# University of Asia Pacific Department of Civil Engineering Midterm Examination – Fall 2024 Program: M.Sc. Engineering (Civil)

Course Title: Irrigation and Drainage Engineering Time: 1 hour

Credit Hour: 3:00

Course Code: CE 6608 Full Marks: 20

## Answer all questions.

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- Suppose you are an Irrigation Engineer; you are going to set up an irrigation project where the land area is around 12000 hectares. Being an Engineer, what will be your list of things in setting up an irrigation project. (5)
- 2. Write short notes on a) SAR, b) Conjunctive use of water. (4)
- 3. Write down the advantages and disadvantages of irrigation. (4)
- 4. Write your opinion about the use of groundwater over surface water during irrigation.

(2)

a) What is the classification of irrigation water having the following characteristics: Concentration of Na, Ca and Mg are 22, 3 and 1.5 milliequivalents per litre respectively, and the electrical conductivity is 200 micro mhos per cm at 25°C? b) What problems might arise in using this water on fine textured soils? C) What remedies do you suggest to overcome this trouble? (5)

# University of Asia Pacific Department of Civil Engineering Mid Semester Examination, Fall 2024 Program: M.Sc. in Civil Engineering

Course Title: Analysis and Design of Tall Buildings		Course Code: CE 6111
Time: 1 hour	Credit Hour: 3.00	Full Marks:60

#### Answer all the questions

#### **QUESTION 1 [18 MARKS]**

Review the structural system of Sears Tower and Petronas Twin Towers. As structural engineer, propose suitable structural system of skyscrapers (40 storeyed) for Cox's Bazar city and justify through critical analysis in terms of design requirements of tall building. [18]

#### **QUESTION 2 [12 MARKS]**

The conceptual structural model of a 40 storeyed office building with wall-column structural system at Cox's Bazar city is shown in **Figure 1**. The structure is critical for wind load, the average wind pressure at Cox's Bazar city could be considered as  $3.5 \text{ kN/m}^2$ . Analyze the frame of grid 3 (shown in **Figure 1 and 2**) using portal method due to wind load to obtain maximum bending moment and shear force of shear wall **W1** and column **C1** for ground floor. Assume that the shear wall and interior column would sustain 2.5V and V respectively. [12]



Figure 1. Structural model (floor plan) of tall building



## **QUESTION 3 [ 30 MARKS]**

The floor of the structure as discussed in **Question 2** would be constructed using flat plate system. Design the **long span of panel A** (shown in **Figure 1**). Thickness of slab should be as minimum as possible considering deflection and punching requirement of slab in accordance to BNBC 2020. Column size could be considered as 1000 mm x 1000 mm. Assume required data to design the slab.

## University of Asia Pacific Department of Civil Engineering Mid Term Examination (Fall 2024) Program: M.Sc. Engineering (Civil)

Course Title: Principles of Earthquake Engineering	Course Code: CE 6701
Credit Hour: 3.0	Full Marks: 40
Time: 1 Hour	I dii Marko. 10

- 1. Briefly explain the earth's interior layers along with the mechanisms involved in the movement of the earth's crust. (5)
- For a structure with a design life of 50 years, estimate the probability of exceedance of any earthquake having a return period of 30, 100, or 2200 years.
- 3. Describe the moment magnitude and compare it with other magnitude scales. (5)
- An earthquake produced P and S wave with velocities 6 km/sec and 4 km/sec respectively. The time difference between the arrival of P and S wave for a seismograph is 25 sec. Estimate the distance between the seismograph and the focus of that earthquake.
- 5. What is the difference between body wave and surface wave? Briefly describe Rayleigh wave. (5)
- 6. Briefly explain the mechanism involved in San Andreas fault. What is elastic rebound theory? (5)
- 7. Briefly explain Fourier spectra along with frequency content. (5)
- 8. Explain the four steps of deterministic seismic hazard analysis. (5)

# University of Asia Pacific Department of Civil Engineering Midterm Examination – Fall 2024 Program: M.Sc. Engineering (Civil)

Course Title: Faecal Sludge Management Time:1 hour

Credit Hour: 3:00

Course Code: CE 6315 Full Marks: 20

### Answer all questions.

1. Consider yourself as an urban planner of 'Y' city and now you are planning for the city's sanitation system. A Shit flow diagram (SFD) is developed from the city's demographic data, which is shown below. Your task is to make decisions for the sanitation system based on the developed SFD of 'Y' city. What decisions do you take for the city, and explain the logic behind your decisions on the sanitation system? [8]



2. Answer any 03 (three) questions from the following:

[3X4=12]

- a. Explain how Citywide Inclusive Sanitation (CWIS) principles directly influence and improve faecal sludge management practices within urban environments.
- b. Discuss the role of regulations and policies in promoting effective faecal sludge management.
- c. Explain the importance of stakeholder engagement in developing and implementing faecal sludge management programs.
- d. How can the principles of the circular economy be applied to faecal sludge management?