

UIL SCIENCE TESTS

PHYSICS

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UIL Science Practice Packet author, Kenneth Davis, earned his B.S. from Texas A&M University and an M.S. in microbiology from The University of Texas Health Science Center. A science teacher for over 24 years, Davis is currently teaching Medical Microbiology at Austin Community College and Science at Harper High School. He has coached numerous UIL Science teams, winning District and Regional championships, as well as achieving success at the State level.

We are a small company that listens! If you have any questions or if there is an area that you would like fully explored, let us hear from you. We hope you enjoy this product and stay in contact with us throughout your academic journey.

~ President Hexco Inc., Linda Tarrant

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CONTENTS

- 1. 5 Sets of 100 Questions**
- 2. Answer Key**
- 3. Answer Sheet**

For official UIL Constitution and Contest Rules for Science,
please review the Section 952 document at:
<http://www.uiltexas.org/academics/science>

63. A flowerpot falls 28.0 m from a windowsill to the ground. If a passerby is standing directly under the pot how long does she have to move before the flowerpot hit the ground?
- 2.85 sec
 - 8.94 sec
 - 5.71 sec
 - .175 sec
 - 2.39 sec
64. Two football players are chasing you in an effort to tackle you. Football player A has a mass of 110 kg and football player B has a mass of 125 kg. Which of the following would be true as you change directions and run for your life in an effort to remain untackled in one piece?
- When velocities are the same, football player A has less momentum than B.
 - Football player B would have more difficulty changing directions than would A.
 - You don't have to worry about football player B because he is larger and is therefore, slower.
 - At the same velocities, football player A would travel faster than football player B.
 - At the same velocities, football player B would have more force to apply than football player A.
- I, II
 - I, II, III
 - I, II, IV
 - I, II, V
 - I, II, III, IV, V
65. The Sears Building in Chicago Illinois sways back and forth at a frequency of about 0.103 Hz. What is its period given this frequency?
- 9.71 s
 - .0103 s
 - 10.3 s
 - need temperature in Kelvin to calculate
 - need speed of sound in air to calculate
66. Your friend can bench press 125 kg here on Earth. What could he lift on the moon where acceleration due to gravity is 1.62 m/s^2 ?
- 125 kg mass is constant
 - $1.22 \times 10^3 \text{ N}$
 - 757 kg
 - 15.9 kg
 - $1.99 \times 10^3 \text{ N}$
67. I want to accelerate a 45.0 kg box of English books up a ramp at a rate of 5.60 m/s^2 . The ramp makes an angle of 30.0 degrees with the horizontal. The coefficient of sliding friction is .250. How much force will I have to apply in order to accomplish this task?
- 221 N
 - 95.6 N
 - 252 N
 - 568 N
 - 590 N
68. A simple pendulum has a length of 1.42 m and a period of 2.38 seconds. What is the acceleration due to gravity at this location according to this pendulum?
- 9.80 m/s^2
 - 9.90 m/s^2
 - 10.0 m/s^2
 - 9.70 m/s^2
 - 9.60 m/s^2
69. Which of the following are true when discussing power in physics?
- Power is a rate.
 - Power can be measured in joules.
 - 1 J/s equals 1 watt.
 - 1 kilowatt equals 1 horsepower.
 - Power equals mass times acceleration times distance/time.
- I, III, V
 - I, III, IV
 - I, II, III
 - II, III, V
 - III, IV, V

268. The Doppler Effect in science is named after the Austrian physicist Christian Johann Doppler who was doing work with sound in the early 1800's. We use the Doppler Effect in weather predictions as well as sound studies. Which statement about the Doppler Effect is **NOT** true?
- The frequency of the sound generated by the source is unchanged throughout.
 - The higher the listener perceives the sound to be in relation to the actual frequency, the closer the sound generating source.
 - The lower the sound frequency perceived by a listener compared to the actual frequency, the farther the sound generating source from the listener.
 - The actual frequency generated by the source object changes as it gets closer or farther away.
 - Doppler Effect can be used to determine whether the Universe is expanding or contracting.
269. My instructor tells me that an object can be accelerating and moving at a constant speed at the same time. What do you think?
- No, it could never happen.
 - Yes, but it could happen only under zero gravity conditions.
 - Yes, if the object is traveling along a curved trajectory, it could occur.
 - Yes, it could happen, but only if the mass changes along the way.
 - In order to solve this, one would need more information than is provided here.
270. You dropped a penny into a water well and timed how long it took from the moment you released it to the second it hit the water. The average time was 5.85 seconds. How far down from the surface is the water?
- 57.3 m
 - 562 m
 - 115 m
 - 28.7 m
 - 8.38 m
271. You want to ask a girl in your physics class to the movies, but you don't know how to start up a conversation with her. Your genius (nerd) friend gives you the perfect opening line when trying to address a physics aficionado. "There is a gravitational attraction between you (55 kg), her, and me (85 kg) when you are sitting next to me her on Earth ($9.81 \text{ m/s}^2 = g$) in physics class (2.55 m away)." Amazingly, the young lady says she would love to go out with you but only if you can calculate the gravitational force between the two of you given the data above. What's your answer?
- $1.83 \times 10^3 \text{ N}$
 - $1.22 \times 10^{-7} \text{ N}$
 - $4.80 \times 10^{-8} \text{ N}$
 - $9.28 \times 10^{-14} \text{ N}$
 - You are speechless as you never thought his line would work
272. You are reaching to catch a home-run ball hit by Barry Bonds (not the record breaking home-run ball, unfortunately!). You and another fan have hold of it. You pull left with a force of 205 N. The other fan pulls right with a force of 215 N. What is the resultant magnitude and direction of the applied forces?
- 420 N
 - 420 N left
 - 10 N right
 - 420 N right
 - 10 N left
273. A truck pulls on a stump with 520 N of force with a direction of 42 degrees north of east. What are the north and east components of its force vectors?
- East 777 N North 700 N
 - East 700 N North 777 N
 - East 70 N North 78 N
 - East 250 N North 500 N
 - East 386 N North 348 N

423. You throw a baseball up vertically at a rate of 77.0 m/s. Its point of apogee will be _____ meters above the ground.
- 3.92
 - 38.5
 - .200
 - 302
 - 455
424. We have a motor on a crane that has a rating of 400.0 kW. I am lifting a load off a ship that weighs 17,500 N. How fast could this crane lift this load off of the ship?
- 7.00×10^5 m/s
 - 2.29×10^{-3} m/s
 - 7.14×10^4 m/s
 - 2.29 m/s
 - None of these answers work. You need the time taken to lift the load.
425. Can an object be in equilibrium when one force greater than zero is acting on it?
- Yes, it can as long as the force is greater than zero.
 - No, there either has to be force applied or there has to be two or more forces applied in order for equilibrium to be established.
 - Yes, it can, but only if the coefficient of friction is greater than zero.
 - Yes, it can, if there is a perfectly elastic collision between the two forces
 - both C and D
426. What is the charge on a fluorine ion (charge of -1) in Coulombs?
- 3.04×10^{-18} C
 - -3.04×10^{-18} C
 - -1.44×10^{-18} C
 - -1.60×10^{-19} C
 - 1.60×10^{-19} C
427. Which of the following physical constants/quantities is/are correct?
- frequency : watt
 - work : joule
 - capacitance : ampere
 - emf : volt
 - electronic resistance : ohm
- I, II
 - I, II, V
 - II, IV, V
 - IV, V
 - III, IV, V
428. You watched the Super Bowl football game on your dad's new TV. The game (with commercials) took 4.5 hr. How much work did the TV do in this amount of time. The voltage supplied to the TV averaged 120.0 V
- 27 J
 - 540 J
 - 3.2×10^4 J
 - 140 J
 - not enough information to calculate
429. You have a 12.5 ohm, 15.0 ohm, and 19.5 ohm resistor connected in parallel to a power source. You measure the current passing through the 12.5 ohm resistor and find it to be 5.75 A. How many volts are being supplied by the source these resistors are connected to?
- 270 V
 - 8.17 V
 - 71.9 V
 - .460 V
 - 29.0 V
430. A box of unused, unopened English books (imagine that!) Has a mass of 38.5 kg. You and your friends think it would be fun to pull this box of books across a level floor using a rope attached to the box. The rope makes a 30.0 degree angle with the floor. You all together exert a force of 255 N on the rope. Calculate the force normal in this problem.
- 224 N
 - 378 N
 - 128 N
 - 505 N
 - 250 N