

## 2012 IOP Physics Quiz Round 1: **Who or What am I?**

1. I lost the tip of my nose in a duel before building a research institute on the island of Hven, where I formally began my life of precise astronomical measurements. In 1600, I moved to Prague, where my assistant Johannes Kepler used my data to derive the three laws of planetary motion.
2. Thomas Edison pioneered DC electrical transmission for General Electric, but I pioneered the more reliable AC for Westinghouse. We were jointly nominated for the 1915 Nobel Prize in Physics, but I refused to share anything with Edison.
3. Who did Judy Dench portray in her Oscar winning performance in *Shakespeare in Love*?
4. Who did Daniel Day Lewis portray in his Oscar winning performance in *My Left Foot*?
5. Who are the BBC's Barry, Daphne, Chris, JC, Judith, Kevin, and Pat collectively better known as?
6. What were the names of Christopher Columbus's three ships that sailed from Palos, Spain (near Seville) to the new world, reaching San Salvador on October 12, 1492?
7. In 1620, Francis Bacon wrote "three things that changed the whole face and state of things throughout the world were the compass" and two other things. Name either.
8. What is the English translation of "Eppur si muove," reputed to have been uttered by Galileo in 1633 after being forced by the Inquisition to recant his Copernican beliefs?
9. Name any one of the three physicists who won the 1956 Nobel Prize "for their researches on semiconductors and their discovery of the transistor effect."
10. For what did Dennis Gabor win the Nobel Prize for Physics in 1971?

## 2012 IOP Physics Quiz Round 2: **A few physics (with a couple math) calculations**

$$c = 3 \times 10^8 \text{ m/s}, g = 10 \text{ m/s}^2, \text{ and } \pi = 3$$

1. What is the height of the Pantheon dome in meters if its Foucault pendulum has a period of 18 s (actually 16.5 s) (within 2 m)? (Assume  $g = 10 \text{ m/s}^2$  and  $\pi = 3$ )?

2. How do I get two ohms of resistance using three 3-ohm resistors?

3. How many times more energetic is light from a Hydrogen Balmer  $\beta$  transition compared to a Hydrogen Balmer  $\alpha$  transition (answer in lowest whole number reduced fraction)?

4. How long does a speed-of-light message take to travel half way around Jupiter along the equator (Take Jupiter's diameter as 140,000 km and assume  $\pi = 3$ )?

5. (IOP DARTish Q). If the sun was the size of a tennis ball at St. Stephen's Green, Dublin, where would the nearest star be? A) The Spire, Dublin, B) Buckingham Palace, London, C) The Olympic Stadium, Kiev, Ukraine, D) The Moon.

[Sun  $r = 7.0 \times 10^5 \text{ km}$ , tennis ball  $r = 4 \times 10^{-5} \text{ km}$  (4 cm), nearest star  $d = 4 \times 10^{13} \text{ km}$  (Proxima Centauri)]

6. (IOP DARTish Q). How many moons fit into the earth? A) 4, B) 40, C) 400, D) 4,000.

[Earth  $r = 6,400 \text{ km}$ , moon  $r = 1,700 \text{ km}$ , assume 75% packing ratio]

7. Which consumes more: a 3 kW kettle for 3 minutes or a 100-W light bulb for 90 minutes?

8. What is Ireland's commitment under the Kyoto protocol to limit greenhouse gas emissions (compared to 1990 levels in the first legally binding commitment period of 2008-2012)?

a) 13% increase b) 13% decrease c) 5% increase d) 5% decrease

9. How many prime numbers are there less than 50 (1 is not prime)?

10. What are the odds of having three letters picked out of a hat in any order, e.g., jkw (*i.e.*, a 26-ball, pick-3 lottery without replacement)?

## 2012 IOP Physics Quiz Round 3: **General Knowledge**

1. On which island did Napoleon die after his final exile?
2. On which island was Nelson Mandela kept for 18 of his 27 years in prison?
3. Who was Gavrilo Princip?
4. Of what is aetiology the study?
5. Which physical chemist whose PhD thesis was on quantum chemistry is the head of an EU state?
6. Who is the president of Afghanistan?
7. Free Rice Level 42 definition: What does **physic** mean A) purgative, B) farmer, C) Gregorian chant, D) sliver?
8. Free Rice Level 42 definition: What does **cyclopean** mean A) dangerous, B) wicked, C) stale, D) huge?
9. In which county is Skellig Michael?
10. Where in the body is the corpus callosum?

## 2012 IOP Physics Quiz Round 4: **Economics or where did it all go wrong?**

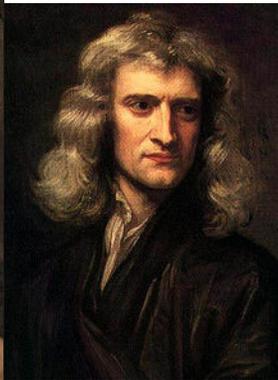
1. Who wrote the landmark 1776 book on economics [*An Inquiry into the Nature and Causes of The Wealth of Nations*]?
2. After whom was the European Recovery Program of 1948-1952 named, which gave monetary support to help rebuild Europe and to halt Soviet expansion after World War II?
3. Who is the University of Chicago economics professor who championed Ronald Reagan's supply-side economics. He won the Nobel Prize in 1976 "for his achievements in the fields of consumption analysis, monetary history and theory and for his demonstration of the complexity of stabilization policy."
4. Who was the former Ronald-Reagan appointed chairman of the Federal Reserve, famous for his Ayn Rand inspired views? He coined the phrase "irrational exuberance" about the creation of stock market bubbles.
5. In which country did the so-called Lost Decade occur between 1990 and 2000, after the economic bubble of the previous five years collapsed?
6. Who famously claimed he didn't have a personal bank account when interviewed by the 2008 Mahon tribunal?
7. Who is the current Irish Minister for Finance?
8. What is the family name of the ousted former Greek prime minister and Socialist party leader, who was son and grandson of former Greek prime ministers?
9. Who replaced Dominic Strauss-Kahn as head of the IMF after he got caught with his pants down?
10. Name either of the two EU countries stated that they wouldn't sign the January 30 treaty designed to stop overspending in the eurozone, known as the "fiscal compact."

## 2012 IOP Physics Quiz Round 5: Picture Physics

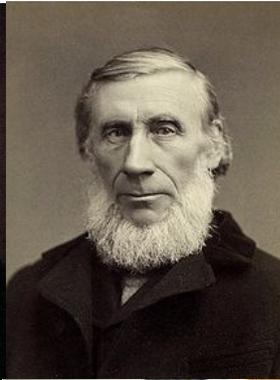
1



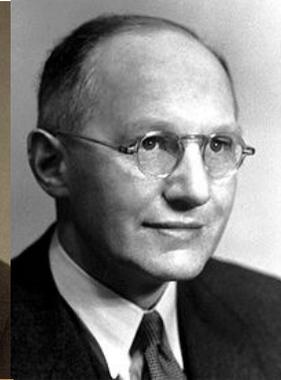
2



3



4



5



7

$$\oint \frac{\delta Q}{T} \leq 0$$

8

$$K_{\max} = h\nu - \phi_0$$

9

$$S = k \cdot \log(W)$$

10

$$\rho \left( \frac{\partial \mathbf{v}}{\partial t} + \mathbf{v} \cdot \nabla \mathbf{v} \right) = -\nabla p + \nabla \cdot \mathbf{T} + \mathbf{f},$$

## 2012 IOP Physics Quiz Round 7: **History, Arts, and Literature**

1. In what century did Muhammad die, marking the beginning of the Islamic calendar?
2. Who wrote *Tales of the Jazz Age*, *The Beautiful and Damned*, and *The Great Gatsby*?
3. In which city does Picasso's *Guernica* currently reside?
4. In which city is James Joyce buried after dying there in 1941?
5. About what 1957 thing did Daniel J. Boorstin say "Never before had so small and harmless an object created such consternation."
6. This artist's works include *Freedom, Fair Day (County Mayo)*, *In the Tram*, and *The Liffey Swim*?
7. Who won the 2011 Man Booker Prize for *The Sense of an Ending*?
8. What was the name of the Egyptian president, who ceded power in February, 2011 as a result of the Arab Spring uprisings?
9. Which poet president of Czechoslovakia died on December 18, 2011?
10. Which singer won the 2012 Grammy for Record of the Year?

## 2012 IOP Physics Quiz Round 8: **Physics**

1. In what order were Boltzmann, Galileo, Kepler, and Newton born?
2. What electrical unit shares its name with Eliza Doolittle's benefactor?
3. This element is the lowest atomic number without any stable isotopes since every form is radioactive. Named from the Greek for "artificial" and confirmed in a 1936 experiment in Italy by Carlo Perrier and Emilio Segrè what is this element called?
4. Bestowed by the International Union of Pure and Applied Chemistry on February 19, 2010, the 537 anniversary of his birth, element 112 was named after which early scientist?
5. The three main research areas of the Manhattan Project were located in Oak Ridge, Tennessee, Hanford, Washington, and which other New Mexico location?
6. How many people have walked on the moon?
7. What is the value of Planck's constant (include units, spot prize for most correct digits)?
8. At which university do Drs Sheldon Cooper, Leonard Hofstadter, Raj Koothrappali, and Mr. Howard Wolowitz work?
9. In honour of whom was the August 2003 Space Infrared Telescope Facility (SIRTF) renamed? He was the first to propose placing telescopes in space.
10. For what did Saul Perlmutter, Brian Schmidt, and Adam Riess win the 2011 Nobel Prize in physics

## 2012 IOP Physics Quiz: **Spot Prizes**

- 1.\* In which year was the first laser patented?
- 2.\* In which year was the first hand-held mobile phone call using microwave technology?
- 3.\* In which year was the World Wide Web launched by CERN?
- 4.\* In which year is Dublin the European City of Science?
5. Which town did President Obama and his wife visit in Ireland in May 2011, home of his eighth cousin Henry Healy?
6. In which Irish city would you find King John's Castle built in 1200?
7. Name the Ivy League Colleges?
8. How many members are there in the U.S. House of Representatives?
9. Which is greater? a) The number of league championships won by Manchester United in the last 50 years + the number of Noble gases – the number of states in the EU with the euro currency or b) The number of league championships won by Liverpool in the last 50 years + the number of Actinide elements minus the number of thousand feet above sea level to the top of Mount Everest?
10. If one doubles the velocity in a centrifuge, how does the centripetal acceleration change?

## 2012 IOP Physics Quiz: **Final Round**

1. Minamata disease results from what elemental poisoning?
2. What is the currency of Poland?
3. Why are Little boy and Fat man famous?
4. Built for its 1958 World's Fair, in which city would you find a 100-metre-high structure with nine connected steel spheres called Atomium?
5. How long is the LHC ring?
6. What is the distance in earth radii to the moon?
7. How was the Belfast born mathematical physicist William Thompson otherwise known?
8. How many ohms is a yellow orange brown banded resistor?
9. What was the first man-made object to leave the solar system?
10. To the nearest 10 million, what is the average mean distance in km from the earth to the sun (i.e., 1 a.u.)?

### **tie-breaker**

1. In what year did Marconi send the first transatlantic wireless transmission from England to Canada?