

***Spreadsheet Tools for Engineers Using Excel 4th
edition Gottfried Solutions Manual***

SKU: 9781259875960-SOLUTIONS

Problem 2.22				
Student	Exam 1	Exam 2	Final Exam	Overall Score
Davis	82	77	94	84.3
Graham	66	80	75	73.7
Jones	95	100	97	97.3
Meyers	47	62	78	62.3
Richardson	80	58	73	70.3
Thomas	74	81	85	80
Williams	57	62	67	62
AVERAGE	71.6	74.3	81.3	75.7

Problem 2.3(a)

Grade Report
Santa Claus
123-45-6789

Course	Credits	Grade
Chemistry I	4	3
Physics I	4	3.3
English Composition	3	2
Intro to Engineering	3	4
Calculus I	3	3.7
Seminar	1	2.7

Problem 2.3(b)**Grade Report**

Santa Claus

123-45-6789

Course	Credits	Grade
Chemistry I	4	3.0
Physics I	4	3.3
English Composition	3	2.0
Intro to Engineering	3	4.0
Calculus I	3	3.7
Seminar	1	2.7

Problem 2.4 (a)**Physical Constants**

Constant	Value	Units
Avogadro's number	6.022142E+23	1/mols
Ideal gas constant	0.082054	liter atm/mol K
Pi	3.141593	
Speed of light	2.997925E+08	m/s
Speed of sound	343.000000	m/s

Problem 2.4 (b)**Physical Constants**

Constant	Value	Units
Avogadro's number	6.022E+23	1/mols
Ideal gas constant	0.082	liter atm/mol K
Pi	3.142	
Speed of light	2.998E+08	m/s
Speed of sound	343.000	m/s

Bill of Materials
(Course Number and Title)
(Name of Project Group)

Part Number	Part Name	Description
#83-17300	Raspberry Pi 2 Model B	Microcontroller
H2181-ND	Conn Socket Housing, 4 Position	Rectangular Housing Connector
3DR-Data-433Mhz	3DRobotics 3DR Radio Telemetry Kit	Telemetry
LM741CNNS	LM 741 Op-Amp	Operational Amplifier
WRL-12577	SparkFun BlueSMiRF Silver	Bluetooth Modem

Quantity	Per Unit Price
2	\$35
5	\$0.16
1	\$26.99
3	\$0.59
1	\$20.95

Bill of Materials
ENGIN 300 Microelectronics
Auto-Balancing Robot

Part Number	Part Name	Description
#83-17300	Raspberry Pi 2 Model B	Microcontroller
3DR-Data-433Mhz	3DRobotics 3DR Radio Telemetry Kit	Telemetry
WRL-12577	SparkFun BlueSMiRF Silver	Bluetooth Modem
LM741CNNS	LM 741 Op-Amp	Operational Amplifier
H2181-ND	Conn Socket Housing, 4 Position	Rectangular Housing Connector

Quantity	Per Unit Price
2	\$35.00
1	\$26.99
1	\$20.95
3	\$0.59
5	\$0.16

Problem 2.6(a)

Semester Grade Report
Santa Claus

Course	Credits	Grade
Chemistry I	4	3
Physics I	3	3.3
English Composition	3	2.7
Engineering Analysis	3	4
Calculus I	3	3.7
Seminar	1	2.7

Problem 2.6(b)

Semester Grade Report

Santa Claus

Course	Credits	Grade
Chemistry I	4	3.0
Physics I	3	3.3
English Composition	3	2.7
Engineering Analysis	3	4.0
Calculus I	3	3.7
Seminar	1	2.7

Problem 2.7	
<i>Item</i>	<i>Quantity</i>
Screws	6500
Nuts	9000
Bolts	5400
Total	20900

Problem 2.8			
<i>Item</i>	<i>Quantity</i>	<i>Cost each</i>	<i>Value</i>
Screws	6500	\$ 0.02	\$ 130.00
Nuts	7500	\$ 0.04	\$ 300.00
Bolts	6200	\$ 0.05	\$ 310.00
Total	20200		\$ 740.00
Average	\$0.04		

Prob 2.9

Course	Credits	Grade	(Credits) x (Grade)
Chemistry I	4	3	12
Physics I	4	3.3	13.2
English Comp	3	2	6
Intro to Engineering	3	4	12
Calculus I	3	3.7	11.1
Seminar	1	2.7	2.7
	18		57

GPA 3.166667

Prob. 2.10

	mass	Mol Wt	n	V	T (Deg C)	P
(a)	400	28	14.28571	10	22	34.5799
(b)	400	28	14.28571	10	37	36.3382
(c)	400	28	14.28571	7	22	49.39986
(d)	300	32	9.375	10	18	22.38536

Prob. 2.11

	P	r	i	n	F	
(a)	1000	5.5	0.055	20	\$2,917.76	
(b)	1000	6	0.06	20	\$3,207.14	\$289.38 additional
(c)	1000	5.5	0.055	30	\$4,983.95	
(d)	5000	5.75	0.0575	25	\$20,229.23	

Prob. 2.12

Part	V	R1	R2	R3	R Total	i	V1	V2	V3	P1	P2	P3	
(a)		12	150	250	50	450	0.026667	4	6.666667	1.333333	0.106667	0.177778	0.035556
(b)		15	150	250	50	450	0.033333	5	8.333333	1.666667	0.166667	0.277778	0.055556
(c)		12	175	100	225	500	0.024	4.2	2.4	5.4	0.1008	0.0576	0.1296

Part	V	R1	R2	R3	R4	R Total	i	V1	V2	V3	V4	P1	P2	P3	P4	
(d)		12	150	250	50	200	650	0.018462	2.769231	4.615385	0.923077	3.692308	0.051124	0.085207	0.017041	0.068166

Problem 2.13(a)

Electrical Circuit Analysis

Known Information:

Source voltage V =	12	volts
Resistance R1 =	10	ohms
Resistance R2 =	5	ohms
Resistance R3 =	20	ohms

Solution:

Resistance Rt =	25	ohms
Voltage drop V1 =	12	volts
Current i1 =	1.2	amperes
Current i2 =	0.48	amperes
Current i =	1.68	amperes
Voltage drop V2 =	2.4	volts
Voltage drop V3 =	9.6	volts

Redundant Checks:

V = (V1 + V2) =	12	volts	(check)
Req =	7.142857	ohms	
i = V/Req =	1.68	amperes	(check)

Problem 2.13(b)

Electrical Circuit Analysis

Known Information:

Source voltage $V =$	12	volts
Resistance $R1 =$	10	ohms
Resistance $R2 =$	5	ohms
Resistance $R3 =$	10	ohms

Solution:

Resistance $R_t =$	15	ohms
Voltage drop $V1 =$	12	volts
Current $i1 =$	1.2	amperes
Current $i2 =$	0.8	amperes
Current $i =$	2	amperes
Voltage drop $V2 =$	4	volts
Voltage drop $V3 =$	8	volts

Redundant Checks:

$V = (V1 + V2) =$	12	volts	(check)
$R_{eq} =$	6	ohms	
$i = V/R_{eq} =$	2	amperes	(check)

Problem 2.14

Part (a)

Mean fluid velocity =	10 ft/sec	
Outer pipe diameter =	4 in	
Pipe thickness =	0.25 in	
Cross sectional flow area =	0.067 sq ft	(calculate)
Volumetric flow rate =	0.668 cu ft/sec	(calculate)

Part (b)

Volumetric flow rate =	1.5 cu ft/sec	
Mean fluid velocity =	10 ft/sec	
Cross sectional flow area =	0.15 sq ft	(calculate)
Pipe thickness =	0.375 in	
Outer pipe diameter =	5.994 in	(calculate)

Problem 2.15

t2 = 0.25 in
d1 = 3 in
t1 = 0.125 in
d2 = 4.922952 in

Nominal pipe diameter: 5 in

Problem 2.16

(a)

Density = 13,600 kg/m³
Gravity = 9.8 m/s²
Height = 10 cm
Pressure difference = 13,328 Pa

Nominal solution: 13.3 kPa

(b)

Density = 13,600 kg/m³
Gravity = 9.8 m/s²
Pressure difference = 20,000 Pa
Height = 0.15006 m

Nominal solution: 15 cm

Bill of Materials
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WRL-12577	SparkFun BlueSMiRF Silver	Bluetooth Modem
LM741CNNS	LM 741 Op-Amp	Operational Amplifier
H2181-ND	Conn Socket Housing, 4 Position	Rectangular Housing Connector
		Grand Total

Quantity	Per Unit Price	Subtotal
2	\$35.00	
1	\$26.99	
1	\$20.95	
3	\$0.59	
5	\$0.16	

Bill of Materials
ENGIN 300 Microelectronics
Auto-Balancing Robot

Part Number	Part Name	Description	Quantity	Per Unit Price	Subtotal
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3DR-Data-433Mhz	3DRobotics 3DR Radio Telemetry Kit	Telemetry	1	\$26.99	\$26.99
WRL-12577	SparkFun BlueSMiRF Silver	Bluetooth Modem	1	\$20.95	\$20.95
LM741CNNS	LM 741 Op-Amp	Operational Amplifier	3	\$0.59	\$1.77
H2181-ND	Conn Socket Housing, 4 Position	Rectangular Housing Connector	5	\$0.16	\$0.80
Grand Total					\$120.51

Problem 2.18	
(a)	Round(average(C2:C8),1)
(b)	Round(average(B4:D4),1)
(c)	Round(average(E2:E8),1)
	Round(average(B10:D10),1)

Bill of Materials
ENGIN 300 Microelectronics
Auto-Balancing Robot

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		Grand Total

Quantity	Per Unit Price	Subtotal
2	\$35.00	
1	\$26.99	
1	\$20.95	
3	\$0.59	
5	\$0.16	

Bill of Materials
ENGIN 300 Microelectronics
Auto-Balancing Robot

Part Number	Part Name	Description	Quantity	Per Unit Price	Subtotal
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3DR-Data-433Mhz	3DRobotics 3DR Radio Telemetry Kit	Telemetry	1	\$26.99	\$26.99
WRL-12577	SparkFun BlueSMiRF Silver	Bluetooth Modem	1	\$20.95	\$20.95
LM741CNNS	LM 741 Op-Amp	Operational Amplifier	3	\$0.59	\$1.77
H2181-ND	Conn Socket Housing, 4 Position	Rectangular Housing Connector	5	\$0.16	\$0.80
Grand Total					\$120.51

Problem 2.20

t2 = 0.25 in
d1 = 3 in
t1 = 0.125 in
d2 = 4.922952 in

Nominal pipe diameter: 5 in

Problem 2.21

(a)

$$\begin{aligned}x &= 0.3 \\y &= 1.626279\end{aligned}$$

(b)

$$\begin{aligned}x &= 2.5 \\y &= 3.7 \\z &= 2.727636\end{aligned}$$

(c)

$$\begin{aligned}\text{theta} &= 27 \text{ degrees} \\y &= 1.975377\end{aligned}$$

Problem 2.22(a)

Simulate throwing a pair of dice

One	Two	Sum
=RAND()	=RAND()	
=INT(6*A6)+1	=INT(6*B6)+1	=A7+B7

Problem 2.22(b)

Simulate throwing a pair of dice

One	Two	Sum
0.387604	0.618873	
3	4	7

$$\text{Complex Number} = x + y \cdot i = x + y \cdot j$$

(where x = Real Part and y = Imaginary Part and both of them are real numbers)

Given:	To Be Determined:
x (Real Part):	Magnitude ($m = \sqrt{x^2 + y^2}$):
y (Imaginary Part):	Phase ($\phi = \arctan(y/x)$ in degree):
Given:	To Be Determined:
m (Magnitude):	$x (= m \cdot \cos(\phi))$:
ϕ (Phase in degree):	$y (= m \cdot \sin(\phi))$:

$$\text{Complex Number} = x + y \cdot i = x + y \cdot j$$

(where x = Real Part and y = Imaginary Part and both of them are real numbers)

Given:		To Be Determined:	
x (Real Part):	3.00	Magnitude ($m = \sqrt{x^2 + y^2}$):	5.00
y (Imaginary Part):	4.00	Phase ($\phi = \arctan(y/x)$ in degree):	53.13

Given:		To Be Determined:	
m (Magnitude):	5.00	$x (= m \cdot \cos(\phi))$:	3.00
ϕ (Phase in degree):	53.13	$y (= m \cdot \sin(\phi))$:	4.00

Problem 2.24

ITEM	QTY
Screws	8000
Nuts	7500
Bolts	6200
TOTAL	21700

Problem 2.25				
Student	Exam 1	Exam 2	Final Exam	Overall Score
Davis	82	77	94	84.3
Graham	66	80	75	73.7
Jones	95	100	97	97.3
Meyers	47	62	78	62.3
Richardson	80	58	73	70.3
Thomas	74	81	85	80
Williams	57	62	67	62
AVERAGE	71.6	74.3	81.3	75.7