Q. Which of the following options are correct?

    (a) Acceleration due to gravity decreases with increasing altitude

    (b) Acceleration due to gravity increases with increasing depth (assume the earth to be a sphere of uniform density)

    (c) Acceleration due to gravity increases with increasing latitude

    (d) Acceleration due to gravity is independent of the mass of the earth

Ans. (a, c, d)

Acceleration due to gravity at altitude h, $g_h = \dfrac{g}{(1 + h/R)^2} \approx g\left(1 - \dfrac{2h}{R}\right)$

At depth d, $\qquad\qquad\qquad\qquad g_d = g\left(1 - \dfrac{d}{R}\right)$

In both cases with increase in h and d, g decreases.

At latitude ϕ, $\qquad\qquad\qquad\qquad g_\phi = g - \omega^2 R\cos^2\phi$

As ϕ increases g_ϕ increases.

Also, we can conclude from the formulae, that it is independent of mass.