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

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

Answer all Questions

1. Define: (1.5 *6= 9)

i)	Permanent Wilting point	iv)	Infiltration Capacity
ii)	Infiltration capacity	v)	Φ – Index
iii)	Potential Evapotranspiration	vi)	Wind velocity profile

2. Why pan co-efficient is introduced to calculate evaporation using different evaporation pan?   (3)

3. Describe factors on which the rate of evaporation is depended.   (6)

4. A catchment has 7 raingauge stations. In 2015 the annual rainfall recorded by the gauges are as follows:

Station	A	B	C	D	E	F	G
Rainfall (cm)	130	142.1	118.2	108.5	165.2	102.1	146.9

   For a 5% error in the estimation of the mean rainfall, calculate the minimum required number of stations in the catchment.   (7)

5. There were 7 rain gauge stations namely A, B, C, D, E, F, G where station D was inoperative for a month. At that month rainfall recorded in the other six stations were 4.1, 6.8, 9.9, 6.9, 9.3, 9.0 cm respectively. If the average annual rainfalls for the stations are 130, 142.1, 118.2, 108.5,165.2, 102.1 and 146.9cm. Estimate the missing rainfall data at station D.   (10)

6. Using Horton's equation $f_{ct} = f_c + (f_0 – f_c) e^{-kt}$, find the infiltration rate at 5th hour given an initial infiltration capacity f_0 of 2.9 in./hr and a time constant k of 0.28 hr-1, ultimate infiltration capacity is 0.50 in./hr.   (10)

7. For a drainage basin (catchment) drawn in attached sheet having scale 1 square = 4 Km². Five rain gauges are also shown in and around the catchment. Annual rainfall are recorded in these stations are given below: (15)

Raingauge Stations	P1	P2	P3	P4	P5
Annual Rainfall (cm)	75	46	79	58	52

   Estimate the average depth of precipitation over the catchment, using Thiessen Polygon Method.

Answer to the Question no.7
(Attach this sheet with the answer script.)
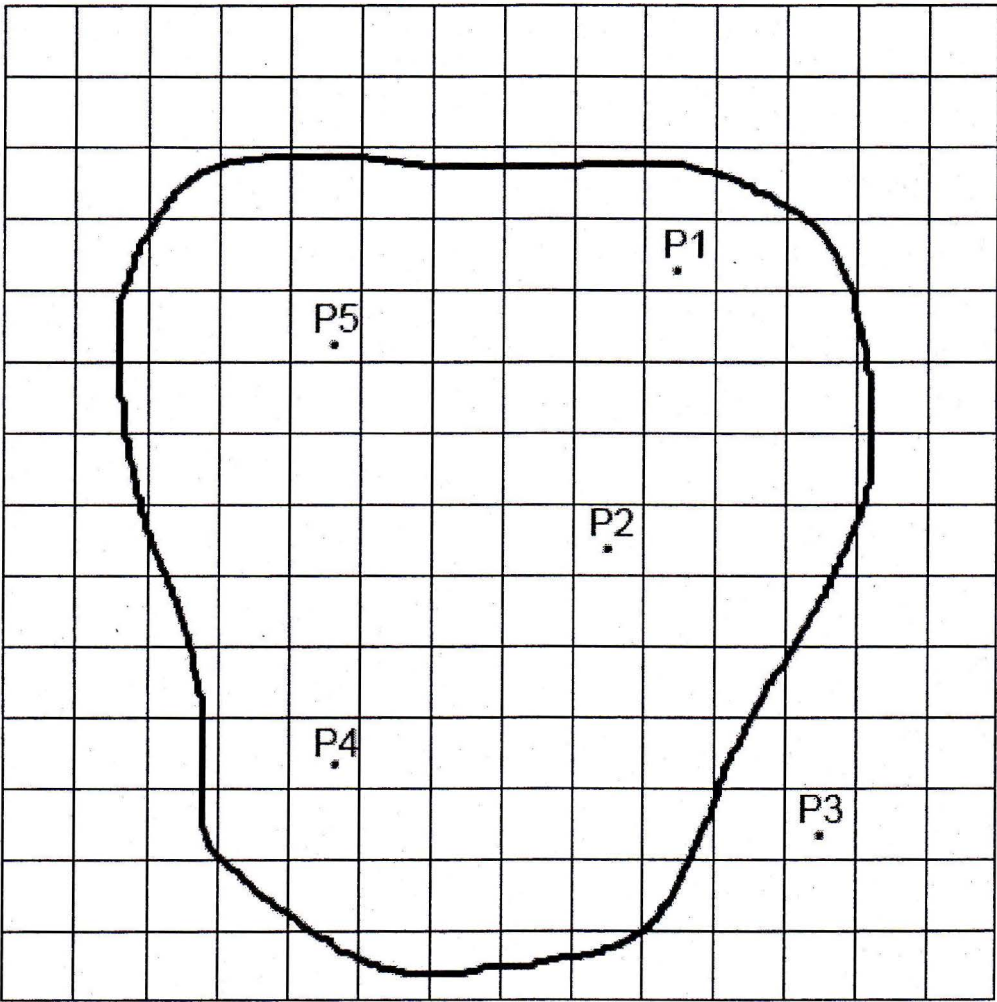
Course Code: CE 313	**Time: 60 Minutes**
Course Title: Structural Engineering II **Credit Hour: 3.0**	**Full Marks: 3 x 20**

ANSWER ALL QUESTIONS. *The figures are not drawn to scale.* Any missing data can be assumed reasonably.

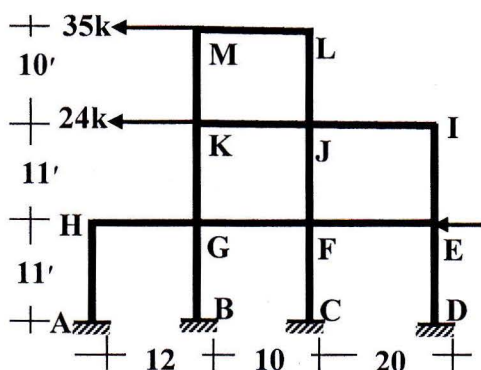[1] Use Portal Method to find all unknowns of joint G and L of the frame shown in Fig. 1? **(20)**
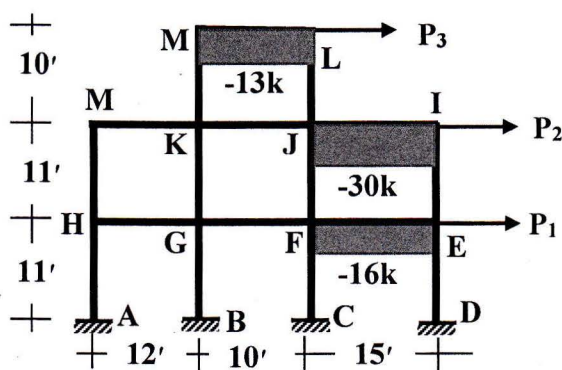

Fig. 1   Fig. 2

[2] Use Cantilever Method to find all the unknown loads P_1, P_2 and P_3 of the frame shown in Fig. 2? Assume all the columns are having same cross-sectional area A. **(20)**

[3] Use Virtual Work Method to determine the vertical deflection (downward) of joint A of the truss shown in Fig. 3. Assume, E = 29 x 10^3 ksi, truss members are having the same cross-sectional of 3.5 in^2. **(20)**
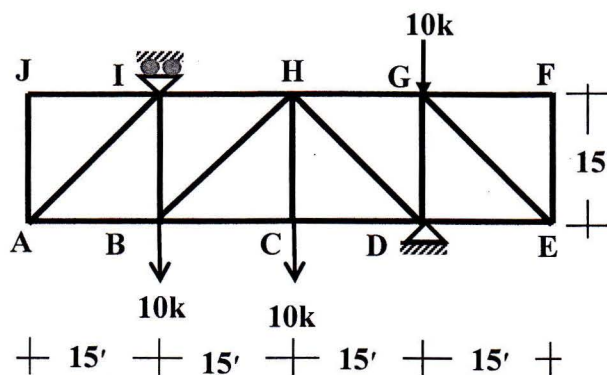

Fig. 3

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

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

Time: 60 minutes   Full Marks: 20

(Answer any 4 questions from 1-5. Each question carries equal marks)   **5x4=20**

1. Describe Frederick Taylor's principles of scientific management.
2. Compare and contrast between effectiveness and efficiency with proper examples.
3. Illustrate the levels of managers and the important skills they need according to those levels.
4. Identify and describe the task environment components for UAP civil engineering department.
5. 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	9.7	8
Heidelberg	9	3.8	4	7.5	9
Bashundhara	8.5	8	3.4	5	8.5
Premier	4.5	6.5	4.5	6.5	6.5

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

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

1. a) Spot speeds were observed for 8 vehicles traversing 4 km 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	75
3	56
4	52
5	67
6	54
7	42
8	28

  b) Briefly describe the benefits of on-street parking management?   4

2. a) Design a two-phase signal of a cross-junction for the data given below: 7

Amber   3 sec
Red-amber   2 sec

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

	Approaches			
	North	South	East	West
Flow, veh/hr	60	780	700	810
Saturation flow veh/hr	2370	2165	2160	2420

Draw the phase diagram.

  b) What are the types of delay? Describe them.   3

3. a) Write short note: 6
     (i)   Park and ride System
     (ii)   Origin-destination (O-D) survey
     (iii) Mandatory traffic sign
  b) List some crossing characteristics (at least three) of pedestrians in Dhaka city.   3
 c) What are the elements of road traffic system?   1

Course Code: CE 317   Time: 1 (One) Hour
Course Title: Design of Reinforced Concrete II   Full Marks: 40

*Question 1 is **COMPULSORY**. And answer any one from Question2 and 3*
Assume reasonable values for any missing data

1.   (a)   Explain why slab coefficients for DL and LL are different for M+ but equal for M-.   [5]

      (b)   Mention the conditions necessary for using the Direct Design Method of flat slab   [5]
              analysis.

      (c)   Compare with brief Pre-stressed concrete with Reinforced Concrete with respect to   [5]
              serviceability, safety and economy.

      (d)   Describe briefly the different stages of loading to which a Pre-stressed concrete   [5]
              member is often subjected.

2.   A Pre-stressed concrete rectangular beam 300 mm × 600 mm (***Fig: 1***) has a simple   [20]
            span of 15 m and is loaded by a uniform load of 30 kN/m excluding its own weight.
            The prestressing tendon is located as shown in the figure and it produces an
            effective prestressing force of 2000 kN. Find out the fiber stresses (top and bottom)
            at the midspan section and at the support.

600 mm   150mm
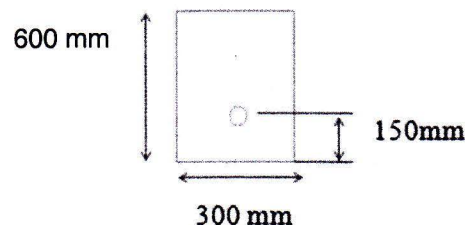
300 mm
Beam section at Midspan

Fig: 1

3.   *Fig: 2* shows floor plan of a RC beam-column slab, with 12″ × 18″ beams and 5″   20
            thick partition walls along column lines (column size 18″ × 18″). Floor loads also
            include working FF = 25 psf, RW = 50 psf.

(i)   Calculate the required slab thickness from deflection considerations, the allowable bending moment (using USD) for this slab thickness and corresponding allowable LL.

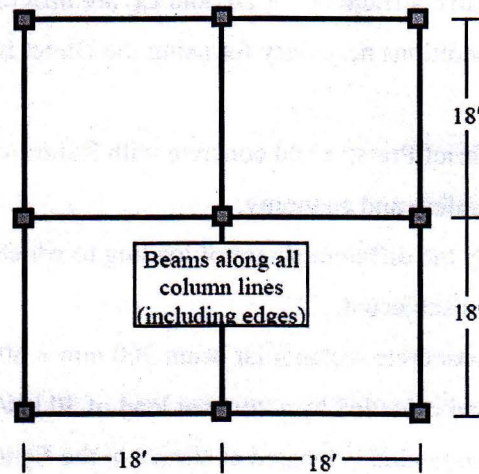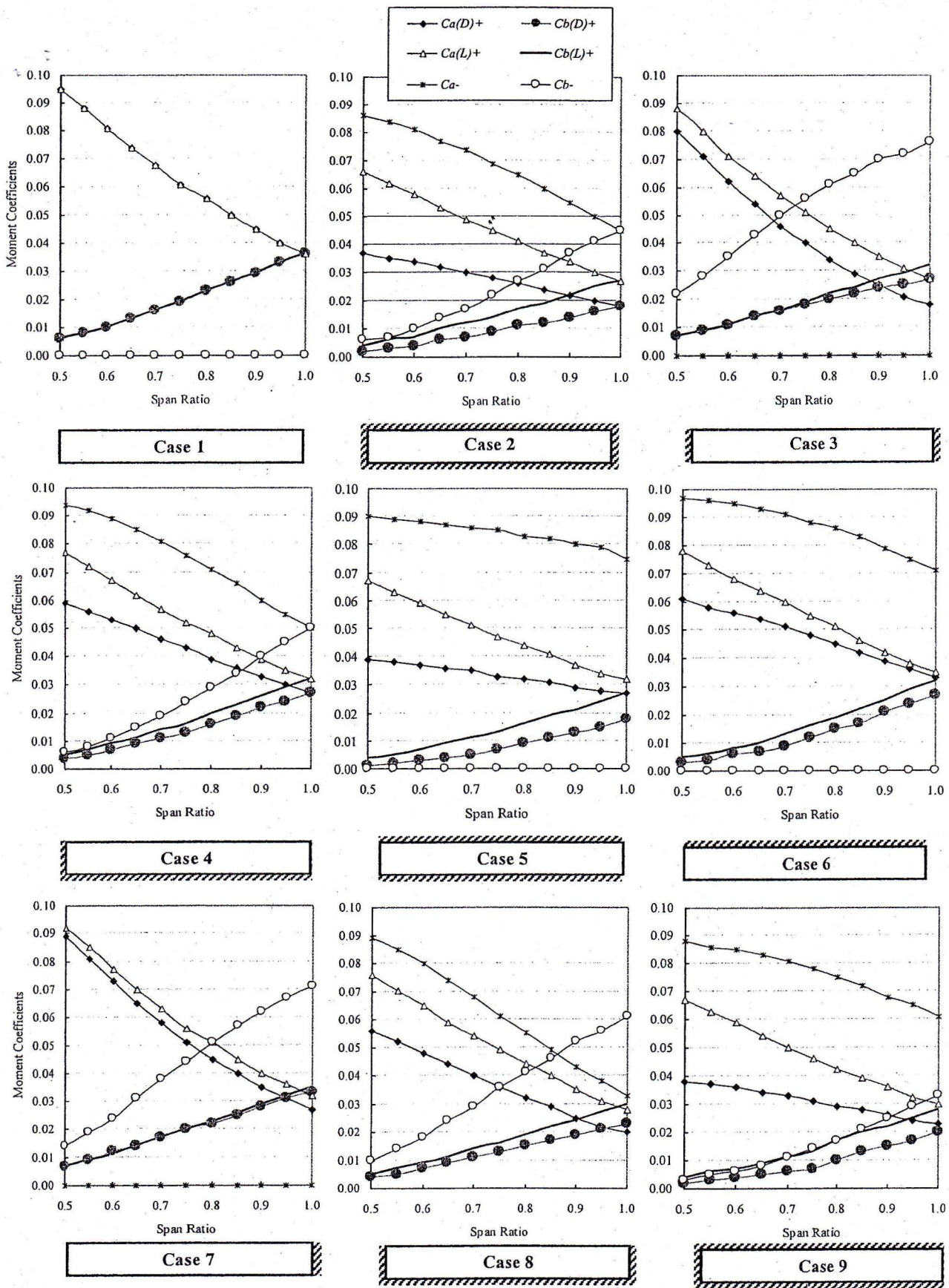(ii)   Design the slab (with neat sketches of reinforcements) using the loads calculated in (i).

Fig: 2

Fig. 1.5: Moment coefficients for different support conditions

$$d = \sqrt{\dfrac{M_u}{\varnothing \rho f_y \left(1 - 0.59 \rho \dfrac{f_y}{f_c}\right)}}$$

$$A_s = \left(\dfrac{f_c}{f_y}\right)\left[1 - \sqrt{\{1 - 2M_u / (\varnothing f_c bd^2)\}}\right]bd$$

$$f_c = 0.85 f_c'$$

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

Course No: CE 333
Full Marks: 60

Course Title: Environmental Engineering II
Time: 1.0 hour

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

1. (a) Describe with a neat sketch how you can prevent groundwater pollution from a simple pit latrine. [10]
   (b) Discuss the benefits of improved sanitation. [10]

2. (a) What is Sanitation Development Program? How to plan a Sanitation Development Program? [10]
   (b) Discuss the different types of wastewater collection systems. [10]

3. (a) Draw the routes of water use and its disposal. [5]
   (b) Discuss about National Sanitation Campaign (NSC) of Bangladesh with its objectives. [15]

4. (a) Mention the composition of wastewater. [5]
   (b) Define septic tank. Mention the removal performance of a septic tank under normal design conditions. What are factors upon which the performance of a septic tank depends on? [15]