

Set-A

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination, Spring 2022
Program: Bachelor of Civil Engineering

Course Title: Principles of Management Course Code: IMG 301
Time: 1 hour

Credit(s): 2
Full Marks: 20

Instructions:

- 1.** Answer any two questions from Section-A and any three questions from Section-B
- 2.** Marks distribution for Section A: $7 \times 2 = 14$ and Section B: $3 \times 2 = 6$
- 3.** Number the questions properly.

Section-A Broad questions (Answer any two questions)

1. Discuss the importance of studying Management for Engineers.
2. Differentiate between the Control and Leading Function of a manager with an example.
3. Describe the components of external environments and discuss their impact on organizations.
4. Identify the major barriers to goal setting and planning and how organizations can overcome those barriers.
5. Discuss how tactical plans are developed and executed.

Section-B Brief questions (Answer any three)

1. Management is Science. Give logics
2. Fred Luthans Theory
3. Conceptual Vs Diagnostic Skills
4. Contingency plan
5. SMART goals

University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Spring 2022
Program: B.Sc. Engineering (Civil)

Course Title: Structural Engineering II
 Time: 1 hour

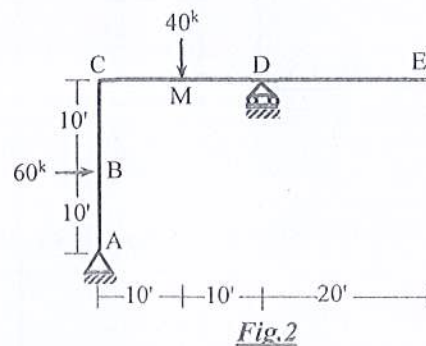
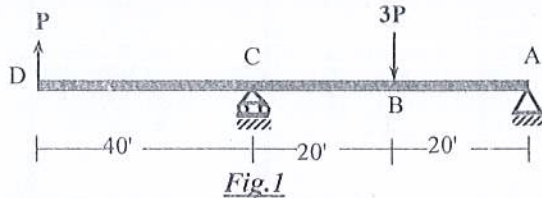
Credit Hour : 3.0

Course Code: CE 313
 Full Marks: 40

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

Part-A

1. Calculate the vertical deflection at **B** of the Beam in **Fig.1** [$P=(\text{last digit of Roll} + 50)^k$, $EI=\text{constant}$]. [08]
2. Calculate the horizontal deflection at **E** or **C** of the frame in **Fig.2** [$EI=\text{constant}$]. [12]



Part-B

3. Column axial forces (kN) of a two-storied frame have been shown in **Fig.3**. Apply the Cantilever Method to calculate; (i) applied loads P_1 and P_2 , (ii) beam shear forces, and bending moments. [13]
4. Calculate member forces of the statically indeterminate truss shown in **Fig.4**, assuming, diagonal members take equal share of the sectional shear force. [07]

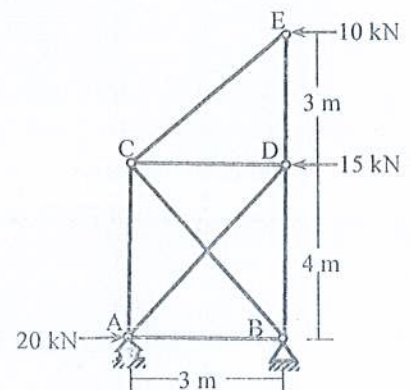
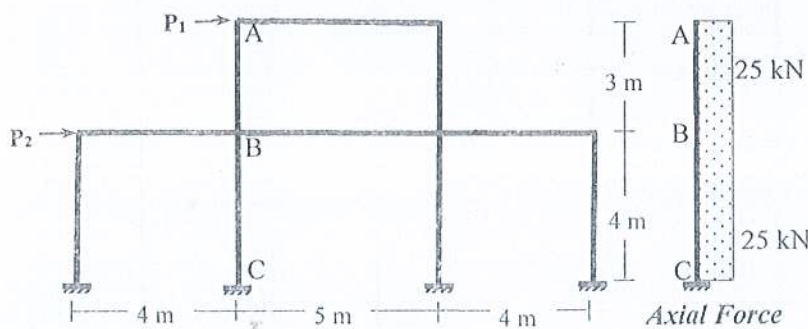
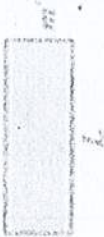



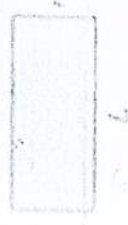






Table for Evaluating $\int_0^L m m' dx$

$\int_0^L m m' dx$				
	$m m' L$	$\frac{1}{2} m m' L$	$\frac{1}{2} m(m_1 + m_2)L$	$\frac{2}{3} m m' L$
	$\frac{1}{2} m m' L$	$\frac{1}{3} m m' L$	$\frac{1}{6} m(m_1 + 2m_2)L$	$\frac{5}{12} m m' L$
	$\frac{1}{2} m'(m_1 + m_2)L$	$\frac{1}{6} m'(m_2 + 2m_1)L$	$\frac{1}{6} [m_1(2m_1 + m_2) + m_2(m_1 + 2m_2)]L$	$\frac{1}{12} [m'(5m_1 + 5m_2)]L$
	$\frac{1}{2} m m' L$	$\frac{1}{6} m m' (L + a)$	$\frac{1}{6} m[m_1(L + b) + m_2(L + a)]$	$\frac{1}{12} m m' \left(3 + \frac{3a}{L} + \frac{a^2}{L^2} \right) L$
	$\frac{1}{2} m m' L$	$\frac{1}{6} m m' L$	$\frac{1}{6} m(2m_1 + m_2)L$	$\frac{1}{3} m m' L$

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2022
Program: BSc in Civil Engineering

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

Credit Hour: 3.00

Course Code: CE 317
 Full Marks: 60

QUESTION 1 [30 MARKS]

A panel of beam supported reinforced concrete slab of an academic building as shown in **Figure 1** is to be designed. The slab is subjected to 3 kN/m^2 dead load due to random wall (without self-weight of slab and finishes) and 2.4 kN/m^2 live load. Thickness of the slab could be assumed as 175 mm . Apply the concept to design the short span of the slab for negative (supports) moments. The negative moment's co-efficient (short span) at support of continuous edge is 0.055 . [30 Marks]

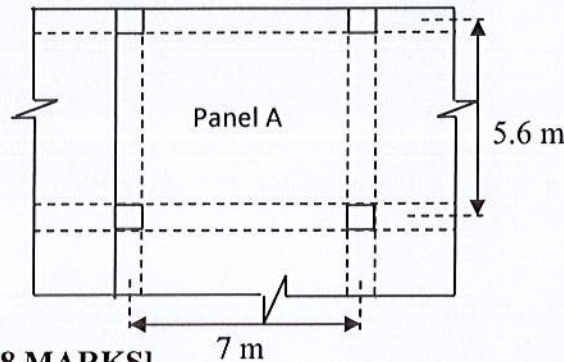


Figure 1. Side slab panel

QUESTION 2 [18 MARKS]

The floor slab layout plan of a 10-storeyed warehouse (live load 6 kN/m^2) is shown in **Figure 2**. The floor will be constructed with **flat slab system** and it carries 3 kN/m^2 dead load due to random wall and floor finishes. **Design** the column **C1** (ground floor) as tie and spiral for gravity load only. [18 Marks]

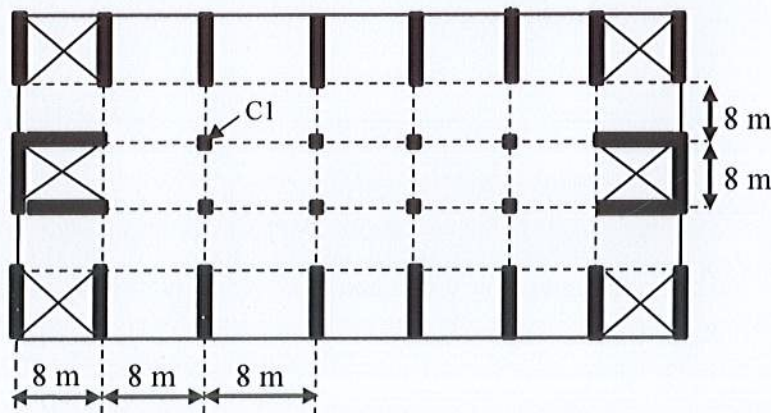


Figure 2. Structural model (floor plan) of high-rise building

QUESTION 3 [12 MARKS]

As per the requirement of Architect, the maximum slab (flat) thickness of the structure (shown in **Question 2**) would be 200 mm . **Propose** a design solution to provide the thickness of the slab as 200 mm , **justify** your proposal in accordance to the requirements of code of practices (BNBC 2020 or ACI 318). [12 Marks]

University of Asia Pacific
Department of Civil Engineering
Midterm Examination, Spring 2022
Program: B.Sc. Engineering (Civil)

Course Title: Environmental Engineering II

Course Code: CE 333

Time: 1 hour

Credit hour: 3

Full Marks: 40

There are Four (4) questions. Answer all the questions.

1. How wastewater turbulence influences pollutant removal performances of septic tank systems? [10]
2. How is human waste converted to compost in Arborloo eco sanitation technologies? [10]
3. Design a coarse screen for wastewater treatment, employing the following information. Assume any missing data. [10]
 - Peak flow through the rack, $Q_p=0.6 \text{ m}^3/\text{s}$
 - Velocity through rack during peak flow, $v= 0.4 \text{ m/s}$
 - Angle of the rack to the horizontal, $\theta=60^\circ$
 - Upstream depth of wastewater, $d=2.0 \text{ m}$
4. Explain the operational mechanisms of the four zones in a rectangular sedimentation tank. [10]

University of Asia Pacific
Department of Civil Engineering
Midterm Examination .SPRING 2022
Program: B.Sc. Engineering (Civil)

Course Title: Transportation Engineering I: Transport and Traffic design

Course Code: CE351

Time: 1 hour

Credit Hour: 3.0

Full Marks: 70

Assume Any reasonable values

Question 1

Explain the importance to know the characteristics of drivers, vehicles, pedestrian and the road for safe and efficient highway transportation. 15

Question 2

While driving you have noticed an accident has occurred, explain your reaction process 15

Question 3

In question 2 your reaction time is 2.5 second, you were driving at 60mi/hr. Calculate the distance the vehicle would move before you could activate the brakes. 5

Question 4

a) The accompanying data show spot speeds collected at a section of highway located in a residential area. Using the student's t test, determine whether there was a statistically significant difference in the average speeds at the 95% confidence level. 10

<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
40	23	38	25
35	33	35	21
38	25	30	35
37	36	30	30
33	37	38	33
30	34	39	21
28	23	35	28
35	28	36	23
35	24	34	24
40	31	33	27
33	24	31	20
35	20	36	20
36	21	35	30
36	28	33	32
40	35	39	33

b) Using the data furnished in Problem 4(a), draw the histogram frequency distribution and cumulative percentage distribution for each set of data and evaluate (a) average speed, (b) 85th-percentile speed, (c) 15th-percentile speed, (d) mode, (e) median, and (f) pace. 25

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2022
Program: B.Sc. Engineering (Civil)

Course Title: Engineering Hydrology
Time: 1 hour

Credit Hour: 3.0

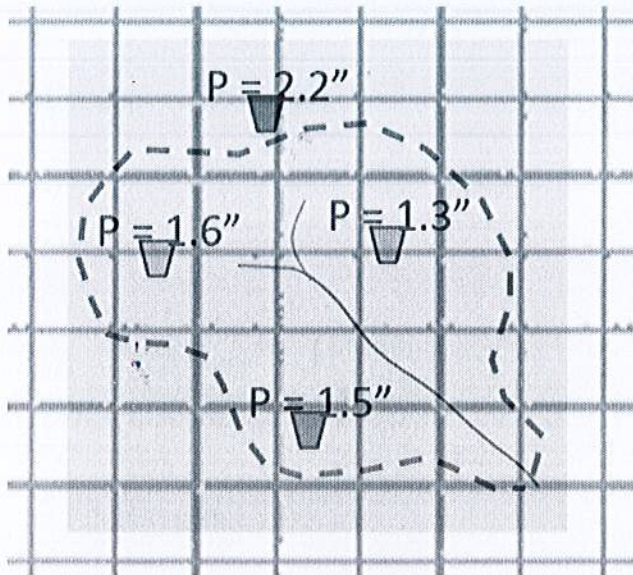
Course Code: CE 363
Full Marks: 60

(Answer all the questions. All questions are of equal value. Figures in the right margin indicate marks)

1. a) Define watershed. What are its components? State the factors on which watershed behavior varies? [5]
- b) What are the methods of measuring precipitation? Which method is more reliable and why? [5]
- c) Classify and briefly describe rain gauges. [5]
2. A 55 acre watershed has a total runoff depth of 0.676 in. What is the phi-index for this watershed? Do the first two trial. [15]

Time (hr)	Precipitation (in/hr)
1	0.1
2	0.22
3	0.87
4	1.3
5	1.3
6	1.6
7	0.8
8	0.6
9	0.4
10	0.2

3. Calculate the average precipitation using Thiessen polygon method for figure on the other page. [15]



4. a) The daily streamflow and baseflow data at a site having a drainage area of 6450 km² are given in Table below. The runoff depth was 40 mm. The hydrograph was produced by a storm of 4-hour duration considered to have uniform intensity over the basin. Determine the unit hydrograph of 4-hour duration. [5]

Time (Hour)	Total Flow (m ³ /s)	Base flow (m ³ /s)
0	0	0
1	170	168
2	220	168
3	510	162
4	1135	161
5	870	160
6	660	157
7	500	155
8	380	150
9	300	148
10	220	147
11	180	145
12	160	141
13	140	140

b) Determine 6 hr unit hydrograph from 2 hr unit hydrograph by lagging method. [10]

Time (Hour)	Total Flow (m ³ /s)
0	0
1	5
2	10
3	15
4	22
5	32
6	21
7	15
8	10
9	5
10	0