navodaya Vidyalaya Yavatmal	Yavatmal
248	MN19021344	Wilson Phaomei	M	MNJ0013	Jnv Tamenglong	Tamenglong
249	MZ19023387	Aanya Singh	F	MZJ0007	Kendriya Vidyalaya Aizawal Tanhril Mu	Aizawl
250	PB19024654	Harpreet Singh	M	PBJ0001	Kendriya Vidyalaya No.I Cant. Amritsar	Amritsar
251	RJ19025718	Apoorv Sharma	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
252	RJ19025720	Devansh Jain	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
253	RJ19025752	Chandan Solanki	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
254	RJ19025757	Aditya Bharadwaj	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
255	RJ19025779	Abhishek Singh	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
256	RJ19025799	Aarav Jha	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
257	RJ19025919	Rhythm Kedia	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
258	RJ19025935	Harshal Lasod	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
259	RJ19025939	Rajat Das	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
260	RJ19025946	Rohan Garg	M	RJJ0001	Disha Delphi Global Sr. Sec. School	Kota
261	RJ19025952	Devang Tibrewal	M	RJJ0003	Cambridge Court High School	Jaipur
262	RJ19026033	Tanmay Pratap Singh	M	RJJ0004	Bharatiya Vidya Bhavan Vidyashram	Jaipur
263	RJ19026279	Gaurvanshu Shivan	M	RJJ0014	Jayshree Periwal High School	Jaipur
264	RJ19026306	Peeyush Bangar	M	RJJ0014	Jayshree Periwal High School	Jaipur
265	RJ19026312	Aaryan Maheshwari	M	RJJ0014	Jayshree Periwal High School	Jaipur
266	RJ19026314	Priyanshu Jindal	M	RJJ0014	Jayshree Periwal High School	Jaipur
267	RJ19026349	Raghav Sharma	M	RJJ0017	Disha Delphi Public School	Kota
268	RJ19026413	Rudransh Kumar Ankodia	M	RJJ0017	Disha Delphi Public School	Kota
269	RJ19026466	Prabhav Khandelwal	M	RJJ0017	Disha Delphi Public School	Kota
270	RJ19026477	Ishaan Gupta	M	RJJ0017	Disha Delphi Public School	Kota
271	RJ19026497	Dnyanesh Hemendra Shinde	M	RJJ0017	Disha Delphi Public School	Kota
272	RJ19026504	Raghav Gupta	M	RJJ0017	Disha Delphi Public School	Kota
273	RJ19026513	Ansh Agarwal	M	RJJ0017	Disha Delphi Public School	Kota
274	RJ19026518	Supriya Bansal	F	RJJ0017	Disha Delphi Public School	Kota
275	RJ19026522	Avani Agrawal	F	RJJ0017	Disha Delphi Public School	Kota
276	RJ19026524	Aadit Kumar Sahoo	M	RJJ0017	Disha Delphi Public School	Kota
277	RJ19026525	Krati Gautam	F	RJJ0017	Disha Delphi Public School	Kota
278	RJ19026529	Amit Bhartiya	M	RJJ0017	Disha Delphi Public School	Kota
279	RJ19026530	Vikas V. Patil	M	RJJ0017	Disha Delphi Public School	Kota
280	RJ19026554	Yash Mishra	M	RJJ0018	Lord Buddha Public School	Kota
281	RJ19026570	Adil Khan	M	RJJ0018	Lord Buddha Public School	Kota
282	RJ19026958	Saksham Rath	M	RJJ0053	Delhi Public School Jodhpur	Jodhpur
283	RJ19027062	Mayank Gupta	M	RJJ0064	Central Academy School	Alwar

284	RJ19027375	Simar Narula	M	RJJ0083	St.Xaviers Sr.Sec.School Jaipur	Jaipur
285	RJ19027814	Aditya Jhahria	M	RJJ0105	Matrix High School	Sikar
286	RJ19027915	Harsh Suthar	M	RJJ0109	Aone Sr.Sec.School	Udaipur
287	RJ19036759	Aditya Gupta	M	UKJ0031	Tcg Public School	Kotdwara
288	TN19029027	K.Sanjay	M	TNJ0022	Narayana Olympiad School	Chennai
289	TN19029086	Julis Joy	F	TNJ0025	Sri Chaitanya Techno School	Hosur
290	TN19029088	Yoogish Sairaaj D	M	TNJ0025	Sri Chaitanya Techno School	Hosur
291	TN19030573	Surya Prakash J	M	TNJ0094	Sri Chaitanya Techno School	Chennai
292	TN19030574	Adithya Acharya	M	TNJ0094	Sri Chaitanya Techno School	Chennai
293	TN19030575	Maheedhar Nandamuri	M	TNJ0094	Sri Chaitanya Techno School	Chennai
294	TN19030582	Srinivas Maturi	M	TNJ0094	Sri Chaitanya Techno School	Chennai
295	TN19030690	Aditya Mahanta	M	TNJ0098	Sri Chaitanya Techno School	Chennai
296	TN19030698	Nithish B	M	TNJ0098	Sri Chaitanya Techno School	Chennai
297	TN19030701	Advaith S	M	TNJ0098	Sri Chaitanya Techno School	Chennai
298	TS19031684	V.Suveeksha	F	TSJ0015	Anjali School	Suryapet
299	TS19031769	N.Gayathri	F	TSJ0015	Anjali School	Suryapet
300	TS19031773	S.Nithya	F	TSJ0015	Anjali School	Suryapet
301	TS19031778	B.Srujitha	F	TSJ0015	Anjali School	Suryapet
302	TS19031783	P.Hemanth Sai	M	TSJ0015	Anjali School	Suryapet
303	TS19031950	Koundinya	M	TSJ0027	Sri Chaitanya High School	Hyderabad
304	TS19031952	Shaik Sahil	M	TSJ0027	Sri Chaitanya High School	Hyderabad
305	TS19031953	T.Tharun Kumar	M	TSJ0027	Sri Chaitanya High School	Hyderabad
306	TS19031955	Mehul Borad	M	TSJ0027	Sri Chaitanya High School	Hyderabad
307	TS19031957	N.Revanth Reddy	M	TSJ0027	Sri Chaitanya High School	Hyderabad
308	TS19031961	R.Surya Theja	M	TSJ0027	Sri Chaitanya High School	Hyderabad
309	TS19031993	K.Jashwanth	M	TSJ0027	Sri Chaitanya High School	Hyderabad
310	TS19032004	K.V.S.Hemanth	M	TSJ0027	Sri Chaitanya High School	Hyderabad
311	TS19032005	M.Sai Sudhamsh	M	TSJ0027	Sri Chaitanya High School	Hyderabad
312	TS19032008	B.Aditya	M	TSJ0027	Sri Chaitanya High School	Hyderabad
313	TS19032012	B.Abhinav	M	TSJ0027	Sri Chaitanya High School	Hyderabad
314	TS19032013	M.Sai Saketh	M	TSJ0027	Sri Chaitanya High School	Hyderabad
315	TS19032015	Sri Hari Pandey	M	TSJ0027	Sri Chaitanya High School	Hyderabad
316	TS19032019	K.Avinash	M	TSJ0027	Sri Chaitanya High School	Hyderabad
317	TS19032020	C.Abhiram	M	TSJ0027	Sri Chaitanya High School	Hyderabad
318	TS19032179	Pratik Bose. Bavanari	M	TSJ0035	Fitjee School	Hyderabad
319	TS19032180	N.Satwik	M	TSJ0035	Fitjee School	Hyderabad
320	TS19032203	Pratham Sonekar	M	TSJ0035	Fitjee School	Hyderabad
321	TS19032208	Machiraju Chandra Harini	M	TSJ0035	Fitjee School	Hyderabad
322	TS19032219	Nagisetty Vinay	M	TSJ0035	Fitjee School	Hyderabad
323	TS19032220	K Abhinav Reddy	M	TSJ0035	Fitjee School	Hyderabad
324	TS19032226	K Aashritha Reddy	F	TSJ0035	Fitjee School	Hyderabad
325	TS19032229	K.R.Srikanth	M	TSJ0035	Fitjee School	Hyderabad
326	TS19032235	Nihal Reddy Desham	M	TSJ0035	Fitjee School	Hyderabad
327	TS19032326	Sahasra Venepally	F	TSJ0040	Sri Chaitanya Junior College	Hyderabad
328	TS19032338	Sai Varshith Mallavarapu	M	TSJ0040	Sri Chaitanya Junior College	Hyderabad
329	TS19032399	Rithika Ayyalapu	F	TSJ0046	Narayana High School	Hyderabad
330	TS19032470	A. Khushi	F	TSJ0046	Narayana High School	Hyderabad
331	TS19032477	Khaled Hussain Mohammed	M	TSJ0046	Narayana High School	Hyderabad

332	TS19032479	Kovvuru Kasyap	M	TSJ0046	Narayana High School	Hyderabad
333	TS19032480	Ch. Vinay	M	TSJ0046	Narayana High School	Hyderabad
334	TS19032499	Balaaji Reddy Nagireddy	M	TSJ0046	Narayana High School	Hyderabad
335	TS19032532	Vignan Srikesh Bathini	M	TSJ0046	Narayana High School	Hyderabad
336	TS19032756	V. Sriyans Reddy	M	TSJ0058	Tejaswi Concept School	Hanamkonda
337	TS19032757	B. Rishi Reddy	M	TSJ0058	Tejaswi Concept School	Hanamkonda
338	TS19032762	P. Nikhil Sai	M	TSJ0058	Tejaswi Concept School	Hanamkonda
339	TS19032763	A. Sai Vikas	M	TSJ0058	Tejaswi Concept School	Hanamkonda
340	TS19032765	Ch. Ashish	M	TSJ0058	Tejaswi Concept School	Hanamkonda
341	TS19032779	K. Rajesh	M	TSJ0058	Tejaswi Concept School	Hanamkonda
342	TS19032780	G. Avinash Reddy	M	TSJ0058	Tejaswi Concept School	Hanamkonda
343	TS19032790	K. Harini	F	TSJ0058	Tejaswi Concept School	Hanamkonda
344	TS19032799	Gottupulla Venkata Aman	M	TSJ0065	Kendriya Vidyalaya No.I Soi Uppal	Hyderabad
345	TS19033211	Sai Prabhav Reddy.Addula	M	TSJ0079	Narayana Co School	Hyderabad
346	TS19033213	Naga Bhavya Sree Nayakanti	F	TSJ0079	Narayana Co School	Hyderabad
347	TS19033216	M. Dheeraj Kumar	M	TSJ0079	Narayana Co School	Hyderabad
348	TS19033221	Saif.Shaik	M	TSJ0079	Narayana Co School	Hyderabad
349	TS19033222	Sampadram Kumar.Jogadenu	M	TSJ0079	Narayana Co School	Hyderabad
350	TS19033227	V.S.S. Sathvik	M	TSJ0079	Narayana Co School	Hyderabad
351	TS19033273	Pranay Sriharsha Surepally	M	TSJ0079	Narayana Co School	Hyderabad
352	TS19033296	Sathvik P	M	TSJ0079	Narayana Co School	Hyderabad
353	TS19033298	Karthik Reddy Sagili	M	TSJ0079	Narayana Co School	Hyderabad
354	TS19033299	Anudeep Gannoju	M	TSJ0079	Narayana Co School	Hyderabad
355	TS19033304	Jaisukh Reddy T	M	TSJ0079	Narayana Co School	Hyderabad
356	TS19033305	Nandan Manjunath Immadisetty	M	TSJ0079	Narayana Co School	Hyderabad
357	TS19033308	Sri Varshith Reddy C	M	TSJ0079	Narayana Co School	Hyderabad
358	TS19033309	Ganji Srinath	M	TSJ0079	Narayana Co School	Hyderabad
359	TS19033310	Vivek Gowtham Korla	M	TSJ0079	Narayana Co School	Hyderabad
360	TS19033315	Venkata Pavaneeswar Reddy Chappidi	M	TSJ0079	Narayana Co School	Hyderabad
361	TS19033317	Kishan Reddy.Bheemavaram	M	TSJ0079	Narayana Co School	Hyderabad
362	TS19033319	S K Avinash Pranao	M	TSJ0079	Narayana Co School	Hyderabad
363	TS19033322	Venkata Aditya Sanapala	M	TSJ0079	Narayana Co School	Hyderabad
364	TS19033324	Vinuthna Gangishetty	F	TSJ0079	Narayana Co School	Hyderabad
365	TS19034575	Charan Teja.Valavala.	M	TSJ0113	Narayana Olympiad School	Hyderabad
366	TS19034579	Suhaas.Lingam	M	TSJ0113	Narayana Olympiad School	Hyderabad
367	TS19034584	Shashank Yadavpotharaveni	M	TSJ0113	Narayana Olympiad School	Hyderabad
368	TS19034585	Rishwanth Reddybethi	M	TSJ0113	Narayana Olympiad School	Hyderabad
369	TS19034587	K.Ved Vaitaran.	M	TSJ0113	Narayana Olympiad School	Hyderabad
370	TS19034604	Madhav.Vutkoori	M	TSJ0113	Narayana Olympiad School	Hyderabad
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372	TS19034697	Challa Sri Ram	M	TSJ0114	Sri Chaitanya International School	Khammam
373	TS19034701	Bettam Akshith Kumar	M	TSJ0114	Sri Chaitanya International School	Khammam
374	TS19034702	Vuppala Vishwanath	M	TSJ0114	Sri Chaitanya International School	Khammam
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376	TS19034704	Arshiya Noureen	F	TSJ0114	Sri Chaitanya International School	Khammam
377	TS19034706	Koleti Eswar Sai Ganesh	M	TSJ0114	Sri Chaitanya International School	Khammam
378	TS19034707	Anugu Indu	F	TSJ0114	Sri Chaitanya International School	Khammam
379	TS19034708	P. Harshith	M	TSJ0114	Sri Chaitanya International School	Khammam

380	TS19034710	Nagandla Siddhaardhaa	M	TSJ0114	Sri Chaitanya International School	Khammam
381	TS19034711	Burri Vivekvardha Varma	M	TSJ0114	Sri Chaitanya International School	Khammam
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383	TS19034720	S Abhilash	M	TSJ0115	Mount Basil High School	Mahabubnagar
384	TS19034723	Giri Sahith Reddy	M	TSJ0115	Mount Basil High School	Mahabubnagar
385	TS19034724	Adiba Tahseen	F	TSJ0115	Mount Basil High School	Mahabubnagar
386	TS19034761	Tatikonda Sudheendra	M	TSJ0117	Sri Chaitanya School	Hanamkonda
387	TS19034762	Ellambhatla Sai Vishesh Sha	M	TSJ0117	Sri Chaitanya School	Hanamkonda
388	TS19034763	Mamunuri Sai Sreemanth	M	TSJ0117	Sri Chaitanya School	Hanamkonda
389	TS19034773	Bobbala Akshay	M	TSJ0117	Sri Chaitanya School	Hanamkonda
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391	TS19034799	Mohammad Moin	M	TSJ0118	Sri Chaitanya School	Hyderabad
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396	TS19034883	Laxmi Pranathi Challa	F	TSJ0118	Sri Chaitanya School	Hyderabad
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399	TS19035366	Gnanesh Gunda	M	TSJ0131	Sri Chaitanya School	Karimnagar
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402	UK19037087	Gaurang Pant	M	UKJ0046	Holy Angel Public School Almora	Almora
403	UK19037097	Monika Bisht	F	UKJ0046	Holy Angel Public School Almora	Almora
404	UP19026566	Viraat Yadav	M	RJJ0018	Lord Buddha Public School	Kota
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406	UP19037690	Madhur Sharma	M	UPJ0006	Saiyyid Hamid Senior Sec.School Boys Amu	Aligarh
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413	UP19038027	Kanishk	M	UPJ0026	Kendriya Vidyalaya Aliganj	Lucknow
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415	UP19038644	Deshank Pratap Singh	M	UPJ0061	Dayawati Modi Academy	Rampur
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417	WB19040733	Rudradip Roy	M	WBJ0002	Basirhat High School	Basirhat
418	WB19040734	Atreya Mondal	M	WBJ0002	Basirhat High School	Basirhat
419	WB19040735	Anish Biswas	M	WBJ0002	Basirhat High School	Basirhat

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NATIONAL GRADUATE PHYSICS EXAMINATION (NGPE-2021)



Conducted by
INDIAN ASSOCIATION OF PHYSICS TEACHERS

Registered Office: 206, Adarsh Complex, OPR4, Awas Vikas-1, Keshavpuram, Kalyanpur, Kanpur-208017

Web: www.iapt.org.in; www.indapt.org.in

(Regd. No. K1448)

Day, Date & Time of Examination

SUNDAY, January 24, 2021

TIME: 10.00 AM to 1.00 PM

Last Date for Enrolment: 17th November 2020

Eligibility for Appearing in NGPE-2021: Students of B.Sc., II and III (Pass, Hons. or Integrated) are eligible.
(Anyone who has already passed B.Sc. is NOT eligible)

Exam Information:

Registration Fee: ₹150 (Rupees One Hundred & Fifty Only)

Language for NGPE: English, Hindi, Gujarati, Tamil,
Telugu or any other language
if 100 or more students opt for it.

Format for NGPE:

- Part A** : 25 MCQs with any number of options (1, 2, 3 or all 4) may be correct.
Credit is given only if all the correct options are marked (6 marks each; Total 150 marks)
- Part B1** : 10 Short Answer (5 to 6 Lines) Questions (5 marks each; Total 50 marks)
- Part B2** : Ten Problems (10 marks each; Total 100 marks)

Unique Features of this Examination:

- ★ Fully voluntary examination in a stress-free environment.
- ★ Carry away the question paper both part A and part B.
- ★ It provides Individual's own assessment at all India level.
- ★ Same paper for all B.Sc., II and III Year Students with separate national merit.
- ★ Solutions in printed form are provided to Centre In-Charge for each participant.
- ★ The only national level examination testing students in both theory & experiment.
- ★ Previous Year (2020) Question Paper & Solution for every centre registered for NGPE-2021.

CERTIFICATES AND AWARDS IN NGPE-2021

(Cash Award will be released only if the candidate continues higher studies in Physics)

NGPE-2021
Awards

- | | |
|---------------------------------|--|
| TOP 10% at Each Centre | : Centre Topper Certificate |
| TOP 1% at State Level | : State Topper Merit Certificate |
| TOP 1% at National Level | : National Topper Merit Certificate + Book Prize |
| Top 5 Students in India | : Merit Certificate + GOLD MEDAL + ₹20,000/- Cash Award |

- ★ Top 25 will be eligible for appearing in NGPE Part-C Examination-2021 (an examination in experimental skill) for final selection for **GOLD MEDAL** and one-time Scholarship (Max. 5 in Number) worth ₹20,000/- for pursuing higher studies in Physics. TA is paid and free lodging arranged.
- ★ Top 25 will have eligibility for an interview for Admission in Post-B.Sc. Integrated Ph.D. Programme in Physical Sciences 2021 of **CSIR-NBSE NATIONAL CENTRE FOR BASIC SCIENCES, KOLKATA**, (Only B.Sc. II year students with more than 60% Marks)
For more details must see website- <http://bose.res.in/admission.htm> write email to admission@bose.res.in
- ★ May get opportunity to attend one week **EXPERIMENTAL PHYSICS WORKSHOP** organized by IAPT AT KOLKATA (Regional Council-15). TA is paid.
- ★ Top 5 to 10 students of B.Sc. First year (of University 3 Yr System) shall be eligible to participate in prestigious **NATIONAL INITIATIVE FOR UNDERGRADUATE SCIENCE [NIUS]** program of Homi Bhabha Center for Science Education, TIFR, Mumbai. [This is AGOvt. of India, DAE Program organized at Mumbai].
- ★ Top 20 students of B.Sc. I appearing in NGPE-2021 may get an opportunity for two weeks Academic Workshop on Basic Physics at IIT Guwahati (Preferably for those from University 3-yr B.Sc. System)
- ★ Some more programmes for toppers may be declared later.

To obtain previous Ten Year Question Papers with complete solution deposit/transfer Rs. 150/- (One hundred fifty only) per set in IAPT account as per Bank details: Name of the account: Indian Association of Physics Teachers, Name of the bank: Central Bank of India, Branch: DBS College, Dehradun-248001, Account Number: 1950511799, IFSC Code: CBIN0283283. Then write email to iaptddn@gmail.com

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BULLETIN OF INDIAN ASSOCIATION OF PHYSICS TEACHERS

FOUNDED BY (LATE) DR. D.P. KHANDELWAL

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*If underlivered please return to :***Dr. Sanjay Kr. Sharma****Managing Editor**Flat No. 206, Adarsh Complex,
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