PYQs on Gravitation (2014-2024)

Planet *A* has double the radius than that of Planet *B*. If the mass of Planet *A* is 4 times heavier than the mass of Planet *B*, which of the following statements regarding weight of an object is correct?

(a) Heavier on Planet *A* than on Planet *B*

(b) Heavier on Planet *B* than on Planet *A*

(c) Same on both the Planets

(d) Cannot be measured on Planet *B*


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If radius of the earth were to shrink by 1%, its mass remaining the same, g would decrease by nearly

(a) 1%

(b) 2%

(c) 3%

(d) 4%


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The radius of the Moon is about one-fourth that of the Earth and acceleration due to gravity on the Moon is about one-sixth that on the Earth. From this, we can conclude that the ratio of the mass of Earth to the mass of the Moon is about

(a) 10

(b) 100

(c) 1,000

(d) 10,000


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Suppose the force of gravitation between two bodies of equal masses is F. If each mass is doubled keeping the distance of separation between them unchanged, the force would become

(a) F

(b) 2 F

(c) 4 F

(d) $\frac{1}{4}$ F


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Which one of the following statements is true for the relation $F = \frac{Gm_1m_2}{r^2}$?

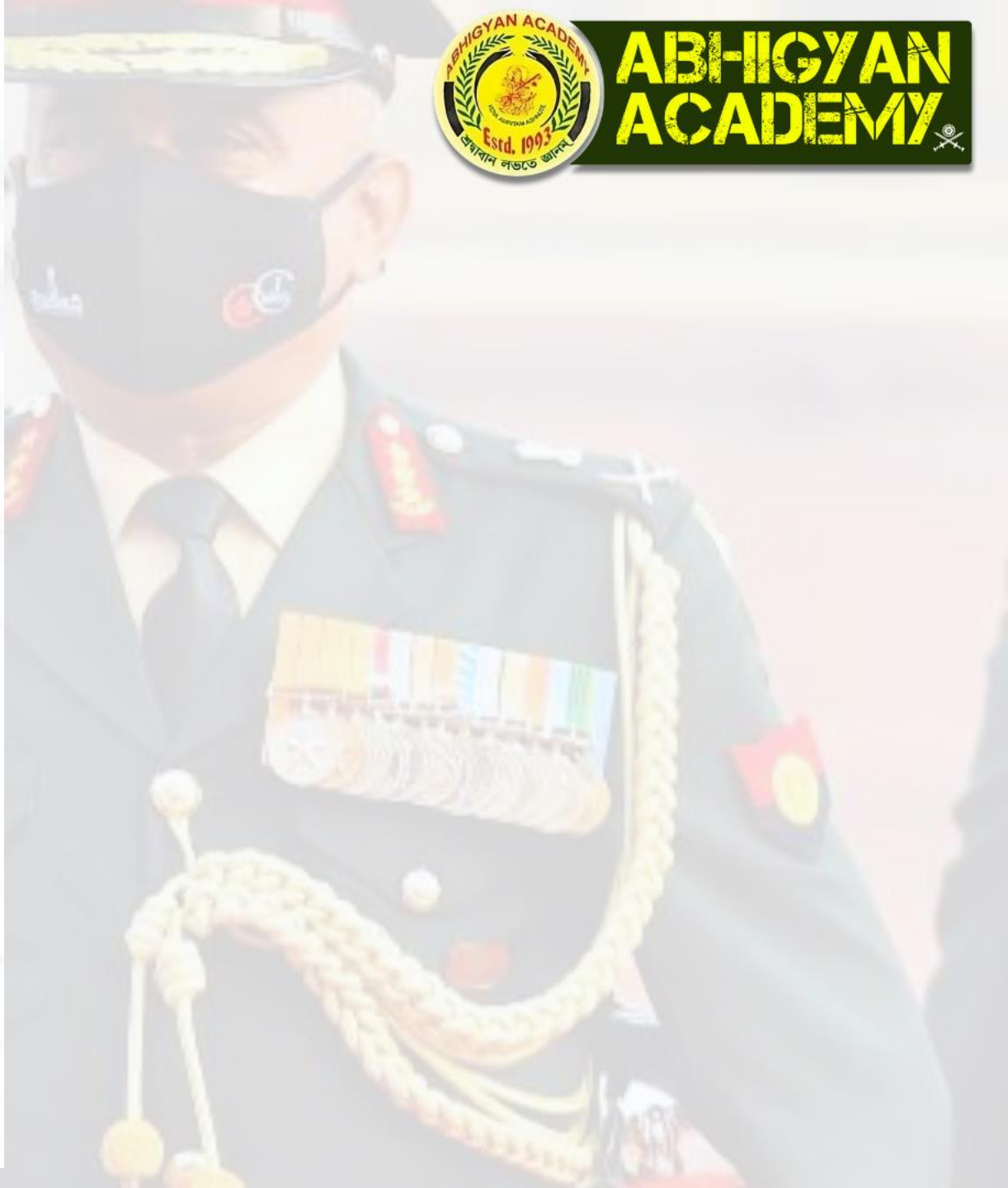
(All symbols have their usual meanings)

(a) The quantity G depends on the local value of g, acceleration due to gravity

(b) The quantity G is greatest at the surface of the Earth

(c) The quantity G is used only when earth is one of the two masses

(d) The quantity G is a universal constant

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. Which one of the following statements about gravitational force is NOT correct ?

(a) It is experienced by all bodies in the universe

(b) It is a dominant force between celestial bodies

(c) It is a negligible force for atoms

(d) It is same for all pairs of bodies in our universe


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. LIGO stands for

(a) Laser Interferometer Gravitational wave Observatory

(b) Light Interferometer Gravitational wave Observatory

(c) Light Induced Gravity Observatory

(d) Laser Induced Gaseous Optics


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. Suppose there are two planets, 1 and 2, having the same density but their radii are R_1 and R_2 respectively, where $R_1 > R_2$. The accelerations due to gravity on the surface of these planets are related as

(a) $g_1 > g_2$

(b) $g_1 < g_2$

(c) $g_1 = g_2$

(d) Can't say anything


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5. The acceleration due to gravity 'g' for objects on or near the surface of earth is related to the universal gravitational constant 'G' as ('M' is the mass of the earth and 'R' is its radius):

(a) $G = g\frac{M}{R^2}$

(b) $g = G\frac{M}{R^2}$

(c) $M = \frac{gG}{R^2}$

(d) $R = \frac{gG}{M^2}$


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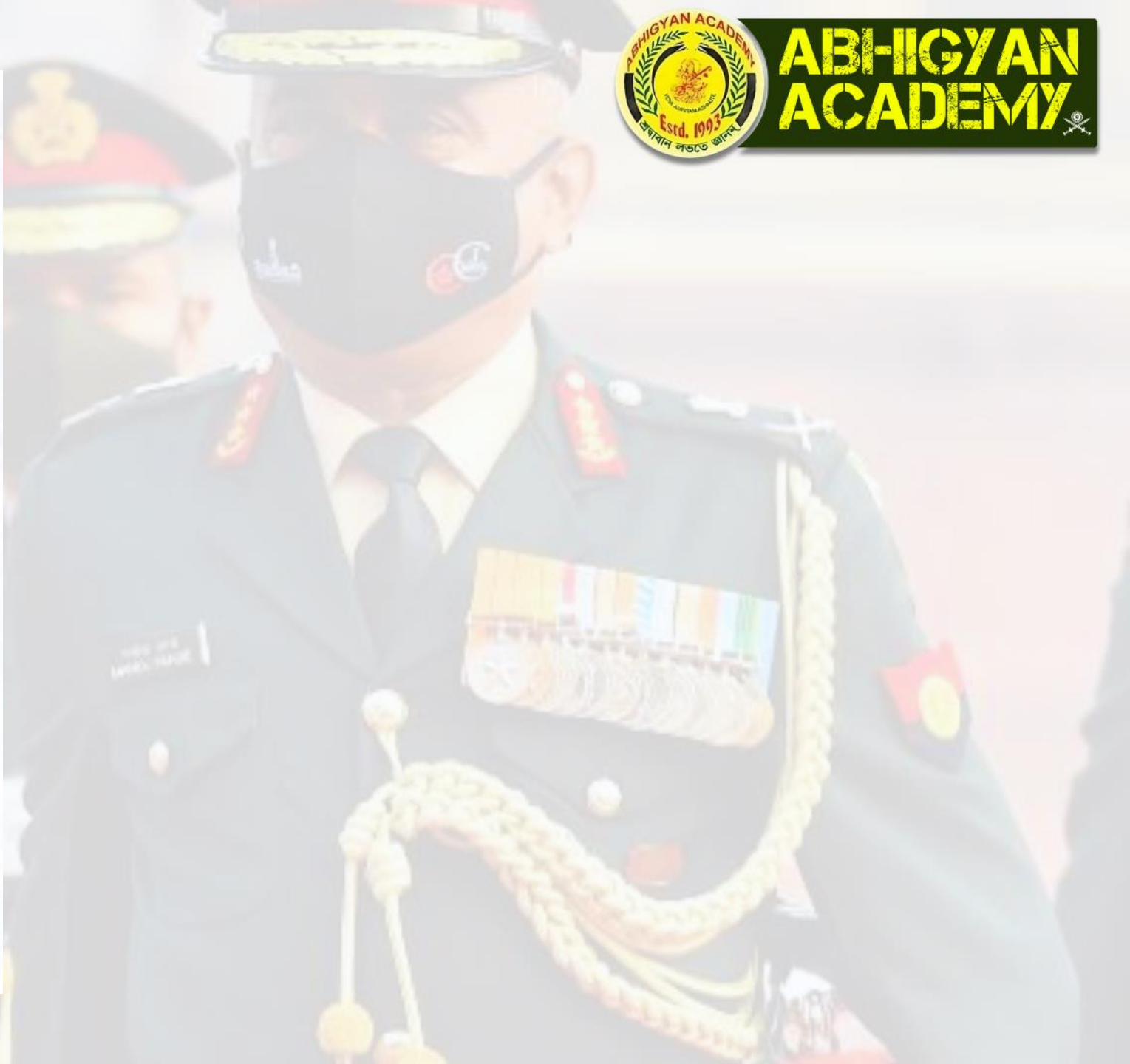
. The free fall acceleration g increases as one proceeds, at sea level, from the equator toward either pole. The reason is

(a) Earth is a sphere with same density everywhere

(b) Earth is a sphere with different density at the polar regions than in the equatorial regions

(c) Earth is approximately an ellipsoid having its equatorial radius greater than its polar radius by 21 km

(d) Earth is approximately an ellipsoid having its equatorial radius smaller than its polar radius by 21 km

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. Which one of the following is *not* a contact force ?

(a) Push force

(b) Gravitational force

(c) Frictional force

(d) Strain force


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A planet has a mass M_1 and radius R_1. The value of acceleration due to gravity on its surface is g_1. There is another planet 2, whose mass and radius both are two times that of the first planet. Which one of the following is the acceleration due to gravity on the surface of planet 2?

(a) g_1

(b) $2g_1$

(c) $g_1/2$

(d) $g_1/4$


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How long does light take to reach the Earth from the Sun ?

(a) About 4 minutes

(b) About 8 minutes

(c) About 24 minutes

(d) About 24 hours


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Two bodies of mass M each are placed R distance apart. In another system, two bodies of mass 2M each are placed $\frac{R}{2}$ distance apart.

If F be the gravitational force between the bodies in the first system, then the gravitational force between the bodies in the second system will be

(a) 16 F

(b) 1 F

(c) 4 F

(d) None of the above


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