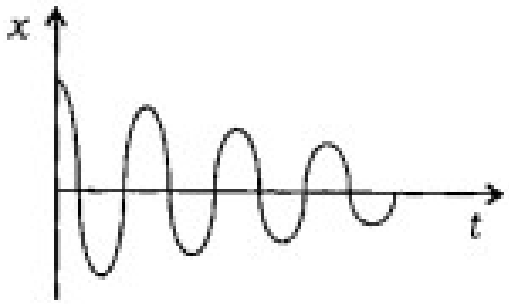
PYQs on PHYSICS (2014-2024)



The displacement (x)-time (t) graph given above approximately represents the motion of a

(a) simple pendulum placed in vacuum

(b) simple pendulum immersed in water

(c) simple pendulum placed in outer space

(d) point mass moving in air

. A spring can be used to determine the mass *m* of an object in two ways : (i) by measuring the extension in the spring due to the object; and (ii) by measuring the oscillation period for the given mass. Which of these methods can be used in a space-station orbiting Earth ?

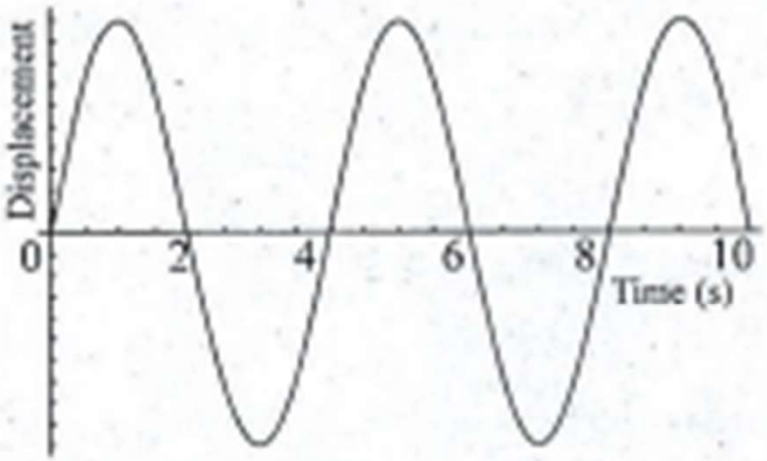
(a) Both

(b) Only the extension method

(c) Only the oscillation method

(d) Neither

. The following figure shows displacement versus time curve for a particle executing simple harmonic motion :



Which one of the following statements is correct ?

(a) Phase of the oscillating particle is same at $t = 1$ s and $t = 3$ s

(b) Phase of the oscillating particle is same at $t = 2$ s and $t = 8$ s

(c) Phase of the oscillating particle is same at $t = 3$ s and $t = 7$ s

(d) Phase of the oscillating particle is same at $t = 4$ s and $t = 10$ s

. A ball balanced on a vertical rod is an example of

(a) stable equilibrium

(b) unstable equilibrium

(c) neutral equilibrium

(d) perfect equilibrium

If T is the time period of an oscillating pendulum, which one of the following statements is NOT correct ?

(a) The motion repeats after time T only once

(b) T is the least time after which motion repeats itself

(c) The motion repeats itself after nT, where n is a positive integer

(d) T remains the same only for small angular displacements

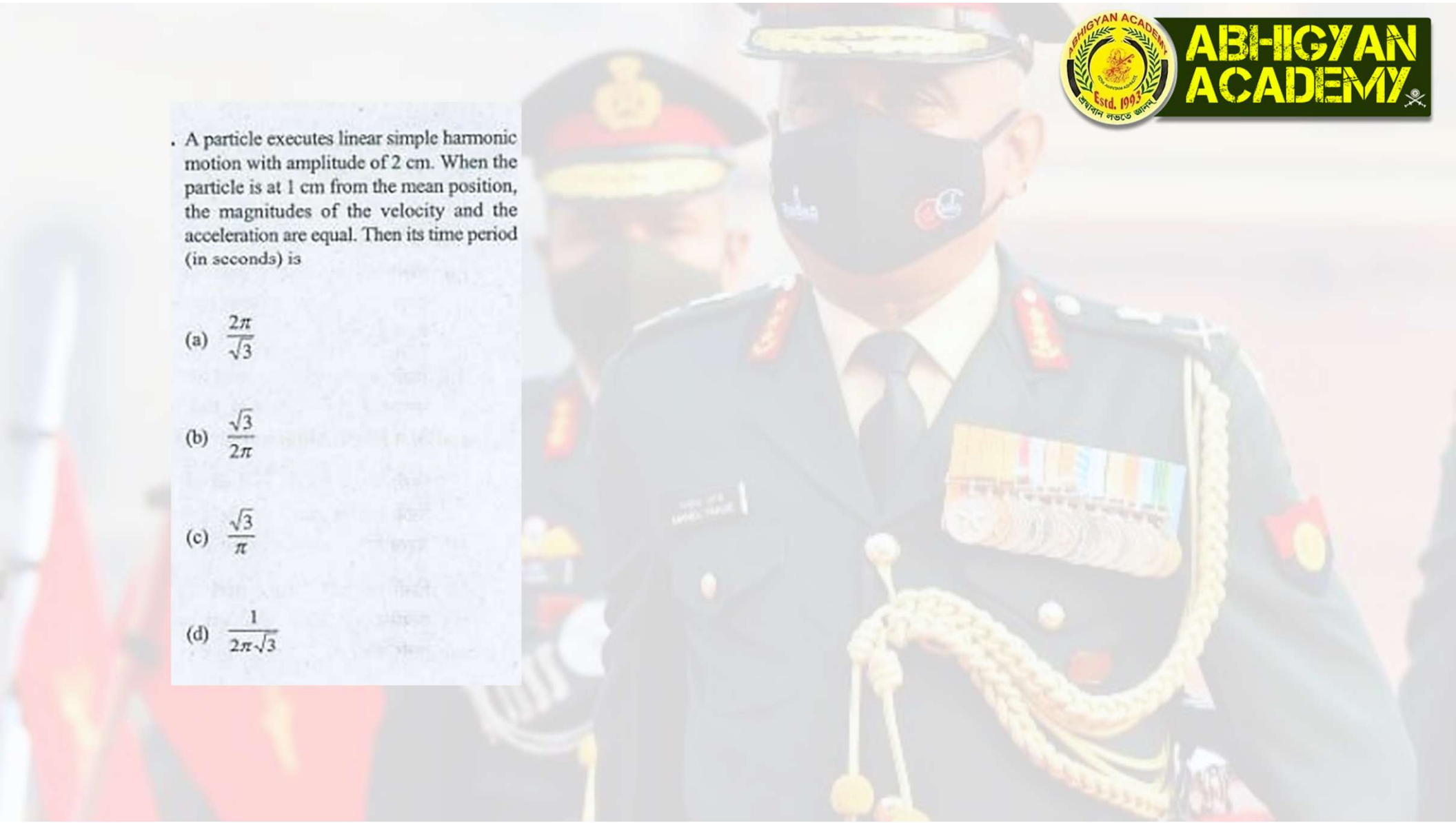
. A particle executes linear simple harmonic motion with amplitude of 2 cm. When the particle is at 1 cm from the mean position, the magnitudes of the velocity and the acceleration are equal. Then its time period (in seconds) is

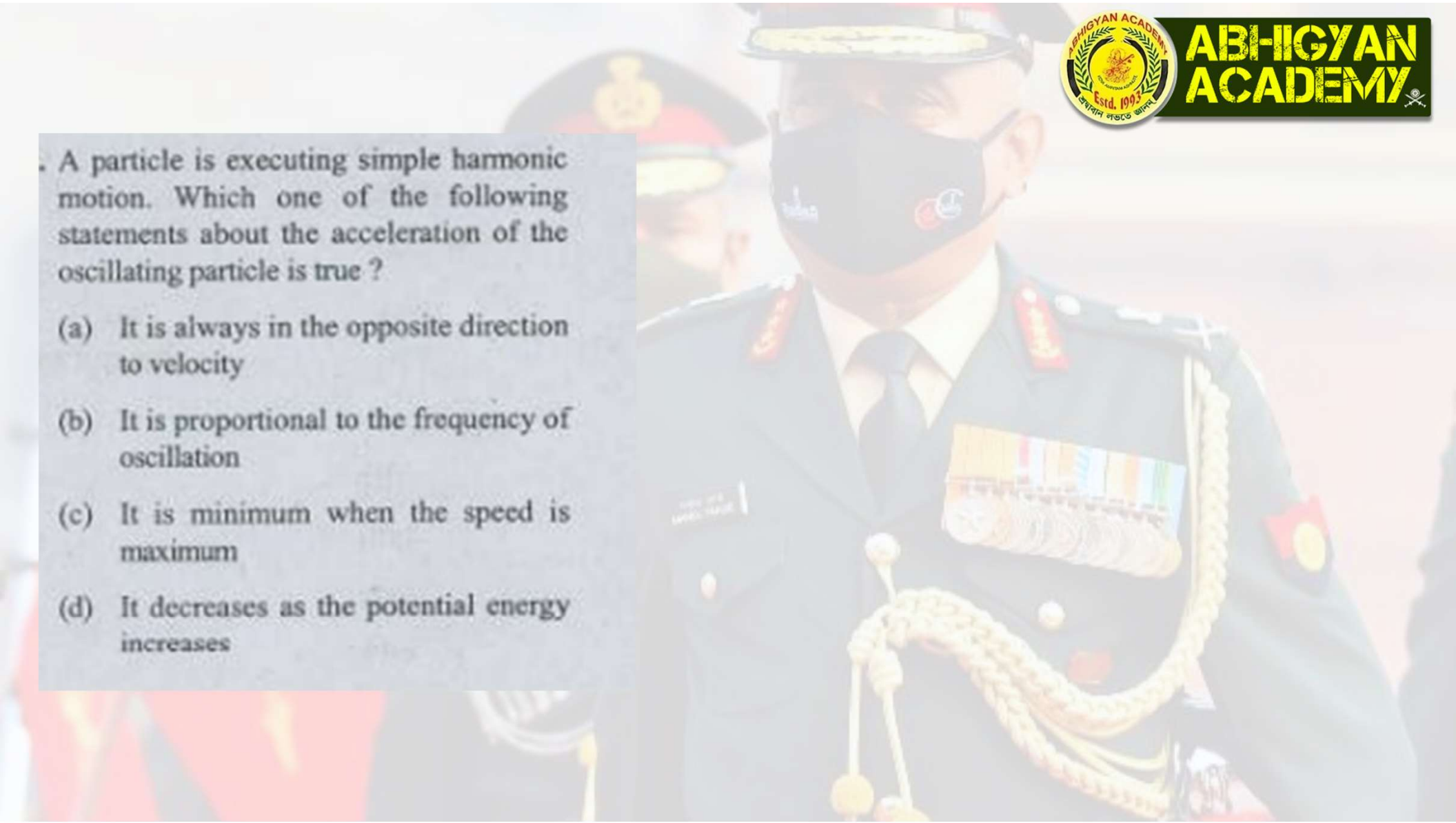
(a) $\frac{2\pi}{\sqrt{3}}$

(b) $\frac{\sqrt{3}}{2\pi}$

(c) $\frac{\sqrt{3}}{\pi}$

(d) $\frac{1}{2\pi\sqrt{3}}$





. A particle is executing simple harmonic motion. Which one of the following statements about the acceleration of the oscillating particle is true ?

(a) It is always in the opposite direction to velocity

(b) It is proportional to the frequency of oscillation

(c) It is minimum when the speed is maximum

(d) It decreases as the potential energy increases

Consider the following statements about a microscope and a telescope :

1. Both the eyepiece and the objective of a microscope are convex lenses.
2. The focal length of the objective of a telescope is larger than the focal length of its eyepiece.
3. The magnification of a telescope increases with the increase in focal length of its objective.
4. The magnification of a microscope increases with the increase in focal length of its objective.

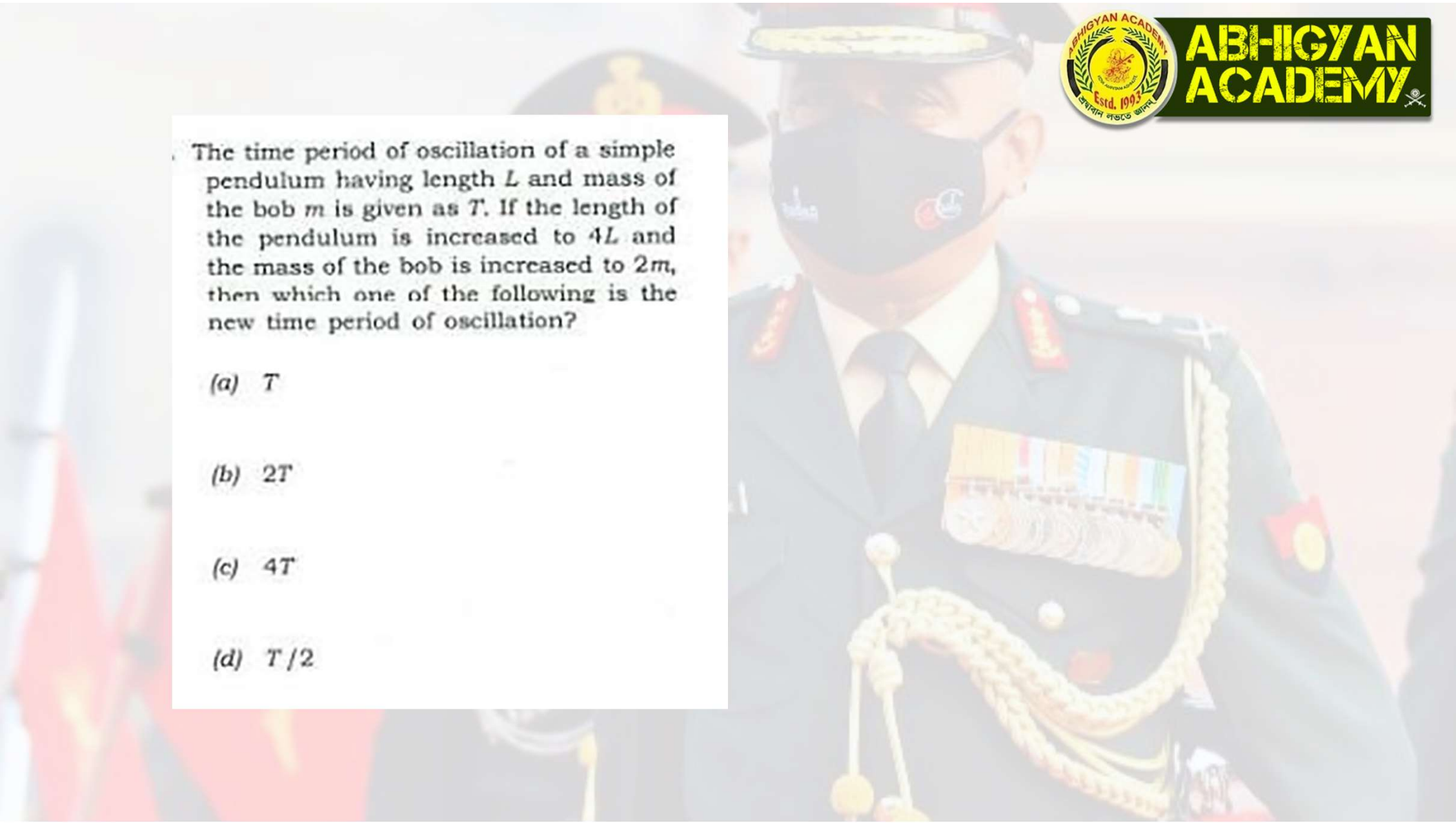
Which of the statements given above are correct?

(a) 1 and 3 only

(b) 1 and 4

(c) 2, 3 and 4

(d) 1, 2 and 3



The time period of oscillation of a simple pendulum having length L and mass of the bob m is given as T. If the length of the pendulum is increased to $4L$ and the mass of the bob is increased to $2m$, then which one of the following is the new time period of oscillation?

(a) T

(b) $2T$

(c) $4T$

(d) $T/2$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