College entrance exam and science high school entrance test tips. Conquer UPCAT, ACET, USTET, DLSUCET, PSHS-NCE, and other entrance tests.

SCIENCE PROFICIENCY
(Physics)

Directions: For each statement or question, choose the letter of the word or expression that, of those given, best completes or answers the question. Then on your answer sheet, blacken the circle that corresponds to your final answer.
Notes:
► Calculators of any kind are not permitted. All numbers used are real numbers.

BEGIN HERE:

1. A vector is a quantity with both magnitude and direction. Which of the following is not a vector?
   a. displacement
   b. force
   c. speed
   d. acceleration

2. A moving object possesses acceleration if a change in a velocity is observed. Which of the following does not illustrate acceleration?
   a. A cart moving downhill on a mountain slope
   b. A ball thrown upwards
   c. A book on the table
   d. A car running along a curve

3. Newton (N) is the metric standard unit of force. This is defined to be _____.
   a. kg/L
   b. $kg \cdot m^2$
   c. $kg \cdot m/s^2$
   d. $kg \cdot m/s$

4. Dante walks 0.5 Km north. Starting from the same point, Richie walks 1.2 Km east. What would be the distance separating the two boys?
   a. 0.7 Km
   b. 0.9 Km
   c. 1.1 Km
   d. 1.3 Km

5. A rally driver has 5 seconds to stop his car which traveling at a speed of 20 m/s. What is his average acceleration?
   a. $4\ m/s^2$
   b. $3\ m/s^2$
   c. $1\ m/s^2$
   d. $0.25\ m/s^2$

6. What force is needed to make a 2 kg rock accelerate at 0.5 m/s^2?
   a. 1 N
   b. 2 N
   c. 3 N
   d. 4 N

7. Which of the following statement/s is/are TRUE?

I. Statics involves the study of the forces acting on a body that is at rest or is moving in a straight line with constant speed.
II. Dynamics is the study of forces acting on a body that are in equilibrium.
III. Statics is the branch of mechanics that studies the forces that affect the motion of an object.

   a. I only
   b. II only
   c. III only
   d. I and II only

8. What is the study under dynamics which deals with the space-time relationship in bodies that are in motion?
   a. Mechanics
   b. Static
   c. kinematics
   d. kinetics

9. What is the centripetal force acting on a 100 kg car negotiating a circular curve of radius 60 meters at a speed of 30 m/s?
   a. 15 KN
   b. 25 KN
   c. 30 KN
   d. 45 KN

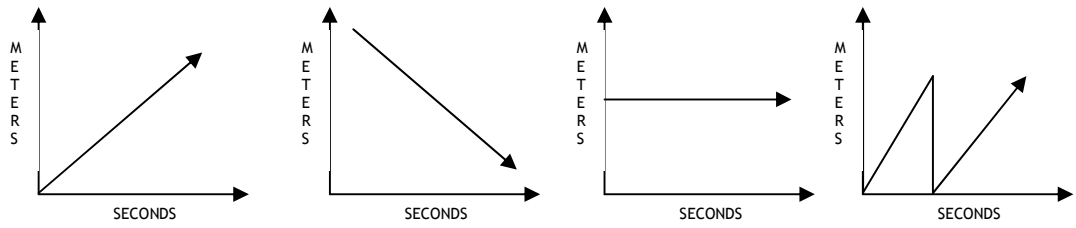
10. "For every action, there is an equal and opposite reaction." If a baseball player hits a ball with a bat – and the "action" is said to be the impact of the bat against the ball – what is its "opposite reaction?"
   a. The grip of the player's hand on the bat.
   b. The air resistance on the ball.
   c. The force of the ball against the bat.
   d. Muscular effort in the player's arm.

11. A block weighing 200 N lies on a plane inclined 20^o with the horizontal. What force tends to pull the block down the plane?
   a. F = (200)(sin 20^o)
   b. F = (200)(cos 20^o)
   c. $F = \frac{200}{\sin 20^0}$
   d. $F = \frac{200}{\cos 20^0}$

12. If speed is defined as the quantitative measure of the change of an object's position over a certain amount of time, what is said to be the speed of an object at any particular moment?
    a. average speed
    b. ordinary speed
    c. uniform speed
    d. instantaneous speed

13. The movement of a body launched in space without its motive power, and travels freely under the action of gravity and air resistance alone is called _____.
    a. rectilinear motion
    b. uniform circular motion
    c. projectile motion
    d. horizontal motion

For numbers 14 -15, refer to the figures below. The following are distance and time readings of a traveling car.



a. b. c. d.

14. Which illustrates the car at rest?

15. Which illustrates traveling at constant velocity?

16. Newton's First Law of motion is called the Law of Inertia. Which of the following does not illustrate Inertia?

    a. A tanker in full speed turning it engine in reverse an hour before reaching the port.
    b. A train slowing down before reaching the station.
    c. A ball falling from an airplane.
    d. A man on a bus being "pushed" backward when the bus starts moving.

17. What horizontal force is necessary to press a 15 kg block against a vertical wall to prevent it from slipping? Assume that the coefficient of static friction between the block and the wall is 0.25.
    a. 600 N
    b. 500 N
    c. 400 N
    d. 300 N

18. Acceleration is defined as the change in velocity of an object over change in time. Based from this statement, what is the equation for the final velocity of an object?
    a. $V_f = V_i + a\Delta t$
    b. $V_f = V_i - a\Delta t$
    c. $V_f = 2V_i + a\Delta t$
    d. $V_f = V_i^2 + 2a\Delta t$

19. A 2-meter long uniform seesaw is supported at its center. A 500 N boy sits 20 cm from the left endpoint of the seesaw. How far from the other side of the seesaw should a 1 500 N man sit so that the seesaw remains in a horizontal position?
    a. 20 cm
    b. 40 cm
    c. 60 cm
    d. 80 cm

20. The law of conservation of energy states that the total energy of the system is constant. What relation does the kinetic and potential energy in one system possess?
    a. KE > PE
    b. KE < PE
    c. KE = PE
    d. KE = -PE

21. What is the kinetic energy of a 500-kg car moving at 3.0 m/s?
    a. 1.50 kJ
    b. 1.75 kJ
    c. 2.00 kJ
    d. 2.25 kJ

22. According to the law of conservation of momentum, the total momentum of a system is conserved. What happens when two bodies of equal masses and equal speeds collide?
    a. They bounce back with the same speed and distance.
    b. They stick together.
    c. They bounce sideways.
    d. Could not be determined.

23. Pressure waves of frequencies above the audible frequencies are called _____.
    a. infrasonic
    b. supersonic
    c. mega sonic
    d. ultrasonic

24. Refraction is the bending of light. Like for example, a fish might look much nearer to the surface than it really is. Why is this so?
    a. Because light bounces off the ocean floor.
    b. Because the fish moves too fast.

c. Because light travels at a different speed on water.
d. This phenomenon is not true.

25. When Ryota looked at himself in the mirror, he look taller then he expected. Why is this so?
a. The mirror was concave.
b. The mirror was convex.
c. The mirror was taller.
d. The mirror has nothing to do with it.

26. Which of the following is NOT TRUE about electromagnetic waves?
a. They are produced by moving charges.
b. They are transverse waves.
c. They require a medium for transmission
d. They travel with the same speed in the absence of vacuum.

27. _____ is an interaction with matter in which transverse waves are restricted to a particular plane of vibration.
a. Polarization
b. reflection
c. refraction
d. optical illusion

28. What property/characteristic of sound do we perceive as volume?
a. Wave length
b. Frequency
c. Amplitude
d. Pitch

29. What is the difference between the speed of sound and the speed of light?
a. Sound is 740 mph faster than light.
b. Light is 17860 mph faster than sound.
c. Sound is equal the speed of light.
d. Light is 740 mph faster than sound.

30. In the color spectrum, the colors are enumerated in increasing_____.
a. Frequency
b. Wavelength
c. Energy
d. penetrability