

Quiz 1

MECHANICS EQUATIONS

1. Which of the following is NOT correctly stated as an equation of mechanics?
A. Velocity is equal to distance divided by time.
B. Force is equal to mass times acceleration.
C. Momentum is equal to mass times velocity.
☒ D. Acceleration is equal to the initial velocity plus the final velocity divided by two.
2. Which of the following correctly states Newton's first law of motion
A. An object with mass (m) and acceleration (a) is acted on by a force given by $F = ma$.
B. For every action there is an opposite and equal reaction.
C. The total momentum before any interaction is equal to the total momentum after the interaction.
☒ D. An object at rest will remain at rest unless acted on by an external force.
3. Another name for velocity is
A. mass B. time C. speed ☒ D. distance/time
4. When you travel 50 mph, you are also doing about
☒ A. 80 km/hr. B. 100 km/hr. C. 2200 ft/min. D. 1100 ft/min.
5. Acceleration is also
A. a time squared. ☒ B. a rate of change of velocity with time.
C. a rate of change of time with velocity. D. a rate of change of velocity with distance.
6. Which of the following units could be used to express velocity?
A. m/yr B. mm/s ☒ C. both of the above D. neither a nor b.
7. An automobile travels 30 miles in 30 minutes. Its average velocity is approximately
A. 88 mph B. 60 mpm C. 33 mpm ☒ D. 1 mpm.
8. The final speed of a dragster in a quarter mile is 80 mph. The average velocity is.
A. 40 mph ☒ B. 32 mph C. 16 mph D. 8 mph
9. A dragster requires 8 seconds to reach a speed of 80 mph. What is its acceleration?
A. 40 m/hr^2 B. 4.5 m/s^2 ☒ C. 10 m/hr^2 D. 8 m/hr^2
10. Inertia is
A. velocity times time. ☒ B. resistance to a change of motion
C. velocity divided by time D. related to Newton's second law of motion.
11. Which of the following statements refers to a vector quantity?
A. the car was speed north at 80 mph ☒ B. the standard man weighs 70 kg.
C. the standard man has a mass of 70 kg. D. the speed of light is $3 \times 10^8 \text{ m/s}$.
12. A Nolan Ryan fast ball was clocked at 90 mph. How long did it take to travel the 90 feet to the plate?
☒ A. 1.0 s B. 1.5 s C. less than 1 s D. more than 2 s.
13. How many fundamental laws of motion did Newton formulate?
A. 1 ☒ B. 2 C. 3 D. 4
14. Should one fall off the edge of the south rim of the Grand Canyon, the force exerted would be measured in
A. pound B. kilogram ☒ C. newtons D. m/s

15. If the acceleration caused by gravity is 9.8 m/s^2 , what is the gravitational force acting on 50 kg. Sack pushed off the roof of a 50-story building?
A. 5.1N B. 490 N C. 0.2 N D. 40.2 N

16. A self-propelled portable ultrasound unit can travel the length of a 90ft (27m) corridor in 15 sec.

Express its average velocity in ft./sec and km/hr

~~A. 6ft/sec, 6.5 km/hr~~

B. 3ft/sec, 3.25 km/hr

17. *A car travels along a certain road at an average speed of 40 km/h and returns along the same road at an average speed of 60 km/hr. Calculate the average speed for the round trip. (Tips- Don't say 50 km/hr) (p.57 N7) |

A. 46 km/hr B. 52 km/hr C. 50 km/hr D. 48 km/hr

18. An automobile is traveling at a velocity of 60 km/hr. It accelerates uniformly to a velocity of 100 km/hr during the 8 minutes. What was its average velocity during acceleration? What was the rate of acceleration?

A. 80 km/hr, 2 m/s^2 B. 80 km/hr, 16 m/s^2 C. 80 km/hr 0.02 m/s^2 D. 60 km/hr, 0.02 m/s^2

19*. A ball is thrown straight up with an initial speed 20 m/s. How high does it go, and how long is it in the air? (Tips- see world problem p.57 N3)

A. 4sec, 10m B. 4sec, 30m C. 2sec, 20m D. 4sec, 20m

20. Any object dropped near the surface of the earth falls with an acceleration of approximately 10 m/s^2 . What is its velocity after 6 sec if it released from rest? What distance is covered?

A. 30m/sec, 90 m B. 60m/sec, 180 m

21. The mass of transducer is 2kg. What is its weight in newtons? What would the same transducer weigh on the moon where gravity = 1.63 m/s^2 ?

A. 20N, 20N

B. 20N 3.26 N

C 20kg, 3.26 N

D. 20 N, 3.26 kg

22. A force of 40N and a force of 30N act on the same object. What is the maximum total force then can exert? What is the minimum force? What is the Net force when then act in perpendicular direction to each other? (Tips Parallelogram Rule)

A. 70N, 10N, 20N B. 40N, 30N, 50N C. 70N, 10N, 50N D. 70N, 30N, 30N

23. What force is required to move a 68.4 kg portable ultrasound machine with a constant Acceleration of 2.31 m/s^2 along a frictionless surface? If we assume that the friction between the machine and the floor produces a 12.6N force (take into account friction) that opposes the motion. What force would be necessary to maintain the 2.31 m/s^2 acceleration?

A. 158N, 136.4N B. 684 N, 671.4N C. 158N, 671.4N D. 158N, 170.6N

24. If you lift a 5kg transformer with a force of 60N, what is acceleration? (Tips, remember that Second Newton Law contains Net Force!)

A. 12 m/s^2 B. 2 m/s^2

25. What is the acceleration of a rocket ship with a mass of $6.1 \times (10^6) \text{ kg}$, that develops a takeoff thrust of $48.1 \times (10^8) \text{ N}$?

A. $8 \times (10^2) \text{ m/s}^2$ B. $8 \times (10^8) \text{ m/s}^2$

26. On the planet Krypton a $7.79 \times (10^3) \text{ kg}$ object is found to weigh (4.38×10^4) . What is the acceleration of gravity on this planet?

A. 9.8 m/s^2 B. 5.6 m/s^2

27. A boxer punches a sheet of paper in midair and brings it from rest up to a speed of 25 m/s in 0.05 s . If the weight of the paper is 0.03 N , what force does the boxer exert on it?

A. 15N B. 10N C. 1.5kg D. 1.5 N (p.90 N1)

28. If you stand next to a wall on a frictionless skateboard and push the wall with a force of 40N, How hard does the wall push on you? If your mass is 80 kg, what's your acceleration?

A. 40N , 0.5 m/s^2 B. 840N, 10.5 m/s^2

29. Forces of 3.0N and 4.0 N act at right angles on a block of mass 2.0 kg How much acceleration occurs?

A. 2 m/s^2 B. 2.5 m/s^2

30. The whole Earth is interacting (gravitationally) with the apple while the apple pulls upward on Earth. Does these two forces comprise an action-reaction pair.

A. Yes. B. No

(p.22)