

Practice Test

Remember, this is only a guide. Your actual test may not have the same questions and will be based on the material in Chapter 1 to Chapter 3.

It is the student's responsibility to bring a calculator, pens/pencils (extra if necessary), and an eraser.

NO PHONES!!!

YOU CAN NOT USE THE CALCULATOR ON YOUR PHONE.

PHY 1025 – Fundamentals of Physics

Test 1

Name

Instructions

This exam is closed book and closed notes. You should only need a pencil/pen, an eraser and a calculator. Put everything else away. **Turn off all cell phones.**

The time to visit the restroom is NOW, not during the test!

Make sure to answer all questions. Check them off as you go to make sure you do not miss important aspects of the problem.

If you have a question, raise your hand. Please do not get up from your seat during the test, and do not yell across the room. If a key question is raised that everyone needs to know about, I will make an announcement.

(If required, use acceleration due to gravity $g = 10 \text{ m/s}^2$)

Questions 1-40: 2 points each

1) In science, an educated guess is a

- A) hypothesis.
- B) theory.
- C) both of these.

2) Science is a body of knowledge that

- A) describes order in nature.
- B) is an ongoing activity of humans.
- C) condenses knowledge into testable laws.
- D) All of the above choices are correct.
- E) None of the above choices are correct.

3) Which of the following is a scientific statement?

- A) The moon is made of green cheese.
- B) There are things we will never know about.
- C) Matter is filled with undetectable particles.
- D) There are parts of the universe that will never be found by man.

4) A truly educated person is knowledgeable about

- A) science.
- B) the arts.
- C) religion.
- D) all of these

5) The easiest way for you to measure the distance between the Earth and the moon is to place in your line of sight to the moon a

- A) magnifying glass.
- B) coin.
- C) telescope.
- D) meter stick.

6) Which of the following activities involves the utmost human expression of passion, talent and intelligence?

- A) painting and sculpture.
- B) literature.
- C) music.

- D) science.
- E) all of these.

7) The sizes of both the Moon and the Sun are the same in the sky, which indicates that

- A) both have the same diameters.
- B) both are at about the same distance from Earth.
- C) the smaller Moon is closer to Earth than the Sun.
- D) both the Moon and the Sun circle Earth.

8) A person who says, “that’s only a theory” likely doesn’t know that a scientific theory is a

- A) guess that involves many facts.
- B) hypothesis of sorts.
- C) vast synthesis of well-tested hypotheses and facts.
- D) guess that may or may not be factual.

9) In science, a theory is

- A) an educated guess.
- B) less than a fact.
- C) a synthesis of a large body of well-tested knowledge.
- D) unchangeable.

10) A scientific hypothesis may turn out to be right or it may turn out to be wrong. If it is a valid hypothesis, there must be a test for proving it

- A) right.
- B) wrong.

11) An object in mechanical equilibrium is an object

- A) at rest.
- B) moving with constant velocity.
- C) having no acceleration.
- D) all of these.

12) When you stand at rest on a pair of bathroom scales, the readings on the scales will always

- A) each be half your weight.
- B) each equal your weight.

C) add up to equal your weight.

13) A 300-kg bear grasping a vertical tree slides down at constant velocity. The friction force between the tree and the bear is

- A) 30 N.
- B) 300 N.
- C) 3000 N.
- D) more than 3000 N.

14) A man weighing 800 N stands at rest on two bathroom scales so that his weight is distributed evenly over both scales. The reading on each scale is

- A) 200 N.
- B) 400 N.
- C) 800 N.
- D) none of these

15) An object slides with a constant velocity. The force of friction on the sliding object is 10 N. The applied force needed to maintain the constant velocity is

- A) more than 10 N.
- B) less than 10 N.
- C) 10 N.

16) What is the net force on a cart that is pulled to the right with 100 N and to the left with 30 N ?

- A) 130 N to the right
- B) 70 N to the right
- C) 70 N to the left
- D) zero net force

17) Whirl a rock at the end of a string and it follows a circular path. If the string breaks, the tendency of the rock is to

- A) continue to follow a circular path.
- B) follow a straight-line path.
- C) increase its speed.
- D) revolve in a smaller circle.

18) If your automobile runs out of fuel while you are driving, the engine stops but you do not come to an abrupt stop. The concept that most explains why is

- A) inertia.

- B) gravity.
- C) acceleration.
- D) resistance.

19) If no external forces are acting on a moving object, it will

- A) continue moving at the same speed.
- B) continue moving at the same velocity.
- C) move slower and slower until it finally stops.

20) According to Newton's law of inertia, a railroad train in motion should continue going forever even if its engine is turned off. We never observe this because railroad trains

- A) move too slowly.
- B) are much too heavy.
- C) must go up and down hills.
- D) always have forces that oppose their motion.

21) The two measurements necessary for calculating average speed are

- A) acceleration and time.
- B) velocity and time.
- C) distance and time.
- D) distance and acceleration.
- E) velocity and distance.

22) What is the average speed of a cheetah that sprints 100 m in 4 seconds?

- A) 100 m/s
- B) 50 m/s
- C) 25 m/s
- D) 4 m/s

23) While an object near the Earth's surface is in free fall, its

- A) velocity increases.
- B) acceleration increases.
- C) mass increases.
- D) mass decreases.

24) If a freely falling object were somehow equipped with a speedometer, its speed reading would increase each second by about

- A) 5 m/s.
- B) 10 m/s.
- C) 15 m/s.
- D) a variable amount.
- E) depends on its initial speed

25) Twelve seconds after starting from rest, an object falling freely will have a speed of

- A) 10 m/s.
- B) 50 m/s.
- C) 100 m/s.
- D) more than 100 m/s.

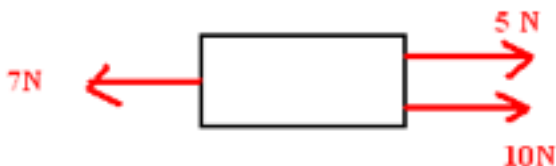
26) If a car increases its velocity from zero to 60 km/h in 10 seconds, its acceleration is

- A) 3 km/h/s.
- B) 6 km/h/s.
- C) 10 km/h/s.
- D) 60 km/h/s.
- E) 600 km/h/s.

27) If you drop an object, its acceleration toward the ground is 10 m/s/s. If you throw it down instead, its acceleration would be

- A) zero
- B) 10 m/s/s
- C) greater than 10 m/s/s

28) What is the net force acting on the object shown below?



- A) 15 N to right
- B) 22 N to right
- C) 8 N to left
- D) 8 N to right

29) In each second of fall, the distance a freely falling object will fall is

- A) about 5 m.
- B) about 10 m.
- C) the same, but not 5 m or 10 m.
- D) increasing.
- E) none of these

30) Drop a rock from a 5-m height and it accelerates at 10 m/s^2 and strikes the ground 1 s later. Drop the same rock from a height of 2.5 m and its acceleration of fall is about

- A) half as much.
- B) the same amount.
- C) twice as much.
- D) four times as much.

31) Compared to a 1-kg block of solid iron, a 2-kg block of solid iron has twice as much

- A) inertia.
- B) mass.
- C) volume.
- D) all of these
- E) none of these

32) You push on a crate that sits on a smooth floor and it accelerates. If you apply four times the net force, how much greater will be the acceleration?

- A) it will be the same
- B) twice
- C) three times
- D) four times

33) What is the weight of a 2 kg rock?

- A) 2 kg
- B) 2 N
- C) 20 kg
- D) 20 N

- 34) Consider drops of water that leak at a steady rate from a dripping faucet. As the drops fall they
- A) get closer together.
 - B) get farther apart.
 - C) remain at a relatively fixed distance from one another.
- 35) A 10-N falling object encounters 4 N of air resistance. The net force on the object is
- A) 0 N.
 - B) 4 N.
 - C) 6 N.
 - D) 10 N.
 - E) none of these
- 36) Consider a book that weighs 15 N at rest on a flat table. What is the support force provided by the table?
- A) 0 N
 - B) 15 N
 - C) 15 kg
 - D) 7.5 N
- 37) A horse gallops a distance of 10 kilometers in a time of 30 minutes. Its average speed is
- A) 15 km/h.
 - B) 20 km/h.
 - C) 30 km/h.
 - D) 40 km/h.
- 38) A car maintains a constant velocity of 100 km/hr for 10 seconds. During this interval its acceleration is
- A) zero.
 - B) 10 km/hr.
 - C) 110 km/hr.
 - D) 1000 km/hr.
- 39) A ball tossed vertically upward rises, reaches its highest point, and then falls back to its starting point. During this time the acceleration of the ball is always
- A) in the direction of motion.
 - B) opposite its velocity.
 - C) directed upward.

D) directed downward.

40) You toss a ball straight up with an initial speed of 30 m/s. How long does it take to reach the highest point?

- A) 1 s
- A) 2 s
- C) 3 s
- D) 6 s

41) An empty jug of weight 10 N rests on a table.

a) What is the support force exerted on the jug by the table? (1 point)

b) What is the support force on the jug when the water of weight 5N is poured into the jug? (1 point)

42) Can an object be in mechanical equilibrium when only a single force acts on it? Explain. (2 points)

43) Consider a pair of forces, one having a magnitude of 20N and the other a magnitude of 12N. What maximum net force is possible for these two forces? What is the minimum net force possible? (4 points)

44) Consider a vertically launched projectile when air drag is negligible. When is the acceleration due to gravity if greater? When ascending, at the top, or when descending? Explain your answer. (2 points)

45) A cat steps off a ledge and drops to the ground. If the ledge is 5 m above the ground, what is the speed of the cat on striking the ground? Show your work. (5 points)

1)

2)

3)

4)

5)

6) Gravity

7)