Applied Physics 11th edition Ewen Solutions Manual

SKU: 9780134159386-SOLUTIONS

Chapter 2

2.1

1. s = vt 2. v = at 3. $m = \frac{w}{g}$ 4. $a = \frac{F}{m}$ 5. $R = \frac{E}{I}$ 6. $w = \frac{V}{1h}$

7. $g = \frac{PE}{mh}$ 8. $h = \frac{PE}{mg}$ 9. $h = \frac{v^2}{2g}$ 10. $f = \frac{X_L}{2\pi L}$ 11. w = Pt 12. F = pA

13. $t = \frac{W}{P}$ 14. $A = \frac{F}{P}$ 15. $m = \frac{2(KE)}{v^2}$ 16. $v^2 = \frac{2(KE)}{m}$ 17. $s = \frac{W}{F}$ 18. $a = \frac{v_f - v_i}{t}$

19. $I = \frac{V - E}{-r}$ or $I = \frac{E - V}{r}$ 20. $t = \frac{v_2 - v_1}{a}$ 21. $P = \frac{\pi}{2R}$ 22. $L = \frac{Rd^2}{k}$

23. $C = \frac{5F - 160}{9}$ or $C = \frac{5(F - 32)}{9}$ 24. $F = \frac{9}{5}C + 32$ 25. $f = \frac{1}{2\pi CX_C}$

26. $L = \frac{RA}{\rho}$ 27. $R_3 = R_T - R_1 - R_2 - R_4$ 28. $Q_2 = \frac{Q_1 + Q_1 P}{P}$ or $Q_2 = \frac{Q_1}{P} + Q_1$

29. $I_P = \frac{I_s N_s}{N_P}$ 30. $N_S = \frac{V_s N_P}{V_P}$ 31. $v_i = 2v_{avg} - v_f$ 32. $a = \frac{v^2 - v_i^2}{2(s - s_i)}$ or $\frac{v^2 - v_i^2}{2s - 2s_i}$

33. $s = \frac{v^2 - v_i^2 + 2as_i}{2a}$ 34. $V_1 = V_2 - \frac{Ft}{m}$ or $V_1 = \frac{mV_2 - Ft}{m}$ 35. $R = \frac{QJ}{I^2 t}$

36. $x_i = x - v_i t - \frac{1}{2}at^2$ 37. $r = \sqrt{\frac{A}{\pi}}$ 38. $r = \sqrt{\frac{V}{\pi h}}$ 39. $d = \sqrt{\frac{kL}{R}}$ 40. $r = \sqrt{\frac{3V}{\pi h}}$

41. $I = \pm\sqrt{\frac{QJ}{Rt}}$ 42. $I = \pm\sqrt{\frac{Fr}{m}}$

2.2

1. (a) A= bh (b) 162 cm^2 2. (a) V= lwh (b) $4420 m^3$ 3. (a) $b = \frac{A}{h}$ (b) 7.50 cm

4. (a) $b = \frac{P}{4}$ (b) 105 in. 5. (a) c = P – a – b (b) 6.0 cm 6. (a) $d = \frac{C}{\pi}$

(b) 158 ft 7. (a) $r = \frac{C}{2\pi}$ (b) 10.9 yd 8. (a) $h = \frac{2A}{b}$ (b) 26.0 m

9. (a) $b = \frac{P - 2a}{2}$ (b) $b = \frac{P}{2} - a$ (b) 33.2 km 10. (a) $V = \pi r^2 h$ (b) 1,460,000 m^3

11. (a) $h = \frac{V}{\pi r^2}$ (b) 6.11 m 12. (a) $h = \frac{A}{2\pi r}$ (b) 5.80 cm 13. (a) $B = \frac{V}{h}$ (b) 154 m^2

14. (a) $r = \sqrt{\frac{A}{\pi}}$ (b) 12.15 m 15. (a) $b = \sqrt{A}$ (b) 21.6 in. 16. (a) $r = \sqrt{\frac{3V}{\pi h}}$ (b) 13.2 m

17. (a) $C = 2\pi r$ (b) 121.6 m 18. (a) $V = \frac{4}{3}\pi r^3$ (b) 70,690 m^3 19. (a) $B = \frac{3V}{h}$

(b) 122.4 ft^2 20. (a) $h = \frac{2A}{a + b}$ (b) 11.40 m

2.3

1. $V = 1wh = (36.0cm)(30.0cm)(24.0cm) = 25,900cm^3$

2. $V = \pi r^2 h = \pi(2.10in.)^2(7.50in.) = 104in^3$ 3. $V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(5.40cm)^2(9.30cm) = 284cm^3$

4. $V = \pi r^2 h = \pi\left(\frac{11.40cm}{2}\right)^2(24.00cm) = 2450cm^3$ 5. $A = \pi r^2 = \pi\left[\frac{11.40cm}{2}\right]^2 = 102.1cm^2$

Applied Physics 11th edition Ewen Solutions Manual

6. $A = \pi dh = \pi(11.40cm)(24.00cm) = 859.5cm^2$

7. $V = \left(1w + \frac{1}{2}bh\right)h' = \left[(22.0\,ft)(10.0\,ft) + \frac{1}{2}(22.0\,ft)(4.70\,ft)\right](37.0\,ft) = 10{,}100\,ft^3$

8. $A = \left[\frac{a+b}{2}\right]h = \left[\frac{3.70\,ft + 6.80\,ft}{2}\right](19.3\,ft) = 101\,ft^2$

9. $V = 1wh = (9.00\,ft)(12.0\,ft)(8.00\,ft) = 864\,ft^3$

10. $A = \pi r^2 = \pi\left[\frac{3.25cm}{2}\right]^2 = 8.30cm^2$

11. $A = \frac{1}{2}bh = \frac{1}{2}(4.00cm)(6.00cm) = 12.0cm^2$

12. $c = \sqrt{a^2 + b^2} = \sqrt{(4.00cm)^2 + (6.00cm)^2} = 7.21cm$

13. $A = \pi\left(r_1^2 - r_2^2\right) = \pi\left[\left(\frac{3.50cm}{2}\right)^2 - \left(\frac{3.20cm}{2}\right)^2\right] = 1.58cm^2$

14. $V = \frac{4\pi r^3}{3} = \frac{4}{3}\pi(8.00m)^3 = 2140m^3$

15. $w = \frac{A}{1} = \frac{900m^2}{25.0m}36.0m$

16. $h = \frac{V}{1w} = \frac{192m}{(8.00m)(4.00m)} = 6.00m$

17. $V = \pi r^2 h = \pi(2.00cm)^2(4.20cm) = 52.8cm^3$

18. $V = \pi r^2 h = \pi(3.90cm)^2(8.00cm) = 382cm^3$

19. $d = \frac{C}{\pi} = \frac{29.5m}{\pi} = 9.39m$

20. $h = \frac{V}{\pi r^2} = \frac{1000m^3}{\pi\left(\frac{9.39m}{2}\right)^2} = 14.4m$

21. Distance=C $(no.of\ rev) = \pi d(no.of\ rev) = \pi(30.0cm)(145) \times \left(\frac{1m}{100cm}\right) = 137m$

22. $A = Ch = (29.5m)(14.4m)\left(\frac{1L}{5.0m^2}\right) = 85L$

23. $h = \frac{V}{\pi r^2} = \frac{500{,}000\,gal \times \frac{1ft^3}{7.50gal}}{\pi(18.0ft)^2} = 65.5\,ft$

24. $r = \sqrt{\frac{V}{\pi h}} = \sqrt{\frac{500{,}00gal \times \frac{1\,ft^3}{7.50gal}}{\pi(42.0\,ft)}} = 22.5\,ft$

25. $\frac{A_1}{A_2} = \frac{(12.0\,ft)(15.0\,ft)}{(1.00\,ft)(3.00\,ft)} = \frac{180\,ft^2}{3.00\,ft^2} = 60\,panels$

26. $A_{total} = A_{rectangle} - A_{trapezoid}$ $A = (3.50cm)(2.00cm) - \left(\frac{1.90cm + 2.20cm}{2}\right)(0.400cm) = 6.18cm^2$

27. $V = V_{cylinder} + V_{cone}$ $V = \pi(1.50m)^2(2.75) + \frac{1}{3}\pi(1.50m)^2(2.00m) = 24.1m^3$

28. $r = \sqrt{\frac{A}{\pi}} = \sqrt{\frac{3.05m^2}{\pi}} = 0.985m; yes$

29. $V = 1wh = (12.0\,ft)(20.0\,ft)(0.500\,ft) \times \frac{1yd^3}{27ft^3} = 4.44\,yd^3$

Applied Physics 11th edition Ewen Solutions Manual

30. $1 = \dfrac{V}{wh} = \dfrac{2.00\,yd^3}{(4.00\,ft)(0.333\,ft)} \times \dfrac{27\,ft^3}{1\,yd^3} = 40.5\,ft$

31. $V = 1wh - \pi r^2 h = (8.00in.)(8.00in.)(6.00in.) - \pi(2.50in.)^2(6.00in.) = 266in^3$

32. $V = \pi r^2 h - \pi r^2 h = \pi(25.0cm)^2(60.0cm) - \pi(10.0cm)^2(60.0cm) = 99,\overline{0}00cm^3$

Chapter 2 Review Questions

1. c 2. b 3. a 4. (1) To find the volume of liquid storage tanks. (2) To determine the amount of concrete needed for a driveway. 5. As a shorthand way to designate different measured quantities of the same type. 6. Most mistakes are made in problem solving by missing needed information or misinterpreting the information given. 7. Making a sketch helps visualize what is happening in the problem. 8. The basic question. 9. The working equation is found by solving the basic equation for the unknown quantity. 10. Carrying the units through a problem shows whether the answer is the kind expected. 11. Making an estimate of the correct answer shows whether the solution is reasonable.

Chapter 2 Review Problems

1. (a) $m = \dfrac{F}{a}$ (b) $a = \dfrac{F}{m}$ 2. $h = \dfrac{v^2}{2g}$ 3. $v_f = \dfrac{2s}{t} - v_i$ 4. $v = \sqrt{\dfrac{2KE}{m}}$

5. b = P – a – c = 36 ft – 12 ft – 6 ft = 18 ft

6. $a = 2\left(\dfrac{A}{h} - \dfrac{b}{2}\right) = 2\left(\dfrac{21\overline{0}m^2}{15.0m} - \dfrac{16.0m}{2}\right) = 12.0m$ 7. $r = \sqrt{\dfrac{A}{\pi}} = 2.19m$

8. A = ½ b h = ½ (12.2cm) (20.0cm) = 122 cm^2 9. $h = \dfrac{3V}{\pi r^2} = \dfrac{3(314cm^3)}{\pi(5.00cm)^2} = 12.0cm$

10. $c = \sqrt{a^2 + b^2} = \sqrt{(41.2mm)^2 + (9.80mm)^2} = 42.3mm$

11. $A = 2\pi rh = 2\pi(7.20cm)(13.4cm) = 606cm$

12. $40.0cm = 2(14.0cm) + 2\omega$
$\omega = 6.0cm$

13. $r = \sqrt{\dfrac{V}{\pi h}} = \sqrt{\dfrac{21\overline{0}0m^3}{\pi 17.0m}} = 6.27m$

14. $h = \dfrac{2A}{b} = \dfrac{2(88.6m^2)}{12.3m} = 14.4m$

15. $V = V_1 - V_2 = (9.0cm \cdot 6.0cm \cdot 12cm) - (6.0cm \cdot 3.0cm \cdot 12cm) = 430cm$

16. $A = A_1 - A_2 = (40.0cm \cdot 12\overline{0}cm) - (10.0cm \cdot 12.0cm) = 4680m^2$

Chapter 2 Applied Concepts

1. $A_{property} - A_{house} = l_{prop} w_{prop} - l_{house} w_{house} = (10\overline{0}ft)(20\overline{0}ft) - (35.0ft)(80.0ft) = 17{,}200\,ft^2$

$\dfrac{\$50.00}{17200ft}\dfrac{(9ft^2)}{(1yd^2)} = \$0.026/yd^2 = 2.62\,¢/yd^2$

2. $V = h \times w \times l = (8.00ft)(10.0ft)(32.0ft) = 2560\,ft^3$; $\dfrac{2560\,ft^3}{20.0\,\text{min}}\dfrac{(1\,\text{min})}{(60\,\text{sec})} = 2.13\,ft^3/s$

3. $V_{SolidBeam} = lwh = (24\overline{0}ft)(8.00in.)(8.00in.) = 15400in^3$

$V_{IBeam} = V_{top} + V_{vertical} + V_{bottom} = (1.00in.)(8.00in.)(24\overline{0}in.) + (6.00in.)(1.00in)(24\overline{0}in.) + (1.00in)(8.00in.)(24\overline{0}in.) = 5280in^3$

$\dfrac{V_{solid}}{V_{IBeam}} = \dfrac{15400in^3}{5280in^3} = 2.91$

Applied Physics 11th edition Ewen Solutions Manual

4. # of balls wide= $\frac{w}{2r} = \frac{16.8in.}{2 \times 4.00in.} = 2.10balls$

   # of balls high= $\frac{h}{2r} = \frac{16.8in.}{2 \times 4.00in.} = 4.20balls$

   2 balls x 2 balls x 4 balls = 16 balls

   # of balls long= $\frac{l}{2 \times r} = \frac{33.6in.}{2 \times 4.00in.} = 4.20balls$

5. (a) $V_{cylinder} = \pi r^2 h = \pi(1.53m)^2(0.915m) = 6.73m^3$

   (b) $m = DV = \left(7750 \, kg/m^3\right)\left(6.73m^3\right) = 522{,}000kg$

   $F = m \times g = (522,000kg)\left(9.80 \, m/s^2\right) = 512,000N$