Chapter 9 Practice

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

1) According to Newton, the greater the masses of interacting objects, the 1) _____
A) less the gravitational force between them.
B) greater the gravitational force between them.
C) greater the force between them by the square of the masses.

2) According to Newton, when the distance between two interacting objects doubles, the gravitational force is 2) _____
A) half.
B) one–quarter.
C) the same.
D) twice as much.
E) four times as much.

3) If Earth's radius somehow increased with no change in mass, your weight would 3) _____
A) increase also. B) decrease. C) stay the same.

4) If the Sun were twice as massive 4) _____
A) its pull on Earth would double.
B) the pull of Earth on the Sun would double.
C) both of these
D) neither of these

5) The difference between Newton's law as a proportion and an equation involves 5) _____
A) the constant *G*. B) the equal sign.
C) one being a vector and the other not. D) magnitude and direction.

6) The force of Earth's gravity on a capsule in space increases as it comes closer. When the capsule moves to half its distance, the force toward Earth is then 6) _____
A) twice. B) three times greater.
C) four times greater. D) none of the above

7) Two planets in space gravitationally attract each other. If both the masses and distances are doubled, the force between them is 7) _____
A) one–quarter.
B) half as much.
C) twice as much.
D) four times as much.
E) none of the above

8) A weight watcher who normally weighs 400 N stands on top of a very tall ladder so she is one Earth radius above Earth's surface. How much is her weight there? 8) _____
A) 0
B) 100 N
C) 200 N
D) 400 N
E) none of the above

9) When you weigh yourself on a bathroom scale on a slight incline instead of a level surface, your weight reading on the scale will be 9) _____
A) less. B) no different. C) more.

10) Which pulls on the oceans of Earth with a greater force? 10) _____
A) Moon B) Sun C) both pull the same.

11) The main reason ocean tides exist is that Moon's pull is stronger 11) _____
A) than the pull of the Sun.
B) on water closer to it than on water farther away.
C) on Earth's oceans than on Earth itself.
D) all of the above

12) We do not observe tides in a community swimming pool because 12) _____
A) gravitation on the small mass of water is negligibly small.
B) it is shallow compared to the ocean.
C) all parts of it are practically the same distance from the Moon.
D) they are masked by the much stronger pull of Earth gravity.
E) the tides are only observed at night.

13) If the Moon were four times as massive but twice as far from Earth, high tides on Earth would be 13) _____
A) higher. B) lower. C) no different.

14) Earth's gravitational field extends 14) _____
A) only above and beyond Earth's surface and cancels inside Earth.
B) both inside and outside Earth and throughout the entire universe.
C) neither of these

15) The direction of a gravitational field is 15) _____
A) in the same direction as gravitational attraction.
B) away from the center of gravity of an object.
C) opposite to the direction of gravitational attraction.

16) An asteroid exerts a 360–N gravitational force on a nearby spacecraft. The 360–N force on the spacecraft is directed 16) _____
A) toward the asteroid.
B) away from the asteroid.
C) toward the Sun.

17) An asteroid exerts a 360–N gravitational force on a nearby spacecraft. If the spacecraft moves to a position three times as far from the center of the asteroid, the force will be 17) _____
A) zero. B) 40 N. C) 120 N. D) 360 N. E) 1080 N.

18) Rate this statement: No force due to Earth's gravity acts on astronauts inside the orbiting space station. 18) _____
A) always true while in orbit
B) sometimes true while in orbit
C) always false

19) How far must one travel to escape Earth's gravitational field? 19) _____

A) to a region above Earth's atmosphere B) to a region well beyond the Moon
C) to a region beyond the solar system D) forget it; you can't travel far enough.

20) If you drop a stone into a hole drilled all the way to the other side of Earth (neglect the molten core), the stone will 20) _____

A) come to an abrupt stop at Earth's center.
B) speed up until it gets to Earth's center.
C) speed up until it reaches Earth's other side.
D) slow down until it reaches Earth's center.

21) Each of us weighs a tiny bit less inside the ground floor of a skyscraper than we do on the ground away from the skyscraper because the 21) _____

A) gravitational field is shielded inside the building.
B) mass of the building above slightly attracts us upward.
C) both of these
D) neither of these

22) A hollow spherical planet is inhabited by people who live inside it, where the gravitational field is zero. When a very massive spaceship lands on the planet's surface, inhabitants find that the gravitational field inside the planet is 22) _____

A) still zero.
B) non–zero, directed toward the spaceship.
C) non–zero, directed away from the spaceship.

23) A black hole is 23) _____

A) an empty region of space with a huge gravitational field.
B) at the center if all stars.
C) the remains of a giant star that has undergone gravitational collapse.

24) The factor most directly responsible for making a black hole invisible is its 24) _____

A) size.
B) mass.
C) color.
D) surface escape velocity.
E) none of the above

25) If the Sun collapsed to a black hole, Earth's gravitational attraction to it would be 25) _____

A) more. B) less. C) the same.

26) Planets wobble in their orbits due to 26) _____

A) the gravitational attraction to other planets.
B) uncertainties in the inverse–square law.
C) elliptical–orbit quirks.
D) all of the above
E) none of the above

Answer Key
Testname: CHAPTER 9 PRACTICE PROBLEMS WITH KEY

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