

403 Problem set 2 Gravity

Section 4.7 The Gravitational Force

20.  A 5.0-kg rock and a 3.0×10^{-4} -kg pebble are held near the surface of the earth. (a) Determine the magnitude of the gravitational force exerted on each by the earth. (b) Calculate the magnitude of the acceleration of each object when released.

21. Mars has a mass of 6.46×10^{23} kg and a radius of 3.39×10^6 m. (a) What is the acceleration due to gravity on Mars? (b) How much would a 65-kg person weigh on this planet?

22. On earth, two parts of a space probe weigh 11 000 N and 3400 N. These parts are separated by a center-to-center distance of 12 m and may be treated as uniform spherical objects. Find the magnitude of the gravitational force that each part exerts on the other out in space, far from any other objects.

28. The drawing (not to scale) shows one alignment of the sun, earth, and moon. The gravitational force \vec{F}_{SM} that the sun exerts on the moon is perpendicular to the force \vec{F}_{EM} that the earth exerts on the moon. The masses are: mass of sun = 1.99×10^{30} kg, mass of earth = 5.98×10^{24} kg, mass of moon = 7.35×10^{22} kg. The distances shown in the drawing are $r_{SM} = 1.50 \times 10^{11}$ m and $r_{EM} = 3.85 \times 10^8$ m. Determine the magnitude of the net gravitational force on the moon.

