

Exam THIRD EXAM Spring 2008 PHYSICS 111

Name _____

Note: Questions 24 to 28 are extra credit.

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

- 1) According to Kepler's laws, the paths of planets about the sun are
A) parabolas B) circles. C) straight lines. D) ellipses E) none of these

- 2) According to Newton, doubling the distance between two interacting objects
A) divides by 2 the gravitational force between them.
B) multiplies by 2 the gravitational force between them.
 C) divides by 4 the gravitational force between them.
D) multiplies by 4 the gravitational force between them.
E) has no effect.

- 3) If your mass, the mass of the Earth, and the mass of everything in the solar system were twice as much as it is now, yet everything stayed the same size, your weight on Earth would
A) be the same.
B) double.
 C) quadruple.
D) be eight times as much as now.
E) none of these.

- 4) The planet Jupiter is about 300 times as massive as Earth, yet on its surface you would weigh only about 3 times as much as on Earth. This is because
A) your mass is 100 times less on Jupiter.
B) Jupiter is significantly farther from the sun.
 C) Jupiter's radius is 10 times the Earth's radius.
D) you are 100 times more weightless there.
E) none of these.

- 5) There are no tides to be seen in the community swimming pool because
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) but there are, at nighttime when the Moon is up.

- 6) A bullet is shot at 1000 m / s horizontally from a tower 20m tall. How far away on a horizontal plane will the bullet land?
- A) 1000 m
 - B) 2000 m
 - C) 1500 m
 - D) 20,000 m (20 km)
 - E) 500 m
- 7) What were the people trying to understand who asked Feynman "Is Electricity Fire?"
- A) Alternate methods of generating energy.
 - B) Ways of conserving energy in household lighting.
 - C) Understand the threat of household fires from electricity.
 - D) Resolve a religious issue.
 - E) Understand the quantum theory of light.
- 8) Which of the following expands most when the temperature is lowered? Equal volumes of
- A) iron.
 - B) wood.
 - C) helium.
 - D) water at 4 degrees C.
 - E) None expands when the temperature is lowered.
- 9) 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.
- 10) The white-hot sparks that strike your skin from a 4th-of-July-type sparkler don't harm you because
- A) they have a low temperature.
 - B) the energy per molecule is very low.
 - C) the energy per molecule is high, but little energy is transferred because the few molecules in the spark hold little heat.
 - D) the gunpowder has low thermal conductivity
 - E) white-hot is too far above the range of thermal damage for skin
- 11) The specific heat of iron is around 0.1, and that of water is around 1.0. 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.
 - D) it cannot be determined unless the masses are given.
 - E) it cannot be determined unless the temperatures are given in degrees Kelvin.
- 12) Radio waves travel at the speed of light, 300,000 km / s. The wavelength of a radio wave received at 100 Megahertz is
- A) 0.3 m.
 - B) 3.0 m.
 - C) 30 m.
 - D) 300 m.
 - E) none of these

- 13) Two charges separated by one meter exert 1-N forces on each other. If the magnitude of each charge is doubled, the force on each charge is
A) 1 N. B) 2 N. C) 4 N. D) 8 N. E) none of these.
- 14) If a steady magnetic field exerts a force on a moving charge, that force is directed
A) opposite the motion.
B) in the direction of the motion.
C) alternately in the direction then away from the direction of motion.
 D) perpendicular to the direction of the motion.
E) a magnetic field has zero force on any electric charge!
- 15) A device that transforms electrical energy to mechanical energy is a
A) generator. B) motor. C) transformer. D) magnet. E) none of these.
- 16) Which of these electromagnetic waves has the shortest wavelength?
A) radio waves
B) infrared waves
 C) X-rays
D) ultraviolet waves
E) light waves
- 17) A pair of sunglasses and a pair of clear reading glasses are left in the sunlight. The hotter glasses would be the
 A) sunglasses.
B) reading glasses.
C) both.
D) neither.
E) it cannot be determined.
- 18) The following will always produce electromagnetic waves
A) sound
B) static magnetic fields.
C) static electric fields.
 D) vibrating charges.
E) none of the above.
- 19) Different colors of light correspond to different light
A) velocities. B) intensities. C) polarities. D) frequencies. E) none of these
- 20) Coastal climates tend to be mild, because
A) The sand reflects the sunlight.
 B) The high specific heat of water stabilizes temperature.
C) The specular reflection of the water alters the wavelength of sunlight.
D) The sand gets hot in the sunlight.
E) The tides tend to equalize the heat distribution.
- 21) Which of the following kinds of wave is composed of electric and magnetic fields changing in space?
A) Red light.
B) Ultraviolet rays.
C) Radio.
D) Microwaves.
 E) All of these.

- 22) If you move a metal wire across a magnetic field, which of the following would you expect to happen?
- A) Nothing, unless the wire was charged.
 - B) A force on the wire.
 - C) The wire begins to vibrate.
 - D) An electric current in the wire.
 - E) Emission of light by the wire.
- 23) Which of these would not travel in empty space (no air)?
- A) Sound
 - B) Light
 - C) Microwaves
 - D) X-Rays
 - E) Infrared radiation
- 24) Which of these is NOT a transverse wave?
- A) The wiggling up and down of a rope held by two people.
 - B) Water waves on the ocean
 - C) Sound waves
 - D) Microwaves
 - E) Light
- 25) Which of these is NOT a standing wave?
- A) The sound of thunder
 - B) The vibration of a guitar string
 - C) The movement of a drum
 - D) The oscillation of air in a pipe organ
 - E) The movement of a violin string when played
- 26) If an apple were magnified to the size of the Earth, the atoms would be the size of
- A) grains of sand
 - B) peas
 - C) apples
 - D) basketballs
 - E) passenger cars
- 27) In the film "Cosmic Voyage", the upward journey began from
- A) St. Marks Square Venice
 - B) Times Square NY
 - C) Lawrence, KS
 - D) Red Square, Moscow
 - E) The Sun
- 28) Which of these scientists was interviewed in the film "Extinctions" with respect to gamma-ray bursts and mass extinctions?
- A) A. Einstein
 - B) R. Feynman
 - C) W. Nye
 - D) A. Melott
 - E) S. Gould