

Review Chapter 10, 12, 13, 14, 15, 16

Conceptual Physics, 10e (Hewitt)

Chapter 10

23) What prevents satellites such as a space shuttle from falling?

- A) gravity
- B) the absence of air drag
- C) Nothing; they're falling continuously all around the Earth.

Answer: C

28) An object is thrown vertically into the air. Because of air resistance, the time for its descent will be

- A) longer than the ascent time.
- B) shorter than the ascent time.
- C) equal to the ascent time.
- D) Not enough information given to say.

Answer: A

30) An airplane flies at 40 m/s at an altitude of 50 meters. The pilot drops a heavy package which falls to the ground. Where, approximately, does the package land relative to the plane's new position?

- A) 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 these

Answer: A

31) A bullet is fired horizontally with an initial velocity of 300 m/s from a tower 20 m high. If air resistance is negligible, the horizontal distance the bullet travels before hitting the ground is about

- A) 200 m.
- B) 300 m.
- C) 400 m.
- D) 500 m.
- E) 600 m.

Answer: E

36) The tangential velocity of an Earth satellite is its velocity

- A) parallel to the surface of the Earth.
- B) perpendicular to the surface of the Earth.
- C) attributed to satellites moving in any direction.

Answer: A

38) If a satellite's radial velocity is zero at all times, its orbit must be

- A) parabolic.
- B) elliptical.
- C) circular.
- D) geosynchronous.

Answer: C

40) What prevents satellites such as the space shuttle from falling?

- A) gravity
- B) centripetal force
- C) centrifugal force
- D) the absence of air drag
- E) Nothing; they are continually falling as they orbit the Earth.

Answer: E

41) The circular path of a satellite orbiting the Earth is characterized by a constant

- A) speed.
- B) acceleration.
- C) radial distance.
- D) all of these
- E) none of these

Answer: D

42) An Earth satellite is in an elliptical orbit. The satellite travels fastest when it is

- A) nearest the Earth.
- B) farthest from the Earth.
- C) It travels at constant speed everywhere in orbit.

Answer: A

43) The fastest moving planet in a solar system is

- A) the smallest planet.
- B) the most massive planet.
- C) the planet nearest the sun.
- D) the planet farthest from the sun.
- E) any planet, for they all move at the same speed.

Answer: C

57) Minimal orbit speed about the Earth is about 8 km/s. Minimal orbital speed about Jupiter would be

- A) less than 8 km/s.
- B) more than 8 km/s.
- C) about 8 km/s.

Answer: B

- 68) Angular momentum is conserved for a satellite in
A) circular orbit.
B) elliptical orbit.
C) both of these
D) neither of these
Answer: C

Chapter 12

- 5) Which has the greater density, a lake full of water or a cup full of lake water?
A) the cup full of lake water
B) the lake full of lake water
C) Both have the same density.
D) It is impossible to tell without knowing the size of the lake.
Answer: C

- 8) If the mass of an object were to double while its volume remains the same, its density would
A) halve.
B) double.
C) stay the same.
D) become four times as great.
Answer: B

- 10) When weight is applied to the top of a stone arch, all of the stone blocks in the arch undergo
A) tension.
B) compression.
C) expansion.
D) change of phase.
Answer: B

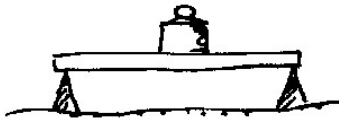


Figure 12-C

- 11) When a load is placed on the middle of a horizontal beam supported at each end, the bottom part of the beam undergoes
A) tension.
B) compression.
Answer: A

- 12) You wish to bolt a sign to a horizontal I-beam supporting a bridge. You will weaken the beam least if you drill the bolt-holes through the
A) upper flange.
B) lower flange.
C) web.
D) All these will have the same effect.
Answer: C

- 14) Stone slabs are stronger under
A) tension.
B) compression.
C) same strength.
Answer: B

- 15) The strength of a rope depends on its
A) thickness.
B) length.
C) both of these
Answer: A

- 18) A wooden block has a mass of 1000 kg and a volume of 2 cubic meters. What is the block's density?
A) 100 kg per cubic meter
B) 200 kg per cubic meter
C) 500 kg per cubic meter
D) 1000 kg per cubic meter
E) none of these
Answer: C

- 21) Which will bounce higher off a hard surface?
A) a rubber ball
B) a steel ball
C) Both bounce the same.
Answer: B

Chapter 13

- 1) Water pressure is greatest against the
A) top of a submerged object.
B) bottom of a submerged object.
C) sides of a submerged object.
D) is the same against all surfaces
E) none of these
Answer: B
- 3) The pressure in a liquid depends on liquid
A) density.
B) depth.
C) both of these
D) neither of these
Answer: C

6) The mass of a cubic meter of water is

- A) 1 kg.
- B) 10 kg.
- C) 100 kg.
- D) 1000 kg.
- E) 9800 N.

Answer: D

8) The reason that buoyant force acts upward on a submerged object is that

- A) it acts in a direction to oppose gravity.
- B) if it acted downward, nothing would float.
- C) the weight of fluid displaced reacts with an upward force.
- D) upward pressure against the bottom is greater than downward pressure against the top of the submerged object.

Answer: D

9) A completely submerged object always displaces its own

- A) volume of fluid.
- B) weight of fluid.
- C) density of fluid.
- D) all of these
- E) none of these

Answer: A

10) A fish normally displaces its own

- A) volume of water.
- B) weight of water.
- C) both of these
- D) neither of these

Answer: C

13) What is the weight of water displaced by a 100-ton floating ship?

- A) less than 100 tons
- B) 100 tons
- C) more than 100 tons
- D) 100 cubic meters
- E) depends on the ship's shape

Answer: B

14) When an object is partly or wholly immersed in a liquid, it is buoyed up

- A) by a force equal to its own weight.
- B) by a force equal to the weight of liquid displaced.
- C) and floats because of Archimedes principle.
- D) but nevertheless sinks.

E) none of these

Answer: B

19) When holes are drilled through the wall of a water tower, water will spurt out the greatest horizontal distance from the hole closest to

- A) the bottom of the tower.
- B) the middle of the tower.
- C) the top of the tower.
- D) The horizontal distance will be the same for all holes.

Answer: A

24) A rock suspended by a string weighs 5 N out of water and 3 N when submerged. What is the buoyant force on the rock?

- A) 8 N
- B) 5 N
- C) 3 N
- D) 2 N
- E) none of these

Answer: D

25) An egg is placed at the bottom of a bowl filled with water. Salt is slowly added to the water until the egg rises and floats. From this experiment, one concludes

- A) calcium in the egg shell is repelled by sodium chloride.
- B) the density of salt water exceeds the density of egg.
- C) buoyant force does not always act upward.
- D) salt sinks to the bottom.

Answer: B

27) A block of wood weighing 5 N in air, is difficult fully submerge in a pool of mercury because the buoyant force when fully submerged is

- A) less than 5 N.
- B) 5 N.
- C) more than 5 N.

Answer: C

29) Compared to an empty ship, the same ship loaded with styrofoam will float

- A) higher in the water.
- B) lower in the water.
- C) at the same level in the water.

Answer: B

Chapter 14

3) Atmospheric molecules do not fly off into outer space because of

- A) their relatively high speeds.
- B) their relatively low densities.
- C) Earth gravitation.
- D) cohesive forces.

Answer: C

4) About what percentage of the molecules that make up the atmosphere are below an aircraft that flies at an altitude of 6 kilometers?

- A) 20%
- B) 30%
- C) 40%
- D) 50%
- E) more than 50%

Answer: E

5) Atmospheric pressure is caused by the

- A) density of the atmosphere.
- B) weight of the atmosphere.
- C) temperature of the atmosphere.
- D) effect of the sun's energy on the atmosphere.

Answer: B

6) What is the approximate mass of a 1-square-centimeter column of air that extends from sea level to the top of the atmosphere?

- A) 1 gram
- B) 1 kilogram
- C) 10 kilograms
- D) 100 kilograms

Answer: B

9) As a helium-filled balloon rises in the air, it becomes

- A) bigger.
- B) more dense.
- C) heavier.
- D) all of these
- E) none of these

Answer: A

11) A one-ton blimp hovers in the air. The buoyant force acting on it is

- A) zero.
- B) one ton.
- C) less than one ton.
- D) more than one ton.

Answer: B

13) In drinking soda or water through a straw, we make use of

- A) capillary action.
- B) surface tension.
- C) atmospheric pressure.

D) Bernoulli's principle.

E) none of these

Answer: C

16) About how high can water be theoretically lifted by a vacuum pump at sea level?

- A) less than 10.3 m
- B) more than 10.3 m
- C) 10.3 m

Answer: C

17) The flight of a blimp best illustrates

- A) the principle of Archimedes.
- B) Pascal's principle.
- C) Bernoulli's principle.
- D) Boyle's law.

Answer: A

18) Airplane flight best illustrates

- A) Archimedes' principle.
- B) Pascal's principle.
- C) Bernoulli's principle.
- D) Boyle's law.

Answer: C

19) The faster a fluid moves, the

- A) greater its internal pressure.
- B) less its internal pressure.
- C) internal pressure is unaffected.

Answer: B

26) Consider two mercury barometers, one with twice the cross-sectional area of the other. Neglecting capillarity, mercury in the smaller tube will rise

- A) the same height as in the larger tube.
- B) twice as high as mercury in the larger tube.
- C) four times as high as mercury in the larger tube.
- D) more than four times as high as in the larger tube.

E) none of these

Answer: A

30) A helium-filled balloon released in the atmosphere will rise until

- A) the pressure inside the balloon equals atmospheric pressure.
- B) atmospheric pressure on the bottom of the balloon equals atmospheric pressure on the top of the balloon.
- C) the balloon and surrounding air have equal densities.

D) all of these

E) none of these

Answer: C

33) Compared to the buoyant force of the atmosphere on a 1-liter helium-filled balloon, the buoyant force of the atmosphere on a nearby 1-liter solid iron block is

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

Answer: C



Figure 14-A

38) The depth to which an inverted drinking glass must be pushed beneath the surface of water so that the volume of enclosed air is squeezed to half is

- A) 76 cm.
- B) 10.3 m.
- C) 14.7 m.
- D) 20.6 m.
- E) 29.4 m.

Answer: B

44) In a vacuum, an object has no

- A) buoyant force.
- B) mass.
- C) weight.
- D) temperature.
- E) all of these

Answer: A

50) A large block of wood and a smaller block of iron on weighing scales both register the same weight - 1 ton. Taking buoyancy of air into account, which has the greater mass?

- A) wood
- B) iron
- C) Both have the same mass.
- D) More information is needed.

Answer: A

Chapter 15

1) When you touch a cold piece of ice with your finger, energy flows

- A) from your finger to the ice.
- B) from the ice to your finger.
- C) actually, both ways.

Answer: A

3) Which of the following normally warms up fastest when heat is applied?

- A) water
- B) iron
- C) glass
- D) wood
- E) All of the above choices are equally true.

Answer: B

7) The moderate temperatures of islands throughout the world has much to do with water's

- A) poor conductivity.
- B) vast supply of internal energy.
- C) high specific heat.
- D) high evaporation rate.
- E) absorption of solar energy.

Answer: C

12) Ice tends to form first at the

- A) surface of bodies of water.
- B) bottom of bodies of water.
- C) surface or bottom depending on the water depth.

Answer: A

13) When an iron ring is heated, the hole becomes

- A) smaller.
- B) larger.
- C) neither smaller nor larger.
- D) either smaller or larger, depending on the ring thickness.

Answer: B

14) As a piece of metal with a hole in it cools, the diameter of the hole

- A) increases.
- B) decreases.
- C) remains the same.

Answer: B

16) When a bimetallic bar made of copper and iron strips is heated, the bar bends toward the iron strip. The reason for this is

- A) iron gets hotter before copper.
- B) copper gets hotter before iron.
- C) copper expands more than iron.
- D) iron expands more than copper.
- E) none of these

Answer: C

17) If glass expanded more than mercury, then the column of mercury in a mercury thermometer would rise when the temperature

- A) increases.
- B) decreases.
- C) neither of these

Answer: B

24) Consider a sample of water at 0 degrees C. If the temperature is slightly increased, the volume of the water

- A) increases.
- B) decreases.
- C) remains the same.

Answer: B

26) During a very cold winter, water pipes sometimes burst. The reason for this is

- A) the ground contracts when colder, pulling pipes apart.
- B) water expands when freezing.
- C) water contracts when freezing.
- D) the thawing process releases pressure on the pipes.
- E) none of these

Answer: B

30) Room temperature on the Kelvin scale is about

- A) 100 K.
- B) 200 K.
- C) 300 K.
- D) 400 K.
- E) more than 400 K.

Answer: C

33) Some molecules are able to absorb large amounts of energy in the form of internal vibrations and rotations. Materials composed of such molecules have

- A) low specific heats.
- B) high specific heats.
- C) none of the above

Answer: B

39) Place a kilogram block of iron at 40 degrees C into a kilogram of water at 20 degrees C and the final temperature of the two becomes

- A) less than 30 degrees C.
- B) at or about 30 degrees C.
- C) more than 30 degrees C.

Answer: A

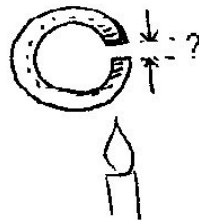


Figure 15-B

42) Consider a metal ring with a gap cut in it. When the ring is heated, the gap

- A) becomes narrower.
- B) becomes wider.
- C) retains its size.

Answer: B

Chapter 16

4) Your feet feel warmer on a rug than on your tile floor because your rug

- A) is usually warmer than your tile.
- B) is a better insulator than your tile.
- C) for the same mass has more internal energy than your tile.
- D) all of these
- E) none of these

Answer: B

5) Energy transfer by convection is primarily restricted to

- A) solids.
- B) liquids.
- C) gases.
- D) fluids.
- E) none of these

Answer: D

6) Warm air rises because faster-moving molecules tend to move to regions of less

- A) density and less pressure.
- B) pressure.
- C) density.

Answer: A

7) At the same temperature, which move with the greater speed in the air?

- A) very light molecules
- B) heavier molecules
- C) All will have equal average speeds.

Answer: A

- 9) Objects that radiate relatively well,
A) absorb radiation relatively well.
B) reflect radiation relatively well.
C) both of these
D) neither of these

Answer: A

- 13) Cold water will warm to room temperature faster in a

- A) black pot.
B) silver pot.
C) depends more on the size of the pots than their color

Answer: A

- 14) An object will normally be a net radiator of energy when its temperature is

- A) higher than its surroundings.
B) lower than its surroundings.
C) neither of these

Answer: A

- 15) It is commonly thought that a can of beverage will cool faster in the coldest part of a refrigerator.

Knowledge of Newton's law of cooling

- A) supports this common knowledge.
B) shows this common knowledge is false.
C) supports or contradicts this common knowledge.

Answer: A

- 17) Which body glows with electromagnetic waves?

- A) both the Sun and the Earth
B) only the Sun
C) only the Earth
D) neither the Sun or the Earth

Answer: A

- 19) The planet Earth loses heat mainly by

- A) conduction.
B) convection.
C) radiation.
D) all of these

Answer: C

- 22) If you double the pressure of an ideal gas while keeping the temperature constant, the average kinetic energy of the molecules

- A) is doubled.
B) increases by more than twice.
C) increases by less than twice.
D) remains unchanged.

Answer: D

- 28) Newton's law of cooling applies to objects that are

- A) cooling.
B) heating.
C) both of these
D) none of these

Answer: C

- 30) A Thermos bottle has double glass walls with silver coating on the glass surfaces that face one another. The silver coating reduces the energy that is transferred by

- A) conduction.
B) convection.
C) radiation.
D) friction.
E) none of these

Answer: C

- 33) If a poor absorber of radiation were a good emitter, its temperature would be

- A) less than its surroundings.
B) more than its surroundings.
C) the same as its surroundings.

Answer: A