

## Round 1 – Physics Multichoice

1 Which of the following is measured in S.I. units of lumens

- a. Luminosity
- b. Luminous efficacy
- c. Luminous exitance
- d. Luminous flux
- e. Luminous intensity

2 Name the odd one out

- a. Callisto
- b. Europa
- c. Ganymede
- d. Io
- e. Titan

3. The heavy elements of which we are all made are created

- a. In pulsars
- b. In fusion reactions in red dwarfs
- c. In black holes
- d. In fusion reactions in supernovae
- e. In exo planets

4. Buckminster Fullerenes consist of which of the following?

- a. Silicon atoms
- b. Carbon atoms
- c. Lead atoms
- d. Tin atoms
- e. Germanium atoms

Which of the following was NOT discovered or created at CERN:

- a. gluons
- b. neutral currents
- c. direct CP violation
- d. antihydrogen atoms
- e. W and Z bosons

6. Atmospheric pressure pressing down on the average body is equivalent to a weight of

- a. 10kg
- b. 100kg

- c. 1,000kg
- d. 10,000kg
- e. 100,000kg

7. If a ping pong ball had the same kinetic energy as two colliding protons in the LHC how fast would it move?

- a. 4mm/s
- b. 4cm/s
- c. 4m/s
- d. 4km/s
- e. 40km/s

Which of the following is not a Hermitian matrix:

$$\begin{bmatrix} 1 & 2+i \\ 2-i & 1 \end{bmatrix} \quad \text{a.}$$

$$\begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix} \quad \text{b.}$$

$$\begin{bmatrix} i & 2-i \\ 2+i & i \end{bmatrix} \quad \text{c.}$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad \text{d.}$$

$$\begin{bmatrix} -1 & i \\ -i & -2 \end{bmatrix} \quad \text{e.}$$

9. 5. What is the coldest temperature ever recorded on the planet?

- a.  $-66^{\circ}\text{C}$
- b.  $-72^{\circ}\text{C}$
- c.  $-80^{\circ}\text{C}$
- d.  $-89^{\circ}\text{C}$
- e.  $-95^{\circ}\text{C}$

10. Which of the following did not receive a Nobel Prize in Physics?

- a. Niels Bohr
- b. James Chadwick
- c. Max Planck
- d. Otto Stern
- c. Walter Gerlach

## Round 2 Geography

### Geography

1. What is the capital of Lithuania?
2. Name all the American states beginning with the letter 'A'
3. Name 8 countries ending with the word 'land'
4. To which country does the island of Madeira belong?
5. Name 6 countries with a 4-letter name.
6. What is the name of the vessel that sank after becoming trapped in pack ice on Shackelton's ill-fated Antarctic expedition of 1914-16?
7. Name the longest river in Australia.
8. Of which country is Ulaan-Baatar the capital?
9. Which Irish County was Antarctic explorer Tom Crean from?
10. What are the four colours in Tanzania's flag below (in order left to right - the two narrow bands are the same colour)?



### Round 3 – Physics general

1. Name a Nobel Prize winning Physicist who fell from favour with the Physics community primarily for his vilification of Jewish scientists and his revisionist programme of “Nazification of Scientific History” in Pre-war Germany
2. The Australian singer and actress Olivia Newton John, star of such classic movies as “Grease” and “Xanadu”, is the granddaughter of a well-known Nobel Prize winning Physicist. Name Him/Her.
3. What is the densest natural element?
4. Lines of equal temperature are called isotherms but what does isopycnic mean?
5. What is the name given to the angle of incidence at which light with a particular polarization is perfectly transmitted through a surface, with no reflection?
6. If two filled beer cans one frozen one liquid roll down a short smooth slope which one gets to the bottom first?
7. Of what element (instead of the usual carbon) has a new type of buckyball been predicted and described by researchers at Rice University.
8. The SI base unit  $\text{kg s}^{-2} \text{A}^{-1}$  is a measure of what quantity and what is the common name used for this?
9. What is the hottest temperature in Celsius (answer to within 2 degrees) ever recorded on the planet? (and which country for bonus point)
10. If 10cm of snow melts in a glass to the nearest cm how much water would it produce – to the nearest cm?

## Round 5 Physics Multichoice

1. When the Earth is between the Sun and a planet the Earth is said to be in:

- a. Opposition
- b. Lineation
- c. Quadrature
- d. Conjunction
- e. Elongation

2. Mars orbits the Sun in

- a. 397 earth days
- b. 687 earth days
- c. 780 earth days
- d. 886 earth days
- e. 954 earth days

3. When a second fainter rainbow with colours reversed can be seen what is the dark band between the two rainbows called?

- a. Optical band
- b. Internal band
- c. Supernumery band
- d. Gauss's band
- e. Alexander's band

4. Galileo fell foul of the Vatican because of the content of his book "Dialogue on the Great World Systems, Ptolemaic and Copernican". Which Pope placed him under house arrest for the last 9 years of his life?

- a. Gregory XV
- b. Innocent X
- c. Alexander VII
- d. Clement IX
- e. Urban VIII

5. What piece of space kit did Japanese astronaut Koichi Wakata test during a stint on the international Space Station in April 2009?

- a. Freeze dried wasabi
- b. zero gravity Wii fit games
- c. Dilithium crystals
- d. Antibacterial underwear
- e. Low foam shaving cream

6. What is element 112's official new name?

- a. galileonium
- b. Euclidium
- c. copernicium
- d. newtonium
- e. leibnitzium

7. What is the difference between the equatorial circumference and the polar circumference of the earth?

- a. 55km
- b. 68km
- c. 76km
- d. 85km
- e. 98km

8. How long did the LHC operate before it was shut down after an electrical fault led to a magnet quench?

- a. nine seconds
- b. nine minutes
- c. nine hours
- d. nine days
- e. nine weeks

9. Which of these did *not* turn 50 in 2008?

- a. Dounreay nuclear power station
- b. L F Vereshchagin Institute for High Pressure Physics, Troitsk, Russia
- c. NASA
- d. Physical Review Letters
- e. The atomium monument in Brussels

10. Who said 'Beware of geeks bearing formulas'?

- a. Freeman Dyson Theoretical physicist at Institute for Advanced Study in Princeton
- b. Bill Foster physicist and US congressman
- c. Warren Buffett, US investment guru
- d. Douglas Osheroff, low temperature physicist and Nobel laureate
- e. Arthur C Clarke science fiction author

## Round 6 – Literature/Arts and Entertainment

1. In which recently released film is a theoretical physicist the protagonist, who, during the film, is giving a lecture with the blackboard covered in maths on Shrodinger's Cat?
2. In the film Avatar what is the name of the mineral, found on the moon Pandora, which humans mine to save the earth?
3. What year was Ulysses published in?
4. 'A classic is something that everybody wants to have read and nobody wants to read?' Who said this? (Oscar Wilde, Mark Twain, Winston Churchill)
5. 'If you like to gamble, I tell you I'm your man'. What song is this the opening line from?
6. Who painted the Birth of Venus (c1485)?
7. What novel begins with the line, 'As Gregor Samsa awoke one morning from uneasy dreams he found himself transformed in his bed into a gigantic insect'?
8. Who directed the 2009 film the Hurt Locker (nominated for oscar best director 2009)?
9. Who composed the opera Aida?
10. The original TV series, Star Trek ran for 3 seasons in the late 1960s. It spawned 4 further TV series, the penultimate of which ran from 1995–2001. What was its name?

## Round 7 – Physics general

1. For how many days a year (answer to within 3 days) is there no sun at the South Pole?
2. What happened when University of Arkansas nanotechnologist Maria Khodakovskaya exposed her tomato seedlings to carbon nanotubes?
3. Who is the current Lucasian Chair of Mathematics in Cambridge?
4. A zepto is 10 to which power?
5. Name the 5 regular platonic solids – (hint a cube is one).
6. Who is the current president of the Institute of Physics?
7. If you hold up a grain of sand at arms length the patch of sky it covers contains how many galaxies? 100 or 1000 or 10,000?
8. What is the name given to the effect of the changing frequencies of light (scattering) which helps to analyse the internal composition of molecules?
9. What is the first transuranic element called?
10. What does PET stand for in a PET scanner in a hospital?

## Round 9 – Politics

1. What does the scientific body the IPCC stand for?
2. Who is the president of the EU council?
3. What is the word for 'Government by the wealthy'?
4. Which TD, who was a former RTE journalist, recently resigned from the Dáil as his contributions were not being recognized sufficiently by Fine Gael?
5. What is the name of the delaying tactic that can be used in the US senate when there is a less than 60% majority by the dominant party?
6. Who is the Minister for Education in the Northern Ireland Assembly?
7. How many countries are there in the United Nations?
8. Who was George W Bush's Vice President?
9. Which Roman philosopher elected Consul for the year 63 BC was a famous statesman, lawyer, political theorist and Roman constitutionalist? Hint: He is the main character in the historical novel 'Imperium' by Robert Harris.
10. What year and month did the Berlin Wall come down?

## Round 10 – Miscellaneous

1. Who are the co-founders of google?
2. Whose ashes were launched into space for their final 'star trek' in 1997.
3. Joseph Gordon-Levitt starred in the 2009 hit film, (500) Days of Summer as Tom Hansen. This was not his first time to play a Tommy. In what science fiction TV series did he play the role of the information officer?
4. What is the hexadecimal number 7E in decimal?
5. How many degrees did the following 4 members of the Boole family have between them (*not including honorary degrees*)? The Boole daughters were all born in Cork and George Boole was the first professor of mathematics in Queens College (now UCC).  
George Boole – algebra of logic/Boolean system; Daughter Alicia Boole Stott mathematician – one of first people to explore four dimensional polytopes; Daughter Lucy Boole – first woman professor of Chemistry in Britain; Daughter – Ethel Boole novelist & music composer.
6. Which economist said that 'science is the great antidote to the poison of enthusiasm and superstition.'
7. The **Borg** are a fictional pseudo-race of cybernetic organisms depicted in the *Star Trek* universe. They seek to acquire universal domination by integrating being and cultures into their collective. Jean Luc Picard, captain of the Enterprise, is assimilated by the Borg and becomes known as?
8. Which footballer has won the Champions League with 3 different Clubs
9. Who was the most recent man to win the Wimbledon Championship prior to Roger Federer or Rafael Nadal.
10. Who is the Irish female Lightweight double World Champion in boxing?

## Head to Head 1

1. Who came up with the term 'the butterfly effect' as a way of describing some aspects of chaos theory?
2. Big Bang Theory features physicists, Leonard and Sheldon. In which American university are they employed?
3. What technical innovation did Linus Yale come up with in 1848?
4. Who won the F1 Driver's Championship last year?
5. Two trains are heading directly towards each other. One is moving at 70kmph and the other at 50kmph. How far apart will they be one minute before they meet?
6. In which film is the quote: 'this is an occasion for genuinely tiny knickers'?
7. For what theory did John Bardeen (University of Illinois) win the Nobel prize in 1972.
8. In which year did the first ever spacecraft (Nasa's 'Stardust') return to Earth with a sample from a comet? 2001, 2006 or 2008
9. Who published in 1906 the third law of thermodynamics to describe what happens to atoms at around absolute zero?
10. What often touched rugby player received an honorary doctorate of science from Limerick University in June 2004?

## Head to Head 2

1. What is the name of the space probe that landed on the surface of Titan in 2005?
2. Who first coined the term Big Bang?
3. What does the acronym ITER stand for in the international tokamak (magnetic confinement fusion) research/engineering project?
4. In which county was the famous John Desmond Bernal (1901) born? He was famous for his work on x-ray crystallography and was universally recognised as "Sage" for his knowledge and wisdom.
5. What country was formerly called Persia?
6. Alpha Orionis is the name of which star?
7. Where is the Russian "Grunt" mission headed in 2011, which might provide more information about a possible stopover for astronauts heading to Mars?
8. In which part of France would a Riesling wine come from?
9. Name the Irish born physicist who worked at CERN and developed a series of equations known as 'X's inequalities'. Clue (He was born in Belfast).
10. What was the name for the property of quantum mechanics in which a key can be sent during the encryption process? The method for this was developed by Polish physicist Artur Ekert in 1991.