

(1)

**SOLUTIONS TO  
 ASSIGNMENT #1**  
 943-DW FALL 2011  
 APPLIED MATH FOR  
 ELECTRONICS  
 ENGINEERING  
 TECHNOLOGY  
 OCTOBER 7TH 2011

61 MARKS

SECTION 1.2 P.10 (4 MARKS)

#26  $20 + 8 \div 4$   
 $= 20 + 2$   
 $= \boxed{22}$

#28  $-10 - (-6)(-8)$   
 $= -10 - 48$   
 $= \boxed{-58}$

#32  $-\frac{18}{3} - \frac{4-6}{-1}$   
 $= -6 - \frac{-2}{-1}$   
 $= -6 - 2$   
 $= \boxed{-8}$

#34  $-7(-3) + \frac{6}{-3} - (-9)$   
 $= 21 - 2 + 9$   
 $= \boxed{28}$

SECTION 1.4 P.20 (10 MARKS)

(Ed. 8 #21; Ed. 9 #19)

$$\left(\frac{2}{b}\right)^3 = \frac{2^3}{b^3} = \boxed{\frac{8}{b^3}}$$

(Ed. 8 #34; Ed. 9 #32)

$$(-y^3)^5 = (-1)^5 (y^3)^5 = \boxed{-y^{15}}$$

(Ed. 8 #26; Ed. 9 #23)

$$(8a)^0 = \boxed{1}$$

(Ed. 8 #43; Ed. 9 #39)

$$\frac{(n^2)^4}{(n^4)^2} = \frac{n^8}{n^8} = \boxed{1}$$

(Ed. 8 #27; Ed. 9 #25)

$$-3x^0 = -3(1) = \boxed{-3}$$

(Ed. 8 #44; Ed. 9 #40)

$$\frac{(3t)^{-1}}{3t^0} = \frac{1}{(3t)(3t^0)} = \boxed{\frac{1}{9t}}$$

(Ed. 8 #33; Ed. 9 #31)

$$(-t^2)^7 = (-1)^7 (t^2)^7$$

$$= \boxed{-t^{14}}$$

(Ed. 8 #45; Ed. 9 #41)

#45  $(5^0 x^2 a^{-1})^{-1}$       #41  $(\pi^0 x^2 a^{-1})^{-1}$

$$= 5^0 x^{-2} a$$

$$= \boxed{\frac{a}{x^2}}$$

$$= \pi^0 x^{-2} a$$

$$= \boxed{\frac{a}{x^2}}$$

(Ed. 8 #47; Ed. 9 #45)

$$\left(\frac{4x^{-1}}{a^{-1}}\right)^{-3} = \frac{4^{-3}x^3}{a^3} = \boxed{\frac{x^3}{4^3a^3}}$$

(Ed. 8 #52; Ed. 9 #48)

$$\frac{(nRT^{-2})^{32}}{R^{-2}T^{32}} = \frac{n^{32}R^{32}T^{-64}}{R^{-2}T^{32}} = \boxed{\frac{n^{32}R^{34}}{T^{96}}}$$

SECTION 1.6 p.25 (16 MARKS)

#6  $\sqrt{225} = \sqrt{9 \cdot 25}$   
 $= \sqrt{9} \cdot \sqrt{25}$   
 $= 3 \cdot 5$   
 $= \boxed{15}$

#8  $-\sqrt{36}$   
 $= \boxed{-6}$

#10  $\sqrt{\frac{1}{4}} = \frac{\sqrt{1}}{\sqrt{4}}$   
 $= \boxed{\frac{1}{2}}$

#12  $-\sqrt{900}$   
 $= \boxed{-30}$

#14  $\sqrt[4]{16}$   
 $= \boxed{2}$

#16  $\sqrt[5]{-32}$   
 $= \boxed{-2}$

#18  $(\sqrt{19})^2$   
 $= \boxed{19}$

#20  $(\sqrt[4]{53})^4$   
 $= \boxed{53}$

#22  $-\sqrt{32}$   
 $= -\sqrt{16} \sqrt{2}$   
 $= \boxed{-4\sqrt{2}}$

#24  $\sqrt{50}$   
 $= \sqrt{25} \sqrt{2}$   
 $= \boxed{5\sqrt{2}}$

#26  $4\sqrt{108}$  (8th Ed.)  
 $= 4\sqrt{36} \sqrt{3}$   
 $= 4 \cdot 6\sqrt{3}$   
 $= \boxed{24\sqrt{3}}$

$\frac{\sqrt{108}}{2}$  (9th Ed.)  
 $= \frac{\sqrt{36} \sqrt{3}}{2}$   
 $= \frac{6\sqrt{3}}{2} = \boxed{3\sqrt{3}}$

#28  $\sqrt{81 \times 10^2}$   
 $= \sqrt{81} \sqrt{10^2}$   
 $= 9 \cdot 10$   
 $= \boxed{90}$

#30  $\sqrt[4]{9^2}$   
 $= 9^{2/4}$   
 $= 9^{1/2}$   
 $= \sqrt{9} = \boxed{3}$

#32  $\frac{2^5 \sqrt[5]{243}}{3 \sqrt{144}}$   
 $= \frac{2^5 \cdot 3}{3 \cdot 12} = \frac{32}{12}$   
 $= \boxed{\frac{8}{3}}$

#34  $\sqrt{25+144}$   
 $= \sqrt{169}$   
 $= \boxed{13}$

#36  $\sqrt{8^2-4^2}$   
 $= \sqrt{64-16}$   
 $= \sqrt{48}$   
 $= \sqrt{16 \cdot 3}$   
 $= \sqrt{16} \cdot \sqrt{3}$   
 $= \boxed{4\sqrt{3}}$

SECTION 1.7 P.29 (7 MARKS)

3

$$\begin{aligned} \#18 \quad & \sqrt{A} + (h - 2\sqrt{A}) - 3\sqrt{A} \\ & = \sqrt{A} + h - 2\sqrt{A} - 3\sqrt{A} \\ & = \boxed{-4\sqrt{A} + h} \end{aligned}$$

$$\begin{aligned} \#34 \quad & 9V - [6 - (V-4) + 4V] \\ & = 9V - 6 + (V-4) - 4V \\ & = 9V - 6 + V - 4 - 4V \\ & = \boxed{6V - 10} \end{aligned}$$

$$\begin{aligned} \#35 \quad & 8c - \{5 - (2 - (3 + 4c))\} \\ & = 8c - \{5 - (2 - 3 - 4c)\} \\ & = 8c - \{5 - (-1 - 4c)\} \\ & = 8c - (6 + 4c) \\ & = 8c - 6 - 4c \\ & = \boxed{4c - 6} \end{aligned}$$

$$\begin{aligned} \#36 \quad & 7y - \{y - [2y - (x - y)]\} \\ & = 7y - \{y - [2y - x + y]\} \\ & = 7y - \{y - [3y - x]\} \\ & = 7y - \{-2y + x\} \\ & = \boxed{9y - x} \end{aligned}$$

$$\begin{aligned} \#44 \quad & a^2 - 2(x - 5 - (7 - 2(a^2 - 2x) - 3x)) \\ & = a^2 - 2(x - 5 - (7 - 2a^2 + 4x - 3x)) \\ & = a^2 - 2(x - 5 - (7 - 2a^2 + x)) \\ & = a^2 - 2(x - 5 - 7 + 2a^2 - x) \\ & = a^2 - 2(-12 + 2a^2) \\ & = a^2 + 24 - 4a^2 \\ & = \boxed{-3a^2 + 24} \end{aligned}$$

$$\begin{aligned} \#45 \quad & -4[4R - 2.5(Z - 2R) - 1.5(2R - Z)] \\ & = -4[4R - 2.5Z + 5R - 3R + 1.5Z] \\ & = -4[6R - Z] \\ & = \boxed{-24R + 4Z} \end{aligned}$$

$$\begin{aligned} \#46 \quad & 3\{2.1e - 1.3[f - 2(e - 5f)]\} \\ & = 3\{2.1e - 1.3[f - 2e + 10f]\} \\ & = 3\{2.1e - 1.3[11f - 2e]\} \\ & = 3\{2.1e - 14.3f + 2.6e\} \\ & = 3\{4.7e - 14.3f\} \\ & = \boxed{14.1e - 42.9f} \end{aligned}$$

SECTION 1.8 p.32 (6 MARKS)

8th Edition

$$\begin{aligned} \#12 \quad & -2m^2(-3mn)(m^2n)^2 \\ & = -2m^2(-3mn)(m^4n^2) \\ & = \boxed{6m^7n^3} \end{aligned}$$

$$\begin{aligned} \#40 \quad & (5a-3c)(a^2+ac-c^2) \\ & = 5a^3+5a^2c-5ac^2-3a^2c-3ac^2+3c^3 \\ & = \boxed{5a^3+2a^2c-8ac^2+3c^3} \end{aligned}$$

$$\begin{aligned} \#43 \quad & -3(3-2T)(3T+2) \\ & = -3(9T+6-6T^2-4T) \\ & = -3(-6T^2+5T+6) \\ & = \boxed{18T^2-15T-18} \end{aligned}$$

$$\begin{aligned} \#46 \quad & ax(x+4)(7-x^2) \\ & = (ax^2+4ax)(7-x^2) \\ & = \boxed{7ax^2-ax^4+28ax-4ax^3} \end{aligned}$$

$$\begin{aligned} \#52 \quad & (b-2x^2)^2 \\ & = (b-2x^2)(b-2x^2) \\ & = \boxed{b^2-4x^2b+4x^4} \end{aligned}$$

$$\begin{aligned} \#54 \quad & 3(3R+4)^2 \\ & = \boxed{27R^2+72R+48} \end{aligned}$$

9th Edition

$$\begin{aligned} \#15 \quad & 5m(m^2n+3mn) \\ & = \boxed{5m^3n+15m^2n} \end{aligned}$$

$$\begin{aligned} \#35 \quad & -3(3-2T)(3T+2) \\ & = -3(9T+6-6T^2-4T) \\ & = \boxed{18T^2-15T-18} \end{aligned}$$

$$\begin{aligned} \#36 \quad & 2n(5-n)(6n+5) \\ & = (10n-2n^2)(6n+5) = 60n^2+50n \\ & \quad \quad \quad -12n^3-10n^2 \end{aligned}$$

$$\begin{aligned} \#44 \quad & (b-6x^2)^2 = \boxed{50n^2+50n-12n^3} \\ & = (b-6x^2)(b-6x^2) \\ & = b^2-6x^2b-6x^2b+36x^4 \\ & = \boxed{b^2-12x^2b+36x^4} \end{aligned}$$

$$\begin{aligned} \#46 \quad & 3(3R+4)^2 \\ & = 3(3R+4)(3R+4) \\ & = 3(9R^2+12R+12R+16) \\ & = 3(9R^2+24R+16) \\ & = \boxed{27R^2+72R+48} \end{aligned}$$

$$\begin{aligned} \#48 \quad & (3x-c^2)^3 \\ & = (3x-c^2)(3x-c^2)(3x-c^2) \\ & = (9x^2-6xc^2+c^4)(3x-c^2) \\ & = 27x^3-9x^2c^2-18x^2c^2+6xc^4+3xc^4-c^6 \\ & = \boxed{27x^3-27x^2c^2+9xc^4-c^6} \end{aligned}$$

SECTION 1.9 (8 MARKS)

$$\#12 \quad \frac{12a^2b}{(3ab^2)^2} = \frac{12a^2b}{9a^2b^4} = \boxed{\frac{4}{3b^3}}$$

$$\#14 \quad \frac{2m^2n - 6mn}{2m}$$

$$= \frac{2m^2n}{2m} - \frac{6mn}{2m}$$

$$= \boxed{mn - 3n}$$

$$\#16 \quad \frac{-5a^2n - 10an^2}{5an}$$

$$= \frac{-5a^2n}{5an} - \frac{10an^2}{5an}$$

$$= \boxed{-a - 2n}$$

$$\#20 \quad \frac{9(ab)^4 - 6ab^4}{3ab^3} \quad (9th \text{ Ed.})$$

$$= \frac{9a^4b^4}{3ab^3} - \frac{6ab^4}{3ab^3}$$

$$= \boxed{3a^3b - 2b}$$

$$\frac{2(ab)^4 - a^3b^4}{3(ab)^3} \quad (8th \text{ Ed.})$$

$$= \frac{2a^4b^4}{3a^3b^3} - \frac{a^3b^4}{3a^3b^3}$$

$$= \boxed{\frac{2ab}{3} - \frac{b}{3}}$$

$$\#31 \quad \begin{array}{r} z-2 \\ 4z+3 \overline{) 4z^2-5z-7} \end{array} \quad (9th \text{ Ed.})$$

$$\begin{array}{r} - (z^2+3z) \\ \hline -8z-7 \\ - (-8z-6) \\ \hline -1 \end{array}$$

$$\frac{4z^2-5z-7}{4z+3} = \boxed{z-2 - \frac{1}{4z+3}}$$

$$\begin{array}{r} z+5 \\ 4z+3 \overline{) 4z^2+23z+18} \\ \hline - (4z^2+3z) \\ \hline 20z+18 \\ - (20z+15) \\ \hline 3 \end{array}$$

$$\frac{4z^2+23z+18}{4z+3} = \boxed{z+5 + \frac{3}{4z+3}}$$

9TH EDITION

$$\begin{array}{r} \#32 \quad \underline{3x-4} \overline{) 6x^2-5x-9} \\ \underline{6x^2-8x} \phantom{-9} \\ 3x-9 \\ \underline{-(3x-4)} \\ -5 \end{array}$$

$$\frac{6x^2-5x-9}{3x-4} = \boxed{2x+1 - \frac{5}{3x-4}}$$

8TH EDITION

$$\begin{array}{r} \#32 \quad \underline{3x-4} \overline{) 6x^2-20x+16} \\ \underline{6x^2-8x} \phantom{+16} \\ -12x+16 \\ \underline{-(-12x+16)} \\ 0 \end{array}$$

$$\frac{6x^2-20x+16}{3x-4} = \boxed{2x-4}$$

$$\begin{array}{r} \#36 \quad \underline{3T^2-T+2} \overline{) 6T^3+T^2+2} \\ \underline{6T^3-2T^2+4T} \\ 3T^2-4T+2 \\ \underline{-(3T^2-T+2)} \\ -3T \end{array}$$

$$\frac{6T^3+T^2+2}{3T^2-T+2} = \boxed{2T+1 - \frac{3T}{3T^2-T+2}}$$

$$\begin{array}{r} \#36 \quad \underline{x^2-x+2} \overline{) 2x^3-3x^2+8x-2} \\ \underline{2x^3-2x^2+4x} \\ -x^2+4x-2 \\ \underline{-(-x^2+x-2)} \\ 3x \end{array}$$

$$\frac{2x^3-3x^2+8x-2}{x^2-x+2} = \boxed{2x-1 + \frac{3x}{x^2-x+2}}$$

# 37 (BOTH EDITIONS)

$$\begin{array}{r} \underline{x+2} \overline{) x^3+8} \\ \underline{-(x^3+2x^2)} \\ -2x^2+8 \\ \underline{-(-2x^2-4x)} \\ 4x+8 \\ \underline{-(4x+8)} \\ 0 \end{array}$$

$$\frac{x^3+8}{x+2} = \boxed{x^2-2x+4}$$

SECTION 1.10

(10 MARKS)

#12  $2x = 12$   
 $x = 6$

#14  $5d - 2 = 13$   
 $5d = 15$   
 $d = 3$

#16  $8 - 5t = 18$   
 $-5t = 10$   
 $t = 10 / -5$   
 $t = -2$

#18  $6 + 4L = 5 - 3L$   
 $1 = -7L$   
 $L = -1/7$

#20  $3(4 - n) = -n$   
 $12 - 3n = -n$   
 $12 = 2n$   
 $n = 6$

#22  $5 - (x - 2) = 5x$   
 $5 - x + 2 = 5x$   
 $3 = 6x$   
 $x = 3/6$   
 $x = 1/2$

#24  $4(7 - f) = -7$   
 $28 - 4f = -7$   
 $-4f = -35$   
 $f = 35/4$

#26  $1.5x - 0.3(x - 4) = 6$   
 $1.5x - 0.3x + 1.2 = 6$   
 $1.2x = 4.8$   
 $x = 4.8 / 1.2$   
 $x = 4$

#39  $\frac{165}{223} = \frac{13V}{15}$   
 $2899V = 2475$   
 $V = \frac{2475}{2899}$

#40  $\frac{276x}{17} = \frac{1360}{46.4}$   
 $12806.4x = 23120$   
 $x = 1.81$

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