Senior Final Review

don't get it twisted Freshmen - this isn't for you!!!

Overview:

- Your final will take 30-40 minutes
- It will be comprehensive
- There will be a mix of vocabulary, short answer, and multiple choice questions, as well as a few problems to solve.
- I have two calculators - you may want to bring your own though
- Make sure your equation sheet is up to date LINK
- Below are questions from our major exams - I'll use questions similar to those below for your final.
- NOTE: I'm going to add a few general questions on the topic of electrostatics and circuits as well.
- Questions? Remind App (fast response) or email josh.alexander@lausd.net (slooooooow)

Motion/Kinematics:

i. A quantity that has both magnitude and direction is called a _____

ii. A quantity that has only magnitude, but no direction, is called a _____

iii. Define "velocity"

iv. What is the difference between average velocity and instantaneous velocity?

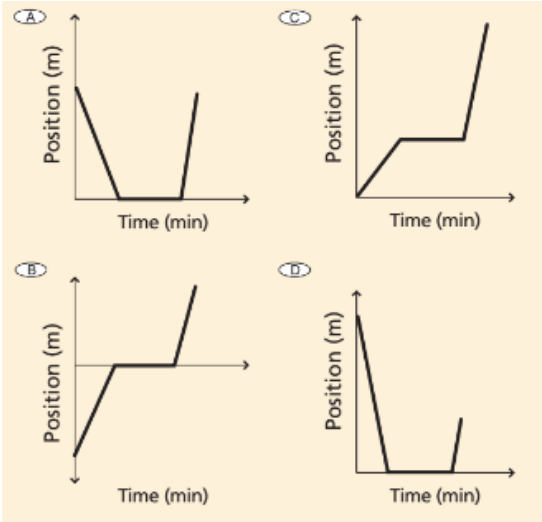
v. What is the difference between velocity and speed?

vi. Define "displacement"

vii. What does the slope of a Position-Time graph represent?

vii. Write an equation that uses change in position and velocity to solve for the change in time

6. A squirrel descends an 8-m tree at a constant speed in 1.5 min. It remains still at the base of the tree for 2.3 min, and then walks toward an acorn on the ground for 0.7 min. A loud noise causes the squirrel to scamper back up the tree in 0.1 min to the exact position on the branch from which it started. Which of the following graphs would accurately represent the squirrel's vertical displacement from the base of the tree?

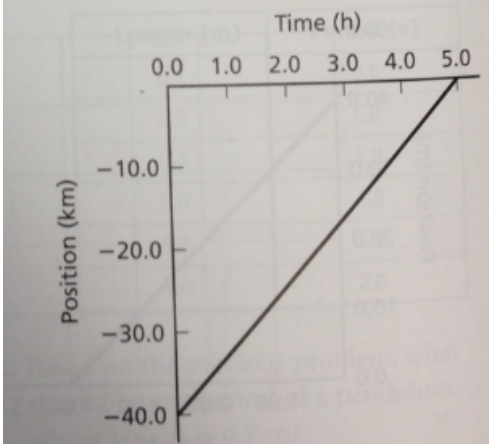


8. A car travels a constant speed of 60.0km/h for 12.00 seconds. How far does it travel? Use the correct number of significant figures…

The position-time graph for a hot-air balloon that is in flight is shown in the accompanying figure.

a. What is the average velocity of the balloon?

b. What is the average speed of the balloon?



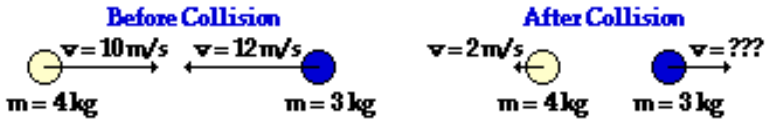
Momentum & Impulse

1. (T / F) A less massive object can never have more momentum than a more massive object.
2. (T / F) An object which experiences a net impulse will definitely experience a momentum change.
3. (T / F) Impulse is a force.
4. (T / F) A force of 20 N acting for 0.5 seconds would provide an equivalent impulse as a force of 5 N acting for 2.0 seconds.
5. (T / F) A moving object collides with a stationary object; the stationary object has significantly less mass. The stationary object encounters the greater momentum change.
6. (T / F) In an isolated system, total momentum is always conserved between any two objects involved in a collision.
7. (T / F) Two colliding objects will exert equal forces upon each other even if their mass is significantly different.
8. (T / F) In an isolated system, momentum is conserved in an elastic collision but not in an inelastic collision.
9. A truck driving along a highway road has a large quantity of momentum. If the mass remains the same, but the truck doubles its speed, its momentum is _____. a. zero b. quadrupled c. doubled d. Unchanged

10. Suppose that you're driving down the road and a bumblebee crashes into the windshield of your car. Which undergoes the greater change is momentum?
    A. bumblebee B. Car C. Both the same
11. A 5 kg object has a momentum of 15 kg•m/s. The object's speed is ___ m/s.
    A. 3m/s B. 5m/s C. 20m/s D. 75m/s E. none of these
12. A 10-N force is applied to a 5-kg ball to change its velocity from +9 m/s to -3 m/s. The impulse experienced by the ball is _____ N•s.
    A. 6 N•s B. 12 N•s C. 30 N•s D. -60 N•s E. -120 N•s

Free-Response. Show work. Use appropriate units and significant figures. Box answers.

13. Find the final momentum



14. A 5000.0-kg truck moving rightward with a speed of 5.00 km/hr collides head-on with a 1000.0-kg car moving leftward with a speed of 20.0 km/hr. The two vehicles *stick together* and move with the same velocity after the collision. Determine the post-collision velocity of the car and truck.

15. A 0.130-kg baseball hits a wall head-on with a forward speed of 34.0 m/s. It rebounds with a speed of 23.5 m/s. The contact time is 0.100 seconds. Determine the force of the wall on the ball.

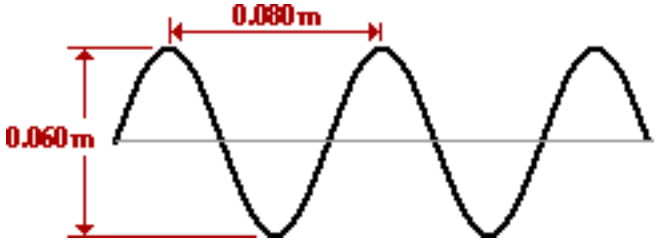
True or False & Multiple Choice (circle the correct answer)

1. (T / F). The meeting of a crest of one wave with a crest of another wave results in destructive interference.
2. (T / F). Black is an actual color of light.
3. (T / F) To hear the sound of a tuning fork, the tines of the fork must move air from the fork to one's ear.
4. (T / F) Sound can travel through a vacuum.
5. (T / F) In general, sound waves travel fastest in solids and slowest in gases.
6. (T / F) A loud shout will move faster through air than a faint whisper.
7. (T / F) A shout in a canyon produces an echo off a cliff located 100 m away. If the speed of sound is 343 m/s, then the echo will be heard 0.720 seconds after the shout.
8. (T / F) Radio waves can travel through a vacuum
9. (T / F) A piano tuner is using a 262 Hz tuning fork in an effort to tune a piano string. She plucks the string and the tuning fork and observes a beat frequency of 3 Hz. Therefore, she must lower the frequency of the piano string by 3 Hz.
10. (T / F) Tripling the frequency of a sound source doubles the speed of the sound waves which it produces.
11. (T / F) In an isolated system, momentum is conserved in an elastic collision but not in an inelastic collision.
12. .__The three primary colors of light are ____.
    a. white, black, gray b. blue, green, yellow c. red, blue, green d. red, blue, yellow
13. .__Combining red and blue light (with equal intensity) makes ____ light
    a. Orange b. Cyan c. Magenta d. Brown
14. .__A filter removes all red wavelengths of light. If you shine yellow light through the filter, what color light will pass through the other side?
    a. yellow b. Cyan c. magenta d. Green
15. When the particles of a medium are vibrating at right angles to the direction of energy transport, the type of wave is described as a _____ wave
    a. longitudinal b. sound c. standing d. transverse
16. The main factor which affects the speed of a sound wave is the ____
    A. amplitude of the sound wave B. loudness of the sound wave
    C. pitch of the sound wave D. properties of the medium
17. Which one of the following factors determines the pitch of a sound?
    A. amplitude of the sound wave B. distance of the sound wave from the source
    C. speed of the sound wave D. frequency of the sound wave
18. A girl moves away from a source of sound at a constant speed. Compared to the frequency of the sound wave produced by the source, the frequency of the sound wave heard by the girl is ____.
    A. lower B. higher C. the same
19. Which color has the shortest wavelength?
    a. Green b. Blue c. Red d.Violet
20. Which color has the least energy?
    A. Blue b. Red c. Violet d.Green
21. Which wave type (choose one answer) has the shortest wavelength?
    a. AM Radio
    b. Gamma
    c. Microwave
    d. Radioactive
    e. FM Radio

22. Which wave type (choose one answer) would be least capable of causing damage to the human body?
    a. AM Radio
    b. Gamma
    c. Microwave
    d. Radioactive
    e. FM Radio

Free-Response. Show work. Use appropriate units and significant figures. Box answers.

23. What is the amplitude of the wave in the diagram below?

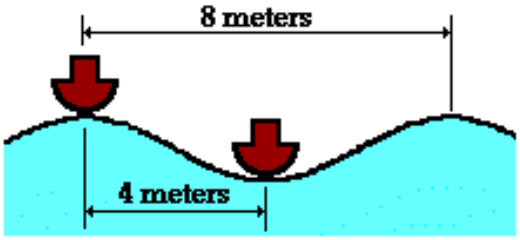


24. The wavelength of the wave in the diagram above is _____m.

25. What is the frequency of a wave that has a speed of 0.4 m/s and a wavelength of 0.020 meter?

26. Batwoman uses waves to navigate and find enemies. If the Batwoman emits a wave, and the wave reflection returns to the Batwoman 1.06 seconds later, how far away is the object? (hint: speed of EM waves = $3x10^8$m/s ---------- speed of sound waves = 343m/s)

27. Two boats are anchored 4 meters apart. They bob up and down, returning to the same up position every 8 seconds. When one is up the other is down. There are never any wave crests between the boats. Calculate the speed of the waves..



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NOTE: There will be a question or two on electricity. Review your activities and notes from the past couple weeks...