Geek & Seek

General Science Quiz
Test your scientific mettle with our 10 questions pop quiz.

Themed Crossword
This theme for this issue is **Quantum Physics**. Send us your crosswords if you want to be featured!

Linked List
Link each term with the next, and complete the science word chain!

General Science Quiz

Q1. This Nobel Prize-winning physicist has an element named after him. His wife, upon being shown the results of his experiment for the first time, said, 'I have seen my death!'. Who is the scientist?
(a) Wilhelm Roentgen
(b) Pierre Curie
(c) Henri Becquerel
(d) Enrico Fermi

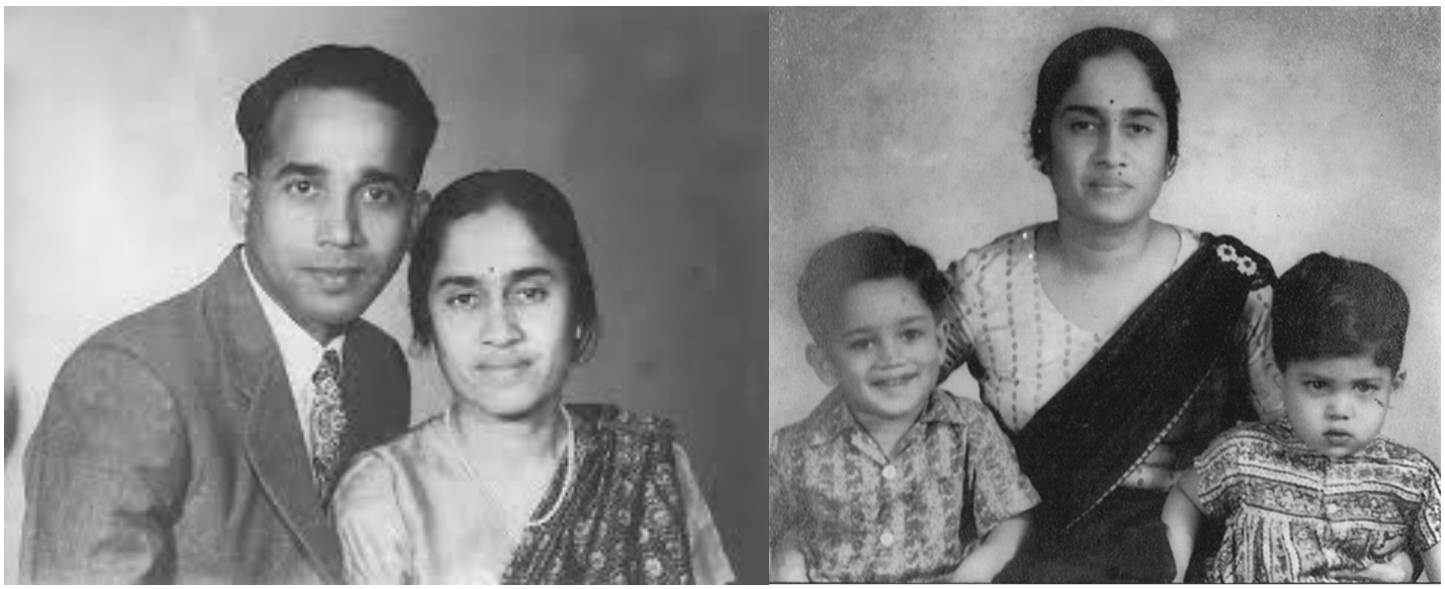
Q2. *Dr Dilip Mahalanabis*, an Indian paediatrician, is famous for pioneering one of the most important medical advances of the 20th century that dramatically saved lives during the cholera outbreak in Bangladesh in 1971. What is this medical advancement?
(a) Vaxchora vaccine
(b) Oral rehydration solution (ORS)
(c) Zinc supplementation
(d) Ringer's lactate

Q3. This physician was one of the pioneers of plastic and dental surgery, and was one of the first to attribute malaria to mosquitoes. The *Royal Australasian College of Surgeons* at Melbourne has a statue in his honour. Who is he?
(a) Sushruta
(b) Hippocrates
(c) Herophilus
(d) Dioscorides

Q4. As part of the National Quantum Mission, this Indian research institute is leading the efforts to create a 100-qubit quantum computer, and recently completed end-to-end testing of a *6-qubit processor*, in collaboration with DRDO and TCS. Name the research institute.
(a) Indian Institute of Science Education and Research Pune
(b) Indian Institute of Science (IISc), Bengaluru
(c) Tata Institute of Fundamental Research (TIFR), Mumbai
(d) Raman Research Institute (RRI), Bengaluru

Q5. Diamond is traditionally known to reside at the top of *Mohs' scale* of mineral hardness since it can scratch all other minerals on the scale. However, scientists in modern years have discovered other materials that are in fact harder than diamond, and would go above diamond in a modern Mohs' scale. Name such a naturally-occuring mineral.
(a) Lonsdaleite
(b) Boron carbide
(c) Moissanite
(d) Cubic boron nitride

Q6. *In Nomine Terra Calens* is a music piece composed by Dr Lucy Jones by converting scientific data from the past 138 years regarding a major global issue into various musical notes. The musical piece was performed by Jones and the Los Angeles Baroque at the Los Angeles Natural History Museum in 2019. What global issue was being studied?
(a) Global warming
(b) Shortage of drinking water
(c) Depleting energy sources
(d) Increasing air pollution levels



Kamala Sohonie with her husband and children. See Q7. [Resonance Journal, 4, 21 (2016)]

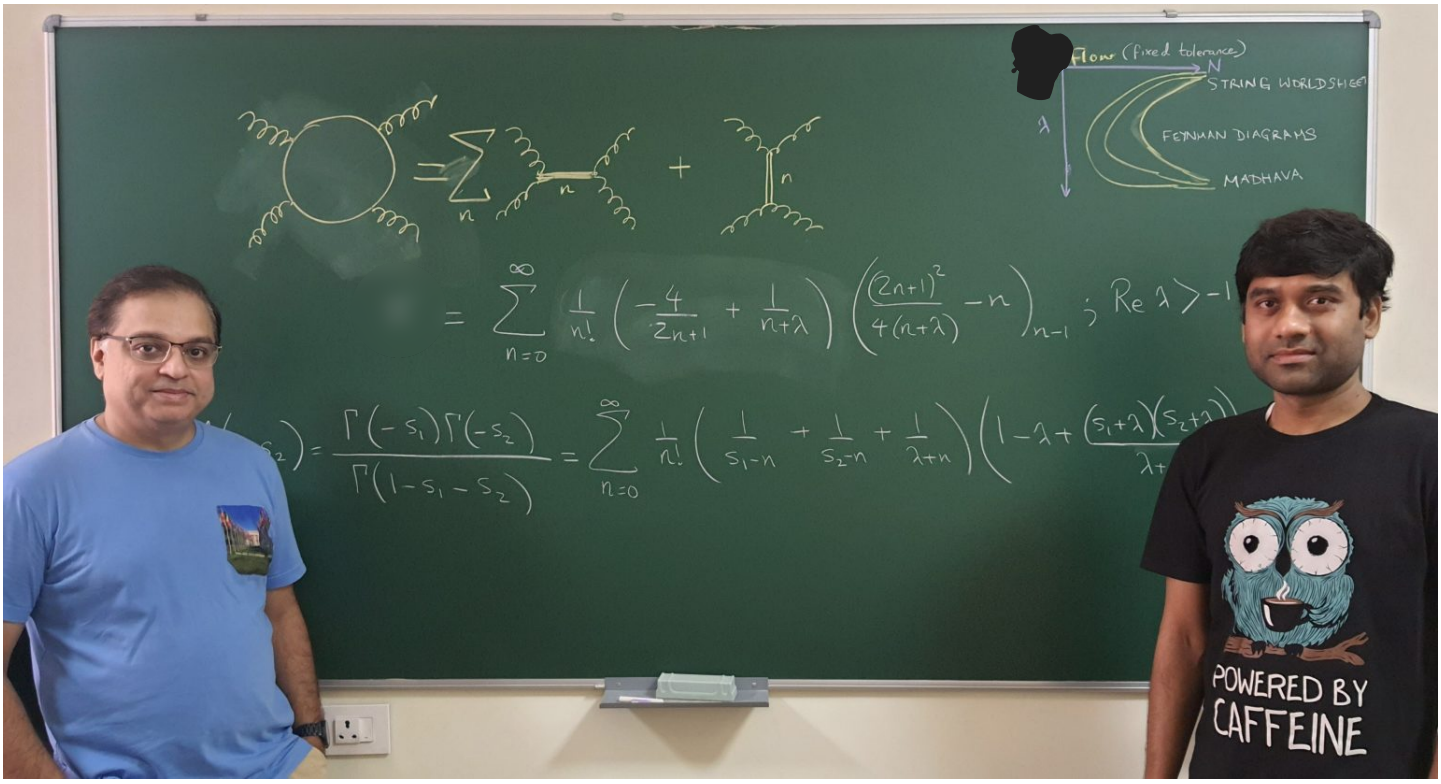
Q7. *Kamala Sohonie* was the first Indian woman to be conferred the degree of PhD, for her ground-breaking work on the electron transport chain. However, she was initially refused admission to one of India's premier research institutes by the institute's director, simply because she was a woman! Who was the director?
(a) C V Raman
(b) Homi J Bhabha
(c) Shanti Swarup Bhatnagar
(d) Vikram Sarabhai

Q8. String theorists at IISc recently found a series representation of a certain irrational number, while studying quantum scattering of high-energy particles. *Ramanujan* has also worked on representations of this number. Which number are we talking about?
(a) 'Pi'
(b) Euler's number e
(c) The golden number
(d) Euler–Mascheroni constant

Q9. *Hennig Brand* was a German alchemist who, while searching for the 'philosopher's stone,' discovered a new material that gave off a pale-green glow by concentrating boiled-down urine. What was this new element?
(a) Zinc sulphide
(b) Strontium aluminate
(c) Sulphate
(d) Phosphorus

Q10. This 20th century European mathematician, during a US citizenship test, claimed before Judge Phillip Forman that the US constitution had a loophole that could reverse democratic government itself. His theorems in mathematical logic are referred to by his name today. Who is he?
(a) André Weil
(b) David Hilbert
(c) Georg Cantor
(d) Kurt Gödel

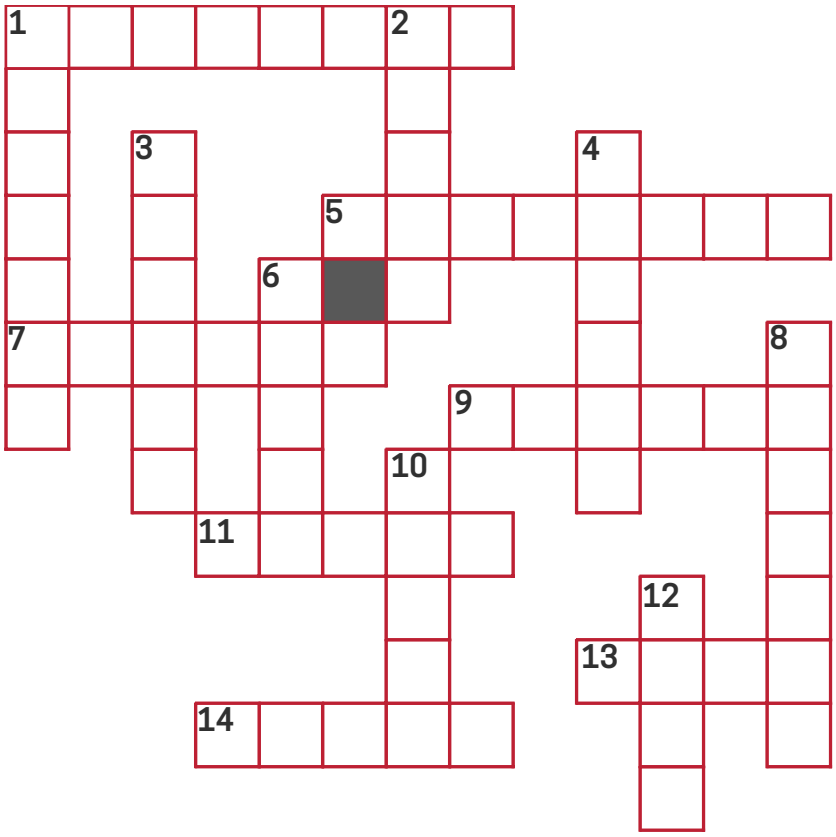
This issue's quiz is brought to you by Alekhya (IISER K) and Archita (HHU Düsseldorf). Answers are provided at the end of the issue..



Aninda Sinha (left) and Arnab Saha (right), scientists from IISc who recently came up with the series representation of a certain irrational number using Feynman diagrammatic expansions. See Q8. [IISc]

Themed Crossword

2025 will mark the 100th anniversary of Heisenberg's formulation of matrix mechanics and the foundation of quantum mechanics. This issues's crossword, based on **quantum physics**, is brought to you by Swarnendu and Abhirup (IISER Kolkata).



Across

1 (verb,)'Mix' two particles such that you cannot specify the state of one without specifying that of the other (8)
5 Lose quantum information by interacting with environment, typically irreversibly (8)
7 Pass through classically-forbidden region (6)
9 Quantised excitation of electromagnetic field (6)
11 English mathematician and physicist, used Lorentz invariance and quantum mechanics to predict antimatter (5)
13 Danish physicist, popularised the Copenhagen interpretation (4)
14 Two-level quantum system, unit of quantum information (5)

Down

1 American physicist, proposed the many-worlds interpretation of quantum mechanics in his doctoral dissertation (7)
2 Source of focused light that uses stimulated emission (5)
3 Unit of 'quantum angular momentum', also a physicist (6)
4 Bosonic excitation, quantised sound wave (6)
6 Italian Nobel laureate, created the first nuclear reactor, well-known for wielding a six-inch slide rule (5)
8 Adjective to describe a transformation that preserves norms of vectors (7)
10 Austrian physicist, the first to propose existence of neutrinos (5)
12 German physicist, postulated that squares of amplitudes are measurement probabilities (4)

Solution can be found at the end of the issue.

Linked List

Linked List is a general science-based word game. The rules are straightforward:
1. The goal is to guess eleven words that have been drawn from science.
2. The first word (the *seed*) will be provided to you, and hints and number of letters will be provided for the remaining words.
3. You are also informed that the first letter of any word is the last letter of the previous word. So the first letter of the second word will be the last letter of the seed word, the first letter of the third word is the last letter of the second word, and so on.
4. This property goes all the way, so that the last letter of the last (eleventh) word is also the first letter of the seed word.

Find all the words!

Today's seed: **MUTATION**

2. Carrier of electrochemical impulses between brain and rest of the body (5)

3. Oval-shaped figure with two lines of symmetry (7)

4. Energy measure combining internal energy and "pressure energy" (8)

5. Three feet or 36 inches (4)

6. Geological process by which sediments, soil, and rocks are deposited onto a landform or landmass

7. Elementary particle, cosmic ray component (8)

8. A process in which fluid moves through semipermeable membrane to seek equilibrium(7)

9. Sedimentary rock formed from the cementation of sand-sized mineral particles, used to build the Qutub Minar (9)

10. Inverse of log function (11)

Lightest metal, used in batteries (7)

Answers can be found at the end of the issue.