3-2

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2016
Program: B.Sc. Engineering (Civil)

Course No: CE 333 | Course Title: Environmental Engineering II
Full Marks: 60 | Time: 1.0 hour

There are **FOUR** questions. Answer any **THREE**.
[Assume reasonable value of missing data (if any)]

1. (a) Describe "Communal Sanitation System" for on-site human waste management. [5]
   (b) Write short notes on i) Black Water and Grey Water ii) Influent and Effluent iii) In Vitro and In Vivo. [15]

2. (a) Mention the factors that influence to estimate the quantity of wastewater or sewage during sewer network design. [5]
   (b) Mention various empirical formulas (at least 5 formulas) which are used in sewer design. A 24 inches sewer with n=0.013is laid on a grade of 0.015. What will be the discharge capacity when the depth of flow is (i) quarter full (ii) half full. [5+10]

3. (a) Make a flow chart of different types of sanitation systems. [5]
   (b) Define sanitation development. Describe the guiding principle of sanitation development program strategy. [5+10]

4. (a) Mention the composition of wastewater. [5]
   (b) Define septic tank. Discuss the process that takes place inside a septic tank. [5+10]

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2016
Program: B.Sc. Engineering (Civil)

Course Title: Design of Concrete Structures II Course Code: CE 317 (A-section)

Time: 1 hr Full Marks: 3x15= 45

[Answer all the three questions and assume reasonable values for any missing data]

1. **a)** State the restrictions for using Direct Design Method for column supported beams. (5)

   b) A slab panel of interior span has a moment of 400kip-ft in one direction. Calculate the distributed moments (beam, column strip and moment strip) using Direct Design Method. Given l_2/l_1= 1.25 and $\alpha_1 l_2/l_1$=2.5. Required chart is given. (10)

2. **a)** Name different types of shear reinforcements used at the supports of flat plates and flat slabs. (5)

   b) A flat plate structure has slab thickness of 8", with 18" square columns. It has to resist a factored shear of 120kips at a typical interior column. Check whether the slab is adequate in resisting the punching shear. If not then provide shear reinforcement in the form of bent bars. Provide the necessary checks up to first critical section. (10)
   Given, d= 7", f_c' = 4 ksi and f_y = 60 ksi.

3. **a)** What are the ACI provisions for using tie bars in column? (5)

   b) A 16" x 24" column has 10 #9 as main reinforcements (As= 5.0in^2 and As'= 5.0in^2). Calculate the P_b, M_b and e_b for the balanced failure. Materials properties: fc' = 5 ksi and fy = 72.5 ksi. Assume cover of 2.5". (10)

List of Useful Formulae for CE 317

Column-Supported Slabs

*Total Static Moment at Factored Loads, $M_0 = w_n L_2 Ln^2/8$

* Total static moment for interior spans: $M_u^{(-)} = 0.65\, M_0$, $M_u^{(+)} = 0.35\, M_0$

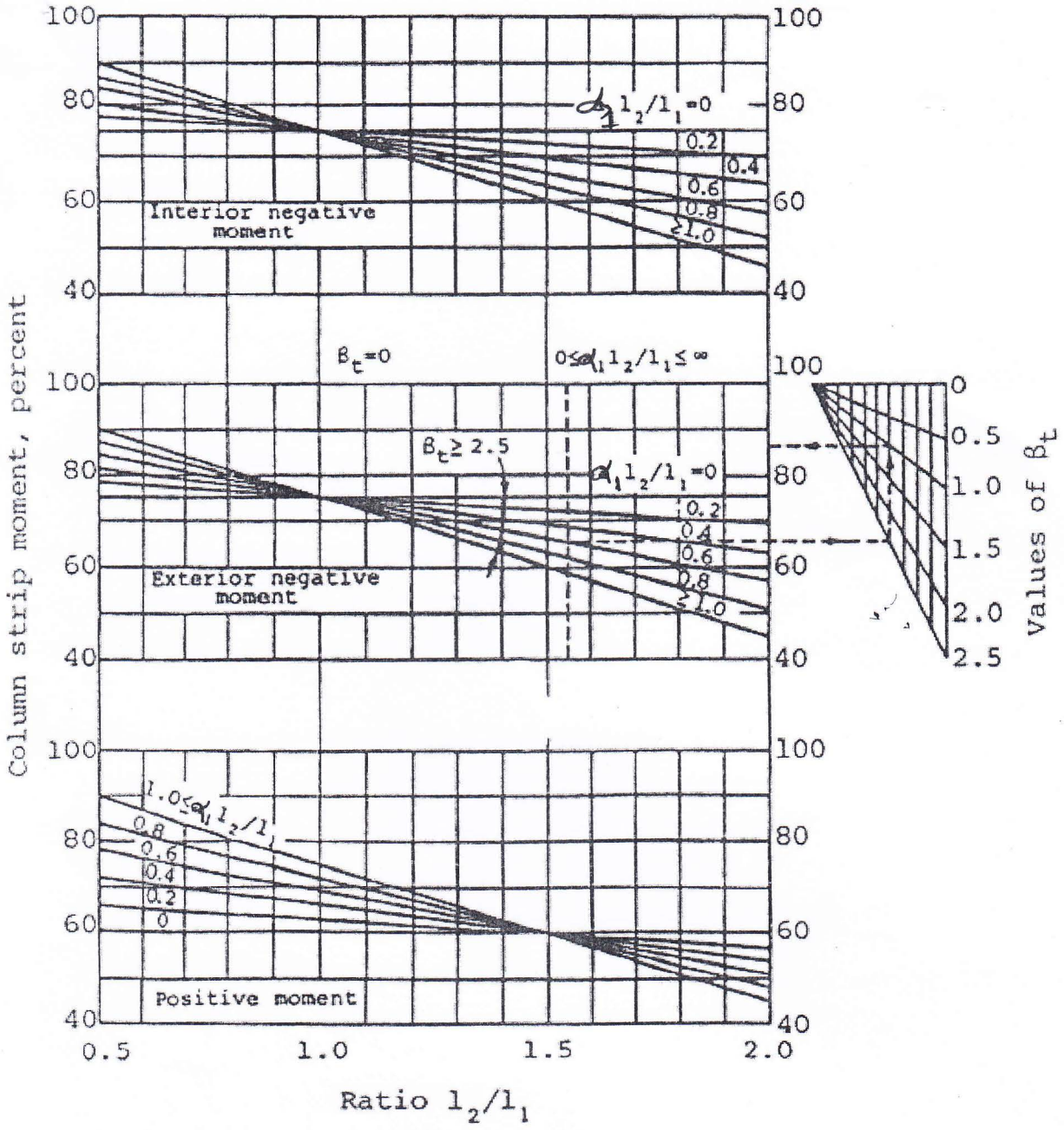
* Distribution Factors applied to Static Moment M_0 for Positive and Negative Moments

Position of Moment	Ext Edge unrestrained (a)	Slab with beams between all supports (b)	No beam between interior supports		Exterior Edge fully restrained (e)
			Without edge beam (c)	With edge beam (d)	
Exterior $M^{(-)}$	0.00	0.16	0.26	0.30	0.65
Interior $M^{(-)}$	0.75	0.70	0.70	0.70	0.65
$M^{(+)}$	0.63	0.57	0.52	0.50	0.36

* $\alpha = E_{cb}I_b/E_{cs}I_s$ * $\beta_t = E_{cb}C/2E_{cs}I_s$ * $C = \sum(1-0.63\, x/y)\, x^3 y/3$

Short Column

*$P_n = 0.85f_c'A_c + f_y A_s = A_g[0.85f_c' + \rho_s (f_y - 0.85f_c')]$ *$P_u = \alpha\, \phi\, A_g[0.85f_c' + \rho_s (f_y - 0.85f_c')]$


Column strip moment, percent
100
80
60
40
Interior negative moment
$\alpha_1 l_2/l_1 = 0$
0.2
0.4
0.6
0.8
≥1.0
$\beta_t = 0$
$0 \le \alpha_1 l_2/l_1 \le \infty$
$\beta_t \ge 2.5$
Exterior negative moment
Positive moment
$1.0 \le \alpha_1 l_2/l_1$
0
0.5
1.0
1.5
2.0
2.5
Values of β_t
Ratio l_2/l_1

University of Asia pacific
Department of Civil Engineering
Midterm Examination
Spring 2016
Program: B.Sc Engineering (Civil)

Course Title: Transportation Engineering 1 **Course Code: CE 351**
Full Marks: 20 **Time: 1hour**

There are **Three** questions. Answer two of them

1. The following data were observed for 6 vehicles traversing 4 mile segment of a highway. Calculate the Time Mean Speed and the Space Mean Speed of the vehicles. 6

Vehicle	Speed (km/hr.)
1	50
2	48
3	36
4	60
5	56
6	65

a) Write short note on any **two**: 4
   I. PIEV time
   II. Angular parking
   III. Stable/steady flow

2. a) Design a two-phase signal of a cross-junctiOon for the data given below: 8

Amber 3 sec
Red-amber 2 sec

	N-S	E-W
Inter green	7	8
Lost time	2	3

	Approaches			
	North	South	East	West
Flow, veh/hr	720	890	910	810
Saturation flow veh/hr	2210	2470	2740	2430

Draw the phase diagram.

b) What are the general requirements of traffic control devices? 2

3. a) What are the needs for traffic surveys? 3
   b) Calculate the AADT for the following data. Data was collected on Tuesday in March. MEF for March is 1.635. Necessary Table is provided in the next page. 7

Hour	Volume
6:00-7:00 a.m.	800
7:00-8:00 a.m.	765
8:00-9:00 a.m.	498
9:00-10:00 a.m.	880
10:00-11:00 a.m.	670

Table for 3b)

Table 1 Hourly Expansion Factors for a Rural Primary Road

Hour	Vol.	HEF	Hour	Vol.	HEF
6:00-7:00 a.m.	294	42.01	6:00-7:00 p.m.	743	16.6
7:00-8:00 a.m.	426	28.99	7:00-8:00 p.m.	706	17.5
8:00-9:00 a.m.	560	22.05	8:00-9:00 p.m.	606	20.4
9:00-10:00 a.m.	657	18.8	9:00-10:00 p.m.	489	25.3
10:00-11:00 a.m.	722	17.11	10:00-11:00 p.m.	396	31.2
11:00-12:00 p.m.	667	18.52	11:00-12:00 a.m.	360	34.3
12:00-1:00 p.m.	660	18.71	12:00-1:00 a.m.	241	51.2
1:00-2:00 p.m.	739	16.71	1:00-2:00 a.m.	150	82.3
2:00-3:00 p.m.	832	14.84	2:00-3:00 a.m.	100	124
3:00-4:00 p.m.	836	14.77	3:00-4:00 a.m.	90	137
4:00-5:00 p.m.	961	12.85	4:00-5:00 a.m.	86	144
5:00-6:00 p.m.	892	13.85	5:00-6:00 a.m.	137	90.2
Total daily volume =		12350			

Table 2 Daily Expansion Factors for a Rural Primary Road

Day of Week	Volume	DEF
Sunday	7,895	9.515
Monday	10,714	7.012
Tuesday	9,722	7.727
Wednesday	11,413	6.582
Thusrday	10,714	7.012
Friday	13,125	5.724
Saturday	11,539	6.51
Total weekly volume =		75,122

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2016
Program: B.Sc. Engineering (Civil)
Section: A & B

Course Code: CE 313 | **Time: 60 Minutes**
Course Title: Structural Engineering II | **Full Marks: 3 x 20**

ANSWER ALL QUESTIONS. *The figures are not drawn to scale.*

[1] Draw the SFD & BMD of beams FE, JK, NM and AFD of columns CFKM and AHIO shown in Figure 1 by using approximate vertical load analysis? **(20)**

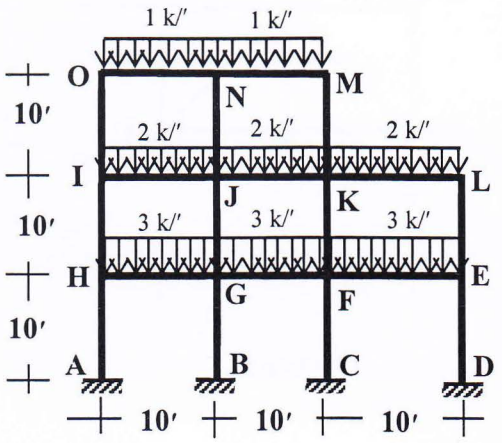


Figure 1

[2] Draw the SFD & BMD of beams JK, NM and AFD of columns CFKM shown in Figure 2 by using Cantilever Method? **(20)**

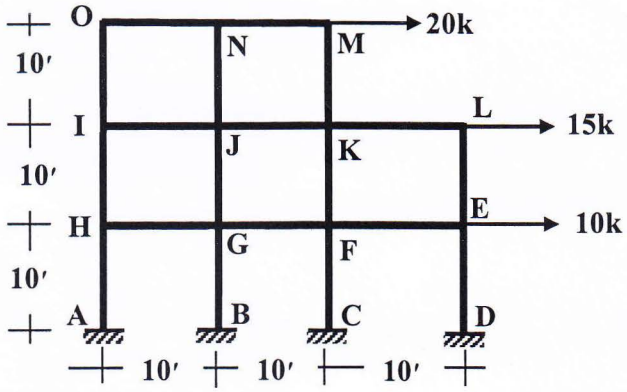


Figure 2

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2016
Program: B.Sc. Engineering (Civil)
Section: A & B

Course Code: CE 313 **Time: 60 Minutes**
Course Title: Structural Engineering II **Full Marks: 3 x 20**

[3] Determine the vertical deflection (downward) of joint B of the truss shown in Figure 3 by using Virtual Work Method. Consider E = 29 x 10^3 ksi, truss members area A = 5 in^2. **(20)**

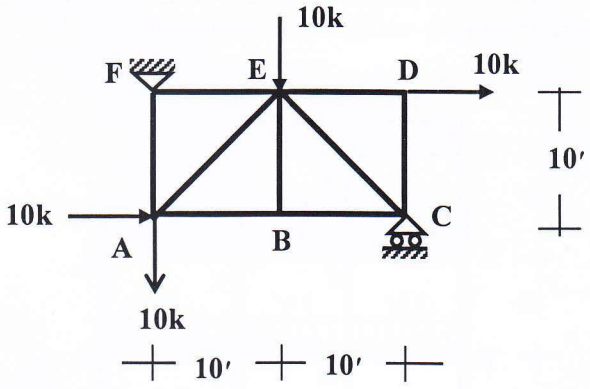


Figure 3

Name_____

Id_____

Set-A

University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination, Spring - 2016
Program: B.S.C in Civil Engineering, 3rd Year, 2nd Semester

Course Title: Principles of Management Course Code: IMG 301 Credit: 2

Time: 5 minutes Full Marks: 05

Part-A

Multiple Choice Questions **1x5=5**

1. Which one from the below falls under the decisional role of a manager?

a) Resource Allocator

b) Spokesperson

c) Figurehead

d) Monitor

2. Low waste is a sign of

a) Efficiency

b) Effectiveness

c) Waste Management

d) None of the above

3. Which view of social responsibility states- "Management's only social responsibility is to maximize profits'-?

a) Classical view

b) Socioeconomic view

c) Financial view

d) None of the above

4._____ is when a company engages in social actions in response to some popular social needs.

a) Social Responsibility

b) Social Responsiveness

c) Social Obligation

d) Activist Approach

5. _____ uses "Rules of thumb" to simplify decision making.

a) Self-Serving Bias

b) Framing Bias

c) Sunk cost errors

d) Heuristics

Set-A

University of Asia Pacific
Department of Business Administration
Mid-Term Examination, Spring - 2016
Program: B.S.C in Civil Engineering, 3rd Year, 2nd Semester

Course Title: Principles of Management Course Code: IMG 301 Credit: 2

Time: 55 minutes Full Marks: 15

Part-B

(Answer any 3 questions from 1-4. Each question carries equal marks) **5x3=15**

1. What are the rewards and challenges of being a manager?
2. Compare and contrast between effectiveness and efficiency with proper examples.
3. How can an organization go green? Discuss the approaches.
4. A site engineer needs to decide on a good brand of cement for his upcoming construction project. He has developed following decision criteria and assigned weight according to the importance.

Strength	10
Plasticity	8
Binding	6
Fly Ash	4
Cost	3

Further, upon doing some research, he has developed 6 alternative brands of cements available in the market and provided value on each alternative using the decision criteria. Following the decision making process, which brand from the below list should the engineer select? Justify your answer showing due analysis.

	Strength	Plasticity	Binding	Fly Ash	Cost
Lafarge	10	5	10	9	6
Diamond	7	4	5.5	8	7
Cemex	8	6	6	9	8
Heidelberg	9	3	4	7.5	9
Bashundhara	8.5	8	2	5	8.5
Premier	4.5	6.5	4.5	6.5	6.5

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2016

Course # : CE 363 Course Title: Engineering Hydrology
Full Marks: 60 Time: 1 hour

Answer all Questions

1. What is residence time? How precipitable water of atmosphere is calculated? What are the conditions to form precipitation? (1+ 5+ 2) = (8)

2. How adequacy of rain gauge stations is checked? What are the different forms of precipitation? (3+3) = (6)

3. Write short notes on (any four): (4*3) = (12)
   i. Intensity-duration-frequency curve
   ii. PET and AET
   iii. Water-Budget method
   iv. Dalton's law of evaporation
   v. FC and PWP

4. Describe different factors that affect the rate of evaporation. Why pan co-efficient is introduced to calculate evaporation using different evaporation pan? (6 +3) = (9)

5. For a drainage basin of 210 km^2, isohyetals drawn for a storm gave the following data: (12)

Isohyetals interval (cm)	80-70	70–60	60-50	50-40
Inter isohyetal area (km^2)	58	35	71	46

Estimate the average depth of precipitation over the catchment.

6. A reservoir with a surface area of 9.5 hectares had the following average values of parameters during a week : saturation vapor pressure= 16.52mm of Hg, relative humidity = 40%, wind velocity at 2.0 m above ground = 15km/h. Estimate the average daily evaporation from the lake using Meyer's formula and volume of water Evaporated from the lake during that one week. (5)

7. There were 6 rain gauge stations namely P, Q, R, S, T, U where station S was inoperative for the month. At that month rainfall recorded in the other five stations were 4.1, 6.8, 9.9, 6.9, 9.3cm respectively. If the average annual rainfalls for the stations are 88, 92, 67, 79, 98 and 101cm. Estimate the rainfall at station S. (8)