

## Extended Response

### 5.1 Vector Addition and Subtraction: Graphical Methods 80.

True or False—For vectors the order of addition is important.

- a. True
- b. False

81.

Consider five vectors  $a$ ,  $b$ ,  $c$ ,  $d$ , and  $e$ . Is it true or false that their addition always results in a vector with a greater magnitude than if only two of the vectors were added?

- a. True
- b. False

### 5.2 Vector Addition and Subtraction: Analytical Methods 82.

For what angle of a vector is it possible that its magnitude will be equal to its y-component?

- a.  $\theta = 0^\circ$
- b.  $\theta = 45^\circ$
- c.  $\theta = 60^\circ$
- d.  $\theta = 90^\circ$

83.

True or False—If only the angles of two vectors are known, we can find the angle of their resultant addition vector.

- a. True
- b. False

84.

True or false—We can find the magnitude and direction of the resultant vector if we know the angles of two vectors and the magnitude of one.

- a. True
- b. False

### 5.3 Projectile Motion 85.

Ignoring drag, what is the x-component of the acceleration of a projectile? Why?

- a. The x-component of the acceleration of a projectile is 0 because acceleration of a projectile is due to gravity, which acts in the y direction.
- b. The x component of the acceleration of a projectile is g because acceleration of a projectile is due to gravity, which acts in the x direction.

- c. The x-component of the acceleration of a projectile is 0 because acceleration of a projectile is due to gravity, which acts in the x direction.
- d. The x-component of the acceleration of a projectile is g because acceleration of a projectile is due to gravity, which acts in the y direction.

86.

What is the optimum angle at which a projectile should be launched in order to cover the maximum distance?

- a.  $0^\circ$
- b.  $45^\circ$
- c.  $60^\circ$
- d.  $90^\circ$

#### 5.4 Inclined Planes 87.

True or False—Friction varies from surface to surface because different substances have different degrees of roughness or smoothness.

- a. True
- b. False

88.

As the angle of the incline gets larger, what happens to the magnitudes of the perpendicular and parallel components of gravitational force?

- a. Both the perpendicular and the parallel component will decrease.
- b. The perpendicular component will decrease and the parallel component will increase.
- c. The perpendicular component will increase and the parallel component will decrease.
- d. Both the perpendicular and the parallel component will increase.

#### 5.5 Simple Harmonic Motion 89.

What physical characteristic of a system is its force constant related to?

- a. The force constant  $k$  is related to the stiffness of a system: The larger the force constant, the stiffer the system.
- b. The force constant  $k$  is related to the stiffness of a system: The larger the force constant, the looser the system.
- c. The force constant  $k$  is related to the friction in the system: The larger the force constant, the greater the friction in the system.
- d. The force constant  $k$  is related to the friction in the system: The larger the force constant, the lower the friction in the system.

90.

How or why does a pendulum oscillate?

- a. A pendulum oscillates due to applied force.
- b. A pendulum oscillates due to the elastic nature of the string.
- c. A pendulum oscillates due to restoring force arising from gravity.
- d. A pendulum oscillates due to restoring force arising from tension in the string.

91.

If a pendulum from earth is taken to the moon, will its frequency increase or decrease? Why?

- a. It will increase because  $g$  on the Moon is less than  $g$  on Earth.
- b. It will decrease because  $g$  on the Moon is less than  $g$  on Earth.
- c. It will increase because  $g$  on the Moon is greater than  $g$  on Earth.
- d. It will decrease because  $g$  on the Moon is greater than  $g$  on Earth.