Analysis of SLO Measure Results and Action Plan

(Completed every three years according to the analysis cycle)

SLO 16: Understand construction project control processes.

Metric: Following courses-course learning outcomes as direct measures.

CMGT 4270 Strategic Analysis and Evaluation

CLO 3(BD) Understand, apply, analyze, or create various types of construction management learning outcomes through an exit examination.

CMGT 4310 Construction Planning and Scheduling

CLO 5(BD) Practice project monitoring and progress reporting.

Date: Click or tap to enter a date.

Course	**Analysis and Action**
CMGT 4270 Strategic Analysis and Evaluation	**Analysis:**
	Action Plan:
CMGT 4310 Construction Planning and Scheduling	**Analysis:**
	Action Plan:

Student Learning Outcomes – Measure 1

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 16: Understand construction project control processes.

CMGT 4270 Strategic Analysis and Evaluation

CLO 3(BD) Understand, apply, analyze, or create various types of construction management learning outcomes through an exit examination.

Target: Average score of class to be 70 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Exit Exam	McCrary	9/19/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
12	43%	86%	52%	Unmet

Note: See the attached sample.

#	Student	Score
1	Student 1	57%
2	Student 2	43
3	Student 3	43
4	Student 4	57
5	Student 5	43
6	Student 6	57
7	Student 7	43
8	Student 8	57
9	Student 9	57
10	Student 10	43
11	Student 11	86
12	Student 12	43
13		
14		
15		

#	Student	Score
16		
17		
18		
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30		

#	Student	Score
31		
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42		
43		
44		
45		

Collected Student Work: Place the collect student's work after this page for each course, each time taught.

Exit Exam 2018
Results Summary

	CMGT 4310						
Q#	108	109	110	111	112	113	114
ANSWERS:	c	a	c	b	b	a	d
Leoany Alvarez	c	a	c	b			b
Dylan Armstrong	c	a	a	b	d	c	b
Esther Salazar	c	a	c	c	d	c	c
Spencer Wommack	c	a	d	c	b	a	c
Casey Burleigh	c	a	d	c	b	c	c
Ryan Stanley	c	a		b	c	a	c
Samantha Thayer	c	a	d	c	b	d	c
Brett Rogers	c	a	d	b	b	b	c
Rhett Williamson	c	a	d	b	b	d	c
Brittan Brown	a	a	d	b	b	d	b
Brittany Stutes	c	a	c	b	c	a	d
Luis Suarez	c	a	c	c	c	b	a

x=incorrect table

	CMGT 4310						
Q#	108	109	110	111	112	113	114
pts possible	2	2	2	2	2	2	2
Leoany Alvarez					x	x	x
Dylan Armstrong			x		x	x	x
Esther Salazar				x	x	x	x
Spencer Wommack			x	x			x
Casey Burleigh			x	x		x	x
Ryan Stanley			x		x		x
Samantha Thayer			x	x		x	x
Brett Rogers			x			x	x
Rhett Williamson			x			x	x
Brittan Brown	x		x			x	x
Brittany Stutes					x		
Luis Suarez				x	x	x	x
% Correct	92%	100%	33%	58%	50%	25%	8%

	CMGT 4310						
Q#	108	109	110	111	112	113	114
names/possible	2	2	2	2	2	2	2
Leoany Alvarez	2	2	2	2	0	0	0
Dylan Armstrong	2	2	0	2	0	0	0
Esther Salazar	2	2	2	0	0	0	0
Spencer Wommack	2	2	0	0	2	2	0
Casey Burleigh	2	2	0	0	2	0	0
Ryan Stanley	2	2	0	2	0	2	0
Samantha Thayer	2	2	0	0	2	0	0
Brett Rogers	2	2	0	2	2	0	0
Rhett Williamson	2	2	0	2	2	0	0
Brittan Brown	0	2	0	2	2	0	0
Brittany Stutes	2	2	2	2	0	2	2
Luis Suarez	2	2	2	0	0	0	0

CMGT 4310				
Total Points Possible for this Course:				14
Name	Points	Curve	Total	%
Leoany Alvarez	8	0	8	57%
Dylan Armstrong	6	0	6	43%
Esther Salazar	6	0	6	43%
Spencer Wommack	8	0	8	57%
Casey Burleigh	6	0	6	43%
Ryan Stanley	8	0	8	57%
Samantha Thayer	6	0	6	43%
Brett Rogers	8	0	8	57%
Rhett Williamson	8	0	8	57%
Brittan Brown	6	0	6	43%
Brittany Stutes	12	0	12	86%
Luis Suarez	6	0	6	43%
			Count of Students:	12
			Minimum Score Received:	43%
			Maximum Score Received:	86%
			Average Score:	52%

LAMAR UNIVERSITY
Reese Construction Management Program
1900 Program's Exit Exam
CLOSED BOOK, CLOSED NOTES.

TIME LIMIT: 3 hours.

Please place your answer on the scan sheet given. Only one answer on this exam form will be graded. Thank you.

COURSE	NO.	QUESTION	ANSWER
4310	**108.**	Fill in the blank: Activity is a single _____ that consumes time and has a recognizable start and finish time. a. process b. operation c. task	c.
4310	**109.**	Fill in the blank: _____ is an effective method for identifying activities of a project. a. WBS b. OBS c. CBS	a.
4310	**110.**	Given the following data, determine the overall status of the project in terms of schedule and cost performance. PV = $480,000, EV = $530,000, AC = $540,000 a. Under budget, ahead of schedule b. Under budget, behind schedule c. Over budget, ahead of schedule d. Over budget, behind schedule Useful equations: PV = Planned Value AC = Actual Cost EV = Earned Value SV = Schedule Variance CV = Cost Variance CPI = Cost Performance Index SPI = Schedule Performance Index CV = EV - AC SV = EV - PV CPI = EV/AC SI = EV/PV	c.

LAMAR UNIVERSITY
Reese Construction Management Program
1900 Program's Exit Exam
CLOSED BOOK, CLOSED NOTES.

TIME LIMIT: 3 hours.

Please place your answer on the scan sheet given. Only one answer on this exam form will be graded. Thank you.

COURSE	NO.	QUESTION	ANSWER
4310	**111.**	Which type of project is not appropriate to apply Line of Balance scheduling? a. A highrise building b. A small commercial building c. A network of pipe lines	b.
4310	**112.**	In the STEP LIST below you are to place the 9 activities (given as ACTIVITY LIST, "a" through "i") in correct order for the procedure of planning and scheduling; please note that 5 steps are given and 4 steps are left blank. For this question provide the correct letter for Step 2, selecting from the letters remaining in the ACTIVITY LIST. ACTIVITY LIST a. Identifying the Critical Path(s) b. Estimate Activity Duration/Cost c. Draw graphic presentation (Schedule Network) d. Assigning Durations to Activities e. Assigning Resources and Costs f. Generate WBS & Activity List g. Scheduling Activity Start/Finish Times h. Ordering Activities (Job Logic) i. Calculating Early/Late Start/Finish Times STEP LIST Step 1: letter ___f____ Step 2: letter _____ Step 3: letter ___h____ Step 4: letter _____ Step 5: letter _____ Step 6: letter ___e____ Step 7: letter ___i____ Step 8: letter _____ Step 9: letter ___g____	b.

LAMAR UNIVERSITY
Reese Construction Management Program
1900 Program's Exit Exam
CLOSED BOOK, CLOSED NOTES.

TIME LIMIT: 3 hours.

Please place your answer on the scan sheet given. Only one answer on this exam form will be graded. Thank you.

COURSE	NO.	QUESTION	ANSWER
4310	**113.**	In the STEP LIST below you are to place the 9 activities (given as ACTIVITY LIST "a" through "i") in correct order for the procedure of planning and scheduling; please note that 5 steps are given and 4 steps are left blank. For this question provide the correct letter for Step 8, selecting from the letters remaining in the ACTIVITY LIST. ACTIVITY LIST a. Identifying the Critical Path(s) b. Estimate Activity Duration/Cost c. Draw graphic presentation (Schedule Network) d. Assigning Durations to Activities e. Assigning Resources and Costs f. Generate WBS & Activity List g. Scheduling Activity Start/Finish Times h. Ordering Activities (Job Logic) i. Calculating Early/Late Start/Finish Times STEP LIST Step 1: letter ___f____ Step 2: letter _____ Step 3: letter ___h____ Step 4: letter _____ Step 5: letter _____ Step 6: letter ___e____ Step 7: letter ___i____ Step 8: letter _____ Step 9: letter ___g____	a.

LAMAR UNIVERSITY
Reese Construction Management Program
1900 Program's Exit Exam
CLOSED BOOK, CLOSED NOTES.

TIME LIMIT: 3 hours.

Please place your answer on the scan sheet given. Only one answer on this exam form will be graded. Thank you.

COURSE	NO.	QUESTION	ANSWER
4310	**114.**	For the PDM network diagram in Exhibit 19, calculate the total duration. a. 9 days b. 11 days c. 14 days d. 17 days	d.

Student Learning Outcomes – Measure 2

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 16: Understand construction project control processes.

CMGT 4310 Construction Planning and Scheduling

CLO 5(BD) Practice project monitoring and progress reporting.

Target: Average score of class to be 80 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Fall 2018	Homework 5	Hwang	2/6/2019

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
12	0%	100%	82.5%	Met

Note: See the attached sample.

#	Student	Score
1	Christopher	75
2	Dylan	0
3	Pedro	100
4	Joshua	70
5	Daniel	75
6	James	100
7	Anthony	100
8	John	95
9	Erik	100
10	Abigail	100
11	Lucas	85
12	Levi	90
13		
14		
15		

#	Student	Score
16		
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#	Student	Score
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Collected Student Work: Place the collect student's work after this page for each course, each time taught.

CMGT 4310 & 5310 Construction Planning and Scheduling

Homework 5 – Cash Flow Analysis

Individual Work

Total Credit: 100 points

Student Name (put your name here): Lucas Sammons 85/100

Submission: Submit your Excel File via Blackboard; Due – 11 pm, Sunday

Description:

Refer to the table and conditions below to complete development of cash flow chart. (80 points)

Note that the project will be completed in six months.

Create two charts (10 points each)

(1) Chart 1 that shows value per month and cumulative value over six months

(2) Char 2 that shows the cumulative cash flow over the nine months.

Conditions of Cash Flow:

There is a two-month time lag in the schedule of monthly payment from the owner to the general contractor.
The owner hold 12% of monthly payment as retention money, but the general contractor cannot hold any retention from subcontract payment.

Retention will be released over three months in equal amount (one third per month) after the completion of job.

Monthly subcontract cost is 90% of value per month.

There is a one-month time lag in the schedule of monthly payment from the general contractor to the subcontractors.

Submission:

Both online and offline classes should submit a softcopy. Save this file as HW-10-YourName.xls.

Month	1	2	3	4	5	6	7	8	9
Value Per Month	1,000	1,500	1,500	1,500	1,500	1,500			
Cumulative Value	1,000	2,500	4,000	5,500	7,000	8,500			
Cumulative Value Less Retention (12%)	880	2,200	3,520	4,840	6,160	7,480			
Cumulative Payment Received From Certification			880	2,200	3,520	4,840	6,160	7,480	7,820
Cumulative Retention Payment							340	340	340
Cumulative Subcontract Cost	900	2,250	3,600	4,950	6,300	7,650	0	0	0
Cumulative Subcontract Payment		900	2,250	3,600	4,950	6,300	7,650	0	0
Cumulative Cash-out		900	2,250	3,600	4,950	6,300	7,650	0	0
Cumulative Cash Flow	0	(900)	(1,370)	(1,400)	(1,430)	(1,460)	(1,490)	7,480	7,820

Position your charts in the boxes below.

Chart 1

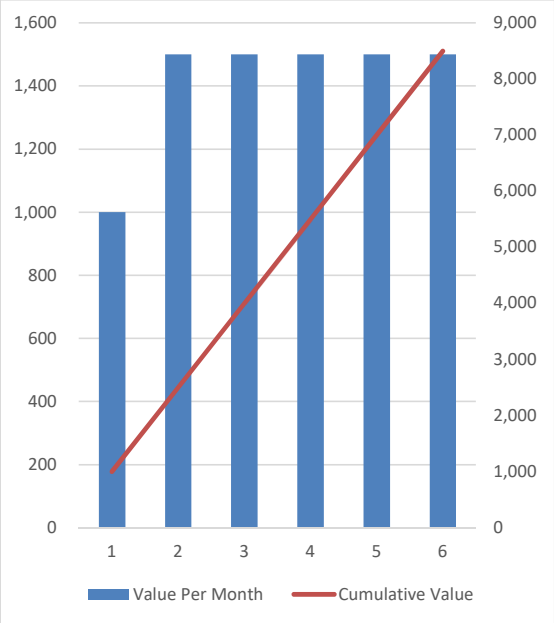
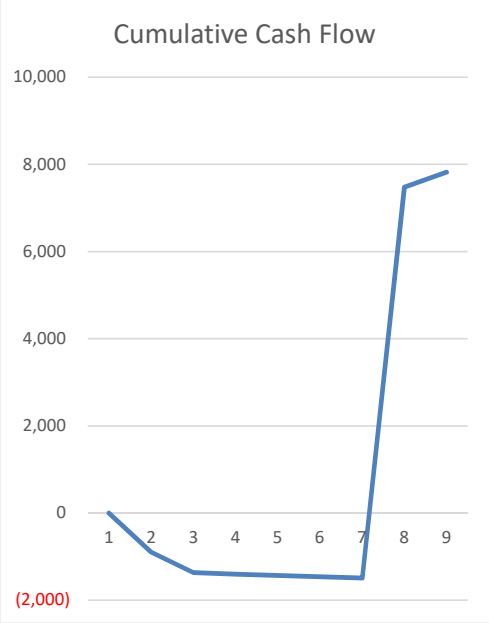


Chart 2



Analysis of SLO Measure Results and Action Plan

(Completed every three years according to the analysis cycle)

SLO 17: Understand the legal implications of contract, common, and regulatory law to manage a construction project.

Metric: Following courses-course learning outcomes as direct measures.

CMGT 4270 Strategic Analysis and Evaluation

CLO 3(BD) Understand, apply, analyze, or create various types of construction management learning outcomes through an exit examination.

CMGT 4350 Legal Practices in Construction

CLO 1(BD) Explain and/or compare construction contracts, roles & responsibilities of parties.

Date: Click or tap to enter a date.

Course	**Analysis and Action**
CMGT 4270 Strategic Analysis and Evaluation	**Analysis:**
	Action Plan:
CMGT 4350 Legal Practices in Construction	**Analysis:**
	Action Plan:

Student Learning Outcomes – Measure 1

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 17: Understand the legal implications of contract, common, and regulatory law to manage a construction project.

CMGT 4270 Strategic Analysis and Evaluation

CLO 3(BD) Understand, apply, analyze, or create various types of construction management learning outcomes through an exit examination.

Target: Average score of class to be 70 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Exit exam score	McCrary	9/14/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
12	56%	89%	74%	Met

Note: See the attached sample.

#	Student	Score
1	Student 1	56 %
2	Student 2	78
3	Student 3	78
4	Student 4	78
5	Student 5	78
6	Student 6	78
7	Student 7	89
8	Student 8	67
9	Student 9	56
10	Student 10	78
11	Student 11	89
12	Student 12	67
13		
14		
15		

#	Student	Score
16		
17		
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29		
30		

#	Student	Score
31		
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42		
43		
44		
45		

Collected Student Work: Place the collect student's work after this page for each course, each time taught.

Exit Exam 2018
Results Summary

Exit Exam relevant to SLO 17

	CMGT 4350								
Q#	162	163	164	165	166	167	168	169	170
ANSWERS:	c	a	b	b	a	b	a	a	c
Leoany Alvarez	c	a	c	c	a	b	a	c	b
Dylan Armstrong	c	a	b	b	a	c	a	b	c
Esther Salazar	c	a	b	b	a	b	c	b	c
Spencer Wommack	c	a	b	b	a	b	c	c	c
Casey Burleigh	c	a	b	b	a	b	c	c	c
Ryan Stanley	c	a	b	b	a	c	a	c	c
Samantha Thayer	c	a	b	b	a	b	a	b	c
Brett Rogers	a	a	b	b	a	c	a	c	c
Rhett Williamson	a	a	b	a	a	b	a	c	b
Brittan Brown	c	a	b	b	a	b	a	b	b
Brittany Stutes	c	a	b	b	a	b	a	b	c
Luis Suarez	c	a	b	b	a	c	b	c	c

x=incorrect table

	CMGT 4350								
Q#	162	163	164	165	166	167	168	169	170
pts possible	2	2	2	2	2	2	2	2	2
Leoany Alvarez			x	x				x	x
Dylan Armstrong						x		x	
Esther Salazar							x	x	
Spencer Wommack							x	x	
Casey Burleigh							x	x	
Ryan Stanley						x		x	
Samantha Thayer								x	
Brett Rogers	x					x		x	
Rhett Williamson	x			x				x	x
Brittan Brown								x	x
Brittany Stutes								x	
Luis Suarez						x	x	x	
% Correct	83%	100%	92%	83%	100%	67%	67%	0%	75%

	CMGT 4350								
Q#	162	163	164	165	166	167	168	169	170
names/possible	2	2	2	2	2	2	2	2	2
Leoany Alvarez	2	2	0	0	2	2	2	0	0
Dylan Armstrong	2	2	2	2	2	0	2	0	2
Esther Salazar	2	2	2	2	2	2	0	0	2
Spencer Wommack	2	2	2	2	2	2	0	0	2
Casey Burleigh	2	2	2	2	2	2	0	0	2
Ryan Stanley	2	2	2	2	2	0	2	0	2
Samantha Thayer	2	2	2	2	2	2	2	0	2
Brett Rogers	0	2	2	2	2	0	2	0	2
Rhett Williamson	0	2	2	0	2	2	2	0	0
Brittan Brown	2	2	2	2	2	2	2	0	0
Brittany Stutes	2	2	2	2	2	2	2	0	2
Luis Suarez	2	2	2	2	2	0	0	0	2

CMGT 4350				
Total Points Possible for this Course:				18
Name	Points	Curve	Total	%
Leoany Alvarez	10	0	10	56%
Dylan Armstrong	14	0	14	78%
Esther Salazar	14	0	14	78%
Spencer Wommack	14	0	14	78%
Casey Burleigh	14	0	14	78%
Ryan Stanley	14	0	14	78%
Samantha Thayer	16	0	16	89%
Brett Rogers	12	0	12	67%
Rhett Williamson	10	0	10	56%
Brittan Brown	14	0	14	78%
Brittany Stutes	16	0	16	89%
Luis Suarez	12	0	12	67%
			Count of Students:	12
			Minimum Score Received:	56%
			Maximum Score Received:	89%
			Average Score:	74%

LAMAR UNIVERSITY
Reese Construction Management Program
1900 Program's Exit Exam
CLOSED BOOK, CLOSED NOTES.

TIME LIMIT: 3 hours.

Please place your answer on the scan sheet given. Only one answer on this exam form will be graded. Thank you.

COURSE	NO.	QUESTION	ANSWER
4350	**162.**	The parties on a "traditional" construction contract would be: a. Owner and Designer/Builder b. Owner and Subcontractors c. Owner and General Contractor	c.
4350	**163.**	The four types of liability commonly found in contracts are: a. Contract, Tort, Statutory, and Strict Liabilities b. Gross, Net, Mass, and Standard Liabilities c. Law, Statute, Regulatory, and Federal Liabilities	a.
4350	**164.**	The clause(s) in contract language regarding solving contractual differences between parties is (are) the _____ clause. a. Primary Funding b. Dispute Resolution c. Unforeseen Conditions	b.
4350	**165.**	A _____ involves only labor unions in a fixed region of limited size. a. National Agreement b. Local Agreement c. Project Agreement	b.
4350	**166.**	A construction contract delivery method that an owner enters into with a company to provide all design, procurement, and construction on a project is called a _____ contract. a. Design-Build b. Construction Management c. Unit Price	a.
4350	**167.**	_____ laws operate to ensure that persons or entities providing labor or materials for construction projects receive the payment that they are due. a. Strict Liability b. Lien c. Performance Bond	b.

LAMAR UNIVERSITY
Reese Construction Management Program
1900 Program's Exit Exam
CLOSED BOOK, CLOSED NOTES.

TIME LIMIT: 3 hours.

Please place your answer on the scan sheet given. Only one answer on this exam form will be graded. Thank you.

COURSE	NO.	QUESTION	ANSWER
4350	**168.**	C and O contract for C's renovation of a one-story office building for $500,000. The completion date is December 1. The contract provides that for every day of unexcused delay, C shall be chargeable with liquidated damages of $1,000 per day. The building was completed twenty days late, and the delay was not excused by any events set forth in the force majeure clause. Can O recover the liquated damages for the delay and why? a. Yes, the liquidated damages are reasonable and agreed to in the contract. b. Yes, sometimes liquidated damages must be high to punish tardy completions. c. No, the liquidated damages are too high, they are punitive. d. No, liquated damages are illegal.	a.
4350	**169.**	During the construction of a commercial building, the contract documents (non-standard documents, i.e., NOT AIA documents) contain only the following statements regarding differing site conditions: • "All excavations shall be unclassified." • "All excavation work performed as required will be paid for at the unit bid price stated in the bid form for 'Unclassified Excavation.'" During execution of the excavation, the earthwork subcontractor hit a small outcropping of rock. The subcontractor submits a request for extra payment since this rock was not shown on the drawings (a differing site condition). When consulted by the General Contractor (GC), the geotechnical engineer states that this outcropping is not unusual for the soil formation found on this project. Should the GC submit the subcontractor's claim to the Owner as a differing site condition? a. No, there is no implied "right to relief" for differing site conditions. b. Yes, the Owner cannot reasonably expect the Contractor to accept the same payment for soil excavation and rock excavation. c. Yes, under the Spearin Doctrine, the drawings are insufficient.	a.
4350	**170.**	A building contractor is sued because a passing car hits some falling material, originating several stories above ground level during the steel erection process. The car went out of control, injuring the driver and killing the passenger. The suit against the contractor alleges that the contractor was negligent in the "manufacture of a product." Under this theory, the contractor would be subject to strict liability for defects in a product under the Uniform Commercial Code. Is the contractor liable for the damage? Why? a. No, the contractor is not liable, this is merely an accident. b. Yes, as stated, the contractor is a manufacturer of a product and liable under the Uniform Commercial Code. c. Yes, but under Tort Law, not the Uniform Commercial Code. d. Yes, but under Miller Act, not the Uniform Commercial Code.	c.

Student Learning Outcomes – Measure 2

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 17: Understand the legal implications of contract, common, and regulatory law to manage a construction project.

CMGT 4350 Legal Practices in Construction

CLO 1(BD) Explain and/or compare construction contracts, roles & responsibilities of parties.

Target: Average score of class to be 80 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Final Exam Score	McCrary	9/14/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
10	40%	98.4%	59.8%	Unmet

Note: See the attached sample.

#	Student	Score
1	Student 1	40.0
2	Student 2	67.2
3	Student 3	98.4
4	Student 4	60.0
5	Student 5	51.2
6	Student 6	48.0
7	Student 7	40.8
8	Student 8	52.8
9	Student 9	50.4
10	Student 10	89.6
11		
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#	Student	Score
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#	Student	Score
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Collected Student Work: Place the collect student's work after this page for each course, each time taught.

Grade Test: CMGT 4350-Undergraduate Final Examination

Brittany Free (Attempt 1 of 1)

Current Grade	123.0 out of 125 points Grade based on Last Evaluated Attempt
Status	Completed
Attempt Score	123 out of 125 points
Time Elapsed	1 hour, 51 minutes out of 3 hours
Started Date	5/8/18 8:28 PM Access Log
Submitted Date	5/8/18 10:19 PM
Due Date	5/9/18 3:00 AM
Clear Attempt	Clear Attempt Click **Clear Attempt** to clear this user's attempt.
Edit Test	Edit Test Click **Edit Test** to make changes.
Instructions	

Question 1: True/False

The insurance company(s) sets and/or defines the liability assumed by the insured under worker's compensation insurance.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 2: Multiple Choice

CASE 5: Under a standard form contract, contractor C formally requests substantial completion for a building whose roof cannot be seen on approach from any direction. Upon inspection, the Owner O finds the roof's shingles to have a minor, consistent (and unattractive) discoloration. The discoloration is traced back to the manufacturer. All other elements of the building are substantially complete.

In CASE 5, as the consultant to O, what is your recommendation about (1) substantial completion and (2) payment for work completed? State the principle of contract interpretation upon which you base the answer.

Given Answer:	A. This is a minor material breach; the work is substantially complete, pay in full.
Correct Answer:	C. This minor material breach breach anticipated by the contract document; the work is substantially complete, withhold an equitable amount.

0 out of 2 points

Question 3: Multiple Choice

Contract Situation "D"

In a $5,000,000 contract for a private owner, O, of a large commercial building, the following wording was found:
"The successful Contractor shall execute and return the contract along with all required insurance policies and contract bonds within 10 calendar days of its delivery to him by Owner. Notice to Proceed (NTP) shall be issued by Owner within 15 calendar days of receipt of the executed contract, insurance policies and bonds from the Contractor. The work of the contract including punch list work and final cleanup of the site shall be completed within 210 calendar days from NTP."

A separate Supplementary Conditions clause read as follows:
If Contractor breaches its obligation to deliver goods in accordance with the schedule provided for in this contract, Contractor shall pay Owner $1000 per day for each day of delay as liquidated damages. The parties agree that quantifying losses arising from Contractor's delay is inherently difficult insofar as delay may impact the Owner's reputation or require the Owner to provide non-monetary concessions (such as a loaner widget) to its own customer, and further stipulate that the agreed upon sum is not a penalty, but
rather a reasonable measure of damages, based upon the parties' experience in the widget industry and given the nature of the losses that may result from delay.

The Contractor completed the contract 295 calendar days after NTP, and $85,000 in liquidated damages was withheld from his final payment. He sued for the $85,000, which he alleged was wrongfully withheld. He took the position that he had been advised by an Owner's employee prior to the bid opening that the schedule was flexible and that "it would be alright" if he did not make the required completion date and that there would be no liquidated damages assessed.

Refer to Contract Situation "D" above, which position would the court decide was correct, the contractor's or the owner's? State the principle of contract interpretation upon which you based the answer.

Given Answer:	B. Owner, the written terms of the contract are clear, so parole evidence is irrelevant.
Correct Answer:	B. Owner, the written terms of the contract are clear, so parole evidence is irrelevant.

2 out of 2 points

Question 4: Essay

Please read each question very carefully. Then, provide an answer that is clear, concise, and correct.

RUBRIC: This question will be graded based upon your ability to analyze a case:
1. give an introduction,
2. present the facts,
3. explain the unsettled legal issues,
4. discuss the applicable rule(s) of law,
5. state assumptions and explain their significance,
6. analyze the application of the law to the legal issues and facts, and
7. draw a conclusion.

This case involves an O and C in SETX (southeast Texas) who entered into a $1,575,000 contract for the construction of roughly 5 miles of 18-inch diameter pipeline that required (generally) the contractor to excavate a trench, place bedding material in the bottom of the trench, install the pipe, place backfill material around and above the pipe, and return the surface to pre-construction conditions, all within 300 days. The contract did not contain soil borings nor a soils report, and the contract was silent

a. on who warrants the plans and specifications,
b. on who bears risks of differing subsurface condition, and
c. on who bears the risk of defective plans and specifications.

About 5 months into construction, the wet and rainy season delayed construction of the pipeline, not only during the rain, but also because the 7-ft deep trench filled with water from an underground water passage just a few feet below ground. It took almost two weeks for the water to be pumped from the trench, and for the trench to dry out enough for work to begin again. The contractor notified the owner and engineer of record, E, that C intended to file a claim under the Spearin Doctrine because the flooded trench caused material damages and delays.

At the end of the month, C filed the estimate for payment, along with the notice for damages in the amount of $100,000 and for two weeks of delays.

Please address the following questions in your answer:

a. If this dispute came before a court, should it look at evidence outside the writings?
b. What evidence would be relevant if the court were willing to look beyond the writings?
c. Assuming that all the relevant evidence is examined, can C recover $100,000? Explain.

Given Answer:

INTRODUCTION

This case is Contractor v. Owner in relation to recovering damages. The case takes place in Southeast Texas and shall be presented in front of the State Court.

FACTS

The contract did not contain soils reports or any documents disclosing the underground conditions.

Contractor notified Owner and Engineer of intent to file claim for damages under Spearin Doctrine.

ISSUES

Owner did not disclose surface conditions resulting in excessive delays and damages for the contractor. Contractor claims damages under the Spearin Doctrine.

Differencing Site Conditions when Spearin Doctrine is incorrectly applied.

ASSUMPTIONS

Contractor did not have adequate subsurface drawings to prevent or prepare for flooding.

APPLICATION

The Spearin Doctrine dictates that if an Owner supplies drawings, he or she warranties these drawings and is responsible for any damages resulting form incomplete drawings. The owner did not supply subsurface reports or drawings detailing these underground issues. Lack of drawings creates lack of liability under the Spearin Doctrine. However, under Differing Site Conditions clause, the contractor may notify the owner of change in conditions upon recognising the change in conditions.

CONCLUSION

Under DSC, the contractor may recover the full extent of the damages cause by the delay.

Correct Answer:

1. The broad legal issue here is unforeseen site conditions.
2. Generally, since there is no clause covering USC and the case is in Texas, the contractor bears all responsibility for USC.
3. First assumption would be that the rain that occurred in the rainy seen was normal.
4. Second assumption would be that the soil is consistent with that expected in the area.
5. If the assumptions hold, C cannot receive compensation for damages. Otherwise, the parties should negotiate the settlement.

Response
Feedback:

0 out of 14 points

Question 5: True/False

Public liability policies are limited to the risk of loss or injury to third parties only.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 6: True/False

A frequent implied breach of contract is "interference with the Contractor's work?"

Given Answer: False

Correct Answer: True

0 out of 1 points

Question 7: Multiple Choice

The AIA and EJCDC specify the date of project completion as _____ .

Given Answer: C.
substantial completion

Correct Answer: C.
substantial completion

2 out of 2 points

Question 8: True/False

Common law requires performance of services before payment for services.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 9: Multiple Choice

During the construction of a commercial building, the contract documents (non-standard documents, i.e., NOT AIA documents) contain only the following statements regarding differing

site conditions:
• "All excavations shall be unclassified."
□ "All excavation work performed as required will be paid for at the unit bid price stated in the bid form for "Unclassified Excavation."
During execution of the excavation, the earthwork subcontractor hit a small outcropping of rock. The subcontractor submits a request for extra payment since this rock was not shown on the drawings (a differing site condition). When consulted by the General Contractor (GC), the geotechnical engineer states that this outcropping is not unusual for the soil formation found on this project. Should the GC submit the subcontractor's claim to the Owner as a differing site condition?

Given Answer: B.
Yes, under the Spearin Doctrine, the drawings are insufficient.

Correct Answer: C.
No, there is no implied "right to relief" for differing site conditions.

0 out of 2 points

Question 10: True/False

Under a "no-damages-for-delay" clause, the contractor's relief in the event of an owner-caused delay is limited to an extension of contract time.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 11: Multiple Choice

The penal sum for the performance bond is usually _____ of the contract price.

Given Answer: A.
100%

Correct Answer: A.
100%

2 out of 2 points

Question 12: Multiple Choice

Contract Situation "E"
A clause in the technical specifications of an AIA A201 contract for the construction of a 35,000 CY fill for a commercial subdivision project read as follows:

"Fill material shall be spread in 6-inch lifts and compacted by a maximum of four passes of a Caterpillar compactor. The minimum compacted density shall be 95% of Modified Proctor."

When compaction tests were taken during contract performance, it was found that four passes of the compactor would not attain 95% Modified Proctor density. The engineer directed the contractor to compact the embankment to 95% Modified Proctor density. After filing a letter of protest and notice of claim for additional costs, the contractor complied and found that six to eight passes were required. Following project completion, the contractor testified in court that he believed the specification provision to mean that no more than four passes would ever be

required and that the sentence about the required density being 95% Modified Proctor was included because it was thought that most of the time this density would be achieved with four passes or less. The engineer, testifying on behalf of the Owner, said that he had written the specification and knew what it meant, which was that 95% Modified Proctor density must be met and that the sentence about the four passes was included because it was expected that the 95% density would be achieved with no more than four passes.

Refer to Contract Situation "E" above, assume that the court found in favor of the contractor, how would the cost of the additional work be priced?

Given Answer:	D. Cost of labor (including benefits), materials, supplies, equipment, rentals, bonds and insurance, supervision, and field personnel without the indirect portion of the cost is determine using contractually stated indirect percentages.
Correct Answer:	E. Use either method A or C.

1 out of 2 points

Question 13: Multiple Choice

Substantial completion _____ .

Given Answer:	D. allows owner occupancy for intended use.
Correct Answer:	D. allows owner occupancy for intended use.

2 out of 2 points

Question 14: Multiple Choice

In the following case, indicate 'Yes' if a legally binding 'offer' exists and 'No' if it does not exist. "I'll paint your house for a price of $3,000 during the third week of September provided my other work will let me."

Given Answer:	A. No
Correct Answer:	A. No

2 out of 2 points

Question 15: True/False

The guarantee is a promise made by the surety to the contractor.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 16: Multiple Choice

Contract Situation "A"

The pre-printed standard terms and conditions on the back of the supplier's purchase order (PO) for the supply of transit mix concrete to a project provided that payment for materials delivered would be made within 10 days of the buyer's receipt of payment from the project owner, and, further, that there would be no pay until and unless the buyer had received payment from the owner. On the face of the PO in one of the blank spaces, under the section entitled "Additional Provisions," the supplier had typed the statement that read, "PAYMENT FOR ALL CONCRETE DELIVERED IN THE MONTH WILL BE MADE TO SELLER BY THE END OF THE FOLLOWING MONTH." Work started and the contractor/buyer refused to pay the supplier/seller until the 10th day after receiving payment from the owner, usually 30 to 45 days later than the end of the month following the month of delivery. The supplier protested each payment, and upon completion of the work sued the contractor for interest on the late payments, alleging breach of contract and citing the typed-in payment statement. The contractor contended that the typed-in statement was never intended to supersede the standard terms and conditions, and that he only agreed to it because he expected the owner to pay him early enough to permit him to pay the supplier by the end of the month following the month of delivery .

Refer to Contract Situation "A" above. Who would a court decide was correct, the contractor or the supplier? State the principle of contract interpretation upon which you based the answer.

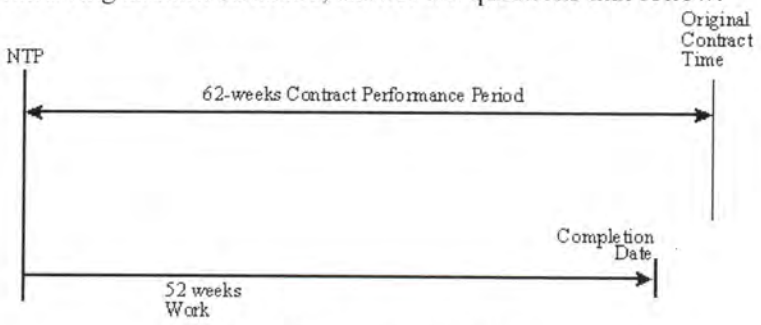
Given Answer: C. Supplier under the principle of specific language supersedes general language.

Correct Answer: C. Supplier under the principle of specific language supersedes general language.

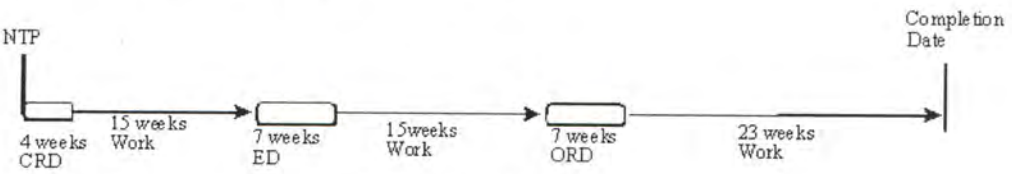
2 out of 2 points

Question 17: Essay

CASE 8: (Keep all of your work, this question will appear several times on this exam!) Given the following as-built schedule, answer the questions that follow:



CONTRACTOR'S ORIGINAL SCHEDULE



AS-BUILT SCHEDULE

For CASE 8, what is the contractor's liability for liquidated damages (if any)? Explain and show your work.

Given Answer:
Original Contract Time = 62 weeks
Contractor Schedule = 52 Weeks
Contractor Float = 62 - 52 = 10 Weeks
As Built Schedule = 4 + 15 + 7 + 15 + 7 + 23 = 71
ABS - Owner Delays and Excused Delays = 71 - (7 + 7) = 57 weeks
Contract Schedule - ABS with Contractor Delays = 62 - 57 = 5 weeks

EXPLANATION:
Although the contractor was behind on his schedule by 3 weeks, he still came in under the contract schedule once owner delays and excused delays were subtracted. This means that the contractor is not responsible for any liquidated damages .

Correct Answer:
ACP: 4 + 15 + 15 + 23 = 57 weeks

No LD, ACP < OCT.

Response Feedback:

10 out of 10 points

Question 18: Multiple Choice

CASE 2: ABC Construction Company (ABC) submitted a bid and entered into a prime contract with Alameda County (AC) for a new court house. The Aetna Life and Casualty Company (Aetna) furnished the normal package of prime contract surety bonds required for public projects. ABC subcontracted all of the concrete flatwork to XYZ Concrete Construction Company (XYZ). XYZ's surety was St. Paul Fire and Insurance Company (St. Paul) who furnished two subcontract bonds (a performance bond and a labor and materials payment bond).

In CASE 2, part of the guarantee of the bid bond furnished by Aetna on behalf of ABC, includes:

Given Answer: D. That the contractor will furnish the performance and payment bonds stipulated.

Correct Answer: D. That the contractor will furnish the performance and payment bonds stipulated.

2 out of 2 points

Question 19: Multiple Choice

CASE 7: A contractor was delayed by the owner in the performance of a construction project, but in spite of the delay, completed the project in less that the contractually stipulated time. The contractor filed a claim for damages suffered due to the delay. The owner denied any

liability. The contract for the project contained no provisions ("silent") addressing the situation.

In CASE 7, would you decide in favor of the Owner or the Contractor? Explain.

Given Answer: C. Contractor, based upon the Owner's failure to not impede the contractor's performance.

Correct Answer: C. Contractor, based upon the Owner's failure to not impede the contractor's performance.

2 out of 2 points

Question 20: Multiple Choice

Cook County received a set of bids for drainage work estimated at $1.9 million, with $1.2 million of drain pipe. Santucci Construction submitted a low bid of $1.1 million, with $775,000 of drain pipe. The other contractors submitted bids between $1.7 million and $1.8 million, with between $1.1 and $1.3 million of drain pipe. The engineer for the awarding authority had thought that Santucci's bid was "cheap, low." A day after bid opening, Santucci claimed a clerical error, and sought to withdraw his bid. The request was refused, and Santucci would not enter the contract. The awarding authority retained Santucci's bid deposit. Do you agree with this action by the owner and why?

Given Answer: D. No, there is no "meeting of the minds," the claimed mistake is obviously clerical.

Correct Answer: D. No, there is no "meeting of the minds," the claimed mistake is obviously clerical.

2 out of 2 points

Question 21: Multiple Choice

A building occupant brought an action against a subcontractor participating in remodeling operations, basing the complaint on the subcontractor's negligence in permitting quantities of dust and plaster to be deposited on several pieces of such occupant's furniture. Ultimately the insured subcontractor sued his insurance carrier for wrongful refusal to defend this action on his behalf. The subcontractor held that a public liability insurance policy covers property damage caused by accidents. Pre-trial findings-of-fact clearly demonstrated that a reasonable subcontractor would have done more to protect the occupant's furniture. Who would a court decide was correct here, the insurance company or the insured? State the principle of contract interpretation upon which you based the answer.

Given Answer: D. The insured, this case is the reason public liability insurance exists.

Correct Answer: A. The insurance company, public liability insurance does not cover damage due to negligence.

0 out of 2 points

Question 22: Multiple Choice

PROBLEM B:
AIA B101-2007
§8.1.3, The Architect and Owner waive consequential damages for claims, disputes or other matters in question arising
out of or relating to this Agreement. This mutual waiver is applicable, without limitation, to all consequential damages
due to either party's termination of this Agreement, except as specifically provided in Section 9.7.
§9.7 Termination Expenses are in addition to compensation for the Architect's services and include expenses directly
attributable to termination for which the Architect is not otherwise compensated, plus an amount for the Architect's anticipated profit on the value of the services not performed by the Architect.
With reference to Problem B...in a traditional design-bid-build project delivery, the owner-architect contract used
AIA Document B101-2007. Under this clause the **architect** can:

Given Answer: C.
still recover damages for termination expenses.

Correct Answer: C.
still recover damages for termination expenses.

2 out of 2 points

Question 23: True/False

A Type II Differing Site Conditions (DSC) clause requires that there be an actual physical condition encountered at the site that differs material from the conditions "indicated" in the contract documents.

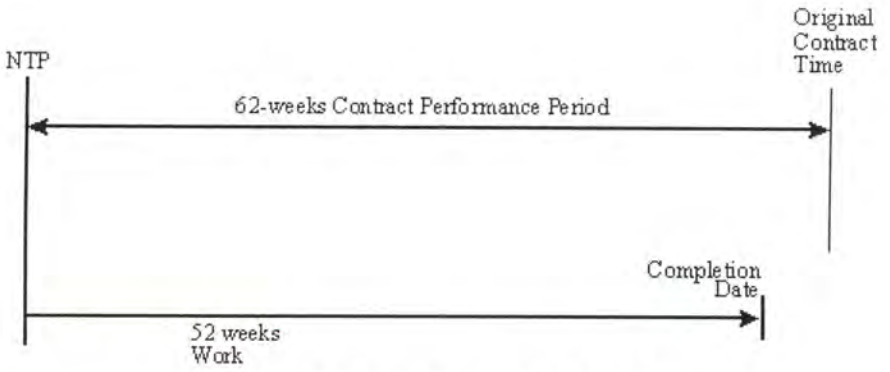
Given Answer: True

Correct Answer: False

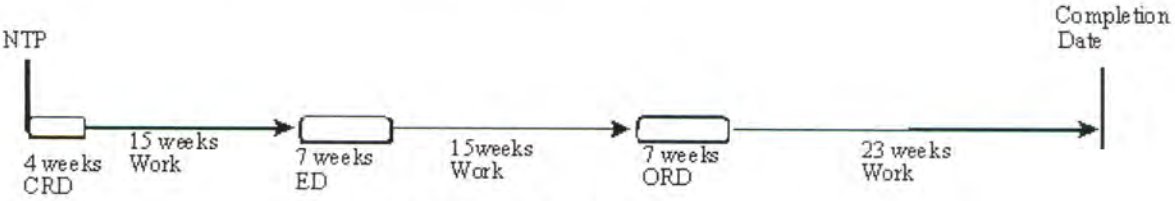
0 out of 1 points

Question 24: Multiple Choice

CASE 8: (Keep all of your work, this question will appear several times on this exam!) Given the following as-built schedule, answer the questions that follow:



CONTRACTOR'S ORIGINAL SCHEDULE



AS-BUILT SCHEDULE

For CASE 8, what is the revised contract time?

Given Answer: E. 76

Correct Answer: D. 71

0 out of 2 points

Question 25: Multiple Choice

The clause(s) in contract language regarding solving contractual differences between parties is (are) the _____ clause.

Given Answer: B. Dispute Resolution

Correct Answer: B. Dispute Resolution

2 out of 2 points

Question 26: True/False

The American Institute of Architects (AIA) Standard Form of Agreement requires that the identity of subcontractors be furnished.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 27: Multiple Choice

Bidder B is the low bidder for construction of a $1.5M building. B's bid is well within the original estimate for the project and within a few percentage points of the other bidders. However, within 24 hours following the bid opening, B calls the Owner O wanting to withdraw the bid because B transposed old salary rates for new salary rates from two columns on B's quarterly report, in determining the bid amount (amounting to about $3,500). The request was refused, and B refused to enter the contract. The Owner retained B's bid deposit. Do you agree with this action by the Owner and why?

Given Answer: D.
Yes, the claimed mistake is immaterial; B is the low bidder, so the deposit can be held by law.

Correct Answer: D.
Yes, the claimed mistake is immaterial; B is the low bidder, so the deposit can be held by law.

2 out of 2 points

Question 28: Multiple Choice

In which situation could a contractor use the *Spearin doctrine* as a "shield"?

Given Answer: D.
As a defense against defects in design specifications.

Correct Answer: D.
As a defense against defects in design specifications.

2 out of 2 points

Question 29: True/False

Liability insurance and surety bonds are two types of insurance coverage.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 30: Multiple Choice

When the terms of a contract are vague, which of the following items has the highest "relative importance of the manifestation of intent" for language interpretation?

Given Answer: B.
parole evidence

Correct Answer: C.
course of performance

0 out of 2 points

Question 31: True/False

Arbitration is a form of dispute resolution whereby a board is formed immediately upon signature of the contract.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 32: True/False

Project delay can be used as either a shield to liability or a sword by which to obtain a damages award.

Given Answer: False

Correct Answer: True

0 out of 1 points

Question 33: Multiple Choice

To settle disputes

Given Answer: C.
Litigation is often chosen over arbitration because arbitration is not binding

Correct Answer: B.
Arbitration is often chosen over litigation because of cost and crowding of court dockets

0 out of 2 points

Question 34: Multiple Choice

_____ laws operate to ensure that persons or entities providing labor or materials for construction projects receive the payment that

Given Answer: A.
Lien

Correct Answer: A.
Lien

2 out of 2 points

Question 35: True/False

An "excusable delay " entitles the contractor to both a time extension and compensation for the extra costs caused by the delays.

Given Answer: True

Correct Answer: False

0 out of 1 points

Question 36: Multiple Choice

Contract Situation "B"

C is constructing a building for O designed by architect A under a contract that uses AIA documents. Clauses in the Supplementary Condition define the Owner's Contract Manager as the individual having authority to bind the Owner. At the pre-construction conference, as documented by meeting minutes, all the parties introduced their representatives. O introduced CM as the individual, "who had authority to sign Change Orders and Construction Change

Directives to the contract," and an inspector, who would oversee the work for compliance with the contract documents." During the actual construction, the inspector relaxed the specifications for what amounted to Minor Changes in the Work. Upon discovery, neither A's representative nor CM would agree to ratify those changes. Both C's field superintendent and O's inspector said that they understood that the inspector had authority to make minor changes, as discussed during the pre-construction meeting. However, both A and O's Contract Manager referred to the Pre-construction Meeting's Minutes.

Refer to Contract Situation "B" above, who would a court decide was correct and why?

Given Answer: B.
Owner, the inspector does not have authority based upon the Pre-Construction Meeting Minutes.

Correct Answer: B.
Owner, the inspector does not have authority based upon the Pre-Construction Meeting Minutes.

2 out of 2 points

Question 37: Multiple Choice

CASE 2: ABC Construction Company (ABC) submitted a bid and entered into a prime contract with Alameda County (AC) for a new court house. The Aetna Life and Casualty Company (Aetna) furnished the normal package of prime contract surety bonds required for public projects. ABC subcontracted all of the concrete flatwork to XYZ Concrete Construction Company (XYZ). XYZ's surety was St. Paul Fire and Insurance Company (St. Paul) who furnished two subcontract bonds (a performance bond and a labor and materials payment bond).

In CASE 2, with respect to the prime contract bonds, who was the principal or principal debtor, with the primary obligation to perform?

Given Answer: D.
ABC Construction Company

Correct Answer: D.
ABC Construction Company

2 out of 2 points

Question 38: True/False

In liability insurance, the insurer cannot recover from those named as insureds in the policy.

Given Answer: False

Correct Answer: True

0 out of 1 points

Question 39: Multiple Choice

Contract Situation "C"

A site development that includes significant fill that will raise the finished floor elevations of several proposed buildings above a flood plain, uses AIA's documents. The Supplementary Conditions define the engineer E's professional activities as part of the architect A's activity. During the course of construction, contractor C, notifies E of a Type II Differing Site Condition (DSC). E agrees that a

Type II DSC exists and verbally tells C to go ahead with the work and they will figure cost changes later. A agrees with E, and issues a written recommendation, stating therein the change in Contract Scope, Contract Sum, and Contract Time. The Owner, however, refuses to accept A's recommendations for Contract Sum and Contract Time, and issues a Claim to the Architect, "as provided in AIA A201." Upon receipt of a copy of the Owner's claim, C stops work, "per AIA A201," and sends a letter to the Owner stating that "O's claim on the differing site condition constitutes an anticipatory breach of contract."

Referring to Contract Situation "C" above, was it proper for the Contractor to stop work under the claim of an anticipatory breach?

Given Answer: B.
Yes, the Contractor followed the requisite procedures for this type of dispute.

Correct Answer: C.
No, the Contractor failed to follow the requisite procedures for this type of dispute.

0 out of 2 points

Question 40: Multiple Choice

Contractor Kiley performed part of the work required by his contract with Owner Daniels, then defaulted. The Owner paid for all work completed by Kiley. However, it was later discovered that part of Kiley's work was unsatisfactory. By agreement with the surety, Daniels and another contractor, Roberts, finished the job for $15,000 additional cost (beyond original contract), in addition, Daniels had this contractor replace Kiley's defective work for $8,000. Kiley's performance bond, having a face value of $25,000, "promised satisfactory performance by the principal." Daniels presented the surety with a bill for $23,000. How much should the surety pay to the Owner Daniels?

Given Answer: C.
$23,000

Correct Answer: C.
$23,000

2 out of 2 points

Question 41: Multiple Choice

A construction contract delivery method that an owner enters into with a company to provide all design, procurement, and construction on a project is called a _____ contract.

Given Answer: B.
Design-Build

Correct Answer: B.
Design-Build

2 out of 2 points

Question 42: True/False

The various Standard Form of Agreements from AIA, EJCDC, ConsensusDocs, and Federal government are unanimous in their attitude toward the inclusion of reports on physical site conditions as part of the contract documents.

Given Answer: True

Correct Answer: False

0 out of 1 points

Question 43: Multiple Choice

Contract Situation "C"

A site development that includes significant fill that will raise the finished floor elevations of several proposed buildings above a flood plain, uses AIA's documents. The Supplementary Conditions define the engineer E's professional activities as part of the architect A's activity. During the course of construction, contractor C, notifies E of a Type II Differing Site Condition (DSC). E agrees that a Type II DSC exists and verbally tells C to go ahead with the work and they will figure cost changes later. A agrees with E, and issues a written recommendation, stating therein the change in Contract Scope, Contract Sum, and Contract Time. The Owner, however, refuses to accept A's recommendations for Contract Sum and Contract Time, and issues a Claim to the Architect, "as provided in AIA A201." Upon receipt of a copy of the Owner's claim, C stops work, "per AIA A201," and sends a letter to the Owner stating that "O's claim on the differing site condition constitutes an anticipatory breach of contract."

Referring to Contract Situation "C" above, under this contract, is this a legitimate differing site condition claim, and why?

Given Answer: C. Yes, the Architect's written interpretation is binding for this type of contract change.

Correct Answer: C. Yes, the Architect's written interpretation is binding for this type of contract change.

2 out of 2 points

Question 44: True/False

A subsurface condition clause, contained in the General Conditions of the contract, on a renovation project can include asbestos insulation in an existing building.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 45: True/False

If bad weather delays construction of a facility, the delay costs in terms of lost use of the facility are not insurable under the owner's property insurance.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 46: True/False

The *Lonergan Doctrine* states that the owner warrants the accuracy and sufficiency of the drawings and specifications used by the contractor to perform the work.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 47: Multiple Choice

CASE 4: Assume that a performance bond was furnished by a general contractor in a penal sum of 100% of th

Begin this question with only the information in CASE 4 (i.e., no other question), if the Owner and the Surety Surety?

Given Answer: D. $1,000,000

Correct Answer: D. $1,000,000

2 out of 2 points

Question 48: Essay

Please read each question very carefully. Then, provide an answer that is clear, concise, and correct.

RUBRIC: This question will be graded based upon your ability to analyze a case:
1. give an introduction,
2. present the facts,
3. explain the unsettled legal issues,
4. discuss the applicable rule(s) of law,
5. state assumptions and explain their significance,
6. analyze the application of the law to the legal issues and facts, and
7. draw a conclusion.

PROBLEM F:
A public owner, O and contractor, C, entered into a construction contract where C was to build a small commercial building in accordance with plans and specifications drafted by A, an architect retained by O. The contract stated that for every day of unexcused delay O would deduct $4,000 as a "penalty." The contract price was $250,000. At the end of the construction period, C was found to be twenty-five days late due to inexcusable delays; C agreed that assessment; and O withheld $100,000 (25d x $4,000/day) .
Claiming the "penalty" clause invalid, C sued O to recover the $100,000? Can C recover this money? Why?
If the clause is invalid, what are O's damages, i.e. how much do you believe that O can retain?
Taken from *Legal Aspects of Architecture, Engineering and the Construction Process*, by Justin Sweet, Stamford, CT: Cengage Learning, 2015. Used under the "Fair Use Doctrine" found in "U.S. Code, Title 17, Chapter 1, § 107 - Limitations on exclusive rights: Fair use."

Given Answer: Introduction
This is a case of Contractor v. Owner to recover withheld damages due to delay.
Facts

Contractor was 25 days late. The damages stipulated $4,000/ day as a penalty for delays. The owner withheld $100,000. The contract Price was $250,000. Contractor agreed to number of delayed days.
Issues
The owner withheld $100,000. The contractor believes this is penalty clause is invalid.
Rules
The contract clearly stated the amount for delays. Precedent dictates the amount of damages allowed by law in accordance to "Good Faith and Fair Dealings" as well as Contra Preforentum.
Assumptions
This contract is assumed to be an adhesion contract. The type of contract is important due to the canons of interpretation.
Application
The adhesion contract allows for Contra Preforentum which rules in favor of the contractor. However, given that the contractor agreed to delays, the owner is allowed some form of compensation.
Conclusion
Given the large sum of delays (40% of contract), and that the contract is an adhesion contract, the courts rule in favor of the contractor and reduce the amount of damages to $1,000.00 per delayed day. This would allow the owner to receive compensation without imposing unfair dealings upon the contractor. The contractor shall recover $75,000 of the $100,000 withheld by the owner.

Correct Answer:

1. The legal issue here is the validity of liquidated damages due to a contract breach.
2. The rule of law that apply here are that liquated damages (a) cannot be a penalty, and (b) must be conscionable.
3. a. The contract clearly states that the LD are a penalty, which is a violation of common law.
3.b. The LD ($100,000) seem very large 1.6% in comparison to the total contract ($250,000).
4. O may be able to recover other LD, but not the $100K and the clause is invalid.

Response Feedback:

14 out of 14 points

Question 49: Multiple Choice

CASE 2: ABC Construction Company (ABC) submitted a bid and entered into a prime contract with Alameda County (AC) for a new court house. The Aetna Life and Casualty Company (Aetna) furnished the normal package of prime contract surety bonds required for public projects. ABC subcontracted all of the concrete flatwork to XYZ Concrete Construction Company (XYZ). XYZ's surety was St. Paul Fire and Insurance Company (St. Paul) who furnished two subcontract bonds (a performance bond and a labor and materials payment bond).

In CASE 2, with respect to the subcontract bonds, who was the obligee (bond holder)?

Given Answer: B.
St. Paul Fire and Insurance Company

Correct Answer: D.
Alameda County

0 out of 2 points

Question 50: Multiple Choice

The four types of liability commonly found in contracts are:

Given Answer: A.
Contract, Tort, Statutory, and Strict Liabilities

Correct Answer: A.
Contract, Tort, Statutory, and Strict Liabilities

1 out of 1 points

Question 51: Multiple Choice

Assume that a performance bond was furnished by a general contractor with a penal sum of 100% of the contract price for a $12,500,000 lump sum contract. The contractor defaults at a point in time when s/he had been paid $4,525,000 for contract billings to date. The owner and surety jointly secure another contractor to complete the contract and the owner pays the second contractor $7,975,000 to complete the contract. When the contract work was ultimately completed, it was 150 days late, so the Owner requested an additional $75,000 of liquidated damages, in accordance with the stipulated amount in the contract of $500 per day. What is the monetary liability of the Surety?

Given Answer: A.
$0

Correct Answer: B.
$75,000

0 out of 2 points

Question 52: True/False

One way to increase the openness of a specification is to include the term "or approved equal" into the product description.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 53: Matching

Please match the following questions with their correct answers. Answers can be used more than once, or not at all.

Question	Correct Match	Given Match

Contractor shall furnish and install floor tile. Floor tile shall be a common, smooth surface finish, 12-inch (nominal) by 12-inch (nominal) by 8 millimeters thick (minimum), ceramic, pattern to be selected by owner.	B. Open Specification	A. Performance and Design Specification
All structural steel shall conform to ASTM A36.	D. Standard Specification	D. Standard Specification
The wall shall be constructed to support a vertical load of 300 pounds per lineal foot (plf).	C. Performance Specification	C. Performance Specification
The panel shall be a type E085-P31 Kemply by Kemlite.	E. Proprietary Specification	E. Proprietary Specification

3 out of 4 points

Question 54: True/False

In essence, a bond is evidence to the obligee of the existence of a separate indemnity agreement.

Given Answer: False

Correct Answer: True

0 out of 1 points

Question 55: Multiple Choice

Addenda are

Given Answer: B. Changes to the contract document before the contract is signed

Correct Answer: B. Changes to the contract document before the contract is signed

2 out of 2 points

Question 56: Multiple Choice

C and O contract for C's renovation of a one-story office building for $500,000. The completion date is December 1. The contract provides that for every day of unexcused delay, C shall be chargeable with liquidated damages of $10,000 per day. The building was completed twenty days late, and the delay was not excused by any events set forth in the *force majeure* clause. Can O recover the liquidated damages for the delay and why?

Given Answer: A. No, the liquidated damages are too high, they are punitive.

Correct Answer: A. No, the liquidated damages are too high, they are punitive.

2 out of 2 points

Question 57: True/False

When presented with a dispute, the "initial decision maker" should judge the contract documents from the perspective of an honest contractor examining them before bid or negotiation.

Given Answer: True

Correct Answer: True

1 out of 1 points

Question 58: Multiple Choice

CASE 2: ABC Construction Company (ABC) submitted a bid and entered into a prime contract with Alameda County (AC) for a new court house. The Aetna Life and Casualty Company (Aetna) furnished the normal package of prime contract surety bonds required for public projects. ABC subcontracted all of the concrete flatwork to XYZ Concrete Construction Company (XYZ). XYZ's surety was St. Paul Fire and Insurance Company (St. Paul) who furnished two subcontract bonds (a performance bond and a labor and materials payment bond).

In CASE 2, what is the guarantee of the labor and materials payment bond furnished by St. Paul on behalf of XYZ?

Given Answer: A.
That the contractor will pay the concrete supplier.

Correct Answer: A.
That the contractor will pay the concrete supplier.

2 out of 2 points

Question 59: True/False

A contractor who has the option to carry Builder's Risk Insurance usually carries the insurance without considering the nature of the project.

Given Answer: True

Correct Answer: False

0 out of 1 points

Question 60: Multiple Choice

The following clause is an _____ clause, typically found in the Supplementary Conditions: "Allow the lump sum of $20,000 for the purchase and delivery of Lawns, Turfgrass, and Trees. Reference Specification Sections 02925, 02927, and 02930."

Given Answer: C.
Allowance

Correct Answer: C.
Allowance

2 out of 2 points

Question 61: True/False

A contractor can expect to be paid for delays that are self-inflicted.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 62: Multiple Choice

PROBLEM B:
AIA B101-2007
§8.1.3, The Architect and Owner waive consequential damages for claims, disputes or other matters in question arising
out of or relating to this Agreement. This mutual waiver is applicable, without limitation, to all consequential damages
due to either party's termination of this Agreement, except as specifically provided in Section 9.7.
§9.7 Termination Expenses are in addition to compensation for the Architect's services and include expenses directly
attributable to termination for which the Architect is not otherwise compensated, plus an amount for the Architect's anticipated profit on the value of the services not performed by the Architect.
With reference to Problem B...in a traditional design-bid-build project delivery, the owner-architect contract used
AIA Document B101-2007. Under this clause the **owner** can:

Given Answer: C.
still recover damages for termination expenses.

Correct Answer: D.
none of the above

0 out of 2 points

Question 63: Multiple Choice

The Department of the Army issued a contract for the construction of an airport facility with a three-year contract time and fixed-price contract terms. Two bids were received. You have been asked to be part of an advisory pre-award panel to evaluate and recommend award of the contract. The low bidder provided all the requisite bonds, signatures, and correct bid package. The contracting officer provides the panel with detailed information regarding the low bidder, including credit reports, Defense Department records; reports from customers, suppliers, and bankers; financial data; and current and past production records. The information showed that the low bidder had deficiencies in past performance and in meeting required schedules. The low bidder's cash flow, equipment and facilities, inventory control system, and quality control systems were all found to be "barely adequate" for this contract. What would you recommend and why?

Given Answer: B.
Reject the low bid; the low bidder is not responsible.

Correct Answer: B.
Reject the low bid; the low bidder is not responsible.

2 out of 2 points

Question 64: Multiple Choice

A _____ involves only labor unions in a fixed region of limited size.

Given Answer: B.
Local Agreement

Correct Answer: B.
Local Agreement

2 out of 2 points

Question 65: Multiple Answer

Differing Site Condition Clauses: Assume that you are an estimator for a construction company bidding on a construction project that has non-standard "differing site condition" clauses (that is, not from AIA nor from other standard general conditions). Please select which of the follow question are among the five (5) key questions that you would try to answer about these clauses that will help avoid making a mistake regarding cost and time adjustments should differing site conditions be encountered.
[IMPORTANT NOTE: Please select all that apply, more than one answer may be possible.]

Given Answers: A.
What are the notice requirements?
C.
Does the clause cover both Type I and Type II conditions?
E.
Does the contract contain other conflicting indemnification and exculpatory clauses?

Correct Answers: A.
What are the notice requirements?
C.
Does the clause cover both Type I and Type II conditions?
E.
Does the contract contain other conflicting indemnification and exculpatory clauses?

10 out of 10 points

Question 66: Multiple Choice

PROBLEM A: In the State of Texas, Owner (O) contracts with contractor C to rehabilitate a bridge, C subcontracts with S to paint the bridge. During the work, two employees of S, Tim and Tammy, are injured. Both C and S have Workers' Compensation Insurance, as required by their contracts. Tim falls off the bridge during painting, and Tammy is electrocuted from old but negligently installed wiring. (Note: Please read this problem carefully, it is not the same one as found in class.)

In PROBLEM A, the insurance of which employer(s) pays for these injuries?

Given Answer: C.
Employer S only

Correct Answer: C.
Employer S only

1 out of 1 points

Question 67: Multiple Choice

Which of the following is not a common condition of *force majeure* for the contractor?

Given Answer: A.
Labor shortage

Correct Answer: B.
Differing site conditions

0 out of 2 points

Question 68: Multiple Choice

_____, a contract modification of common law, meets the unique needs of the construction industry by dividing the project into smaller units of work, and by paying the contractor incrementally commensurate with the percentage of work completed.

Given Answer: C.
Progress payment

Correct Answer: C.
Progress payment

2 out of 2 points

Question 69: Multiple Choice

Which of the following is NOT an example of a first-tier bond?

Given Answer: B.
Material supplier bond

Correct Answer: B.
Material supplier bond

2 out of 2 points

Question 70: Multiple Choice

The parties on a "traditional" construction contract would be:

Given Answer: C.
Owner and General Contractor

Correct Answer: C.
Owner and General Contractor

2 out of 2 points

Question 71: True/False

1.

A performance bond promises to indemnify the obligee against financial loss caused by the licensee's noncompliance with specified laws or regulations.

Given Answer: False

Correct Answer: False

1 out of 1 points

Question 72: Multiple Choice

CASE 1: The low bidder on a project failed to acknowledge receipt of an addendum at the requisite place in the bid form. The addendum changed the contract time from 150 calendar days to 100 calendar days. The second low bidder asked the owner to relieve the low bidder of contractual obligation.

In CASE 1, should the owner discard the low bid? Why or why not?

Given Answer: D.
Yes, this is a major irregularity in the bid

Correct Answer: D.
Yes, this is a major irregularity in the bid

2 out of 2 points

Question 73: Multiple Choice

Complete this sentence: The recommendations of CSI regarding the content of The Supplementary Conditions includes _____?

Given Answer: A.
modifications (only) to the General Conditions.

Correct Answer: A.
modifications (only) to the General Conditions.

2 out of 2 points

Question 74: Multiple Choice

CASE 3: A building contractor is sued because a passing car hits some falling material, originating several stories above ground level during the steel erection process. The car went out of control, injuring the driver and killing the passenger. The suit against the contractor alleges that the contractor was negligent in the "manufacture of a product." Under this theory, the contractor would be subject to strict liability for defects in a product under the Uniform Commercial Code.

In CASE 3, is the contractor liable for the damage? Why?

Given Answer: B.
Yes, but under Tort Law, not the Uniform Commercial Code.

Correct Answer: B.
Yes, but under Tort Law, not the Uniform Commercial Code.

2 out of 2 points

Question 75: Multiple Choice

1.

2.

CASE 4: Assume that a performance bond was furnished by a general contractor in a penal sum of 100% of the contract price for a $12,000,000 lump sum contract. The contractor defaults at a point in time when he/she had been paid $4,000,000 for contract billings to date.

Begin this question with only the information in CASE 4 (i.e., no other question), if the Owner and the Surety establish that the final and true value of the work in place at the time of the default was $3,000,000, and the Owner pays the second contractor $9,000,000 to complete the original contract, what would be the monetary liability of the Surety?

Given Answer: D. $1,000,000

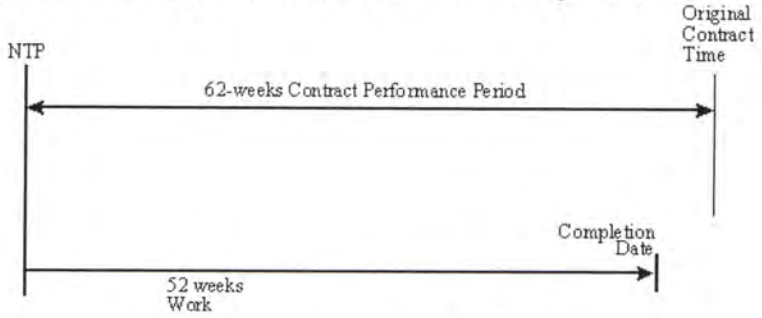
Correct Answer: D. $1,000,000

2 out of 2 points

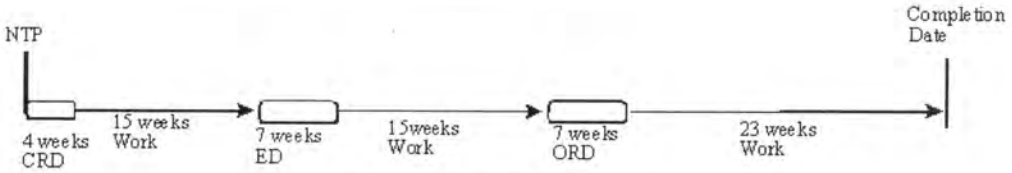
Question 76: Multiple Choice

1.

CASE 8: (Keep all of your work, this question will appear several times on this exam!) Given the following as-built schedule, answer the questions that follow:



CONTRACTOR'S ORIGINAL SCHEDULE



AS-BUILT SCHEDULE

For CASE 8, what is the contractor's actual performance (including contractor delays) of the work?

Given Answer: A. 57

Correct Answer: A. 57

2 out of 2 points

Question 77: True/False

1.

Builder's Risk Insurance covers equipment loss or damage.

Given Answer: True

Correct Answer: False

0 out of 1 points

Question 78: True/False

The general rule under common law is that the owner is responsible for the consequences of encountering defective soil conditions.

Given Answer: True

Correct Answer: False

0 out of 1 points

Analysis of SLO Measure Results and Action Plan

(Completed every three years according to the analysis cycle)

SLO 18: Understand the basic principles of sustainable construction.

Metric: Following courses-course learning outcomes as direct measures.

CMGT 1320 Light Construction Materials and Methods
CLO 6(BD) Explain fundamental technologies for design and construction of green building.

Exit Interview – Question 27

Date: Click or tap to enter a date.

Course	**Analysis and Action**
CMGT 1320 Light Construction Materials and Methods	**Analysis:**
	Action Plan:
Exit Interview – Question 28	**Analysis:**
	Action Plan:

Student Learning Outcomes – Measure 1

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 18: Understand the basic principles of sustainable construction.

CMGT 1320 Light Construction Materials and Methods

CLO 5(BD) Identify issues of residential planning and development, including sustainable construction.

CLO 6(BD) Explain fundamental technologies for design and construction of green building.

Target: Average score of class to be 80 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Homework or Exam	Waddill	9/25/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
24				Choose an item.

Note: No data was collected. Mr. Waddill (adjunct faculty) taught this course as a substitute for the original instructor (full-time faculty) who had a health issue. An unsmooth transition resulted in a failure of data collection. Director will coordinate with the faculty for the next academic year.

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#	Student	Score
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45		

Collected Student Work: Place the collect student's work after this page for each course, each time taught.

Student Learning Outcomes – Measure 2

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 18: Understand the basic principles of sustainable construction.

Considering that your education is to prepare you for an entry level management position related to construction, how do you rate yourself concerning the following? Choose the appropriate number. Use a scale of 1 to 5.

Exit Interview - Question 27: I understand sustainability principles

Target: Average score of class to be 70 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Exit Interview – Q27	McCrary	9/26/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
12	60%	100%	85.45%	Met

Note: See the attached sample.

#	Student	Score
1	Williamson	3
2	Thayer	5
3	Wommack	5
4	Rogers	3
5	Stanley	4
6	Free	n/a
7	Suarez	4
8	Brown	4
9	Armstrong	5
10	Salazar	5
11	Alvarez	4
12	Burleigh	5
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Collected Student Work: Place the collect student's work after this page for each course, each time taught.

5 4 0 18

Considering that your education is to prepare you for an entry level management position related to construction, how do you rate yourself concerning the following? Choose the appropriate number. Use a scale of 1 to 5 as follows:

1 Disagree strongly 2 Disagree 3 Mixed feelings/Neutral 4 Agree 5 Agree Strongly

8. I feel well prepared for professional work.	○ 1	○ 2	◉ 3	○ 4	○ 5	○ NA
9. I have the ability to estimate using computer spreadsheets.	○ 1	◉ 2	○ 3	○ 4	○ 5	○ NA
10. I have the ability to estimate using the computer program Heavy Bid.	○ 1	◉ 2	○ 3	○ 4	○ 5	○ NA
11. I have the ability to schedule using CPM and computers.	○ 1	○ 2	○ 3	○ 4	○ 5	◉ NA
12. I have the ability to set up cost accounts and variance reports.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
13. I am confident in my ability to manage the safety operations of a company.	○ 1	○ 2	○ 3	○ 4	◉ 5	○ NA
14. I am aware of the major issues concerning contract law.	○ 1	○ 2	○ 3	○ 4	◉ 5	○ NA
15. I have the ability to manage and inspect the work of plumbers and pipe fitters.	○ 1	○ 2	○ 3	○ 4	○ 5	◉ NA
16. I have the ability to manage and inspect the work of the earthworkers.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
17. I have the ability to manage and inspect the work of the electricians.	○ 1	◉ 2	○ 3	○ 4	○ 5	○ NA
18. I have the ability to manage and inspect the work of the HVAC subcontractors.	○ 1	◉ 2	○ 3	○ 4	○ 5	○ NA
19. I have the ability to manage and inspect the concrete and masonry work.	○ 1	○ 2	○ 3	○ 4	◉ 5	○ NA
20. I am able to read and interpret contract plans, specifications and documents.	○ 1	○ 2	○ 3	○ 4	◉ 5	○ NA
21. I am capable of working on a survey or layout crew.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
22. I am able to communicate effectively with the engineers concerning main engineering principles and practices.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
23. I understand and can apply the basic principles of ethics.	○ 1	○ 2	○ 3	○ 4	◉ 5	○ NA
24. I understand the basic fundamentals of business management.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
25. I understand the basic fundamentals of project management.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
26. I have the ability to work with BIM projects.	○ 1	○ 2	◉ 3	○ 4	○ 5	○ NA
27. I understand sustainability principles.	○ 1	○ 2	○ 3	○ 4	◉ 5	○ NA
28. I am confident in my ability to communicate with oral effectiveness.	○ 1	○ 2	◉ 3	○ 4	○ 5	○ NA
29. I am confident in my ability to communicate effectively in writing.	○ 1	○ 2	○ 3	◉ 4	○ 5	○ NA
30. Would you advise a friend with similar interests to select CM as their major?	○ Y	○ N	◉ Undecided			
31. If you were starting over, would you choose the same major?	○ Y	○ N	◉ Undecided			

32. For 30 and 31, whether yes or no, please tell why?

While the program is good, it is general and more locally focused. If my friend is going to be living in beaumont and working in the plant, then I would recommend this program.

33. How would you change this form?

I would add this question: "Which classes did you find to be most difficult and why?"

Other Comments?

4/30/2018

Student Signature Date

Program Chair Signature Date

Program Chair Comments:

Analysis of SLO Measure Results and Action Plan

(Completed every three years according to the analysis cycle)

SLO 19: Understand the basic principles of structural behavior.

Metric: Following courses-course learning outcomes as direct measures.

CMGT 2330 Fundamental Statics
CLO 5(BD) Indicate an analytical understanding of forces on trusses, frames, and retaining walls.

CMGT 3330 Structural Behavior I
CLO 1(BD) Indicate an analytical understanding of concepts related to stress, strain, and deformation.

Date: Click or tap to enter a date.

Course	**Analysis and Action**
CMGT 2330 Fundamental Statics	**Analysis:**
	Action Plan:
CMGT 3330 Structural Behavior I	**Analysis:**
	Action Plan:

Student Learning Outcomes – Measure 1

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 19: Understand the basic principles of structural behavior.

CMGT 2330 Fundamental Statics

CLO 5(BD) Indicate an analytical understanding of forces on trusses, frames, and retaining walls.

Target: Average score of class to be 70 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Final Exam	McCrary	9/14/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
9	48.4%	85.3%	70.2%	Met

Note: See the attached sample.

#	Student	Score
1	Student 1	84.2
2	Student 2	70.5
3	Student 3	71.6
4	Student 4	53.7
5	Student 5	70.5
6	Student 6	48.4
7	Student 7	75.8
8	Student 8	71.6
9	Student 9	85.3
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#	Student	Score
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#	Student	Score
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Collected Student Work: Place the collect student's work after this page for each course, each time taught.

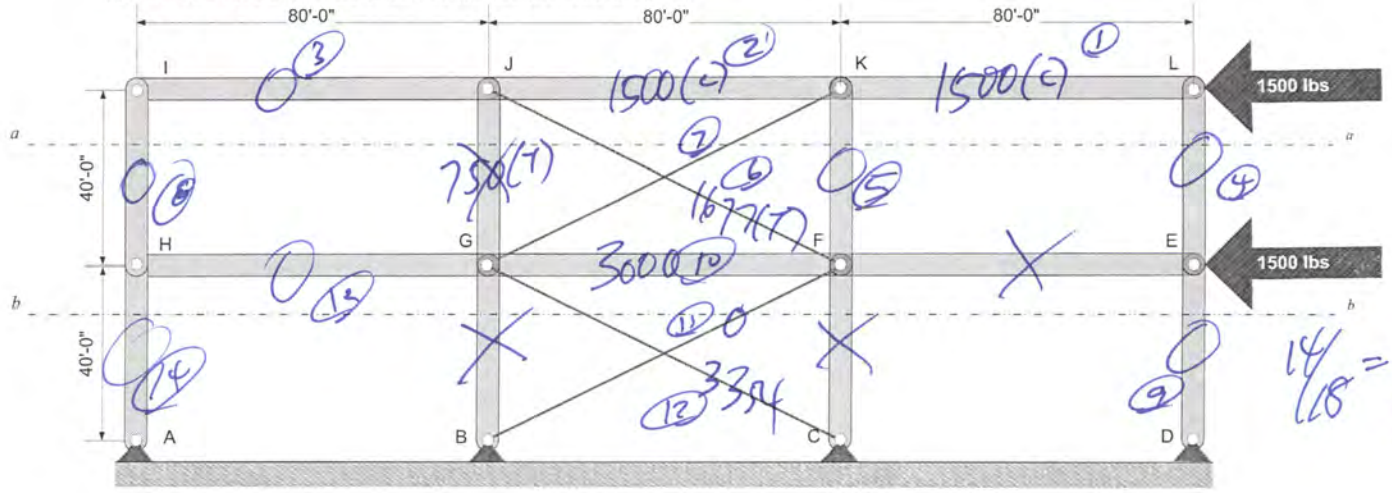
Your Name: Lucas Sammons

5/2/18

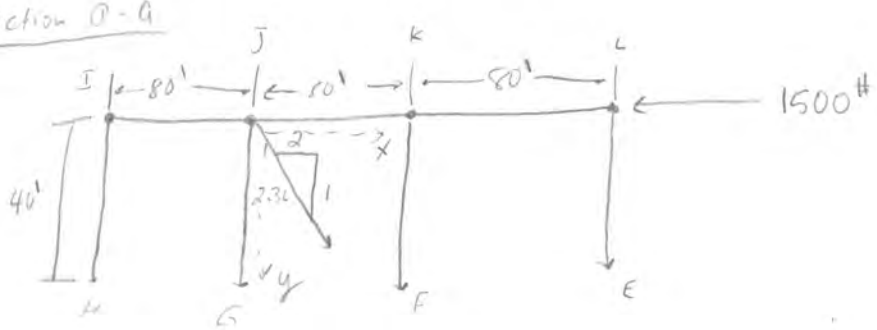
CMGT 2330 - MECHANICS
FINAL EXAM
OPEN BOOK, OPEN HANDOUTS

Please answer the following questions or solve the following problems. SHOW ALL OF YOUR WORK. State your assumptions. Unless stated otherwise, report your answers in three or four significant figures.

1. (10 points) The truss system, shown below, is loaded with two horizontal loads of 1500 lbs, as shown. The members BJ, CG, FJ, and GK are tension only, and all joints are pinned. Draw the needed FBDs to find the load in all members.



Section a-a



$\Sigma F_x = 0 = -1500^{\#} + JF_x$

$-JF_x = -1500^{\#} \rightarrow \boxed{JF_x = 1500^{\#}}$

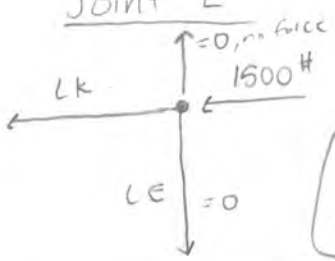
Slope is 1:2, so $JF_y = JF_x(1500^{\#})(T)$

$JF_y = 750^{\#} \uparrow (T)$

$JF = \sqrt{750^2 + 1500^2}$

$\boxed{JF = 1677.050\ldots}$ ✓

Joint L



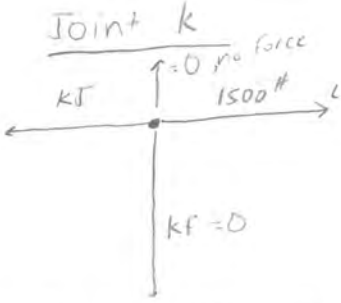
$\boxed{LE = 0}$ ✓

$\boxed{LK = 1500^{\#}(C)}$

$\Sigma F_x = 0 = -1500^{\#} - LK$

$LK = -1500^{\#} \rightarrow LK = 1500^{\#}(C)$

Joint k



$\boxed{kF = 0}$ ✓

$\boxed{kJ = 1500^{\#}(C)}$

$\Sigma F_x = 0 = -1500 - kJ$

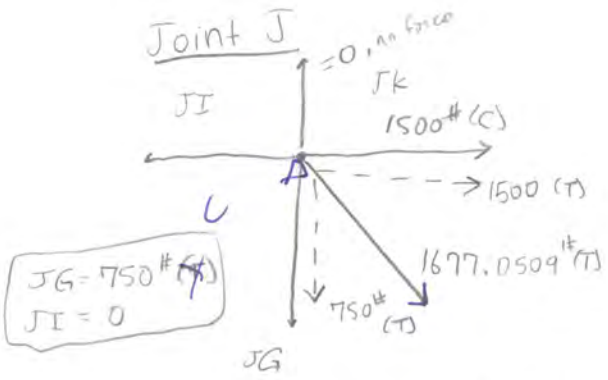
$kJ = 1500^{\#}(C)$

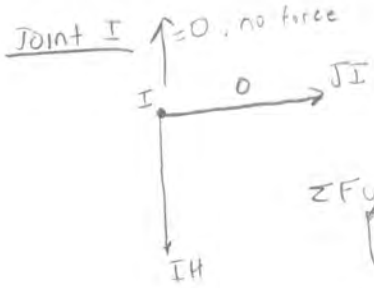
14/18 = 16/20

85%

8/95

continue on the next page





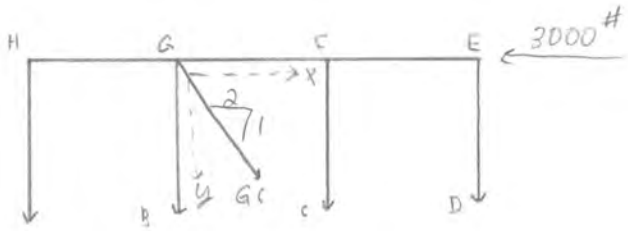
$\Sigma F_y = 0 = 750^{\#} - JG$

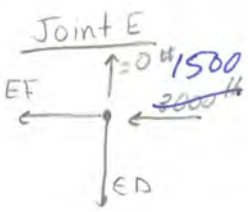
$JG = 750^{\#}$

$\Sigma F_x = -1500^{\#} + 1500^{\#} - JI$

$JI = 0$

Section b-b





$\Sigma F_x = 0 = -3000^{\#} - EF$

$EF = 3000^{\#} (C)$

$\Sigma F_y = 0 = 0 - ED$

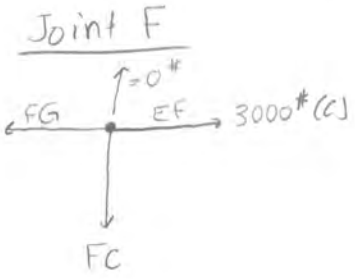
$ED = 0$

$\Sigma F_x = 0 = -3000^{\#} + GC_x$

$+GC_x = +3000^{\#} (T)$

1:2 slope so $GC_y : GC_x = 3000^{\#} : 2 = 1500^{\#}$

So, $GC_y = 1500^{\#} (T)$

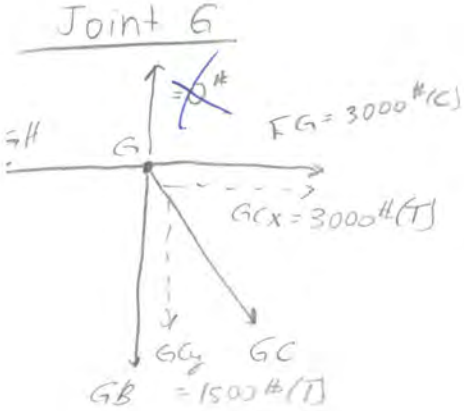


$\Sigma F_y = 0 = 0 - FC$

$FC = 0$

$\Sigma F_x = 0 = -3000 - FG$

$FG = 3000^{\#} (C)$

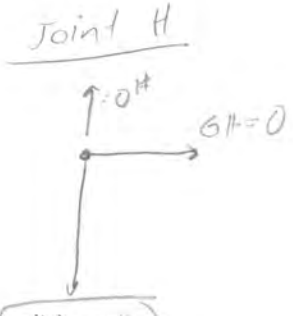


$\Sigma F_x = 0 = -3000^{\#} + 3000^{\#} - GH$

$GH = 0$

$\Sigma F_y = 0 = 0 + 1500^{\#} - GB$

$GB = 1500^{\#} (T)$



$\Sigma F_y = 0 = 0 - HA$

$HA = 0$

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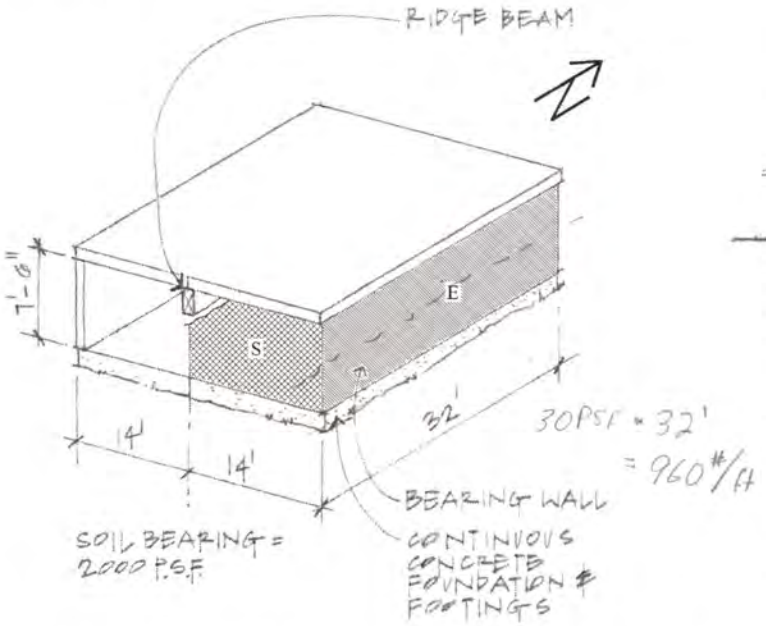
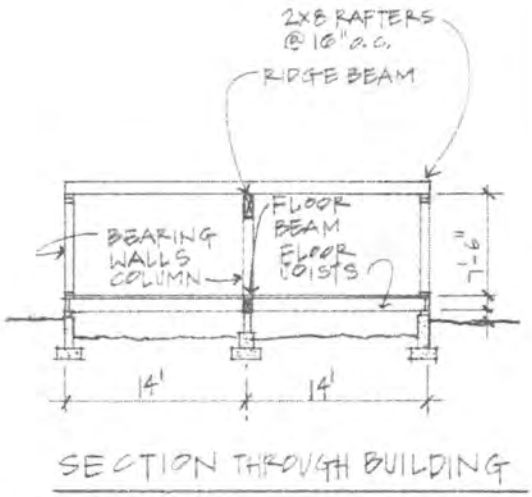
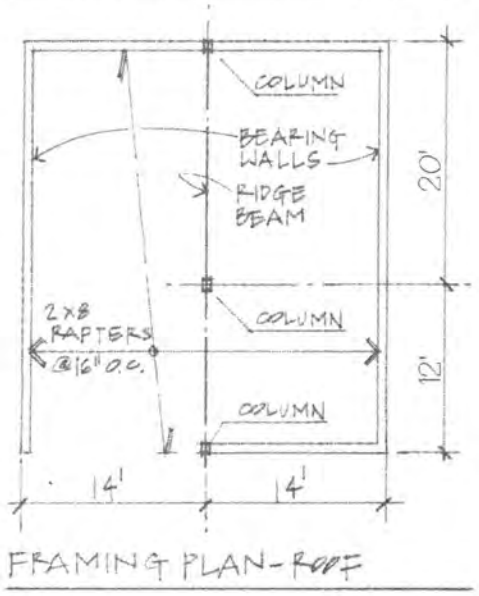
Use the figures shown below as instructed in the following problems.

NOTE: Both the North wall and the South wall, labeled "S", are partially unframed (open) as shown.







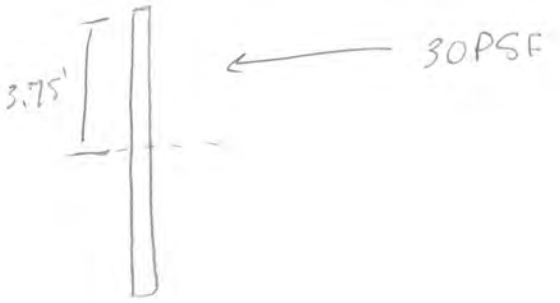
- The wood-framed roof area load (live load + dead load) is 30 psf
- The wood-framed floor area load (live load + dead load) is 60 psf.
- The ridge beam is discontinuous across the interior column.
- The rafters are discontinuous across the ridge beam.
- There are two columns along the exterior perimeter of the building, and a third interior column.
- The bearing and diaphragm (shear walls) walls are constructed of 2x4 studs @ 16" O.C. covered with wood sheathing.
- Assume there are anchor bolts in the "S" wall near the east and west ends.

Figure of a Light-framed Wood Building

2. (10 points) For the Figure of a Light-framed Wood Building above, there is a wind load of 30 P.S.F. on the East wall (labeled "E") that transfers load to the roof diaphragm, and then to the north and south (labeled "S") shear walls (10 P.S.F.). Draw an exploded view of the building that performs a lateral load trace through the building from East to West. Determine shear force V, and the theoretical tie-down force to establish equilibrium of the shear wall. Use the weight of the shear wall to assist in stabilizing the structure.

Load Path = Wall, Roof, Shear Wall

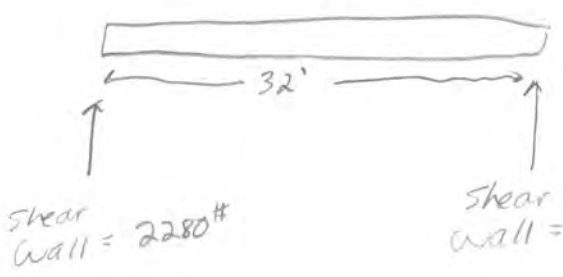
FBD @ Wall "E"



WALL E

$V = 3.75 \times 30\ PSF = 112.5\#/ft$

FBD @ Roof



WHY?

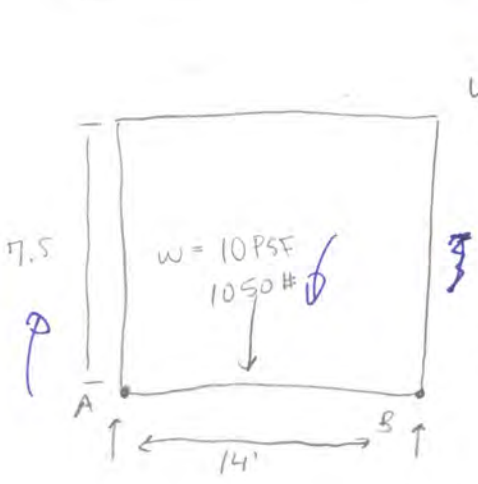
$(30\#/ft + 112.5\#/ft) \times 32' = 3600\#$

Roof Load = 30 PSF × 1' = 30#/ft

$4560\# \div 2 = 2280\#$ Assuming Shear Walls are equal

FBD of Shearwall

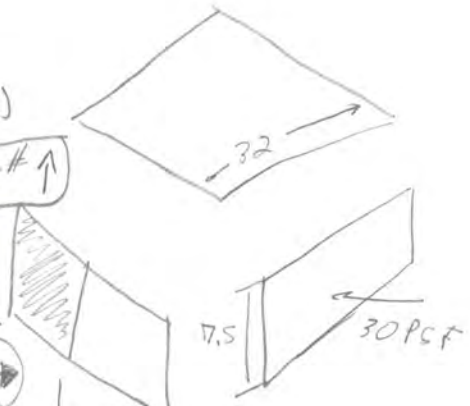
15/20



$10PSF \times 14 \times 7.5 = 1050\#$

$\Sigma M_B = 2280\#(7.5) + 1050\#(7) - A(14)$

$\frac{A(14)}{14} = \frac{24450}{14} = A = 1746.4285\#\uparrow$



$\Sigma F_y = +1746.4285 + B_y - 1050\#$

$-B_y = 696.4285$

$B_y = 696.4285$

$B_x = A_x = 2280/2 = 1140\#$

$B_x = A_x$

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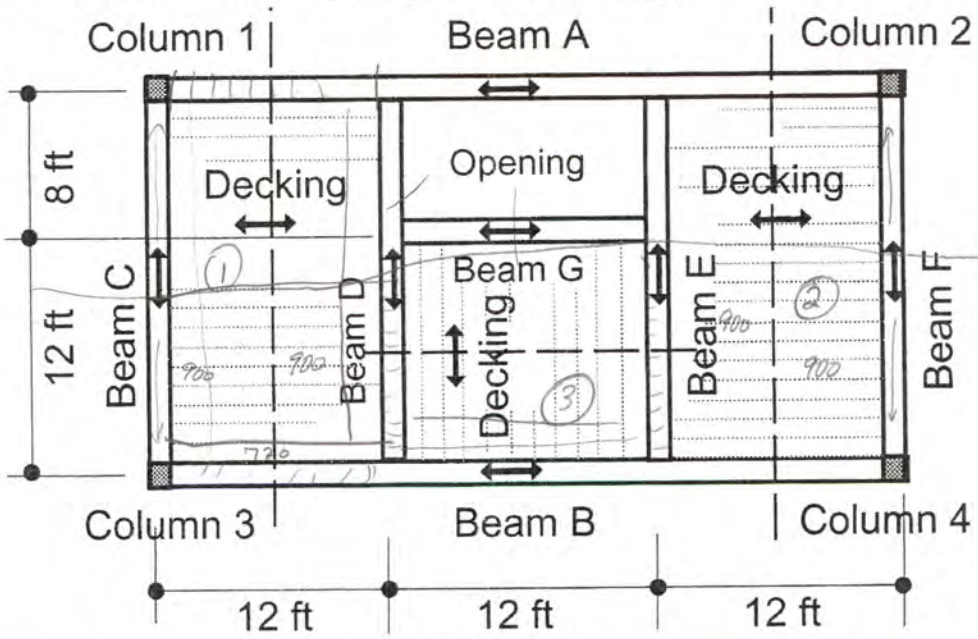
3. The figure below shows a plan view of a floor system; floor joists are 16" o.c. Assume that the average dead load plus live load is a total of 60 lbs/ft^2, and that all beams weigh 10 lbs/ft. Dotted lines and arrow show direction of joist spans (below decking).



Floor Load
60 #/FT^2

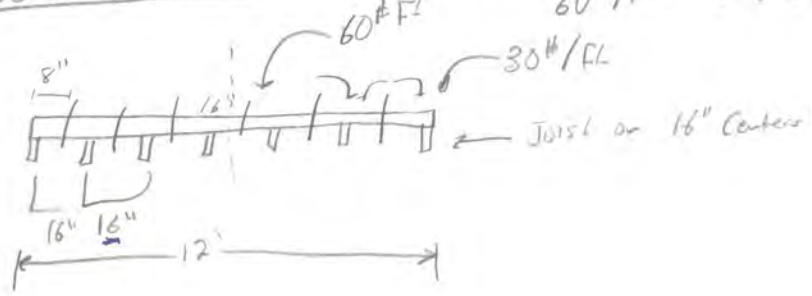
Beams
10 #/ft

(20 points) Draw exploded FBDs of the floor that performs a vertical load trace through the structural elements to the columns.

Load PATH: Deck, Joist, BEAM, column.

FBD of DECKING

60#/FT^2 × 1' section = 60#/FT



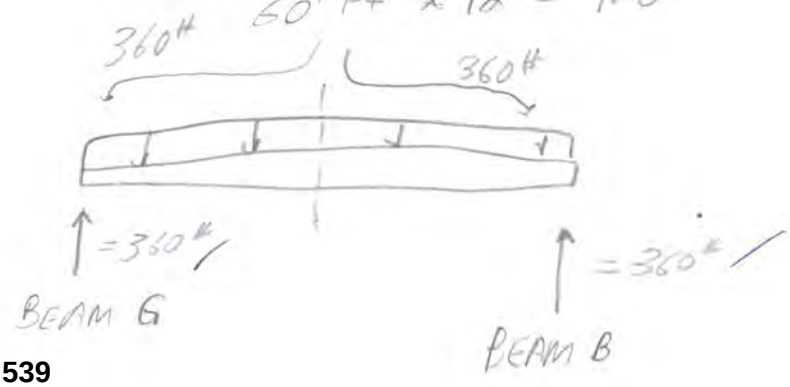
FBD of Joists small Deck

END Joists

30#FT × 12' = 360

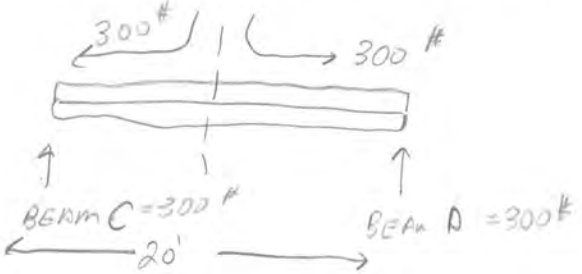
Middle Joists

60#FT × 12' = 720



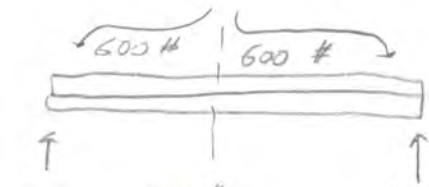
FBD of Large Decks 1+2

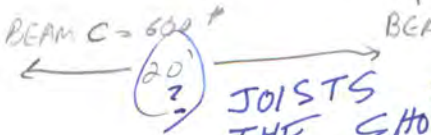
END JOISTS 30PSF × 20' = 600



BEAM C = F BEAM D = E

middle Joist 60 PSF × 20' = 1200

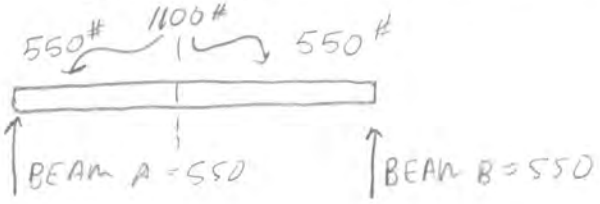




JOISTS SPAN THE SHORT DIRECTION!

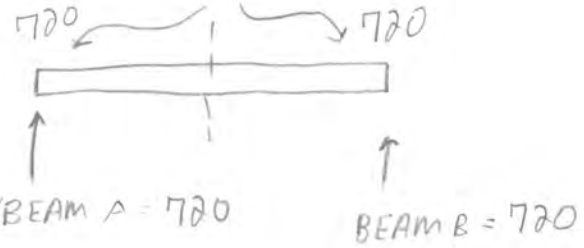
FBD of BEAM C/F

300# + 600# = 900# + 10#/ft × 20' = 1100#

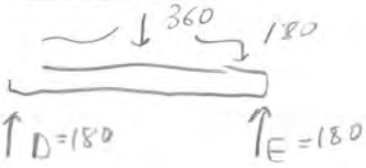


FBD of BEAM D/E BEAM D=E

900 + 180 + 360 = 1440

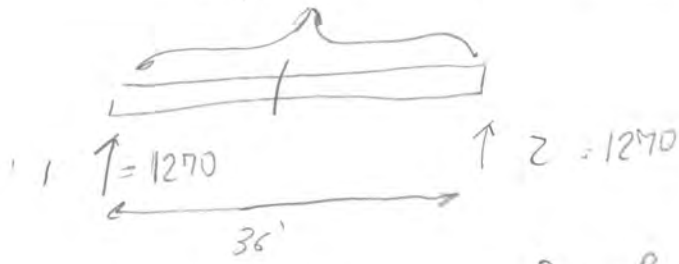


BEAM G



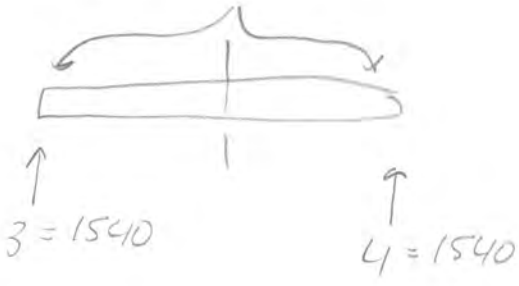
BEAM A

720 + 720 + 550 + 550 = 2540



BEAM B

2540 + 540 = 3080



BEAM A = 2540#
BEAM B = 3080#
BEAM C = 900#
BEAM D = 1080#
BEAM E = 1080#
BEAM F = 900#
BEAM G = 180#

Column 1 = 1270#
Column 2 = 1270#
Column 3 = 1540#
Column 4 = 1540#

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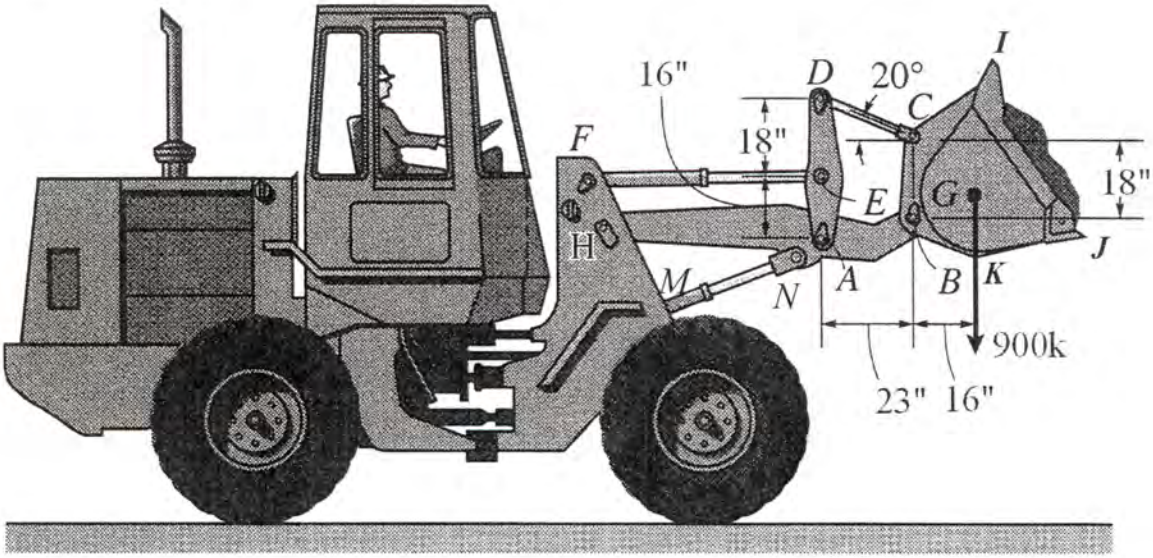
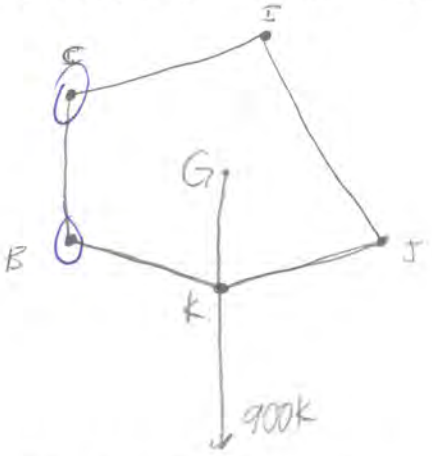
4. In the front end loader below, the link BH is continuous, as is link AD. The shovel (BCIJK) contains a load with a center of gravity at point G. All joints are pinned. The shovel is tilted by the hydraulic force in FE; the shovel is raised/lowered by the hydraulic force in MN. HAB is one continuous member.

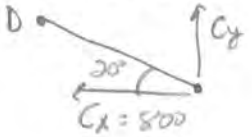


A. (10 points) For the figure above, draw only, do not solve the problem, FBD of the shovel (BCIJK) only. Then solve in part B below.

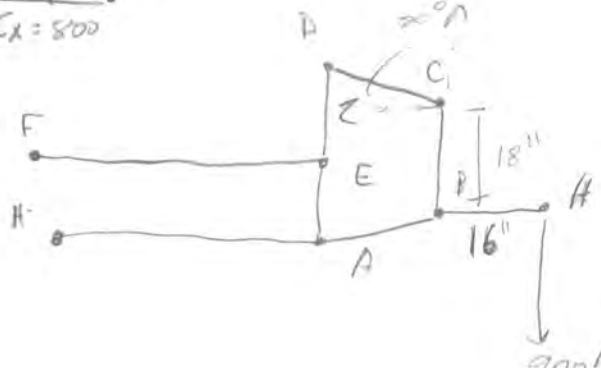


5

B. (10 points) Find the reaction in member DC.



SOH CAH TOA



10

$\Sigma M_B = 0 = -900(16) + C_x(18)$

$\frac{-C_x(18)}{18} = \frac{-14400}{18}$

$C_x = 800$

$\tan 20° \times (800) = 291.1762 = C_y$

$C = \sqrt{800^2 + 291.1762^2}$

$C = 851.2022\ \#$ ✓

PART II-COMPREHENSIVE PORTION

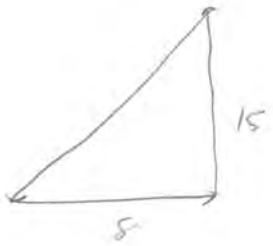
I. (5 points) If a horizontal vector with a magnitude of eight (8) is combined with a vertical vector of fifteen (15), the resultant vector's magnitude will be:

a. 13
b. 16
c. 17
d. 18

C

$V = \sqrt{15^2 + 8^2}$

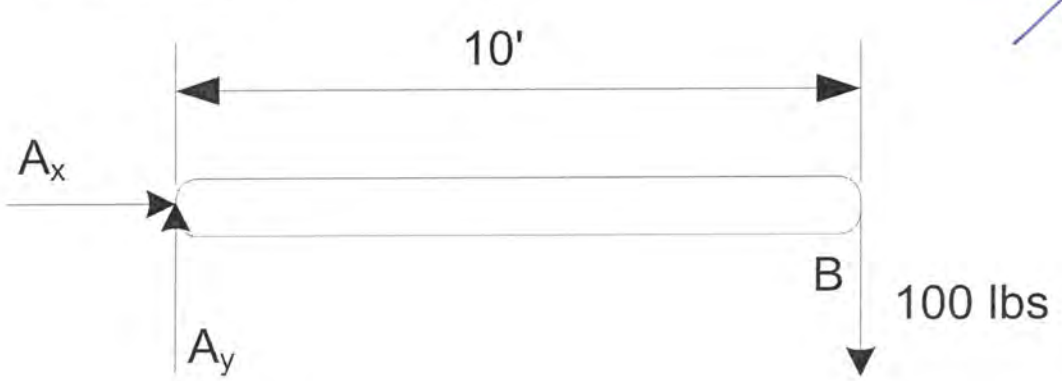
$V = 17$



II. (5 points) From the beam shown below, select the correct value of the moment at A produced by the 100-lb force.

D

a. 12,000 foot-pounds
b. 100 foot-pounds
c. 1000 inch-pounds
d. 12,000 inch-pounds

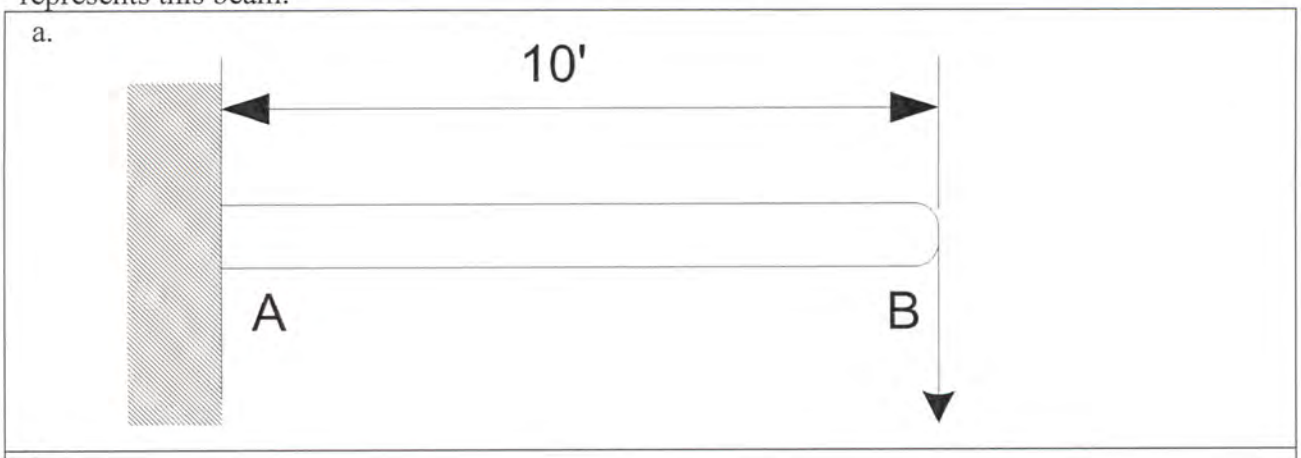


$\Sigma M_A = 0 = -100^{\#}(10)$

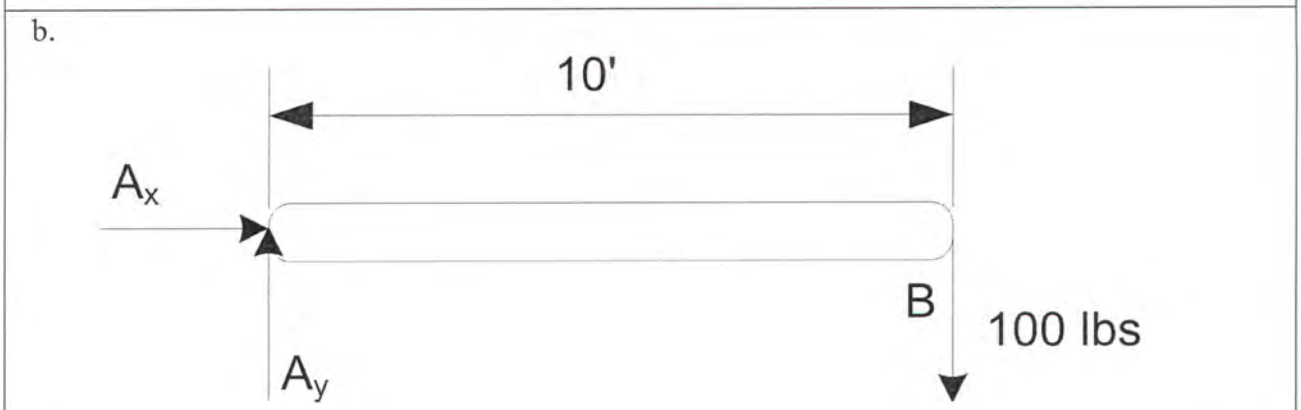
$= 1000^{'lb} \times 12'' = 12000$ inch lbs

III. (10 points) Given a 10-foot long cantilevered beam (one end fixed, the other end free), with a 100 pound load at the free end of the beam, which of the following free-body diagrams correctly represents this beam.

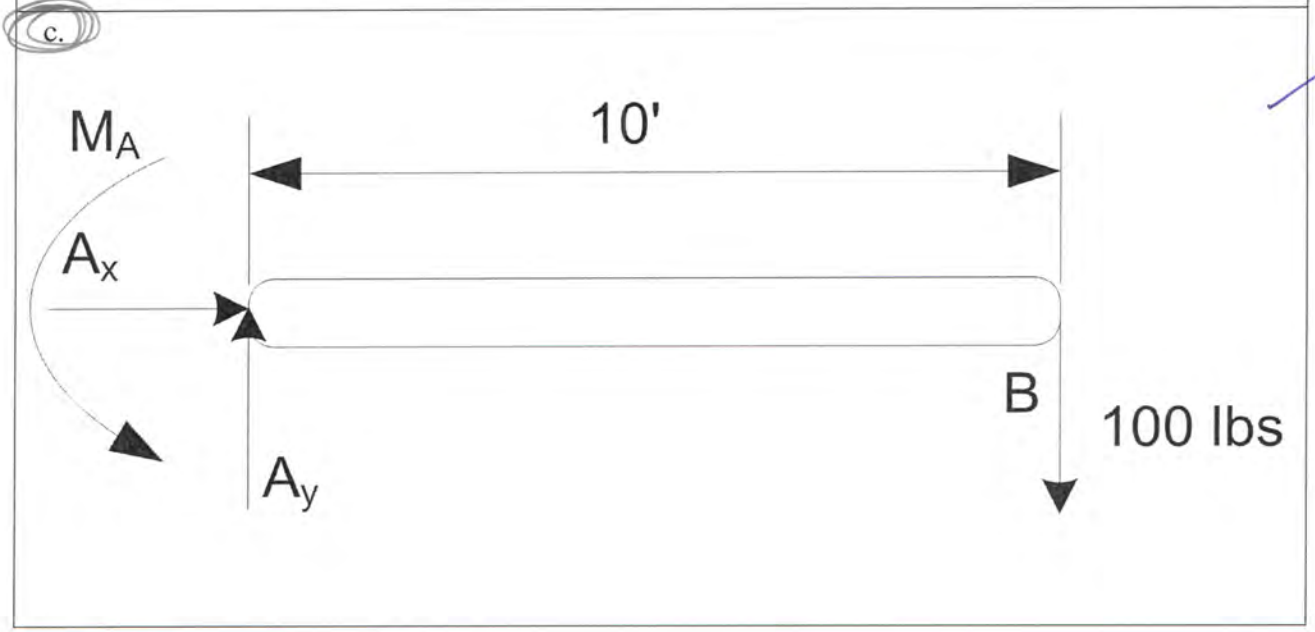
a.



b.



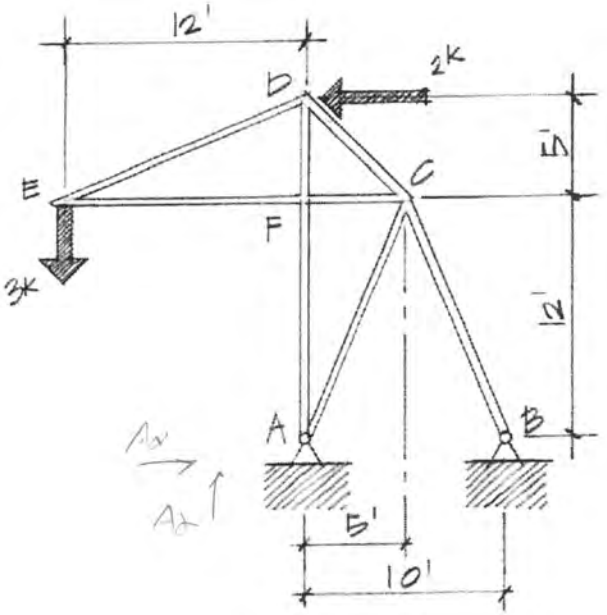
c.



IV. (5 points) Consider the truss/frame configuration given earlier. The following reactions at B are known.

Bx = 2.69k→, and
By = 7.00k↓.

What are the reactions at A, Ax and Ay (not in member AF)?



$\Sigma M_B = 3^k(22') + 2^k(17) - A_y(10')$

$\Sigma F_x = 0 = +A_x - 2k + 2.69k$

$-A_x = 0.69k \quad A_x = -0.69k$

$A_x = 0.69k \leftarrow$

$\Sigma F_y = 0 = -7k - 3k + A_y$

$-A_y = -10k \quad A_y = 10k \uparrow$

✓

10

Student Learning Outcomes – Measure 2

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 19: Understand the basic principles of structural behavior.

CMGT 3330 Structural Behavior I

CLO 1(BD) Indicate an analytical understanding of concepts related to stress, strain, and deformation.

Target: Average score of class to be 70 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Fall 2018	Final Exam	Majdalani	2/13/2019

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
11	80	100	90.45	Met

Note: See the attached sample.

#	Student	Score
1	Albright	80
2	Escamilla	90
3	Harris	85
4	Hernandez	95
5	Juneau	100
6	Kappelman	85
7	Kim	100
8	Pastorella	85
9	Reichard	80
10	Rodriguez	95
11	Sammons	100
12		
13		
14		
15		

#	Student	Score
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

#	Student	Score
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		

Collected Student Work: Place the collect student's work after this page for each course, each time taught.

Name Erik Rodriguez

95

F18

Final Exam

Structural Behavior

Lamar University
CMGT 3330

December 2018

Problem - 1 (40 points)

40

A three-story building has a structural steel beam-girder-column framing system. Columns are spaced at 18 ft. on center in one direction and 28 ft. on center in the perpendicular direction.

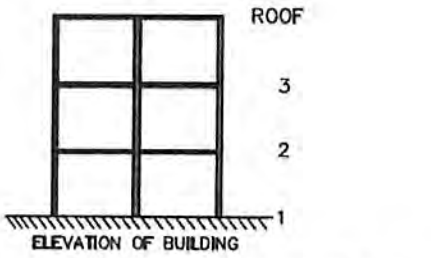
For a preliminary design, find an economical W10 section for an interior first=floor column. Assume that the column has unsupported lengths of 10' and a K=1.0.
F_y=36 ksi

Roof Loads: DL=70 psf
SL=20 psf

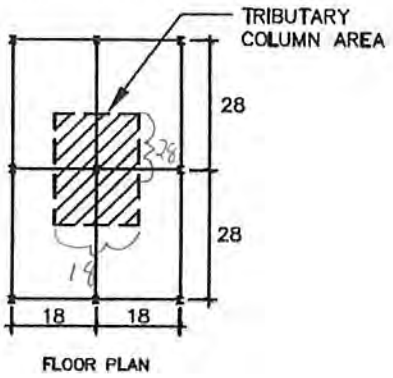
Floor Loads: DL=90 psf
LL=60 psf

Try: W10 x 45 (A = 13.3 in², r_y = 2.01 in) = 232 K pass
W 10 x 39 (A = 11.5 in², r_y = 1.98 in) = 199 K pass
W 10 x 33 (A = 9.71 in², r_y = 1.94 in) = 196 fail

- Tributary area? 28x18 = (504 sf)
- Total roof loads? = 45,360 #
- Total floor loads? = 75,600 per floor
- Total load on the first floor? = 196,560 ≈ 196
- Select a Size? W 10X 39 = 199 K



ELEVATION OF BUILDING



FLOOR PLAN

roof = 70+20 = (90psf) x (504 sf) = 45,360 # = 45 K

Floor = 90+60 = (150psf) x 504 sf = 75,600 = 76 K

Pactual = 45,360 (roof) + 2(75,600) (floor) = 196,560

W16x45 = $\frac{(1.0)(10' \times 12 in/ft)}{2.01}$ = 59.70 ksi

17.46 x 13.3 = 232.218 > 196,560 to strong ✓

W10x39 $\frac{1.0(10 \times 12 in/ft)}{1.98}$ = 60.60 ksi

17.37 x 11.5 = 199.755 > 196,560 to strong

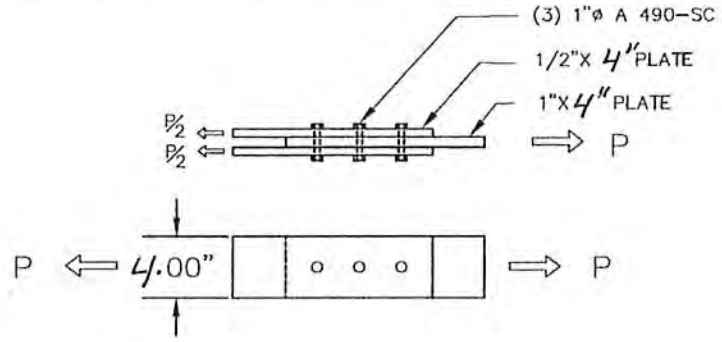
W10x33 $\frac{1.0(10 \times 12 in/ft}{1.94}$ = 61.855 ksi 6167 < 196,560 fail

35

Problem - 2 (40 points)

Determine the allowable load P permitted for this double shear joint connection assuming A36 steel and A490-SC bolts in standard round holes.

33.00



$F_V = 21.0$ K.n
$d = 1"$
$F_u = 1.2$
$F_t = 0.5$
$F_V = 0.5(59\ ksi)$ 29.5ksi

- Shear – Double Shear? = 9.891K
- Bearing? = 209.8 k
- Net Tension @ connection? = 85.1875 K
- Tension on gross area of the plate? = 88K
- Conclusion? Shear 9.891K is smallest allowable value, it governes capacity of the connection

Shear $P_V = F_V \times A_V$

$A_V = 3\ bolt \times 2 \times \left(\pi \times \frac{d^2}{4}\right) = 4.71\ in^2$

$P_V = 21.0\ k/in \times 4.71\ in = 9.891K$

98.91 (-5)

Bearing

$1.2 \times 59\ ksi = 69.6\ ksi$

$P_P = 3\ bolts \times (1" \times 1") \times 69.6 = 209.8$

Table $= 3 \times 69.6 = 209.8$ ✓

NET tension @ connection

$A_{net} = (1") \times \left(4" - 1\tfrac{1}{16}"\right) = 2\tfrac{15}{16}\ in^2 = 2.9375\ in^2 \times 29\ k/in^2 = 85.1875\ k$ ✓

tension + gross

$A_{gross} = 1" \times 4" = 4\ in^2$

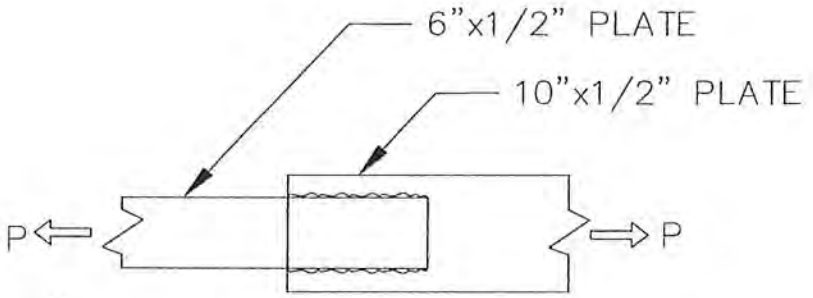
$P_t = F_t \times A_{gross}$

$22\ k/in^2 \times 4\ in^2 = 88\ k$ ✓

Problem - 3 (20 points)

20

Determine the size and length of longitudinal fillet welds that will develop the strength of the smaller plate. Assume A36 steel with E60XX electrodes.



PARALLEL FILLET WELDS

- Plate Capacity? = 66 K
- Max. Weld Size? = 7/16 in
- Allowable Weld Strength, S=? = 5.568 K/in
- Total Weld Length? = 11 7/8 in ≈ 6 in on each side

Plate capacity =

$6 \times .50 \times 22 = 66$

Max weld

$1/2 - 1/16 = 7/16$"

Allowable weld

$= 0.707 \times 7/16 = 0.309$

$S = (= 0.707 \times 7/16 \times 0.3 \times 70)$ K in

$S = 5.568$

---

total weld length

$66 / 5.568 = 11.85 \approx 11\ 7/8 / 2 = 5\ 15/16 \approx 6$ each side ✓

Analysis of SLO Measure Results and Action Plan

(Completed every three years according to the analysis cycle)

SLO 20: Understand the basic principles of mechanical, electrical, and piping systems.

Metric: Following courses-course learning outcomes as direct measures.

CMGT 3340 Industrial and Mechanical Construction

CLO 2(BD) Read and interpret mechanical drawings and diagrams, including PI&Ds.

CMGT 3350 Electrical Systems

CLO 1(BD) Explain the fundamentals of electrical and electronics principles and behavior.

Date: Click or tap to enter a date.

Course	**Analysis and Action**
CMGT 3340 Industrial and Mechanical Construction	**Analysis:**
	Action Plan:
CMGT 3350 Electrical Systems	**Analysis:**
	Action Plan:

Student Learning Outcomes – Measure 2

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 20: Understand the basic principles of mechanical, electrical, and piping systems.

CMGT 3340 Industrial and Mechanical Construction

CLO 2(BD) Read and interpret mechanical drawings and diagrams, including PI&Ds.

Target: Average score of class to be 80 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Fall 2018	Homework	Waddill	2/11/2019

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
19				Not Reported

Note: See the attached sample.

The instructor implemented the measure as shown in the attachment. However, the instructor did not report either individual scores or the results of evaluation. Director needs to coordinate with the faculty in the future before the class begins.

#	Student	Score
1	Abigail	
2	Anthony	
3	Austin	
4	Cameron	
5	Chris	
6	Evaiv	
7	Jean	
8	Jeramy	
9	Jordin	
10	Juan	
11	Lester	
12	Levi	
13	Lucas	
14	Matthew	
15	Nathan	

#	Student	Score
16	Pedro	
17	Ryan	
18	Leoany	
19	William	
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

#	Student	Score
31		
32		
33		
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41		
42		
43		
44		
45		

Collected Student Work: Place the collect student's work after this page for each course, each time taught.

Refiner

Refiners are high-speed grinders used in the food processing and pulp and paper industries. See Figure 4-23. Coarse material is fed between two grinding plates spinning rapidly in opposite directions. A fine material is discharged from the refiner.

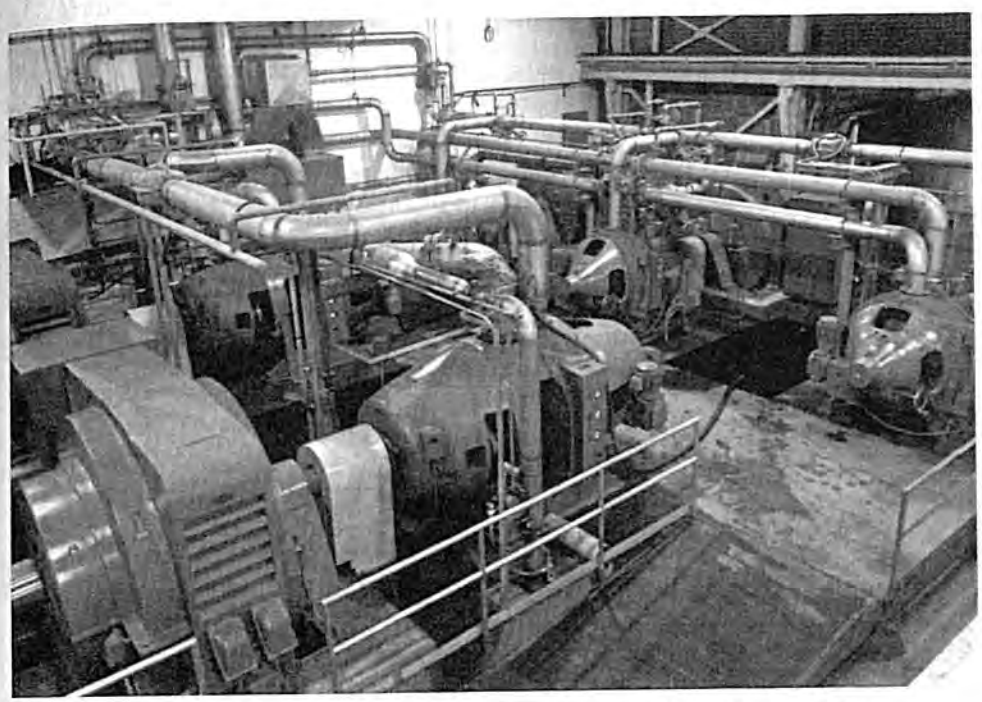


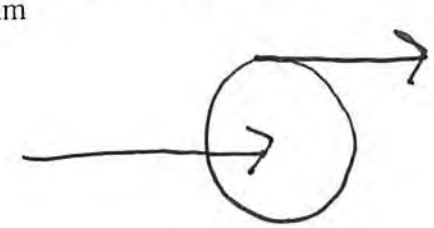
Figure 4-23. Refiners at a paper mill grind coarse material into fine particles. (Beloit Corporation)

Equipment standards

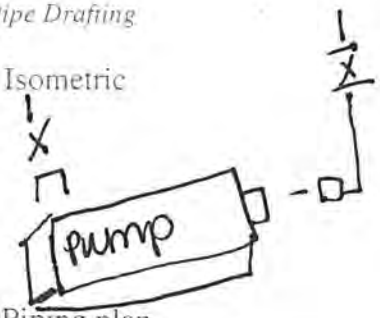
Keep in mind that all companies possess standards that specify all of the drawing conventions and techniques to be used by the drafter. Most firms illustrate equipment with fairly universal symbols, but there always are exceptions. Therefore, whenever you are drawing a new piece of equipment, always look to the standards for the correct symbol or drawing method.

Review Questions

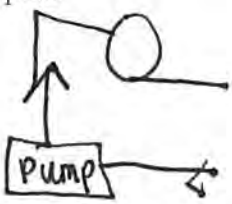
1. Sketch the pump symbol for each of the following types of drawings:
   A. Flow diagram



B. Isometric



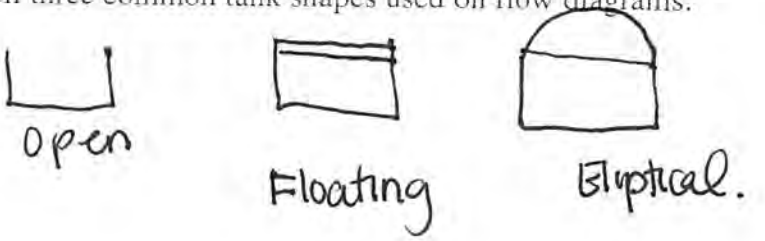
C. Piping plan



2. Why are centrifugal pumps the most popular type for industrial process systems?
constant rate even flow

3. What is the difference between a tank and a vessel?
vessel can withstand max pressure

4. Sketch three common tank shapes used on flow diagrams.



5. What is the purpose of the tank drawing, and who will use it?
instructions how to build tank fabricators.

6. The piece of equipment that allows solids to settle out of wastewater is a(n) Clarifer.

7. What is a "fraction," and what piece of equipment produces it?
fractions are made by Complex still heating oil, gas

8. The drafter must often obtain pump data from what sources?
Vendors catalog.

9. What information is found on a Bill of Materials?
All information (what) to build tank.

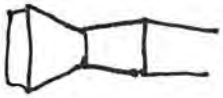
10. Briefly compare and contrast pumps and compressors.
pump sucks liquid
compressors pushes air

11. What piece of equipment is used to mix a substance within a tank?
Agitator

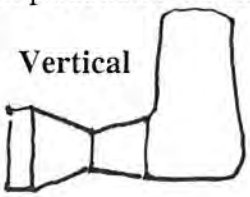
12. How much space should be provided around pumps for access?
3'

13. Sketch the correct orientation of reducers in pump suction lines in the spaces provided.

Horizontal



Vertical



14. Why is a check valve installed on the discharge side of a pump?
product can flow back to pump

15. Define the following parts of a tank:
A. Head:
caps off ends of tank
B. Saddle:
support for tank
C. Nozzle:
Nipples on tank

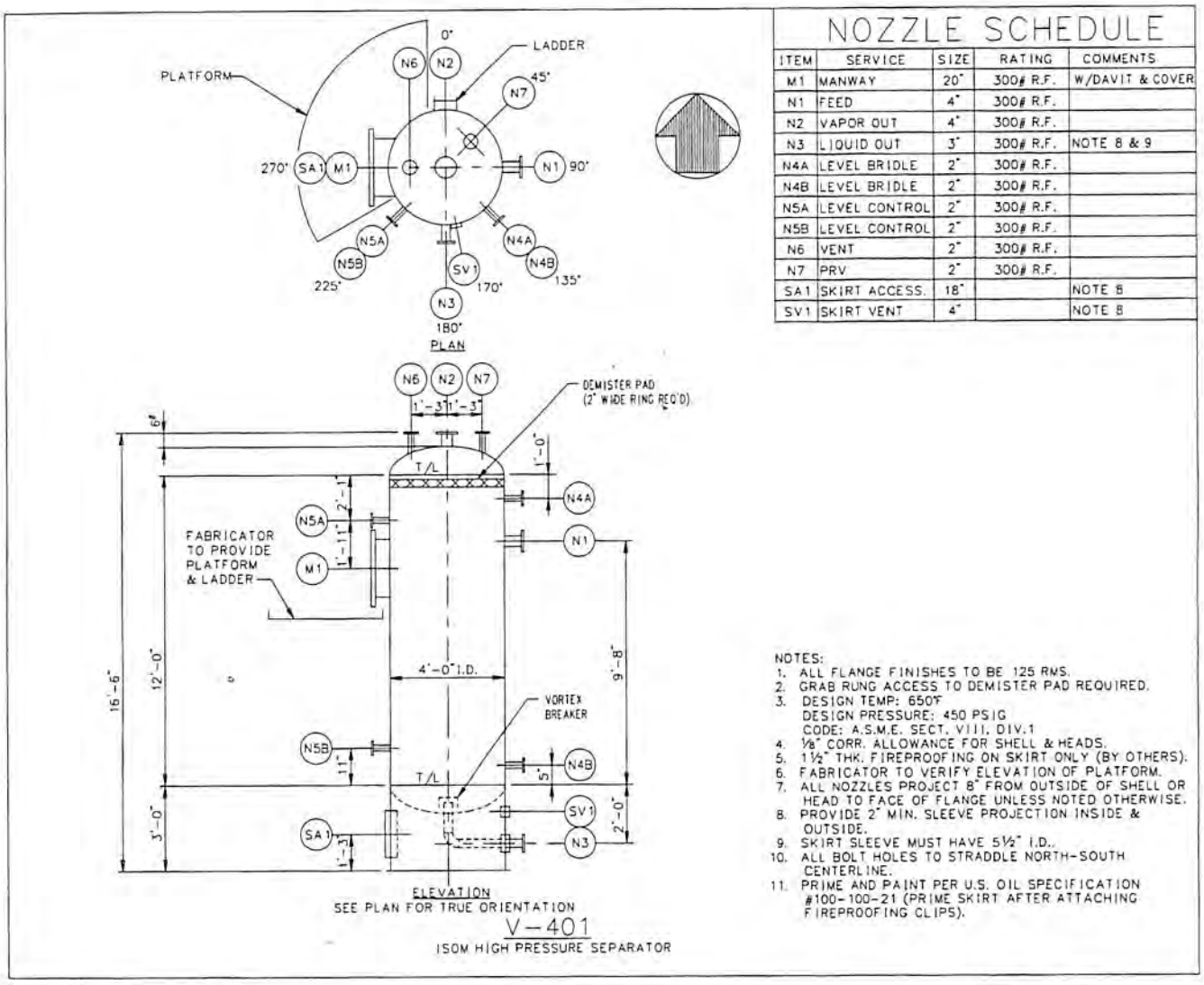
16. What is parametric design?
Constraints - information needed for layout

17. What spacing should be provided between columns and towers?
3-4 pin apart

18. Why should a clear space be provided from the top of a tank to the ground?
load equipment by crane

Print Reading Exercise #1

This exercise applies to the tank drawing for the Isomerate High Pressure Separator, V-401. Record your answers in the spaces provided.



NOZZLE SCHEDULE

ITEM	SERVICE	SIZE	RATING	COMMENTS
M1	MANWAY	20"	300# R.F.	W/DAVIT & COVER
N1	FEED	4"	300# R.F.	
N2	VAPOR OUT	4"	300# R.F.	
N3	LIQUID OUT	3"	300# R.F.	NOTE 8 & 9
N4A	LEVEL BRIDLE	2"	300# R.F.	
N4B	LEVEL BRIDLE	2"	300# R.F.	
N5A	LEVEL CONTROL	2"	300# R.F.	
N5B	LEVEL CONTROL	2"	300# R.F.	
N6	VENT	2"	300# R.F.	
N7	PRV	2"	300# R.F.	
SA1	SKIRT ACCESS.	18"		NOTE 8
SV1	SKIRT VENT	4"		NOTE 8

NOTES:
1. ALL FLANGE FINISHES TO BE 125 RMS.
2. GRAB RUNG ACCESS TO DEMISTER PAD REQUIRED.
3. DESIGN TEMP: 650°F
   DESIGN PRESSURE: 450 PSIG
   CODE: A.S.M.E. SECT. VIII, DIV.1
4. ⅛" CORR. ALLOWANCE FOR SHELL & HEADS.
5. 1½" THK. FIREPROOFING ON SKIRT ONLY (BY OTHERS).
6. FABRICATOR TO VERIFY ELEVATION OF PLATFORM.
7. ALL NOZZLES PROJECT 8" FROM OUTSIDE OF SHELL OR HEAD TO FACE OF FLANGE UNLESS NOTED OTHERWISE.
8. PROVIDE 2" MIN. SLEEVE PROJECTION INSIDE & OUTSIDE.
9. SKIRT SLEEVE MUST HAVE 5½" I.D.
10. ALL BOLT HOLES TO STRADDLE NORTH-SOUTH CENTERLINE.
11. PRIME AND PAINT PER U.S. OIL SPECIFICATION #100-100-21 (PRIME SKIRT AFTER ATTACHING FIREPROOFING CLIPS).

(Norwest Engineering)

1. What is the overall height of this vessel? 16'-6"
2. What is the inside diameter? 4'-0"
3. What is the length of the vessel shell? 14
4. What is the largest diameter nozzle on the vessel? 3.0"

5. What is the smallest diameter nozzle on the vessel? 2"
6. What is the diameter of the accessway in the vessel skirt? _____
7. How many nozzles are located at the 0° location? 1
8. What is the angular distnace between nozzle SV1 and SA1? 100°
9. How many nozzles are located at the 225° location? 0
10. What are the diameters of the nozzles in Question 9? _____
11. What is special about nozzle M1? _____
12. How far above the top of the tank is the face of the flange for nozzle N2? 6"
13. What is installed over the opening of the liquid out pipe at the bottom of the vessel? 2" min sleeve with min 5 1/2 ID
14. What is the location of the feed nozzle from the top of the vessel shell? 90°
15. How far must the sleeve for SV1 project inside the tank? 2" min

270 - 170 = 100

Student Learning Outcomes – Measure 2

(Completed each year by Instructor after review of student work)

For each course, select whether the student learning outcome was met, partially met, unmet, or not reported. Attach documentation supporting the findings, including student's work example, rubrics, questions, or criteria, used in this determination.

SLO 20: Understand the basic principles of mechanical, electrical, and piping systems.

CMGT 3350 Electrical Systems

CLO 1(BD) Explain the fundamentals of electrical and electronics principles and behavior.

Target: Average score of class to be 80 or higher out of 100 points.

Semester:	Metric:	Instructor:	Date:
Spring 2018	Homework	Safa	9/25/2018

Findings

Enrollment	Min. Score	Max. Score	Ave. Score	Met/Part/Unmet/NR
25	0%	100%	51.2%	Unmet

Note: See the attached sample.

#	Student	Score
1	Student 1	0
2	Student 2	5
3	Student 3	3
4	Student 4	5
5	Student 5	0
6	Student 6	5
7	Student 7	5
8	Student 8	2
9	Student 9	4.5
10	Student 10	0
11	Student 11	5
12	Student 12	0
13	Student 13	5
14	Student 14	5
15	Student 15	0

#	Student	Score
16	Student 16	5
17	Student 17	0
18	Student 18	0
19	Student 19	5
20	Student 20	0
21	Student 21	2
22	Student 22	0
23	Student 23	4
24	Student 24	3
25	Student 25	0
26		
27		
28		
29		
30		

#	Student	Score
31		
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Collected Student Work: Place the collect student's work after this page for each course, each time taught.

28 Nov. 2018

Name: RYAN MALONE

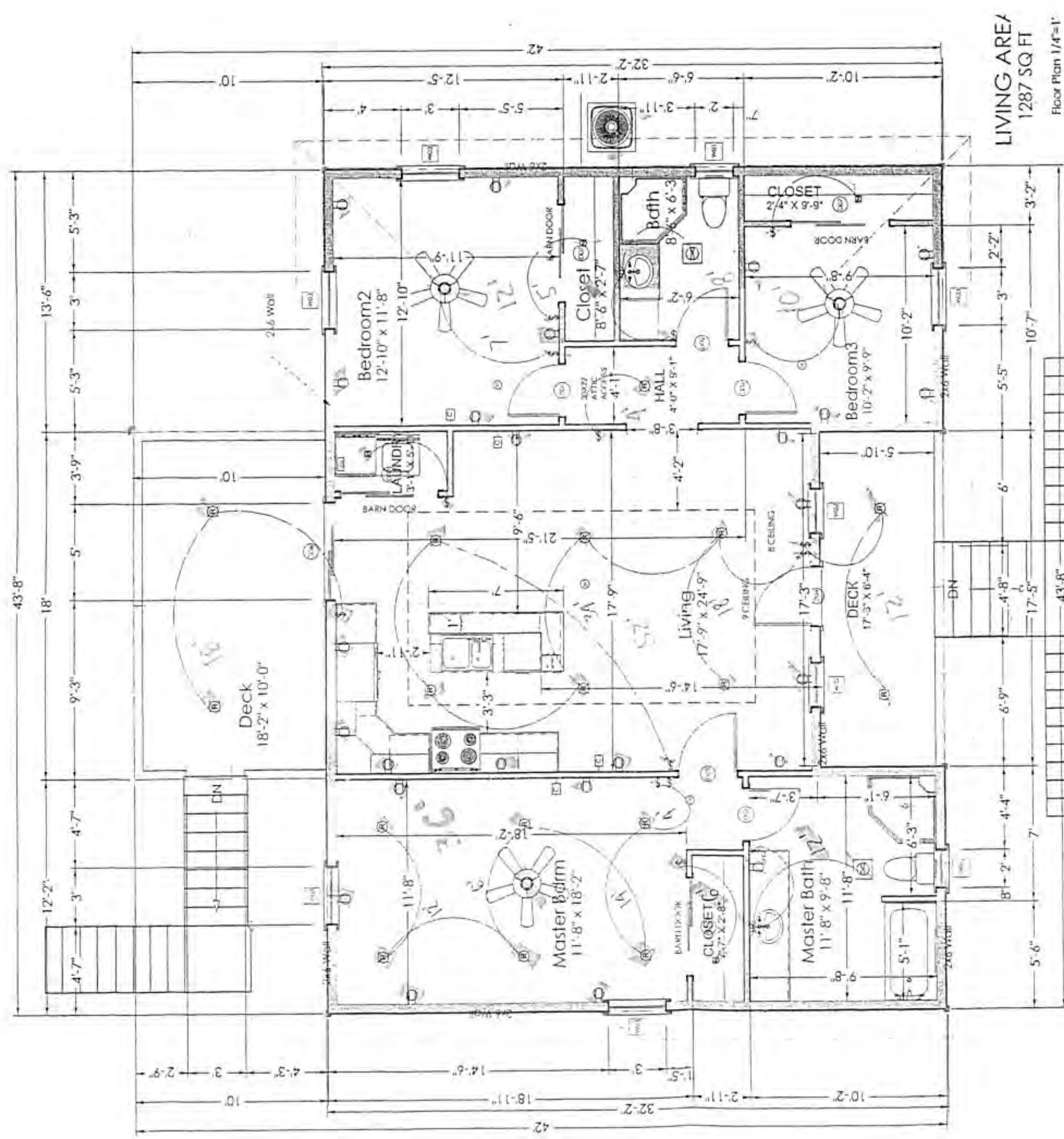
Progress Pipe & Electrical Final Exam Part 2:

Using the information provided estimate the cost of the electrical system as indicated on the enclosed drawing. Use the enclosed estimating sheet and costs as listed on inventory sheet. Labor costs with O&P is figured at $45.00 per MH.

Provide a combined Labor, material and O&P at the end of your estimate...

$3,033.28

9¢ = (A)


LIVING AREA
1287 SQ FT
Floor Plan 1/4"=1'
Bedroom2
12'-10" x 11'-8"
Bedroom3
10'-2" x 9'-9"
Closet
Bath
CLOSET
2'4" X 9'-9"
HALL
LAUNDRY
BARN DOOR
Living
17'-9" x 24'-9"
Deck
18'-2" x 10'-0"
DECK
17'-3" x 6'-4"
Master Bdrm
11'-8" x 18'-2"
Master Bath
11' 8" x 9'-8"
DN
42'
32'-2"
43'-8"

Material list for Exam part 2 Industrial and Mechanical Construction

1. Electrical Boxes: a. Small single switch/plug .... $ 3.50
   b. Large double switch/plug ...$ 5.60
   c. Junction Boxes ..... $ 3.00
   d. Box supports ..... $ 2.71
2. Electrical box cover plates ..... $ 1.89
3. Romex wire: a. 8-2-G ..... $ 125.00 per 100'
   b. 10-2-G ..... $ 119.00 per 100'
   c. 12-2-G ..... $ 50.74 per 100'
   d. 14-2-G ..... $ 32.00 per 100'
4. GFCI ..... $ 11.50
5. 200 AMP main breaker ..... $ 178.00
6. 100 AMP secondary breaker box ..... $ 106.00
7. 125 AMP main breaker box ..... $ 25.18
8. 30 AMP stop breaker ..... $ 27.22
9. 50 AMP stop breaker ..... $ 65.50
10. 15 AMP fuse ..... $ 10.05
11. 20 AMP fuse ..... $ 12.30
12. 30 AMP double fuse ..... $ 22.00
13. 50 AMP double fuse ..... $ 28.00
14. Outdoor Lights (3 bulb) ..... $ 99.95
15. Outdoor Lights (2 bulb) ..... $ 50.69
16. Outdoor Lights (single bulb) ..... $ 28.00
17. 6" Drop Cans and cover ..... $ 8.67
18. 4" Drop Cans and cover ..... $ 16.98
19. LEG Lights (Kitchen) ..... $ 32.25
20. Bathroom Lights ..... $ 28.50
21. HVAC ..... $ 4,000.00
22. Kitchen low voltage lighting ..... $ 29.80
23. Ceiling Fan ..... $ 145.00

LABOR = $ 35.00

3 LABORERS

ELECTRICAL SCHEDULE						
NUMBER	QTY	WIDTH	DEPTH	HEIGHT	ATTACHED TO	DESCRIPTION
E01	4	3"	3/4"	5"	WALL	CABLE JACK
E02	13	3"	3/4"	5"	WALL	SINGLE POLE
E03	2	3"	3/4"	5"	WALL	THREE WAY
E04	25	3"	5/16"	5"	WALL	
E05	4	4 13/16"	4 13/16"	3/16"	CEILING	RECESSED DOWN LIGHT 4
E06	3	49 15/16"	51 15/16"	23"	CEILING	CLASSIC CEILING FAN LIGHT FIXTURE
E07	4	5"	5"	1 1/8"	CEILING	SMOKE DETECTOR
E08	2	7 3/4"	6 1/4"	13"	WALL	
E09	17	8"	8"	4 1/8"	CEILING	EYEBALL (ROTATED)
E10	2	8 1/2"	8 1/2"	3/4"	CEILING	EXHAUST

ESTIMATE SHEET

PAGE NO. OF PAGES

JOB NAME MALONE'S CABIN	CONTRACTOR BELAIRE CONST.	ESTIMATE NO.
LOCATION 007 JASPER	ARCHITECT JAMES WADDILL	DATE 12-05-18
MATOR RYAN MALONE	CHECKED BY	BID DATE
JOB DESCRIPTION ELECTRICAL		

FORWARD

DESCRIPTION	QUANTITY	@	MATERIAL	LABOR	SUBCONTRACT	TOTAL
THREE-WAY SWITCH	2	8.50				17.00
GFCI DUPLEX	1	17.10				17.10
SINGLE-POLE SWITCH	13	3.50				45.50
CEILING FAN	3	145.00				435.00
4" RECESSED	4	16.98				67.92
6" RECESSED	12	8.67				104.04
VENT FAN	2	26.00				52.00
DUPLEX RECEPTACLE	23	5.60				128.80
BATHROOM LIGHT FIXTURE	2	28.50				57.00
HVAC	1	4000.00				4000.00
RANGE RECEPTACLE	1	5.23				5.23
BOX SUPPORTS	16	2.71				43.36
COVER PLATES	16	1.89				30.24
LED KITCHEN	4	32.25				129.00
ROMEX 12-2-G	2	50.74				101.48
OUTDOOR LIGHTS (2)	2	50.69				101.38
LOW VOLT. INTERIOR	12	29.80				357.60
LABOR 8days/8hr/3hands	←	35.00				6720.00
TOTAL COSTS						12,412.65

MISC. JOB EXPENSES	AMOUNT
TOTAL	

OVERHEAD 2.5 %

PROFIT 2.5 %

BID SUBMITTED OR TOTAL FORWARD 13,033.28

INCLUDED IN

BATHROOM

~~Surface~~: ||

Duplex R: 𝍸 𝍸 𝍸 𝍸 |||

VENT FAN: ||

6" RECESSED: 𝍸 𝍸 𝍸 |

4" RECESSED: ||||

Ceiling fan: |||

SINGLE SW: 𝍸 𝍸 |||

GFCI Duplex: |

THREE WAY: ||

HVAC: |

RANGE R: |