Vectors and Forces in Physics

Physics · Practice Test · 20 Questions

1. What is a resultant vector?

A) A vector with the same magnitude but opposite direction.
B) A vector sum of two or more vectors, having the same effect as the original vectors.
C) A vector perpendicular to the original vectors.
D) A vector representing the difference between two vectors.

2. Which method is used to determine the resultant of vectors on a Cartesian plane by finding vertical and horizontal components?

A) Graphical method
B) Tail-to-head method
C) Component method
D) Parallelogram method

3. To calculate the magnitude of the resultant vector, which theorem is used?

A) Pythagorean theorem
B) Sine rule
C) Cosine rule
D) Law of Sines

4. How is the direction of the resultant vector determined?

A) Using the Pythagorean theorem
B) Using simple trigonometric ratios
C) By graphical representation only
D) By adding the angles of the original vectors

5. What is the parallelogram method used to determine?

A) The magnitude of a single vector
B) The resolution of a vector
C) The resultant of two vectors graphically
D) The components of a vector

6. What does a closed vector diagram represent?

A) A vector that is zero.
B) A vector that is perpendicular to the resultant.
C) A resultant vector that returns to the starting point.
D) A set of non-collinear vectors.

7. If ? is the angle between a resultant vector R and the x-axis, which formula is used for the resultant x-component?

A) Rx = Rsin?
B) Rx = Rcos?
C) Rx = Rtan?
D) Rx = R/cos?

8. If ? is the angle between a resultant vector R and the x-axis, which formula is used for the resultant y-component?

A) Ry = Rcos?
B) Ry = Rtan?
C) Ry = Rsin?
D) Ry = R/sin?

9. Which of the following is NOT a type of force mentioned in the text?

A) Weight
B) Centripetal force
C) Normal force
D) Frictional force

10. What is the normal force (N)?

A) The force that opposes motion.
B) The force exerted by a surface on an object in contact with it, perpendicular to the surface.
C) The force of gravity acting on an object.
D) The force applied by pushing or pulling.

11. The normal force acts perpendicular to the surface, regardless of whether the plane is:

A) Horizontal or inclined
B) Smooth or rough
C) Moving or stationary
D) Flat or curved

12. What is frictional force (f)?

A) The force that causes motion.
B) The force that opposes the motion of an object and acts parallel to the surface.
C) The force exerted by a string or cable.
D) The force due to gravity.

13. Frictional force is proportional to:

A) The area of contact
B) The normal force
C) The velocity of the object
D) The applied force

14. Frictional force is independent of:

A) The normal force
B) The applied force
C) The area of the surfaces in contact
D) The type of surfaces

15. What is static frictional force (fs)?

A) The force that opposes motion when an object is moving.
B) The force that opposes the tendency of motion of a stationary object relative to a surface.
C) The force that causes an object to accelerate.
D) The maximum possible frictional force.

16. The static frictional force can have a range of values from zero up to a maximum value of:

A) f = uN
B) f = N/u
C) f = u/N
D) f = N - u

17. If an applied force parallel to the surface does not cause a stationary object to move, what is the magnitude of the applied force equal to?

A) The maximum static frictional force
B) Zero
C) The static frictional force
D) Twice the static frictional force

18. What is the definition of 'resultant' in the context of vectors?

A) The difference between two vectors.
B) A single vector having the same effect as two or more vectors together.
C) A vector perpendicular to the sum of vectors.
D) The average of multiple vectors.

19. Which of the following is a graphical method for determining the resultant of two vectors?

A) Component method
B) Pythagorean theorem
C) Tail-to-head method
D) Trigonometric ratios

20. For inclined planes, what are the forces perpendicular to the plane?

A) Weight and normal force
B) Component of weight (Wcos?) and normal force (N)
C) Frictional force and normal force
D) Applied force and weight