

LSU-PHYSICS IQ TEST (2010)

Name: _____

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

(1) Participate in one of the Block Party activities. Get one appropriate signature to prove your participation:

Ping Pong Tournament Director: _____
Mad Scientist Competition Host: _____
Guitar Hero Coordinator: _____
Member of your 'Rock Band': _____

(2) Apollo 14 astronaut Alan Shepard used a 6-iron to hit a golf ball 300 yards on the Moon. The Moon's gravity is one-sixth that on the Earth's surface (i.e., $g/6$). For an identical golf swing here on Earth (ignoring air resistance), how far would the ball have traveled?

- A. 730 yards B. 300 yards C. 120 yards
D. 50 yards E. 20 yards

(3) Our department has a number of married couples where both are officially in this department. First, in the array of first names below, draw lines connecting the first letters of all 5 pairs. Second, identify the symbol drawn with all your line segments. Third, give me the atomic number (i.e., Z) for the element associated with this symbol: _____

Ravi	Jeff	Rachel	Jo
Kristina	Maria	Martha	Shemeka
Zach	Oleg	Abby	Rob
Christopher	Wanshu	Caroline	Neel
Joe	Qianxi	Alison	Kalani
Amar	Arnell	Azadeh	Gabriela
Limin	Xiaojie	Jake	Ashley
Ashkan	Mitsuko	Jorge	Dana
Sarah	Sam	Josh	Chen
Becky	Alex	Sean	Chris
Dominique	Dubravka	Brad	Jerry
Juana	Jen	Mette	Ken

(4) The *Big Bang Theory* is a wickedly funny television show that is a physics sitcom that strikes too close to home. For this question, your task is to select one person from our Department to best match each of the six *Big Bang Theory* characters listed below. You must choose from: Jorge **PULLIN**, Gabriela **GONZALEZ**, Anamaria **EFFLER**, Zach **BYERLY**, Kundan **KADAM**, Alex(andra) **SEDEVIE**, Kristina **GIESEL**, Sean **BALDRIDGE**, Ravi **RAU**, Randy **GOULD**, Amar **KARKI**, and Beverly **RODRIGUEZ**. You might match these pairs of people as based on interests, personality, physical looks, or whatever. I will tabulate all answers to this question, and the Department person voted to be the best match to the character's traits will become the 'right' answer. So put down the persons who you think that the most other people will put down.

- A. Sheldon (Supersmart, supergeek, OCD, theorist, pro-String Theory) _____
B. Leonard (Nice, geek, experimentalist, wears glasses) _____
C. Penny (Nice, ~normal, waitress, aspiring actress) _____
D. Rajesh (Particle astrophysicist, tongue-tied around women) _____
E. Howard (Aerospace engineer, "ladies man", "Mama's boy") _____
F. Leslie (Smarter than Sheldon, experimentalist, Loop Quantum Gravity) _____

(5) The star ν And is visible to the unaided eye tonight and it is very similar to our Sun. This ordinary star now has three discovered planets in orbit. The outermost has an orbital period of about 4 years. What is its distance from its star (in units of AU, the average Earth-Sun distance)? Estimate its surface temperature?

- A. 2.5 AU, 160°K B. 4 AU, 130°K C. 8 AU, 90°K
D. 8 AU, 160°K E. 8 AU, 260°K

(6) Recent Ph.D. defenses have produced many new doctors among us. Match up the five people (lettered A-E) with their thesis title (in random order, numbered 1-5) and place the corresponding number in the blank after each name:

- | | | |
|-----------------|-------|--|
| A. Limin Xiao | _____ | 1. Calibrating and Improving the Sensitivity of the LIGO Detectors |
| B. Jeff Kissel | _____ | 2. New Strategies for Phase Estimation in Quantum Optics |
| C. Jay Call | _____ | 3. Gamma Ray Burst Redshift Catalog and Applications |
| D. Jake Slutsky | _____ | 4. Generalized Curvilinear Advection Formalism for Finite Volume Codes Doing Relativistic Hydrodynamics |
| E. Yang Gao | _____ | 5. Quantifying the Impact of Data Quality on Searches for Gravitational Waves from Binary Coalescing Systems with LIGO |

(7) Vincent Van Gogh painted “Starry Night Over the Rhone” in 1888. Based on measurements from the painting, calculate the latitude of the site. Some helpful information is that the star Dubhe and Merak (the two end stars of the bowl of the Dipper, placed vertically in this painting) are the Pointer stars that point up to Polaris. Dubhe (the upper star of the Pointers) is 28° from Polaris, is 5° from Merak, and is about 25° from the tip of the handle of the Dipper.



- | | | |
|----------------------------|----------------------------|----------------------------|
| A. $\sim 50^\circ\text{N}$ | B. $\sim 45^\circ\text{N}$ | C. $\sim 40^\circ\text{N}$ |
| D. $\sim 35^\circ\text{N}$ | E. $\sim 30^\circ\text{N}$ | |

(8) Like most state universities, LSU is suffering from budget cutbacks as part of the usual business cycles. Perhaps our department can use some of our special expertise to provide substantial additional funding. Which of the following methods would actually likely work in practice?

- A. Prof. R. Hynes could astound the gullible world by putting forth the new science discipline of “X-ray Astrology”. Calculate your horoscope with Sco-X-1 ascendant, calculate your biorhythm according to the Crab pulsar, ... This new fad would sell a zillion books, with profits to the Department.
- B. Prof. H. Lee could finish his quantum computer that would smash all modern cryptography based on multiplying two primes. With this, he could initiate illicit bank transfers to our Department from BP accounts.
- C. Prof. R. Jin could use her technical expertise to work through the security precautions for the vault of the Campus Federal Credit Union on campus. With this, we then fund the department with gold bullion.
- D. Prof. J. Blackmon could advertise to serve as a consultant on ‘nuclear physics’. For just one contract with North Korea, he’ll provide enough to the department as indirect return to fund our entire program.
- E. Prof. P. Sprunger could use CAMD for the transmutation of elements. He has worked out that lead can be turned to radium and gold, which has so far only been done in microscopic quantities. If we can get the state to pay for the electricity bill, then economies of scale will allow for the direct and legal manufacture of gold bullion.

(9) Find any one of the new graduate students or new professors and get them to sign their name or put an ‘X’; and introduce yourself:

Sign or signature or chop or any pithy comment: _____

(10) Most everybody in the world works for someone else, and these ‘bosses’ work for someone else, and so on. Let us take the case of a TA here, and to take a specific example, let us use my graduate student Andrew Collazzi. What is his line of authority on the organizational chart all the way to the top? [No, I am not thinking of the old movie “Kind Hearts and Coronets”.]

- A. Collazzi→Professor Chastain→Professor Browne→Dean Carman→Provost Hamilton→Chancellor Martin→President Lombardi→Commissioner Clausen→Governor Jindal
- B. Collazzi→Chastain→Browne→Constant→Office of Research→Hamilton→Martin→Lombardi→Jindal
- C. Collazzi→Schaefer→Cherry→Carman→Hamilton→Martin→Lombardi→Board of Regents→Legislature
- D. Collazzi→Schaefer→Cherry→Carman→Hamilton→Martin→Lombardi→Board of Supervisors →Board of Regents→Jindal
- E. Collazzi→Chastain→Browne→Cherry→Carman→Hamilton→Martin→Lombardi→Board of Supervisors →Board of Regents→Jindal