

SOLUTIONS TO END-OF-CHAPTER PROBLEMS

Section 1.1 Standards of Length, Mass, and Time

P1.1 (a) Modeling the Earth as a sphere, we find its volume as

$$\frac{4}{3}\pi r^3 = \frac{4}{3}\pi(6.37 \times 10^6 \text{ m})^3 = 1.08 \times 10^{21} \text{ m}^3$$

Its density is then

$$\rho = \frac{m}{V} = \frac{5.98 \times 10^{24} \text{ kg}}{1.08 \times 10^{21} \text{ m}^3} = \boxed{5.52 \times 10^3 \text{ kg/m}^3}$$

(b) This value is intermediate between the tabulated densities of aluminum and iron. Typical rocks have densities around 2000 to 3000 kg/m³. The average density of the Earth is significantly higher, so higher-density material must be down below the surface.

P1.2 (a) $\rho = m/V$ and $V = (4/3)\pi r^3 = (4/3)\pi(d/2)^3 = \pi d^3/6$, where d is the diameter.

$$\text{Then } \rho = 6m / \pi d^3 = \frac{6(1.67 \times 10^{-27} \text{ kg})}{\pi(2.4 \times 10^{-15} \text{ m})^3} = \boxed{2.3 \times 10^{17} \text{ kg/m}^3}$$

(b) $\frac{2.3 \times 10^{17} \text{ kg/m}^3}{22.6 \times 10^3 \text{ kg/m}^3} = \boxed{1.0 \times 10^{13} \text{ times the density of osmium}}$

P1.3 For sphere the volume is $V = \frac{4}{3}\pi r^3$ and the mass is $m = \rho V = \rho \frac{4}{3}\pi r^3$.

We divide this equation for the larger sphere by the same equation for the smaller:

$$\frac{m_L}{m_s} = \frac{\rho(4/3)\pi r_L^3}{\rho(4/3)\pi r_s^3} = \frac{r_L^3}{r_s^3} = 5$$

Then $r_L = r_s \sqrt[3]{5} = (4.50 \text{ cm})\sqrt[3]{5} = \boxed{7.69 \text{ cm}}$

Modern Physics Solution Manual

Fujia Yang, Joseph H Hamilton



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Modern Physics J.M. MacKinley,1978 **Modern Physics** Krane,1996-06 *Modern Physics* Wolfson,1999

Modern Physics Student Solutions Manual Mark J. Llewellyn,Paul A. Tipler,Ralph Llewellyn,2007-12-15 Student Solutions Manual to accompany Modern Physics fifth edition **Student Solutions Manual for University Physics with Modern**

Physics Gary Westfall,Wolfgang Bauer,2010-07-20 The Student Solutions Manual contains answers and worked out solutions to selected end of chapter Questions and Problems Again Chapters 1 through 13 include worked out solutions following the complete 7 step problem solving method from the text for Problems and Additional Problems Chapters 14 through 40 continue to use the 7 step problem solving method for challenging one bullet and most challenging two bullet Problems and Additional Problems while switching to a more abbreviated solution for the less challenging no bullet Problems and Additional Problems *Student's Solution Manual for University Physics with Modern Physics Volume 1 (Chs. 1-20)* Hugh D.

Young,Roger A. Freedman,2015-04-15 This volume covers Chapters 1 20 of the main text The Student s Solutions Manual provides detailed step by step solutions to more than half of the odd numbered end of chapter problems from the text All solutions follow the same four step problem solving framework used in the textbook Student Solutions Manual for

Modern Physics, 3/e by Paul A. Tipler and Ralph A. Llewellyn Paul A. Tipler,Mark J. Llewellyn,1999 Contains worked solutions to every third end of chapter problem in the text **Modern Atomic And Nuclear Physics (Revised Edition):**

Problems And Solutions Manual Fujia Yang,Joseph H Hamilton,2010-06-01 This problems and solutions manual is intended as a companion to an earlier textbook Modern Atomic and Nuclear Physics Revised Edition World Scientific 2010 This manual presents solutions to many end of chapter problems in the textbook These solutions are valuable to the instructors and students working in the modern atomic field Students can master important information and concept in the process of looking at solutions to some problems and become better equipped to solve other problems that the instructors propose

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Serway,Clement J. Moses,Curt A. Moyer,2005 Student's Solution Manual for University Physics with Modern Physics

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Student Study Guide and Solutions Manual for University Physics, Volume 2 (Chapters 21-37) Hugh

Young,Roger Freedman,2019-08-15 The Student s Study Guide summarizes the essential information in each chapter and provides additional problems for the student to solve reinforcing the text s emphasis on problem solving strategies and

student misconceptions Student s Study Guide for University Physics with Modern Physics Volume 2 Chapters 21 37

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