Exam

Name_____

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

1) Tidal forces in general are the result of 1) _____
   A) unequal forces acting on different parts of a body.
   B) a combination of any kind of forces acting on a body.
   C) two or more sources of gravitation.
   D) unequal fluid flow.
   E) the inverse–square law.

2) If you drop a stone into a hole drilled all the way to the other side of the Earth (neglect the molten core), the stone will 2) _____
   A) speed up until it gets to the center of the Earth.
   B) come to an abrupt stop at the center of the Earth.
   C) slow down until it reaches the center.
   D) speed up until it reaches the other side of the Earth.

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

4) Two objects move toward each other because of gravity. As the objects get closer and closer, the acceleration of each 4) _____
   A) decreases. B) increases. C) remains constant.

5) During an eclipse of the sun the high ocean tides on Earth are 5) _____
   A) extra high.
   B) extra low.
   C) not particularly different.

6) If a block is set sliding on a huge frictionless plane in contact with the Earth, it will NOT continue to move at constant speed because 6) _____
   A) gravity will pull in a non–perpendicular direction as the block gets farther out on the plane.
   B) gravity gets weaker as distance increases.
   C) of its inertia.
   D) it is not free from the shackles of Earth's gravity.

7) Angular momentum is conserved for a satellite in 7) _____
   A) circular orbit. B) elliptical orbit. C) both of these D) neither of these

8) What prevents satellites such as a space shuttle from falling? 8) _____
A) the absence of air drag
B) gravity
C) Nothing; they're falling continuously all around the Earth.

9) A projectile is launched at ground level an angle of 15 degrees above the horizontal and lands down range. What other projection angle for the same speed would produce the same down–range distance? 9) _____
A) 45 degrees B) 30 degrees C) 90 degrees D) 50 degrees E) 75 degrees

10) Two projectiles are fired from ground level at equal speeds but different angles. One is fired at an angle of 30 degrees and the other at 60 degrees. The projectile to hit the ground first will be the one fired at (neglect air resistance) 10) _____
A) 60 degrees.
B) 30 degrees.
C) Both hit at the same time.

11) Compared to a 50–kg person, a 100–kg person at the beach requires 11) _____
A) the same amount of suntan lotion.
B) less than twice as much suntan lotion.
C) more than twice as much suntan lotion.

12) Consider the fictional case of the incredible shrinking man. If he shrinks proportionately to 1/10 his original height, his weight will be multiplied by 12) _____
A) 0.0001.
B) 0.001.
C) 0.01.
D) 0.1.
E) none of these

13) Which has more skin, an elephant or a mouse? 13) _____
A) elephant B) mouse C) typically, both the same

14) Doubling the linear size of an object multiplies its area by 14) _____
A) 4 and its volume by 8. B) 2 and its volume by 4.
C) 8 and its volume by 16. D) none of these

15) 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 15) _____
A) web. B) upper flange.
C) lower flange. D) All these will have the same effect.

16) An ice cube floating in a glass of water contains many air bubbles. When the ice melts, the water level will 16) _____
A) rise. B) fall. C) remain unchanged.

17) Two equal sized buckets are filled to the top with water. One of the buckets has a piece of wood floating in it, making its total weight 17) _____
A) equal to the weight of the other bucket.
B) more than the weight of the other bucket.
C) less than the weight of the other bucket.

18) When an ice cube in a glass of water melts, the water level 18) _____
A) rises. B) falls. C) remains the same.

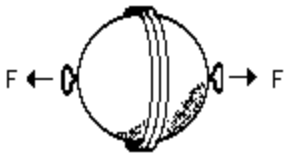
19) When you put a stick in water and remove it, the stick is wet. When you put a stick in mercury and remove it, the stick is dry. The reason for this is that adhesive forces are greater 19) _____
A) between stick and water.
B) between the mercury and the water.
C) between the stick and mercury.

20) The density of a submerged submarine is about the same as the density of 20) _____
A) water.
B) a crab.
C) iron.
D) a floating submarine.
E) none of these

21) Most of the mass of material that makes up a plasma is 21) _____
A) electrically neutral.
B) always positively charged.
C) always negatively charged.

22) Atmospheric pressure is caused by the 22) _____
A) weight of the atmosphere.
B) temperature of the atmosphere.
C) density of the atmosphere.
D) effect of the sun's energy on the atmosphere.

Figure 14–B



23) It would be easier to pull evacuated Magdeburg hemispheres apart when they are 23) _____
A) 20 km beneath the ocean surface.
B) held upside down.
C) 20 km above the ocean surface.
D) at sea level.
E) none of these

24) Assuming no change in temperature, as a freely-expanding helium-filled balloon rises in the atmosphere, the buoyant force that acts on it 24) _____
A) increases.
B) decreases.
C) remains nearly the same for a long way.

25) A suction cup sticks to a wall. It is 25) _____
A) pulled to the wall by the vacuum. B) pushed to the wall by the atmosphere.
C) both of these D) neither of these

26) The main difference between gases and plasmas has to do with 26) _____
A) the kinds of elements involved.
B) interatomic spacing.
C) fluid pressure.
D) the proportion of matter to antimatter in the universe.
E) electrical conduction.

27) Which of the following expands most when the temperature is increased? Equal volumes of 27) _____
A) helium.
B) iron.
C) wood.
D) ice water.
E) All expand the same.

28) Room temperature on the Kelvin scale is about 28) _____
A) 400 K.
B) 100 K.
C) 300 K.
D) 200 K.
E) more than 400 K.

29) Aluminum has a specific heat capacity more than twice that of copper. Place equal masses of aluminum and copper wire in a flame and the one to undergo the fastest increase in temperature will be 29) _____
A) copper. B) aluminum. C) both the same

30) A temperature difference of 10 degrees Celsius is also equal to a temperature difference of 10 on the 30) _____
A) Kelvin scale. B) Fahrenheit scale.
C) both of these D) neither of these

31) Between 0 degrees Celsius and 8 degrees Celsius a red-dyed-water-in-glass thermometer would 31) _____
A) explode.
B) give ambiguous readings.
C) be especially suitable.
D) always be wrong.
E) implode.

32) If glass expanded more than mercury, then the column of mercury in a mercury thermometer would rise when the temperature 32) _____
A) increases. B) decreases. C) neither of these

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

34) Suppose you are served coffee at a restaurant before you are ready to drink it. In order for it to be the hottest when you are ready for it, you should add cream 34) _____
A) right away.
B) at any time.
C) when you are ready to drink the coffee.

35) One of the main reasons one can walk barefoot on red-hot coals of wood without burning the feet has to do with 35) _____
A) low thermal conductivity of the coals.
B) low temperature of the coals.
C) mind over matter techniques.

36) A good heat conductor is 36) _____
A) a poor insulator.
B) a good insulator.
C) neither a poor nor a good insulator.

37) The food in a refrigerator is cooled by 37) _____
A) vaporization of the refrigerating fluid.
B) condensation of the refrigerating fluid.
C) the ice in your nearby freezer.

38) When snow forms in clouds, the surrounding air 38) _____
A) cools.
B) warms.
C) neither warms nor cools.

39) Food cooked in boiling water at a mountain top cooks slower than when cooked at sea level. If the temperature under the pot of boiling water is increased, the food will cook 39) _____
A) faster at sea level.
B) faster at the mountain top.
C) faster at both places.
D) no differently than it did before the increase.

40) To melt 50 grams of 0-degree-Celsius ice requires 40) _____
A) 80 calories. B) 25 calories. C) 50 calories. D) none of these

41) The mass of ice that can be melted by 1 gram of 100-degree-C steam is 41) _____
(Hint: Don't forget about hot water remaining from condensed steam)
A) 8 grams.
B) 0.125 gram.
C) 0.148 gram.
D) 6.75 grams.
E) none of these

42) We are warmed by condensation because water molecules in the air that strike our bodies 42) _____
A) transfer some of their kinetic energy to us.
B) form an insulating layer on our bodies.
C) gain kinetic energy as they change state.

43) A container of air is at atmospheric pressure and 27 degrees C. To double the pressure in the container, it should be heated to 43) _____
A) 54 degrees C.
B) 327 degrees C.
C) 600 degrees C.
D) 300 degrees C.
E) none of these

44) A quantity of water has more entropy when it is 44) _____
A) boiling. B) at room temperature. C) frozen ice.

45) Suppose you rapidly stir some raw eggs with an eggbeater. The temperature of the eggs will 45) _____
A) decrease. B) increase. C) remain unchanged.

46) When mechanical work is done on a system, there can be an increase in 46) _____
A) its temperature. B) its internal energy.
C) both temperature and internal energy. D) neither temperature or internal energy.

47) A heat engine would have 100 percent efficiency if its input reservoir were 47) _____
A) 100 times hotter than the exhaust sink.
B) 100 times cooler than the exhaust sink.
C) 1000 times hotter than the exhaust sink.
D) any finite temperature if the exhaust sink were at absolute zero.
E) at any finite temperature regardless of the heat sink temperature.

48) Suppose you put a closed, sealed can of air on a hot stove burner. The contained air will undergo an increase in 48) _____
A) pressure.
B) internal energy.
C) temperature and pressure.
D) temperature.
E) internal energy, temperature and pressure.

49) Consider a spaceship that moves away from you at half the speed of light. It fires a probe, also away from you, at half the speed of light relative to the spaceship. Relative to you, the probe moves at 49) _____
A) 95% c. B) 90% c. C) 100% c. D) 87% c. E) 80% c.

50) The experiments of Michelson and Morley provided evidence that the speed of light is 50) _____
A) constant.
B) invariant.
C) the same whether its source approaches or recedes.
D) all of these
E) none of these

51) To outside observers, the overall sizes of objects traveling at relativistic speeds are 51) _____
A) larger. B) the same size. C) smaller.

52) According to relativity theory, if a space trip finds a son or daughter biologically older than his or her parents, then the space trip is taken by the 52) _____

A) son or daughter.
B) parents.
C) either
D) Neither, it can't be done.

53) According to Einstein's theory of special relativity, 53) _____

A) space and time are aspects of each other.
B) energy and mass are aspects of each other.
C) both of these
D) none of these

54) A 10–meter–long spear is thrown at relativistic speeds through a 10–meter–long pipe. (Both these dimensions are measured when each is at rest.) When the spear passes through the pipe, which of the following statements is true? 54) _____

A) Both appear to shrink equally so the pipe barely covers the spear.
B) The spear appears to shrink so the pipe completely covers it.
C) The pipe appears to shrink so the spear extends from both ends.
D) any of these, depending on the motion of the observer (moving with the spear, at rest with the pipe, etc.)
E) none of these

Answer Key
Testname: PRACTICE_TEST2

1) A
2) A
3) D
4) B
5) A
6) A
7) C
8) C
9) E
10) B
11) B
12) B
13) A
14) A
15) A
16) C
17) A
18) C
19) A
20) A
21) A
22) A
23) C
24) C
25) B
26) E
27) A
28) C
29) A
30) A
31) B
32) B
33) A
34) A
35) A
36) A
37) A
38) B
39) D
40) D
41) A
42) A
43) B
44) A
45) B
46) C
47) D
48) E
49) E

50) D
51) C
52) B
53) C
54) D