

2008 LSU-PHYSICS IQ TEST ANSWERS

- (1) Faculty web pages:
A - Jonathan Dowling
B - Gabriela Gonzalez
C - Geoff Clayton
D - Joel Tohline
E - Brad Schaefer
- (2) Slinky, drop, what happens immediately to the bottom?
B - Bottom of slinky remains steady for a brief time (Just before it is dropped, the force diagram for the bottom end of the slinky has balanced forces down from gravity and up from the spring. Just after the top is dropped, the forces on the bottom are the same, as the spring is still extended and exerting the same force upwards and gravity is still pulling down, so the forces are still balanced. With balanced forces, the bottom will not move. Or at least until the falling upper parts catch up. And for the non-theorists, this is exactly what I observe. Note, a very stiff spring will have the bottom start falling immediately.)
- (3) Movie plots made into major Hollywood pictures:
A - Armageddon (bad plot and acting, but a major Hollywood movie)
B - No (I made this up)
C - No (The plot is from the great book The Black Cloud by Sir Fred Hoyle, but this has not been made into a movie)
D - The Core (so bad a movie that it made Dean Byerly angry. Nevertheless, a major Hollywood movie.)
E - No (The Krone Effect, a small-budget independent movie shown at a Department 'party', but not a major Hollywood movie)
- (4) How many professor in our Department (including adjuncts) have their legal last name pronounced "Shay-fer"?
D - 4
- (5) Formula for velocity as a function of time in dissipative medium:
A - No (velocity increases with time)
B - No (units in exponent are not dimensionless)
C - No (velocity goes negative as time increases)
D - Yes
E - (velocity is zero at the start, in violation of the given)
- (6) Why is the sky blue?
A - Yes (Mie scattering off of aerosols is about half the reason that the sky is blue. This fraction will change with the haziness of the air, but in general, it is the Mie scattering that dominates for many locations.)
B - Yes (Rayleigh scattering is the traditional answer that is partially correct.)

(7) Olympic Gold Medals:

A - 100-m dasy - Joey Chatelain

B - All-round Gymnastics - Ashley Pagnotta

C - Ping Pong - Hwang Lee (appropriately, as he won the ping pong tournament! His partner was Ray Chastain).

D - Bicycle Road Race - Christoph Wildfeuer

E - Synchronized diving - Rachel and Rob Collyer

(8) What color is the Sun?

B - White. A correct proof is indeed that a sheet of white paper held out in direct sunlight appears white. After all, a piece of white paper looked at in a dark closet while being illuminated by a red flashlight will appear red. For the technically minded, I have taken the correct solar spectrum, corrected for typical atmospheric extinction, multiplied the spectrum by the sensitivity functions for the various pigments in the eye, integrated the result to get the perceived brightness for each pigment, plotted the results into the CIE color definitions, and found that the Sun is *exactly* WHITE. For the even more technically minded, the λ_{\max} might be in the green, but this is not relevant because our eyes are photon sensors, so ν_{\max} is more relevant. But even this is not really relevant, as what matters is really how the detected photons are perceived as color, and this goes as the CIE definition.

(9) Roswell Incident:

C - Yes - The balloon was launched from nearby, the debris does look 'alien', and there is a long heritage, both before and after the Roswell incident, for balloon and rocket launches from SW New Mexico. Indeed, while our party was going on, an LSU group was in the middle of a balloon flight (the High Altitude Student Platform) launched from Fort Sumner NM, a few miles from Roswell.

E - Yes - The balloon debris was from Project Mogul, a top secret experiment (at the time) designed to detect any Soviet nuclear test.

(10) The LSU Practical String Theorists (aka. knitting group)

A - Ashley Pagnotta and Martha Schaefer

C - Jen Andrews and Shannon Fritz