

# Unit II

C V RAMAN & SAM PITRODA

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# Sir Chandrasekhara Venkata Raman

(1888-1970)

Internationally reputed Indian physicist, is best known for his research on the molecular scattering of light.

For his discovery of this phenomenon, known as the Raman Effect, he was awarded the 1930 Nobel Prize for Physics.



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# C V RAMAN

A portrait of C.V. Raman, an elderly man with a white turban and a white shirt, looking slightly to the right. The background is a warm, golden-brown color.

- born in Trichinopoly (now Tiruchirapalli) to Chandra Shekar Iyer and Parvati Ammal
- three books “Light of Asia”, “The Elements of Euclid”, and “The Sensations of Tone” greatly influenced him
- was a precocious child –
  - completed his schooling at just eleven
  - joined Presidency College at thirteen
- stood first in his B.A. class in Presidency College
- teachers forced Raman to sit for the ICS examinations

# C V RAMAN

A portrait of C.V. Raman, an elderly man with a white beard and mustache, wearing a white kurta and a red turban. He is looking slightly to the right of the camera. The background is a warm, golden-brown color.

- could not travel to England on health grounds
- continued his further studies – joined in M. A.
- Achieved Gold Medal by standing first in the University
- became the first ever student from Presidency College to publish research papers in Philosophical Magazine
- married Lokasundari and was posted in Calcutta as the Assistant Accountant General

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# C V RAMAN

A portrait of C.V. Raman, an elderly man with a white turban and a white kurta, looking slightly to the right. The background is a warm, golden-brown color.

- started his research career in the labs of the IACS with some experiments on ektara, violin & some other musical instruments
- Sir Ashutosh Mookerjee gave him an opportunity to join the Calcutta University as Professor
- during his voyage across the Mediterranean Sea, Raman discovered that water molecules could scatter light just like air molecules
- it led him to the discovery of his famous “Raman effect” that won him the coveted Nobel Prize

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# C V RAMAN

- in 1933, he was appointed head of the department of physics of the Indian Institute of Science in Bangalore
- in 1947 he became director of the Raman Research Institute, also in Bangalore
- he was knighted in 1929 and was named president of the Indian Academy of Sciences in 1934

# INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE – CALCUTTA

– established in July 1876 at 210, Bowbazar street



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# INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE – CALCUTTA

- IACS is the oldest (established in 1876) institute in India devoted to the pursuit of fundamental research in the frontier areas of basic sciences
- Founded by Dr. Mahendra Lal Sircar, a philanthropist, it was desired to be an institution 'solely native and purely national' and to create scientific awareness in Indians
- C V Raman worked at IACS for many years (1907- 1933) and it is here that he discovered the celebrated **Raman Effect** that bears his name and for which he was awarded **Nobel Prize** in Physics in 1930



# RAMAN RESEARCH INSTITUTE, BANGALORE



# RAMAN RESEARCH INSTITUTE, BANGALORE

- Founded by Prof. Raman in 1948, RRI is located in a sprawling campus in Bangalore very close to the Indian Institute of Science (IISc)
- From a research institution privately owned by the greatest- ever Indian scientist to a national centre of repute in basic sciences, the Raman Research Institute (RRI), Bangalore, has come a long way during its existence over sixty years

# INDIAN INSTITUTE OF SCIENCE, BANGALORE

## JRD TATA, THE FOUNDER



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# INDIAN INSTITUTE OF SCIENCE, BANGALORE

- The Indian Institute of Science (IISc) was conceived as a 'Research Institute' or 'University of Research' by Jamsetji Nusserwanji Tata, in the twilight years of the 19th century.
- A long period of almost thirteen years was to elapse from the initial conception in 1896 to the birth of the Institute on May 27, 1909.
- Raman was appointed the first Indian head of the department of physics of the Indian Institute of Science in Bangalore in 1933.

Feb 28th is our National Science day !

This day, in the year 1928, C.V. Raman announced to the world his famous discovery, a discovery which would earn him a Nobel prize.



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# Comprehension Questions

- How were the great men who Raman read about as a child reflected in the work he did later in life?
- Raman was an avid reader right from his childhood. Three books among the great many books that he read as a child had a lasting impression on Raman's young mind. These three books were "Light of Asia", "The Elements of Euclid", and "The Sensations of Tone". The third book among these was about sound waves. Later on when he grew up and got an opportunity to conduct research in IACS (Indian Association for the Cultivation of Science), he chose to study musical instruments. He also published a book on the mechanical theory of the musical instruments. He also explained the working of ektara, a musical instrument. Thus, what Raman read in his school days got reflected in the inventions he made.

# Comprehension Questions

- Why did Raman fail to impress his teachers when he first joined Presidency College?
- Raman failed to impress his teachers when he joined Presidency College because at that time he was just thirteen years old. And he was not physically very strong and looked very young like a school boy. So, when he went to attend his first English class the professor asked him if he really belonged to that class.
- What made Raman say of the Civil Surgeon of Madras, 'I shall ever be grateful to this man'?
- The Civil Surgeon of Madras was the one who declared Raman physically unfit to travel abroad for appearing for the Indian Civil Services examination. Raman did not get disappointed because he was he not at all interested in any career other than research. He chose his favorite subject Physics for his higher education. So Raman forever remained grateful to the Civil Surgeon of Madras.

# Comprehension Questions

- Why was the day when Raman walked into the Indian Association for the Cultivation of Science a historic moment?
- The day when Raman walked into the Indian Association for the Cultivation of Science was a historic moment because it was in the lab of this association where he and his team performed the legendary experiments on light, which the world knows today as “Raman effect”.
- Outline the subject of the first research Raman conducted in the IACS?
- When Raman got the first opportunity to study and experiment at the IACS, he decided to study musical instruments. He explained the working of ektara - a simple musical instrument. He also made a scientific study of the functions of violin. He published several papers in national and international journals on his research findings in this area.



# Comprehension Questions

- What discovery did Raman make during his voyage across the Mediterranean and how did it prove to be important?
- During his voyage across the Mediterranean Sea, Raman, while watching the sea, started wondering why sea water was blue in colour. He later discovered that water molecules could scatter light just like air molecules. It led him to the discovery of his famous “Raman effect”. The Raman Effect has practical importance in spectrographic chemical analysis and in the determination of the structure of molecules.

# SAM PITRODA

"The father of India's communication revolution"



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# SAM PITRODA

- Satyanarayan Gangaram Pitroda, or Dr Sam Pitroda as he is better known, was born in Titlagarh, Orissa in 1942.
- Dr. Pitroda is presently the chairman of India's National Knowledge Commission, besides being the Chairman and CEO of World-Tel Limited and the founder and CEO of C-SAM, Inc. He also worked as an advisor to the United Nations in 1992.

# SAM PITRODA

- Sam Pitroda was born in Titlagarh, Orissa on 4<sup>th</sup> May 1942 in a large family of seven brothers and sisters. His father believed in educating his children and letting them do what they wanted to do.
- Pitroda did his Masters in Physics and Electronics from Maharaja Sayajirao University in Baroda.
- Pitroda started his career in digital Technology at GTE Inc., Chicago, USA.
- He opened a telephone exchange company called Wescom Switching in 1974.

# SAM PITRODA

- Pitroda thought of setting up cheap rural exchanges when he made his first telephone call only after moving to USA to study Electrical Engineering
- He visited Saudi American Bank in Jeddah as a venture capitalist
- Indian Prime Minister Mr. Rajiv Gandhi made him his chief scientific Advisor and provided the opportunity to start a new public-sector venture called Centre for the Development of Telematics (C-Dot)
- Rural automatic exchanges were provided with SS7 Intelligent Networking Signaling Systems. Which are used to find out if a number busy or available and to check up the database of telephone numbers

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# SAM PITRODA

- According Sam Pitroda, we need to make use of IT to fulfill basic human needs related to food, water, sanitation, literacy and health. It must speed up the process of nation-building using the tools available and it should help us to handle problems in core areas like governance, commerce, finance, education, health, agriculture, environment, legal issues and employment.
- Pitroda's idea of electronic wallet does not contain any currency. It would contain only plastic currency - credit card, debit card and health card, insurance card, driving license etc.

# EPABX SYSTEM



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# PCOs



PUBLIC CALL OFFICES

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In India, manned and automated (coin operated payphone) versions of the service are available. BSNL, a public sector corporation, has the largest installation of PCOs in India.

Private sector corporations such as Reliance Infocomm, Tata Indicom, Hutch, Idea and Airtel are prepaid PCO providers and have a moderate number of PCOs in the public landscape.

There are two types of PCO landline and wireless

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# THE DIGITAL WALLET



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