

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Midterm Examination Fall 2015**  
**Program: B.Sc. Engineering (Civil)**  
**Section: A & B**

**Course Code: CE 313**

**Course Title: Structural Engineering II**

**Time: 60 Minutes**

**Full Marks: 3 x 20**

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

- [1] What are the assumptions for the vertical load analysis? Draw the Shear Force & Bending Moment Diagram of the **beams** shown in Figure 1?

20

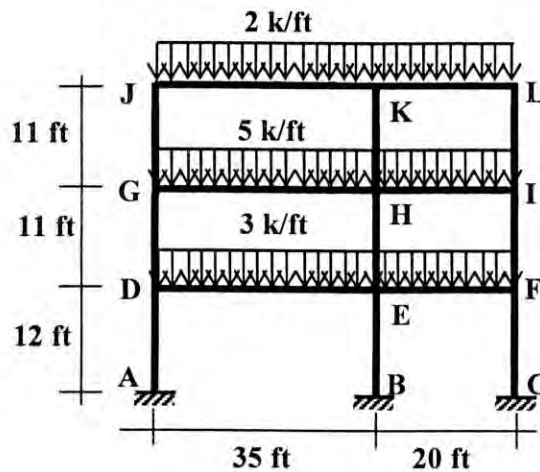


Figure 1

- [2] Find the vertical force  $K_y$  shown in the figure below by employing the **Portal Method**. Find the unknown moment  $M_E$  of the beam DE indicated by a box at joint E in the figure below by using the **Cantilever Method**.

20

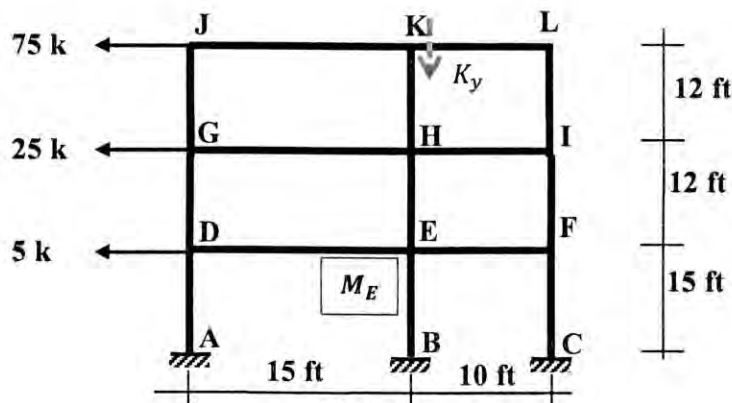


Figure 2

**University of Asia Pacific**  
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- [3] Calculate the **horizontal deflection of the joint D** of the truss by using the Virtual Work Method. Consider the elastic modulus  $E = 29 \times 10^3$  ksi, truss members area  $A = 2.5$  in<sup>2</sup> except member AE which has the area of 4 in<sup>2</sup>.

20

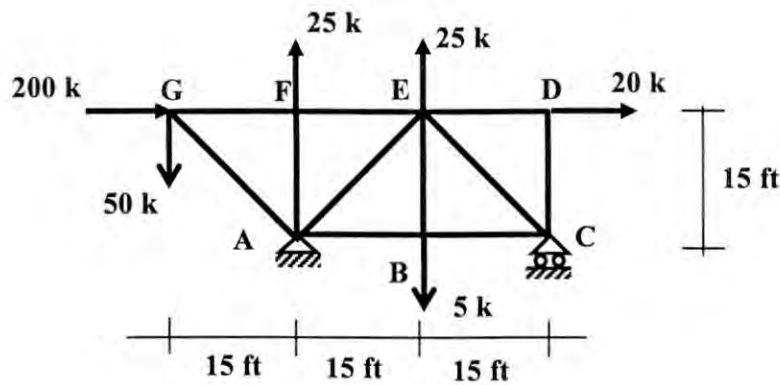


Figure 3

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Term Examination Fall 2015**  
**Program: B.Sc. Engineering (Civil)**

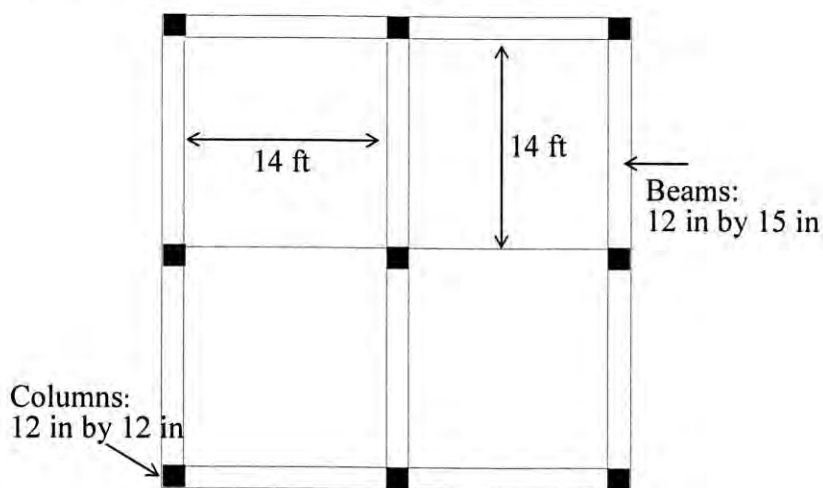
Course Title: Design of Concrete Structures II  
Time: 1 hr

Course Code: CE 317 (B-section)  
Full Marks: 45

[Answer all the questions. Assume value for any missing data]

1. (a) Refer to the following slab system of a two-storied building (**Figure: 1**). For the slab (10)  
consider LL = 60 psf, Partition Wall = 30 psf, Floor Finish = 20 psf,  $f'_c = 3000$  psi,  $f_y = 40,000$  psi.

$+C_{A(DL)} = 0.027$ ,       $+C_{A(LL)} = 0.032$ ,       $-C_A = 0.050$   
 $+C_{B(DL)} = 0.027$ ,       $+C_{B(LL)} = 0.032$ ,       $-C_B = 0.050$



**Figure: 1**

Show the detailed calculations of the following steps using WSD method:

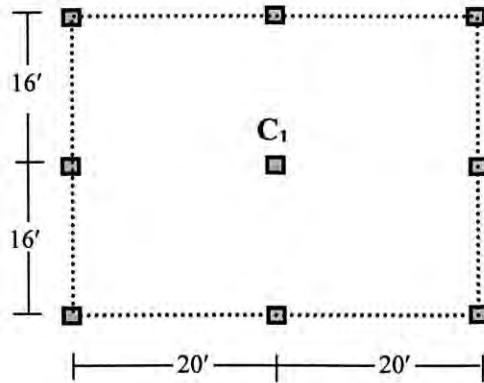
- (i) Minimum slab thickness
- (ii) Calculation for design moments
- (iii) Calculation for reinforcements for moments
- (iv) Calculation for temperature and shrinkage reinforcements.

(b) What is flat slab? Mention advantages and disadvantages of flat slab.

(5)

2. A building is to be designed as a flat plate structure. A plan of the building is shown in **Figure: 2** and dimension of all columns is 12"X12". Using WSD, check column  $C_1$  of the slab shown in **Figure: 2** for punching shear and calculate shear reinforcements. (10)

[Given, slab thickness = 6 inch, FF = 25 psf, RW = 20 psf, LL = 40 psf,  $f'_c = 3$  ksi and  $f_y = 40$  ksi,  $f_{c,all} = 1.35$  ksi and  $f_{s,all} = 18$  ksi]



**Figure: 2**

3. (a) What are the differences between one-way slabs and two-way slabs? Discuss the significance of the limitation laid by ACI for long span/short span should be less than 2 for two-way slab design. (3+5=8)

(b) Using USD method design a spiral column for a DL= 550<sup>k</sup> and LL= 250<sup>k</sup>. [Given:  $f'_c = 3$  ksi and  $f_y = 60$  ksi and  $f_{s,all} = 20$  ksi and steel ratio is 2.5%]. (12)

#### List of Useful Formulae for CE 317

##### Two way Slab

$$\begin{aligned} *M_A &= C_A \times W_T \times A^2, & *M_B &= C_B \times W_T \times B^2 \\ *M_A &= C_{A(DL)} \times W_{DL} \times A^2 + C_{A(LL)} \times W_{LL} \times A^2, & *M_B &= C_{B(DL)} \times W_{DL} \times B^2 + C_{B(LL)} \times W_{LL} \times B^2 \end{aligned}$$

$$*A_s = M / f_y j d$$

##### Column-Supported Slabs

$$*A_v = (V_n - V_c) / (f_y \sin \alpha) \quad *S = A_v f_y d / (V - V_c)$$

$$*V_c = 4 \sqrt{f'_c} b_o d \quad *V_c = (2 + 4/\beta_c) \sqrt{f'_c} b_o d \quad *V_c = (2 + \alpha_s d/b_o) \sqrt{f'_c} b_o d \quad [\text{Use half of the values for WSD}]$$

$$*V_c = 1.1 \sqrt{f'_c} b_o d$$

##### Short Column

$$*P_n = 0.85 f'_c A_c + f_y A_s = A_g [0.85 f'_c + \rho_s (f_y - 0.85 f'_c)]$$

$$*P_u = \phi A_g [0.85 f'_c + \rho_s (f_y - 0.85 f'_c)]$$

$$*P_{all} = \phi' (0.25 f'_c A_g + f_{s,all} A_s) = \phi' A_g (0.25 f'_c + \rho_s f_{s,all})$$

$$*\rho_s = 0.45 (A_g / A_{core} - 1) (f_c' / f_y) \quad *S = 4 A_{sp} / (\rho_s d_{core})$$

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Semester Examination Fall 2015**  
**Program: B.Sc. Engineering (Civil)**

Course No: CE 333  
Full Marks: 60

Course Title: Environmental Engineering II  
Time: 1.0 hour

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

1. (a) Define sewage, sewerage and sewer. [8]  
(b) Draw and discuss a water-wastewater cycle. Mention different types of wastewater. [12]
2. (a) Write short notes on i) Storm water ii) Non-scouring velocity of wastewater in a sewer iii) Separate sewerage collection system iv) Average dry weather flow. [8]  
(b) What is communal sanitation system? How it can differentiate with public sanitation systems? What are its main disadvantages? [12]
3. (a) What is a simple pit latrine? Describe with a neat sketch how you can prevent groundwater pollution from a simple pit latrine. [8]  
(b) Define sanitation development. Mentions the problems that affect the ability and willingness of a community to participate sanitation development project. [12]
4. (a) Define septic tank. Design and sketch of a two compartment septic tank to serve a household of 12 persons who produce 120 lpcd of wastewater. The tank is to be desludged every 5 years. [20]

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Midterm Examination**  
**Fall 2015**  
**Program: B.Sc Engineering (Civil)**

**Course Title: Transportation Engineering 1**  
**Full Marks: 20**

**Course Code: CE 351**  
**Time: 1 hour**

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

1. a) The following spot speeds were observed for 7 vehicles traversing 5 km segment of a highway. Calculate the Time Mean Speed and the Space Mean Speed of the vehicles. 6

| Vehicle | Speed (km/hr.) |
|---------|----------------|
| 1       | 60             |
| 2       | 65             |
| 3       | 56             |
| 4       | 52             |
| 5       | 57             |
| 6       | 66             |
| 7       | 48             |

- b) What are 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           | 730        | 680   | 720  | 780  |
| Saturation flow veh/hr | 2360       | 2065  | 2260 | 2520 |

Draw the phase diagram.

- b) What are the general requirements of traffic control device? 3

3. a) Write short note on any **four**: 6

- (i) Origin-destination (O-D) survey
- (ii) Non-recurrent delay
- (iii) Contra flow
- (iv) Variable Message Sign (VMS)
- (v) Park and ride System

- b) What are the factors that affect the road users' behavior? 3

- c) Name the elements of road traffic system. 1

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Term Examination Fall 2015**

Course # : CE 363  
Full Marks: 60

Course Title: Engineering Hydrology  
Time: 1 hour

**Answer all Questions**

1. Define : (1.5 \*4= 6)

- |                             |                        |
|-----------------------------|------------------------|
| i) Relative humidity        | iii) Glaze             |
| ii) Permanent Wilting Point | iv) Evapotranspiration |

2. Write short notes on: (3\*3=9)

- |                                      |                                                  |
|--------------------------------------|--------------------------------------------------|
| i. Pan coefficient                   | iii. Intensity- Duration- Frequency relationship |
| ii. Conditions to form precipitation |                                                  |

3. Describe the procedure of estimating missing precipitation data. (5)

4. What are the factors that affect evaporation? (6)

5. A catchment has 6 raingauge stations. In 2014 the annual rainfall recorded (in cm) by the gauges are as followed:

| Station  | A    | B     | C     | D    | E     | F     |
|----------|------|-------|-------|------|-------|-------|
| Rainfall | 91.6 | 167.9 | 175.3 | 86.3 | 124.2 | 172.7 |

For a 10% error in the estimation of the mean rainfall, calculate the optimum number of stations in the catchment. (5)

6. Estimate the daily potential evapotranspiration for the following data by Penman's formula: (10)

- Slope of the saturation vapor pressure vs. temperature at the mean air temperature = 1.4 mm/ $^{\circ}$ C
- Mean temperature = 22 $^{\circ}$ C
- Relative humidity = 80%
- Wind velocity at 2 m height = 86 km/day
- Saturated vapour pressure  $e_w$  = 5.34 mm of Hg
- Net radiation = 5 mm of water per day
- Psychrometric constant = 0.49 mm of Hg/ $^{\circ}$ C

7. Calculate air density, vapor pressure, specific humidity at 2km high above 1 m<sup>2</sup> of ground surface. The surface pressure is 101.3 kPa, the surface air temperature is 30 $^{\circ}$ C and the lapse rate is 6.5 $^{\circ}$ C/km. (9)

8. For a drainage basin of 310 km<sup>2</sup>, isohyets drawn for a storm gave the following data: (10)

| Isohyets interval (cm)                  | 70-60 | 60-50 | 50-40 | 40-30 | 30-20 |
|-----------------------------------------|-------|-------|-------|-------|-------|
| Inter isohyetal area (km <sup>2</sup> ) | 75    | 46    | 79    | 58    | 52    |

Estimate the average depth of precipitation over the catchment.

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid-Semester Examination Fall-2015**  
**Program: B. Sc Engineering 3<sup>rd</sup> Year 2<sup>nd</sup> Semester**

Course Title: Principles of Management.

Course No. IMG 301

Credit: 2.00

Time: 1.00 Hour.

Full Marks: 20

Q#1: Best Matching:

4 @ 1

1= Strategic Intent;  
4= Innovation;

2= Efficiency;  
5= None.

3=Liaison role;

- : Compromise between conflicting interest groups.
- : The ability and power to develop new ideas.
- : Picking a course of action that is satisfactory/good enough under the circumstances.
- : "Encircle Bata".

Q#2: Pick the right one:

4 @ 1

"No competition"

The V.C. was doing a press conference.

No ideas are ever criticized

You are receiving an email from a friend.

: blue ocean/ red ocean/ none.

: liaison/ spokesperson/ none.

: brainstorming/ Delphi technique/ none

: liaison/ disseminator/ none.

----- tear here please -----

**Briefly explain any Three question from below:**

**Marks: 3 @ 4**

Q#3: Compare 'Efficiency' with 'Effectiveness'.

Q#4: Describe the Planning function and the Staffing function of management.

Q#5: Explain the Codetermination.. How it differs from Japanese Management System

Q#6: What do you mean by 'Satisficing' decision.

Q#7: Describe the Delphi technique process. How it differs from Brainstorming process.