

Me

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Fall 2019
Program: Master in Civil Engineering

Course code: CE 6006

Course title: Environmental Hazard and Disaster Management

Time: 60 Minutes

Total marks: 20

Answer all questions

1. Do you agree that there is no such term as *natural disaster* – disaster always occurs due to human activities? Justify your answer. 4

2. Explain the relationship between *hazards, vulnerability, coping capacity* and *disaster risk* with practical examples. 4

3. a. Explain the difference between *disaster management* and *disaster risk management* concepts with practical examples. 4

- b. In engineering point of view, which concept is more effective for reducing hazards, vulnerability and increasing coping capacity along the coastal areas of Bangladesh? Justify your answer with practical examples. 4

4. Explain different steps of *disaster risk assessment*. 4

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2019
Program: Master of Civil Engineering (MCE)

Course Title: Advanced Concrete Technology
Time: 1 hour

Course Code: CE 6201
Full Marks: 60

Answer all questions

QUESTION 1 [30 MARKS]

Reinforced Concrete (RC) slabs will be constructed for road construction, which is sensitive to thermal expansion. To minimize/reduce the thermal effect, three types of cement (X, Y and Z) have been chosen, and technical data sheets are collected to pre-investigate the performance of cement. The chemical constituent of cement (X, Y and Z) is given in Table 1.

Table 1: Chemical constituent of cement (X, Y and Z)

Bulk Oxide Content	CaO	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MgO	SO ₃	K ₂ O	Na ₂ O	LOI
X	58	22	8	5	1.3	0.5	2.6	1	1.6
Y	46	8	15	2.8	1.1	3	9	8	5
Z	68	22	5.9	2.5	1.4	2	1.2	0.6	1

- (i) Calculate the silica modulus, alumina modulus and hydraulic modulus of three types of cement (X, Y and Z) that have been chosen for RCC road construction. [4.5]
- (ii) Using Bogue's equation, calculate the major chemical compounds of three types of cement (X, Y and Z). If these three types of cement are used to make RCC road, explain the expected performance of concrete mixes made with those three types of cement regarding the following: (a) temperature increase in concrete, (b) compressive strength and (c) permeability. [18]
- (iii) Based on the silica modulus, alumina modulus, hydraulic modulus and Bogue analysis, propose a suitable cement for the RC road construction and justify your selection with proper comments. [7.5]

QUESTION 2 [15 MARKS]

"The purpose of air entrainment in concrete is to protect concrete from cracks due to freezing and thawing cycles". Explain the statement using the schematic diagram, proper mechanism and comments. [15]

Or

Explain the effect of aggregate shapes and types of gradation on the fresh and hardened properties of concrete. [15]

QUESTION 3 [15 MARKS]

Sketch the shrinkage and water loss relation for cement paste and discuss the effect of different water loss on shrinkage. Explain how water to cement ration affects the shrinkage of cement paste. [15]

Or

With the help of neat sketches and curves, explain the effect of specimen height to diameter ratio and loading rate on the compressive strength of the concrete cylinder. [15]

University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Fall 2019
MCE/M.Eng Program

Course Code: CE 6108

Time: 1 (one) Hour

Course Title: Advanced Design of Concrete Structures

Full Marks:(3+7+10)=20

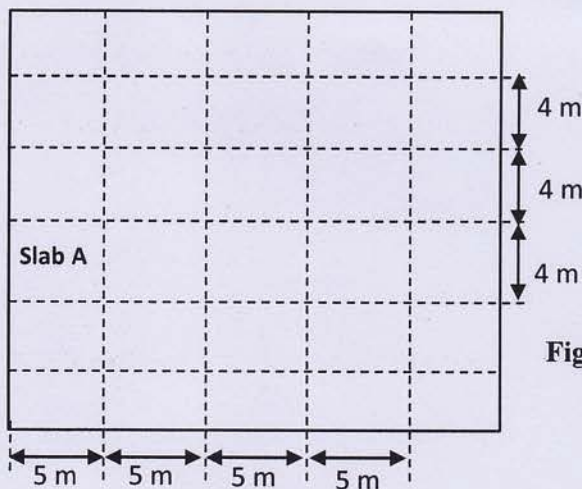
[Use f'_c is 24 MPa, f_y is 420 MPa for all design]

QUESTION 1 [3 MARKS]

According to ACI 318, the coefficient of depth of stress distribution (β_1) depends on compressive strength of concrete (f'_c). Derive the design equation of flexural member for high strength concrete of 40 N/mm². [3 marks]

QUESTION 2 [7 MARKS]

The floor plan of an office building (live load 2.4 kN/m²) is shown in **Figure 1**. The side slab panel "A" is required to analyze for design. **Justify**, whether **Strip Method** would be the economical choice to analyze the slab as compared to conventional **Co-efficient Method through analysis** of slab for both spans. The co-efficient of moment as shown in Table 1 could be used for conventional method. As a Design Engineer assume the appropriate required data for analysis the slab. [7 marks]



Span Ratio	Positive Moment		Negative Moment
	Live load	Dead Load	
0.8	0.044	0.032	0.055

Figure 1: Floor plan of office building

QUESTION 3 [10 MARKS]

Design the beam "AB" as **deep beam** for the column load of 7-storeyed residential building as shown in **Figure 2**. The column is located at middle of the beam having the design load of 3000 kN. Assume required data to design the beam. Approximate method could be used to obtain reaction and shear force of the beam. [10 marks]

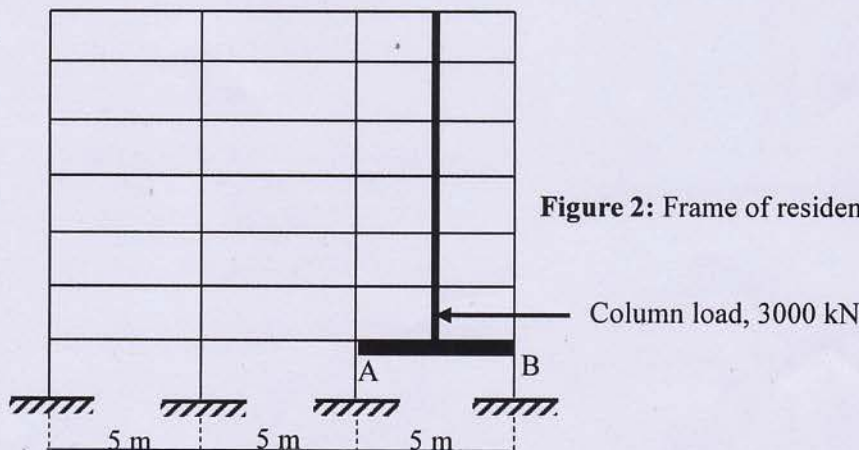


Figure 2: Frame of residential building