

PHYSICS MID*TERM REVIEW*

Your Mid-term will consist of these problems which cover most of the formulas that we have learned this year. You will also have some EWSH and rotational questions. Problems will be similar to these from past tests - make sure you understand each of them!

1. A runner begins a race and accelerates at a rate of $+14.0 \text{ m/s}^2$ for 12.0 seconds. How fast was his finishing speed and what was the distance of the race?
(168 m/s & 1010 m)

2. As a gun is fired the bullet accelerates the length of the 1.00 m barrel and gains a speed of 899.2 m/s.

A. What is the acceleration of the bullet? ($4.04 \times 10^5 \text{ m/s}^2$)

B. If the bullet's mass is 5.97 g, how much force was there? (2410 N)

C. How long did it take for the bullet to leave the gun? (0.00223 sec)

D. If the rifle is fired straight up, how high will the bullet go? (41200 m)

E. If the gun was pointed at a 68.3 degree angle, how far will the bullet travel? (56600 m)

3. Galileo drops a cannon ball off the leaning tower's roof and it takes 2.85 s to reach the ground. How tall is the tower? (39.8 m)

4. If Tseganesh has a mass of 52 kg and she gets thrown into the air with a force of 1620 N, how quickly is she accelerated into the air? (21 m/s^2)

5. Sarah is fired out of a cannon over Niagara Falls. Her velocity is 24.3 m/s, at an angle of 36.9 degrees. She soars majestically through the air for 11.7 seconds before diving gracefully into the pool at the lower end of the falls.

A. How far did she travel horizontally? (227 m)

B. How tall are the falls? (501 m)

6. When a .404 kg box is pushed along the floor, it accelerates it at $.819 \text{ m/s}^2$ forward. If the coefficient of sliding friction is .579, with what force are you pushing? (2.63N)

7. A heavy sign is suspended by three ropes. Rope A is straight up and has a force of 106 N, rope B pulls at 34 degrees from A with a force of 76 N, and rope C pulls at 49 degrees on the other side of A with a force of 56 N.

A. What is the magnitude of the sum of all four forces acting on the sign? (Zero, equilibrium)

B. How heavy is the sign? (206 N)

8. A box weighing 250 N is on a ramp and the coefficient of friction between the box and ramp is .29. If the angle of incline is 68 degrees, how fast will the box accelerate down the ramp? (8.0 m/s^2)

9. A cockroach is running at at 1.32m/s velocity toward your desk. If he is 3.87m away now and your desk is 1.19m tall, how fast do you push your calculator off your desk to smash him? (6.54 m/s)

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10. Spaceman Spiff is stranded from his ship. The ship has a mass of 42500 kg and Spaceman Spiff has a mass of 135 kg. They are located 1.00 km apart.

A. What is the force of attraction between Spiff and his ship?

(3.83×10^{-10} N)



B. How fast does Spiff accelerate towards the ship?

(2.83×10^{-12} m/s²)

11. A 38 g penny is on a turntable, 12.6 cm from the center. If the coefficient of friction is .235, how fast must the turntable be spinning before the penny flies off? (.539 m/s)

12. Planet X, (home of ammonium phosdex, the shaving cream atom) has a mass of 6.31×10^{16} kg, and a radius of 942 m. Duck Dodgers (in the twenty-fourth and a half century) wants to colonize the planet. He needs to know what the acceleration due to gravity is on this planet. You tell him.... (4.74 m/s²)

13. Marvin Martian also wants to colonize planet X. He is 151 m above the planet's surface. How fast must Marvin's ship be going to make a perfect orbit? (62.0 m/s)

Study Hard - have fun!

10 of these exact problems will be on the exam - the numbers will be changed to protect the innocent. Many of you are at a make-or-break moment in this class - this gives you a chance to either suck it up and get the job done, no matter what the cost, or be a quitter and fail. The ONLY thing that matters whether or not you succeed in life is how easily you quit. Those who quit easily are doomed to failure in all areas of their life, those who never quit will succeed in anything they attempt. I'd obviously prefer you to be in the latter group with me, but the choice is yours.

Make the most of the opportunities you are presented with.

