# Chapter 10 Practice Problrems

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

1) Nellie tosses a ball upward at an angle. Assuming no air resistance, which component of velocity changes with time? 1) _____
A) the horizontal component B) the vertical component
C) both of these D) neither of these

2) As soon as a bowling ball rolls off the edge of a table its horizontal component of velocity 2) _____
A) decreases. B) remains constant. C) increases.

3) As soon as a ball rolls off the edge of a table 3) _____
A) it is not acted on by any forces.
B) it is not acted on by any horizontal forces.
C) has a zero net force acting on it.
D) none of the above

4) A ball rolls off the edge of a table at the same time another ball drops vertically from the same table. The ball to hit the floor first is the 4) _____
A) rolling ball.
B) dropped ball.
C) both hit at the same time

5) While a rock thrown upward at 50 degrees to the horizontal rises, neglecting air drag, its vertical component of velocity 5) _____
A) increases. B) remains unchanged. C) decreases.

6) Dr. Chuck projects a ball horizontally from a lab bench. The ball lands on a bullseye marked on the floor a horizontal distance equal to the ball's initial speed 6) _____
A) multiplied by its time in the air.
B) coupled with its speed of fall.
C) squared plus its downward speed squared when hitting the floor.
D) all of the above
E) none of the above

7) A hunter on level ground fires a bullet at an angle of 10 degrees *above* the horizontal while simultaneously dropping another bullet from the level of the rifle. Which bullet will hit the ground first? 7) _____
A) the one dropped
B) the one fired
C) both hit at the same time.

8) A projectile is launched from ground level at 15° above the horizontal and lands downrange. What other projection angle for the same speed would produce the same down–range distance? 8) _____
A) 30° B) 45° C) 50° D) 75° E) 90°

9) A ball is tossed upward. Neglecting air drag, the acceleration along its path is 9) _____
A) 0 $g$.
B) $g$ downward.
C) $g$ upward.
D) $g$ upward, then $g$ downward.
E) none of the above

10) When air drag affects the motion of projectiles, they don't travel 10) _____
A) as high. B) as far.
C) both of these D) neither of these

11) A gun with a muzzle velocity of 100 m/s is fired horizontally from a tower. Neglecting air resistance, how far downrange will the bullet be 1 second later? 11) _____
A) 50 m
B) 98 m
C) 100 m
D) 490 m
E) none of the above

12) While an airplane flies at 40 m/s at an altitude of 500 meters, the pilot drops a heavy package that falls to the ground. Neglecting air drag, about where does the package land relative to the plane flying above? 12) _____
A) directly beneath the plane
B) 400 m behind the plane
C) 500 m behind the plane
D) more than 500 m behind the plane
E) none of the above

13) An Earth satellite is simply a projectile 13) _____
A) freely falling around Earth.
B) floating motionless in space near Earth.
C) approaching Earth from outer space.

14) Planets would crash into the Sun if it weren't for 14) _____
A) their tangential velocities.
B) their vast distances from the Sun.
C) the inverse–square law.
D) their relatively small masses.
E) the fact that they are beyond the main gravitation of the Sun.

15) An astronaut at Earth's surface has a mass of 50 kg and a weight of 500 N. If she were floating freely inside a space habitat in remote space, she would have 15) _____
A) no weight and less mass. B) no weight and the same mass.
C) more weight and no mass. D) none of the above

16) The speeds of the planets about the Sun depend on 16) _____
A) their distances from the Sun. B) the masses of the planets.
C) their periods of rotation. D) none of the above

17) Earth satellites are typically more than 100 km high so as to be above Earth's 17) _____
A) atmosphere. B) gravitational field. C) both of these

18) The circular path of a satellite orbiting Earth is characterized by a constant 18) _____
A) speed.
B) acceleration.
C) radial distance.
D) all of the above
E) none of the above

19) An Earth satellite in close orbit circles Earth in about an hour and a half. How long would a satellite located as far away as the Moon take to orbit Earth? 19) _____
A) the same hour and a half
B) less than an hour and a half
C) about 28 days
D) need more information
E) none of the above

20) Which of these vary for satellites in circular orbits? 20) _____
A) speed.
B) momentum.
C) kinetic energy.
D) all of the above
E) none of the above

21) Which of these vary for satellites in elliptical orbits? 21) _____
A) speed.
B) momentum.
C) kinetic energy.
D) all of the above
E) none of the above

22) An Earth satellite in an elliptical orbit travels fastest when it is 22) _____
A) nearest Earth.
B) farthest from Earth.
C) everywhere along its orbit.

23) According to Kepler, the paths of planets about the Sun are 23) _____
A) parabolas.
B) circles.
C) straight lines.
D) ellipses.
E) none of the above

24) According to Kepler, the line from the Sun to any planet sweeps out equal areas of space 24) _____
A) with each complete revolution.
B) only when the paths are ellipses.
C) in equal time intervals.

25) According to Kepler, the orbital period of a planet is directly proportional to the 25) _____
A) planet's average distance from the Sun.
B) square of the planet's average distance from the Sun.
C) cube of the planet's average distance from the Sun.

26) When the potential energy of a satellite decreases 26) _____
A) kinetic energy also decreases.
B) its kinetic energy correspondingly increases.
C) its distance from the orbiting body increases.
D) none of the above

27) The kinetic energy of a planet is maximum when it is 27) _____
A) closest to the Sun. B) farthest from the Sun.
C) least accelerating. D) none of the above

28) Angular momentum is conserved for a satellite in 28) _____
A) circular orbit. B) elliptical orbit.
C) both of these D) neither of these

29) Escape speed from Earth is 29) _____
A) 8 km/s. B) 9 km/s. C) 11.2 km/s. D) 63 km/s.

30) Escape speed from the Sun is 30) _____
A) about the same as from Earth.
B) very much greater than for Earth.
C) indefinite.

1) B
2) B
3) B
4) C
5) C
6) A
7) A
8) D
9) B
10) C
11) C
12) A
13) A
14) A
15) B
16) A
17) A
18) D
19) C
20) E
21) D
22) A
23) D
24) C
25) C
26) B
27) A
28) C
29) C
30) B