University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination, Fall - 2018
Program: B.Sc in Civil Engineering

Course Title: Principles of Management   Course Code: IMG 301   Credit: 2.00
Time: 1 hour   Full Marks: 20

Answer all the questions

1. "Managers require different skill sets in order to get things done effectively and efficiently"- briefly explain the managerial skills needed by a manager in order to succeed in their endeavors.   **4**

2. Social responsibility is said to be an ethical practice which is expected from the organizations in order to save the natural environment, and also serve the stakeholders, what are the approaches (degrees) to social responsibility? Briefly explain.   **4**

3. Suppose, you are the structural engineer of 'Nexus Construction Corp.' Your organization needs to purchase some earth moving equipment: Excavator. While purchasing, the following decision criteria deem important to you and you have also given weights to individual criterion according to the importance:

Decision criteria	Weights
Ease of operating	15%
Endurance	20%
Work load per day	20%
Consumption of fuel	30%
Price	5%
Brand	10%

The available alternatives into the market are the followings:

    a. Case construction equipment
    b. Caterpillar
    c. Komatsu
    d. Volvo construction equipment

Assign weight to the above-mentioned brands (using your intuition) and determine the weighted score of each brand in order to find the best purchasing option for 'Nexus Construction Corp.' *You need to follow the 8-step decision making process.*   **8**

4. Explain the following terms: **4**
    a. Rationality
    b. Bounded rationality
    c. Intuition
    d. Decision making under risk.

Course Code: CE 313
Course Title: Structural Engineering II

Time: 1 (one) Hour
Full Marks :(4+8+8)=20

QUESTION 1 [4 MARKS]
a) State the fundamental assumptions to analyze statically indeterminate frames using Portal and Cantilever Methods. [2 marks]
b) Formulate the equation to calculate deflection of beam using Virtual Work Method.
[2 marks]

QUESTION 2 [8 MARKS]
A frame of reinforced concrete building is shown in **Figure 1**. All beams of the frame are carrying 40 kN/m floor (vertical) load and lateral loads due to wind shown in Figure 1. Analyze the structure;
a) for vertical load using approximate method to get bending moment diagram (BMD) of roof floor beam. [3 marks]
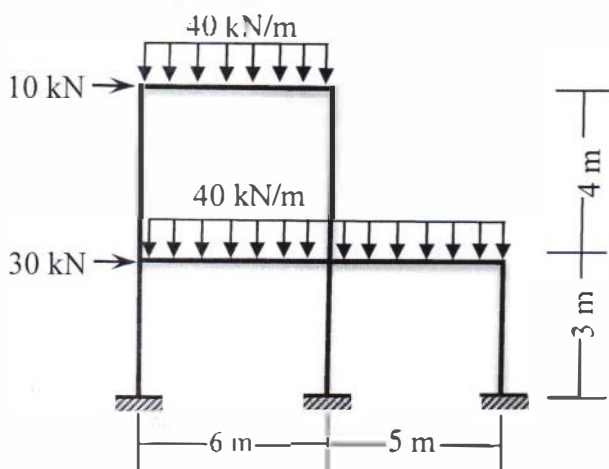b) for lateral load using Portal Method to get bending moment diagram (BMD) of all columns. [5 marks]
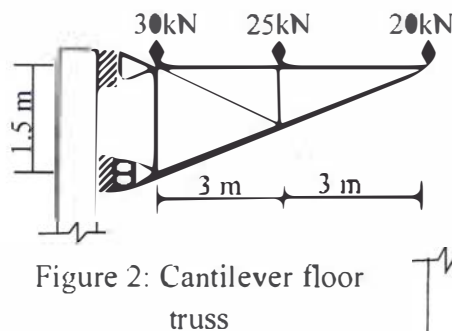

Figure 1: Frame of building

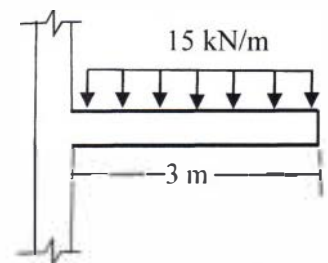Figure 2: Cantilever floor truss

Figure 3: Cantilever RC slab

QUESTION 3 [8 MARKS]
a) A cantilever steel truss is carying floor load as shown in **Figure 2**. Analyze the truss to get maximum vertical deflection using Virtual Work Method [Given: Cross sectional area of all members is 900 mm², Modulus of elasticity of steel is 200,000 N/mm²]. [5 marks]
b) A reinforced concrete cantilever slab strip is subjected to floor load as shown in **Figure 3**. The maximum allowable deflection of the slab is 15 mm. Analyze the slab using Virtual Work Method to get minimum required thickness to control the deflection. The width of the slab strip is 1000 mm [Given: Modulus of elasticity of concrete is 30,000 N/mm²] [3 marks]

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

Answer all the QUESTIONS
Use f_c' is 24 N/mm², f_y is 420 N/mm² and γ_c is 24 kN/m³ for design

QUESTION 1 [4 MARKS]
a. State the necessity to provide corner reinforcement at edge supported slab and show the details of corner reinforcement.   [2 marks]
b. State the procedures and criteria to check punching shear of flat plate slab and flexural-shear for edge supported slab.   [2 marks]

QUESTION 2 [10 MARKS]
The floor of class room of 8 storey academic building (live load 2 kN/m²) is constructed with reinforced concrete flat plate slabs as shown in **Figure 1**. All the slabs of the floor are supported with columns and assume that the columns have same size of 400 mm x 400 mm. The floor carries 5 kN/m² 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. Clear long span depth ratio of internal panel of flat slab is 33 to control deflection. Assume the required data to design the slab.   [10 marks]
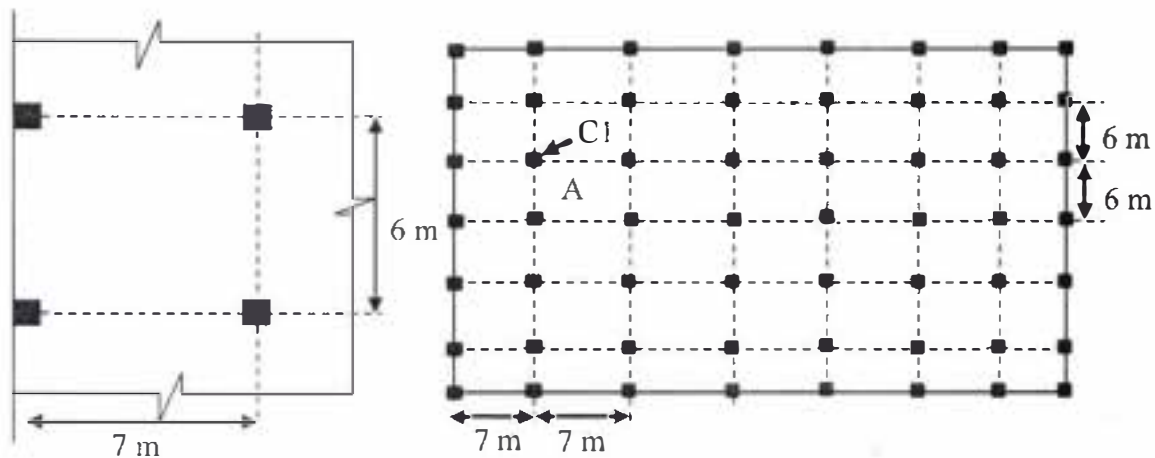

Figure 1. Floor plan of 8-storey academic building

QUESTION 3 [6 MARKS]
Design the interior **column "C1"** for ground floor of academic building (shown in **Figure 1**) mentioned in QUESTION 1 as rectangular / square size **tied column** and circular size **spiral column** and show the reinforcement details. Design the column only for gravity (vertical) load without considering bending moments of column. The floor to floor height of the building is 3.5 m and the size of column would be based on design of column. Assume the required data to design.   [6 marks]

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

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

1. A clarifier is designed to have a surface overflow rate of 25.0 m^3/m^2.d. Compute **[10]** the overall removal efficiencies with settling analyses data, illustrated in following Table. The water temperature is 15°C, and particle specific gravity is 1.20. At 15°C the kinematic viscosity of water, μ is 0.00113kg/(s.m) and specific gravity of water ρ is 0.9990.

Particle size mm	Weight fraction <size. %
0.10	13
0.08	25
0.07	45
0.06	77
0.05	84
0.04	95
0.02	99
0.01	100

2. (a) Show schematic diagrams of disease transmission routes for: (a) the Diarrhea- **[5]** causing infections and enteric fevers; and (b) Worm Infection with animal host.
    (b) What are the main differences between VIP and ROEC latrines? **[5]**

3. (a) Calculate the velocity through a rack, when approach velocity is 0.50 m/s, flow **[5]** open area through clean bar rack is 0.25 m^2 and headloss across the rack is 35 mm. Also estimate the headloss, when 50% area of the flow area is blocked off due to coarse solids accumulation.
    (b) Explain operational mechanisms of DAF systems with recycle-flow mode. **[5]**

4. (a) Write short notes on: (i) manholes; and (ii) inverted siphons. **[5]**
    (b) With necessary diagram briefly describe working principles of small bore sewer **[5]** (SBS) system.

University of Asia pacific
Department of Civil Engineering
Midterm Examination
Fall 2018
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) The following data were observed for 7 vehicles traversing 2000 m segment of a highway.   6
Calculate the Time Mean Speed and the Space Mean Speed of the vehicles.

Vehicle	Distance (m)	Travel time (sec)
1	2000	42
2	2000	39
3	2000	44
4	2000	36
5	2000	40
6	2000	34
7	2000	32

   b) Write short note on any **two**:
     I.   PIEV time
     II.   Saturation flow   4
     III.   Parallel parking

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	9	8
Lost time	3	4

		Approaches		
	North	South	East	West
Flow, veh/hr	820	870	900	750
Saturation flow veh/hr	2310	2760	2680	2230

     Draw the phase diagram.
   b) Categorize traffic signs according to function.   3

3. a) Summarize the needs for traffic surveys.   2
   b) Compile the traffic data collection techniques.   2
   c) Calculate the AADT for the following data. Data was collected on Wednesday in   6
     November. MEF for November is 1.186. Necessary Table is provided in the next page.

Hour	Volume
6:00-7:00 a.m.	1100
7:00-8:00 a.m.	1250
8:00-9:00 a.m.	1420
9:00-10:00 a.m.	1380
10:00-11:00 a.m.	1005

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	