

Question #53698, Physics / Other |

The mass and radius of a planet are half the respective values of the earth. What is the value of acceleration due to gravity of the planet? (Take value of g on earth as 10 m s^{-2})

Answer:

Accelerations for both cases are defined by the Gravitation equation:

$a_1 = (G \times m_1) / r_1^2$ and $a_2 = (G \times m_2) / r_2^2$, where m_1 and m_2 – the masses of Earth and the planet, and r_1 and r_2 – the corresponding radii of the planets, respectively.

Taking into account that $m_2 = m_1/2$ and $r_2 = r_1/2$ the ratio of the accelerations equals:

$$a_2/a_1 = (m_2/m_1) \times (r_1/r_2)^2 = (1/2) \times (2)^2 = 2$$

Thus, the value of acceleration due to gravity of the planet is of **20 m s^{-2}** .

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