

2007 LSU-PHYSICS IQ TEST

More than one answer might be correct, or none . . . Circle the correct answer(s).

Name:

- (1) Many of the physics faculty have lunch together at the LSU Union, and a notable feature is always Prof. J. Frank searching for a bottle of Tabasco Sauce to pour onto his Cajun food. On Mon. 20 August at 12:10 PM, Juhan brought back a found bottle of Tabasco Sauce to the table, and Martha Schaefer immediately noticed that there was a carefully taped label on the bottle stating "For J. Frank, Enjoy". Prof J. Frank was flabbergasted, and it was soon found that all the Tabasco Sauce bottles in the Union had identical neat labels added. Who was the culprit in the great Physics Tabasco Fiasco?
- A. Martha Schaefer
 - B. Juhan Frank
 - C. Joel Tohline
 - D. 'Kip' Matthews
 - E. Arlo Landolt
- (2) How long must be the string on a simple pendulum on the ground floor of Nicholson so that its period of oscillation is one second?
- A. $1/(27)^2$ meters
 - B. 0.25 meters
 - C. 1 meter
 - D. 4 meters
 - E. 472 meters
- (3) Our physics department is quite cosmopolitan, because we are always seeking out the best people that we can, wherever in the world they come from. How many countries-of-origins are represented now in our department for the staff/profs/postdocs/grads/undergrads and total? And no, this does not count Jonathan O'Dowling's Irish passport.
- A. 2 /21 /11 /7 /3 (for a total of 29 countries)
 - B. 3 /13 /10 /13 /1 (for a total of 29 countries)
 - C. 1 /7 /17 /18 /5 (for a total of 29 countries)
 - D. 5 /9 /11 /6 /1 (for a total of 29 countries)
 - E. 1 /24 /6 /21 /2 (for a total of 29 countries)

- (4) I place a daily 'Far Side' cartoon outside my office door (243 Nicholson), with Americans finding these cartoons hilarious. But I find that most non-Americans don't get the jokes, because each nation has its own different shared traditions and cultural connections. So I have gotten five short jokes contributed to this IQ test by Juhan Frank, Luke Smith, Mette Garde, Sarvnipun Chawla, and Weiwei Mou. Each joke is typical for the joker's country of origin. For this question, match up the joker with the joke.
- Two men were sitting on a bench in a park. One of them was drunk, and the other was also Swedish!
 - ISRO rockets never fail. You first tilt them to the right, then tilt them to the left, then fire them, just like a Bajaj.
 - The Monk said to the Monkey King that the meat of the second disciple (the Pig) is much more expensive than that of the Master.
 - What do Superman and a humble Argentine have in common? They both are imaginary.
 - There are only two things that you don't really want to know how they are made: laws and sausages.
- (5) Given $s=t^u$, find the partial derivative $(\partial s / \partial u)|_t$? [This is from the Placement Exam for incoming students.]
- $s * \ln(s) / u$
 - u
 - $\ln(t) * t^u$
 - $t^{u-1} / (u-1)$
 - t^u
- (6) You roll a filled coke can, an empty coke can, and a round pen down an inclined plane. Which object(s) reach the bottom first?
- They all take the same time to reach the bottom. [Galileo used the inclined plane as a way to slow 'falling', and everything falling accelerates equally under gravity.]
 - The filled coke can reaches bottom first. [Its greater mass overcomes air resistance.]
 - The empty coke can reaches bottom first. [No loss of energy to sloshing liquid in an empty can.]
 - The round pen reaches bottom first. [It has the smallest moment of inertia.]
 - The filled coke can and the round pen are tied for reaching the bottom first. [Both are filled cylinders with identical specific moments of inertia.]
- (7) With the recent prominence of the excellent Harry Potter books, attention is turned to reading for fun, and to academia. It is always very human to draw parallels, for example with LSU as Hogwarts and the P&A Department as Gryffindor. Out of the following list of a dozen people, who best fits each of the five Harry Potter characters listed below? There are no *a priori* correct answers, so I will take these tests sheets as a vote and use the results to score this question. So select one of the dozen people for each of the characters as you think the majority will vote. The dozen people are Amy Campbell, Dubravka Rupnik, Gabriela González, Greg Guzik, Jarrod Marsh, Jeff Kissel, Jen Andrews, Jim Matthews, Juhan Frank, Luke Smith, Mike Cherry, and Sarvnipun Chawla.
- Albus Dumbledore = _____
 - Hermione Granger = _____
 - Ron Weasley = _____
 - Sybill Trelawney = _____
 - Rubeus Hagrid = _____

- (8)** You run a red light, a policeman tickets you, and you contest the ticket in traffic court before a presiding judge. Which argument(s) would be effective at getting you out of a ticket?
- A. Your honor, I was driving fast, so the Doppler blueshifting of the red light made it appear green to me.
 - B. Your honor, the light was really green, but a passing miniature black hole beside the traffic light made the green light gravitationally redshifted to red so the policeman was in error.
 - C. Your honor, the light might have been red, but a passing miniature black hole just behind my head made the red light blueshift to appear green to me.
 - D. Your honor, the policeman was speeding fast such that in his rest frame I was in the intersection on a red light, but in my rest frame I was in the intersection during a green light, so I am innocent.
 - E. Your honor, I have here a very nicely made barometer, and I'll give it to you if you let me off.
- (9)** Homeland Security has become a national priority as well as a good source of funding. Which of the possible projects in our Department have a good chance of getting funded?
- A. Hwang Lee will propose to NSA to use his quantum computing to solve encrypted codes even with keys up to 1024 digits long.
 - B. Jonathan Dowling will propose to install the correct GR equations so as to improve the accuracy of the military's GPS system.
 - C. 'Kip' Matthews will propose a new radiation imaging sensor array for airport scanners that will detect the next wave of Al-Qaeda bomb attempts; the underwear bomb. (Think of the damage to American aviation and the long passenger delays that resulted from just one bomber hiding it in his shoes, so the next bomber hiding the bomb in his underwear will result in a complete breakdown of the system, and this must be avoided at all costs.)
 - D. Mike Cherry will propose to use his x/ γ -ray astronomy detector in harbors to remotely inspect ships for smuggled nuclear bombs or dirty-bomb materials.
 - E. Ed Seidel will propose to use SuperMike to correlate all Internet pages for signs of future attacks.
- (10)** In the last two years of the LSU-Physics IQ Test, who have consistently come in first place, second place, and third place (or at least in ties for those places)?
- A. Phil Adams, Beverly Rodriguez, and Gary Case in order
 - B. Gabriela González, Ravi Kopparapu, and Yvonne Thomas in order
 - C. Dana Browne, Jim Giammanco, and John DiTusa in order
 - D. Arlo Landolt, Roger McNeil, and Mette Gaarde in order
 - E. Ravi Rau, Luke Smith, and Juhan Frank in order