Informal Science Quiz
Questions 1, 8, 15, 21, 23 will be used to break ties

Name:

1. Shape memory alloys have the ability to *remember* their shapes – deforming them when they are below their transformation temperature, and then heating them to above their transformation temperature brings them back to their original shape. The most common of such materials was accidentally discovered by William Buehler at Naval Ordnance Laboratory in Maryland in the 60's. What is its common name, which comes from its constituent elements (Nickel and Titanium) and the place of its discovery?.

2. Its diameter is 4m, circumferential length is 27 Km and it is buried between depths of 50 to 175 metres below ground. It crosses national boundaries at 4 points. It will become becomes operational in July. At peak operation it will consume about 120 MW of power. Legal challenges as far away as Hawaii forced its operating agency to issue a report saying its operation will not destroy the Earth. What is it or what is its purpose?.

3. If $FeCl_2$ is Ferrous Chloride, what is $CmCl_3$?.

4. To parody the attempts by creationists to collect a list of scientists who were skeptical of evolution, the National Center for Science Education created a list of scientists who supported evolution. The list is called Project X, X being the first name of a famous scientist and populariser of science. It contains only scientist with first names as X or variations there in. Who is the scientist for whom the list is named?.

5. At a 1967 conference X was searching for something to call a phenomenon known as "gravitationally completely collapsed star". As X later noted, "After you get around to saying that about 10 times, you look desperately for something better". An unknown student at the conference shouted out the term Y and X used it often enough and made it stick. Identify X and Y.

6. The west coast of India was not in line of sight of the epicenter of the 2004 Sumatra earthquake. Yet waves of up to 1m struck parts of the west coast. What one word physical phenomena made this happen?.

7. Mankind looks grateful now on thee,

For what thou did'st in surgery,

And death must often go amiss

By smelling X bliss

The first stanza of a poem written by a grateful patient is shown above. What is X and who is the poem about?.

8. “Camels ordinarily sit down carefully. Perhaps their joints creak. Possibly early oiling might prevent premature hardening” - What is this?.

9. This Nobel laureate was known in his field for working on a single problem for up to 10 years, and then coming up with the definitive monograph regarding the problem. The last decade of his life was spent on re-working the calculations from a famous book, using modern methods. He did come out with a book at the end (he died shortly after), showing both his calculations and the original. He later remarked that in almost every single case the original methods were better. Identify both the Nobel laureate, who has a dimensionless number in magneto hydrodynamics named for him, and the famous book.

10. Leon Chua formulated the theory of this hypothetical circuit element in a 1971 paper. Researchers at HP Labs were able to fabricate this device earlier this year, 37 years after it was first hypothesized. It could potentially be used in computer memories, enabling the computer to be switched on and off like bulbs, without losing any memory. What is this element called?

11. “How many piano tuners are there in New York?”. Questions like this are named for a famous scientist X because he thought they clarified the assumptions underlying the problem to be solved. A documented instance of his using this approach is after the Trinity nuclear bomb test (incidentally the first ever test of a nuclear bomb). By dropping pieces of paper before, during and after the passage of the blast wave, and noting the displacement of the pieces of paper after the blast wave had passed, he estimated the yield of the test to be 10,000 tons of TNT. The Drake equation is an example of this kind of analysis. What are these kind of questions called or who is the famous scientist/

12. This term is used in Mathematics when a function is undefined at some point. It is also used to refer to the initial state of the universe, at the beginning of the Big Bang. A recent popular use of this term refers to “a theoretical point in the future of unprecedented technological progress, caused in part by the ability of machines to improve themselves using artificial intelligence”. What term?

13. Robert Jensen, an economist at Brown University, recently found one of the Holy Grails of economics. Potato during the Irish famine was long thought to be an example of this, but this has been disproved. Jensen found an example of this in the Hunan and Gansu provinces of China. This finding has huge implications for how governments should use consumer price subsidies. What did Jensen find an example of in China?

14. After Charles Darwin proposed the theory of evolution, a number of scientists calculated the age of the earth using Fourier’s theory of heat conduction. Lord Kelvin came up with an age between 24 and 400 million years, Helmholtz calculated it to be 22 million years. This gave ammunition to critics of evolution, even 400 million years not being enough for evolution by natural selection. The age of the

earth is now estimated to be atleast 4.5 billion years. What physical phenomenon not known in 1862, caused the miscalculation?.

15. John Tukey was the co-developer of the Fast Fourier Transform algorithm along with James Cooley. He designed polls to predict and analyze election for NBC. He also coined two terms, X and Y, which are now ubiquitous. X was coined in a 1958 American Mathematical Monthly article about electronic calculators, predicting X of the calculators would become atleast as important as the "tubes, transistors, wires, tapes and the like". Twelve years earlier, while working at Bell Labs he coined the term Y. What are X and Y?.

16. This science was so dominated in Britain in the 19th century by Edward Tylor, that it was known an "Mr.Tylor's science". It has 4 sub-fields – Biological, Socio-cultural, Linguistic and Archaeology. What?

17. This was first proposed by Russian scientist Konstantin Tsiolkovsky in 1895, after being inspired by the Eiffel Tower to consider a tower that reached all the way into space. A technical paper written by Jerome Pearson in 1975 caught the eye of Arthur C Clarke and proved to be the inspiration for one of his novels. In the novel, Clarke imagines it to be constructed from hyper filament of "continuous pseudo-one-dimensional diamond crystal". He later expressed belief that Buckminsterfullerene would play a more important role when this was constructed. What concept?

18. What is "a hypothetical end-of-the-world scenario involving molecular nanotechnology in which out-of-control self-replicating robots consume all living matter on Earth while building more of themselves"?

19. The first appearance of this popular probability puzzle was in a Martin Gardner column and was called "The Three Prisoner Problem". It is now named after the producer of the TV show that used it. Marilyn vos Savant analyzed it in Parade magazine. Her answer was roundly criticized by thousands, with Math Professors writing in to say they had a good laugh at her ignorance. However recent simulations show her analysis to be mostly right. What is the name of this puzzle that has caused embarrassment to many professional mathematicians?.

20. Scientist and Pulitzer Prize winning author Jared Diamond calls it the biggest mistake in history. In his book "Guns, Germs and Steel", he argues that along with this practice came "the gross social and sexual inequality, the disease and despotism that curse our existence". What practice?

21. This Mathematical concept was first described by William Hamilton in 1843. The idea/formula for it came during a stroll through Dublin, and he immediately carved the formula into a limestone on the Brougham Bridge. The name comes from Latin for "four at a time", and also appears in a Bible verse, where it represents a band of four Roman soldiers. While they have superseded by Matrices and Vectors, they still find application in computer graphics, where they are used to represent rotations in 3D. What?

22. He received the first Engineering PhD in the United States from the Yale University in 1863. He invented Vector Analysis independent of Oliver Heaviside. He came up with the theoretical foundations of Chemical Thermodynamics and Physical Chemistry. However he published his great works in an obscure journal called Transactions of the Connecticut Academy of Sciences. He has a type of energy named for him. Who?

23. His most important research was conducted while at the Madras University. He established the structure of Collagen to be a triple-helix. His lasting contribution to Stereochemistry was a 2D dimensional map of dihedral angles of amino acids in polypeptide chains. This map bears his name. He later did 3D image reconstruction work that had important applications in Computer Assisted Tomography. Who?

24. A 19th-century German industrialist and amateur mathematician, Paul Wolfskehl, had carefully planned his suicide on account of an unhappy love affair. He had a few hours to spare before the appointed hour and browsed through some mathematical publications. He found that there was a gap in the reasoning of the mathematician Ernst Kummer in his important work on X. Wolfskehl was able to repair the gap, but in doing so he overstepped the hour he had allotted for his suicide. Wolfskehl attained a new lease of life, and he set up the prize related to X bearing his name. What is X and who won the prize?.

25. This poem by John Updike appeared in a 1960 issue of New Yorker magazine.

John Updike

X they are very small.
They have no charge and have no mass
And do not interact at all.
The earth is just a silly ball
To them, through which they simply pass,
Like dustmaids down a drafty hall
Or photons through a sheet of glass.
They snub the most exquisite gas,
Ignore the most substantial wall,
Cold-shoulder steel and sounding brass,
Insult the stallion in his stall,
And, scorning barriers of class,
Infiltrate you and me! Like tall
And painless guillotines, they fall
Down through our heads into the grass.
At night, they enter at Nepal
And pierce the lover and his lass
From underneath the bed – you call
It wonderful; I call it crass"

The seond line turned out to be factually wrong as X were later found to not be massless. When the Nobel Prize for Physics in 1995 was awarded for work related to X, the above poem was part of the poster. What is X?