3-2

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination, Spring 2019
Program: B.Sc in Civil Engineering

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

Time: 1 Hour Full Marks: 20

Instructions:

1. Answer any four (4) out of the five (5) questions
2. Each question carries equal mark (5)
3. Answer the questions sequentially

1. What is Management? Briefly explain the management process with examples.

2. Briefly describe the ten managerial roles identified by Henry Mintzberg. Give an example of each.

3. Discuss the nature of the organizational environment and the components of the general, task, and internal environments with an example of a company.

4. Discuss the arguments for and against companies engaging in social responsibility.

5. Write short notes on any two (2) of the followings:
   Scientific Management, Managerial Ethics, Three levels of Managers

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2019
Program: B.Sc. Engineering (Civil)

Course Title: Structural Engineering II | Course Code: CE 313
Time: 1 hour | Credit Hour : 3.0 | Full Marks: 20

ANSWER ALL QUESTIONS. Any missing data can be assumed reasonably.

1. Use cantilever method to draw the axial force, shear force and bending moment diagrams for ground floor beams and columns of the structure shown in ***Fig.1***. All columns have the same cross-sectional area. [7]

2. For the structure shown in ***Fig.2***, use approximate vertical load analysis method to determine the uniformly distributed loads on beams and draw their shear force diagrams from the given bending moment diagrams. [3]

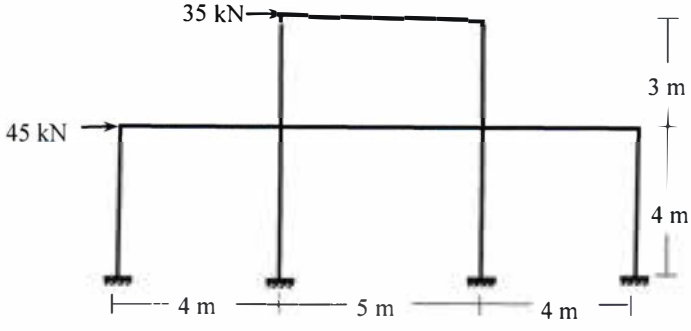

Fig.1

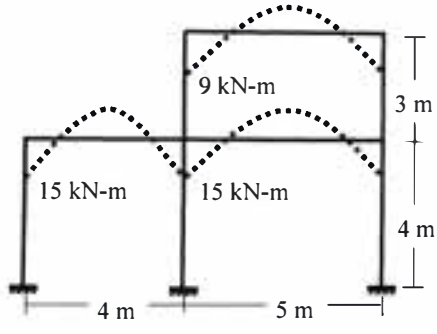

Fig.2

3. Use virtual work method to determine the slope at point **C** of the beam shown in ***Fig.3*** [Given:E=200 GPa , I = 200×10^6 mm^4]. [5]

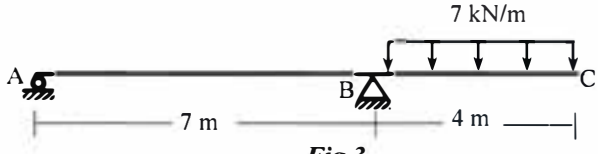

Fig.3

4. Calculate forces in member AC, BD, CF, DE of the statically indeterminate truss shown in ***Fig.4*** assuming

(i) Diagonal members take equal share of the sectional shear force for members AC, BD

(ii) Diagonal members can take tension only for members CF, DE. [5]

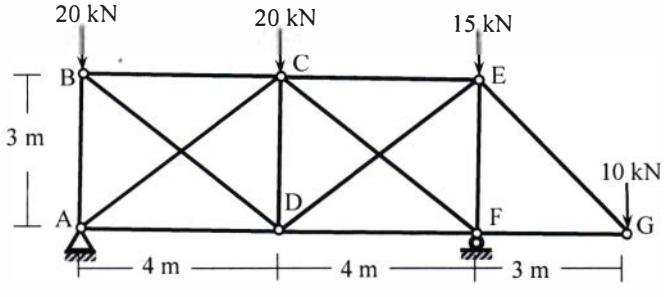

Fig.4

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Program: B.Sc. in Civil Engineering

Course Code: CE 317 Time: 1 (one) Hour
Course Title: Design of Concrete Structures II Full Marks:(10+6+4)=20

Answer all the QUESTIONS
Use f_c' is 24 N/mm^2, f_y is 420 N/mm^2 and γ_c is 24 kN/m^3 for design

QUESTION 1 [10 MARKS]

The floor of a storage warehouse of garments building (live load 12 kN/m^2) is constructed with reinforced concrete slabs which are supported with beams (250 mm x 600 mm) on all slabs. The floor carries 3 kN/m^2 dead load due to finishes and partition wall (excluding self-weight of slab). The thickness of slab could be assumed as 150 mm. Apply design concept to calculate flexural reinforcements for mid-span and support of an interior slab panel as shown in **Figure 1**. The moment coefficients of interior panel are listed in **Table 1**. [10 Marks]

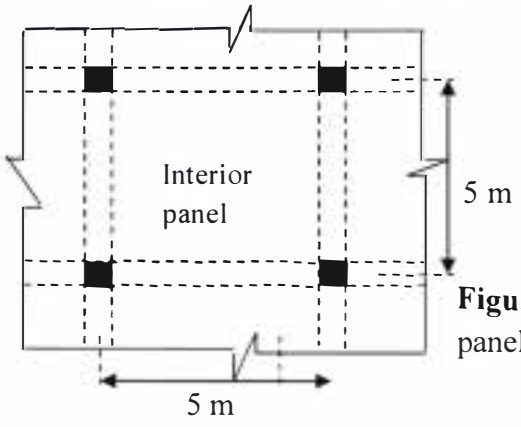

Figure 1. Interior slab panel of warehouse

Table 1: Moment coefficients of Interior slab			
Span Ratio	Positive Moment		Negative Moment
	Live load	Dead Load	
1	0.027	0.018	0.045

QUESTION 2 [6 MARKS]

The floor of an 8 storey office building (live load 2.4 kN/m^2) is constructed with reinforced concrete flat plate slabs as shown in **Figure 2**. All the slabs of the floor are supported with columns and assume that the columns have same size of 500 mm x 500 mm. The floor carries 5 kN/m^2 dead loads due to finishes and random wall (excluding self-weight of slab). Design the **long span column strip** of slab panel "A" for flexural reinforcement considering optimal thickness of slab. As per ACI 318, the minimum thickness of interior slab is $l_n/33$ to control deflection. Assume required data to design the slab. [6 marks]

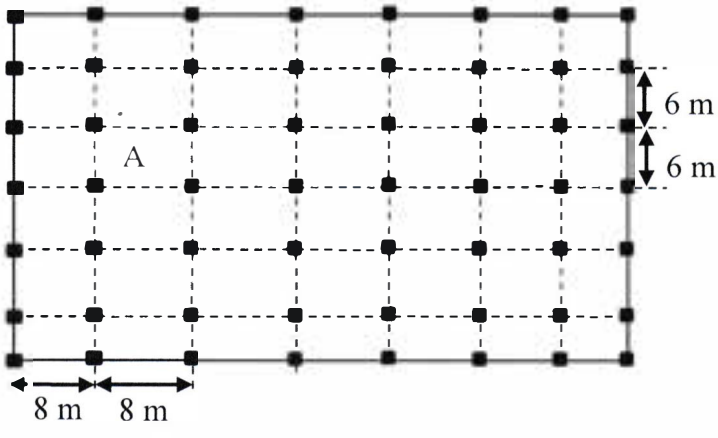

Figure 2. Floor plan of 8-storey office building

QUESTION 3 [4 MARKS]

A column of reinforced concrete frame structure has to support 1800 kN axial floor load and 300 kN.m moment due to lateral load. The design details of the column as shown in **Figure 3**. **Evaluate and justify the design** through analysis of column for its maximum capacity, whether it could sustain the load and moment at balanced failure condition. Assume required data for analysis. [4 Marks]

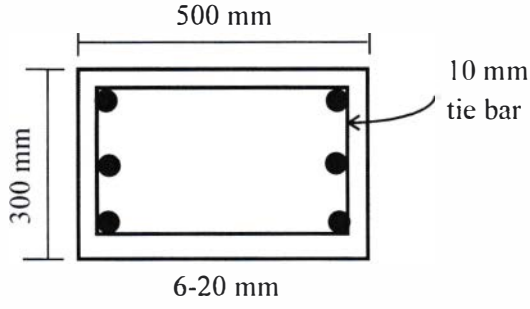

Figure 3. Details of column

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Midterm Examination Spring 2019
Program: B.Sc. Engineering (Civil)

Course Title: Environmental Engineering II | Course Code: CE 333
Time: 1 hour | Full Marks: 30

There are Four (4) questions. Answer any Three (3). Assume any missing data.

1. A settling analysis is run on a type 1 suspension. The column is 2m deep, and the dataset are given below. Compute the removal efficiency in a settling basin with a load of 30 m/d. **[10]**

Time, min	0	60	80	100	130	200	240	420
Conc., mg/L	500	200	180	140	120	90	50	5

2. (a) What are the advantages and disadvantages of a pit latrine? **[5]**
   (b) Show the network diagram of decision tree for selecting latrine options. **[5]**

3. (a) Explain operational principle of comminuting process in preliminary treatment systems. **[5]**
   (b) What are the functions of an equalization basin? **[5]**

4. (a) How corrosion occurs in sewerage networks? **[5]**
   (b) With a schematic diagram show different zones that are formed in a septic tank during wastewater treatment. **[5]**

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Midterm Examination
Spring 2019
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. a) Differentiate between angular and parallel methods of parking. 4
   b) Compute the time-mean speed and space-mean speed of 6 vehicles traversing a 2000 m of segment of a highway presented in following table: 6

Vehicle no.	Distance (m)	Travel time (sec)
1	2000	40
2	2000	39
3	2000	46
4	2000	48
5	2000	54
6	2000	52

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

Amber 3 sec
Red-amber 2 sec

	N-S	E-W
Inter green	8	7
Lost time	4	3

	Approaches			
	North	South	East	West
Flow, veh/hr	1250	1090	850	1170
Saturation flow veh/hr	3540	3360	2460	3410

   b) Enumerate the needs for traffic surveys. 2

3. a) Calculate the AADT for the following data. Data collection was conducted on Tuesday in May. MEF for May is 1.395. 7

Hour	**Volume**
7:00-8:00 a.m.	1200
8:00-9:00 a.m.	1350
9:00-10:00 a.m.	1680
10:00-11:00 a.m.	1460
11:00-12:00 p.m.	1570
12:00-1:00 p.m.	1670

   b) Define (any **three**): 3
   (i) VMS (ii) Average daily traffic (ADT),
   (iii) Geometric delay, (iv) Free flow speed

Table for Question 3 a)

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

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Mid Term Examination Spring 2019

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

Assume any reasonable value, if not given

Answer All the Questions

1. In a certain river basin there are six rain gauge stations, the normal annual rainfall depths at the stations being 42.4, 53.6, 67.8, 78.5, 82.7 and 95.5 cm, respectively. Determine the optimum number of rain gauge stations to be established in the basin if it is desired to limit the error in the mean value of rainfall over the catchment to 10%. (7)

2. Calculate in a one step, the precipitable water in a saturated air column of 2000 m high above 1 m^2 of ground surface. The surface pressure is 101.3 kPa, the surface air temperature is 30^0C and the lapse rate is 6.5^0C/km. (15)

3. A reservoir with a surface area of 220 hectares had the following average values of parameters during a month: water temperature= 25°C, Relative humidity =37%, wind velocity at 1.0 m above ground = 14 km/h. Using Meyer's formula, Estimate the average daily evaporation from the lake and volume of water evaporated from the lake during the hole month. (10)

4. Rain gauge station D was inoperative for part of a month during which a storm occurred. The storm rainfall recorded in the three surrounding stations A, B and C were 8.5, 6.7 and 9.0 cm, respectively. If annual normal rainfall for the stations are 75, 84, 70 and 90 cm, respectively, estimate the storm rainfall at station D. (5)

5. Explain the five variables that influenced the rate of evaporation. (5)

6. Distinguish between: (3x2=6)

a) Actual and potential evapotranspiration
b) Field capacity and permanent wilting point
c) Recording and non-recording rain gauges

7. Isohyetal map is drawn in a catchment shown below. Areas within two consecutive isohytes are tabulated. Compute the average precipitation over the basin. (12)

Zone	Area (km^2)
I	56
II	192
III	420
IV	244
V	44
VI	58