University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Spring 2018

Course Code: CE 313 | Time: 1 (one) Hour
Course Title: Structural Engineering II | Full Marks:(4+8+8)=20

QUESTION 1 [4 MARKS]

a) State fundamental assumptions to analyze statically indeterminate truss and portal mill using approximate method. [2 marks]

b) Formulate the equation to calculate deflection of truss using virtual work method. [2 marks]

QUESTION 2 [8 MARKS]

A frame of 7 storied reinforced concrete building is shown in **Fig. 1**. All beams of the structure are carrying 40 kN/m uniformly distributed (vertical) load. The lateral load of the structure is shown in **Fig. 1**. **Analyze** the structure to get **bending moment** for;

a) ground floor roof beam for vertical load only using approximate method. [4 marks]

b) ground floor column for lateral load only using portal frame method. [4 marks]

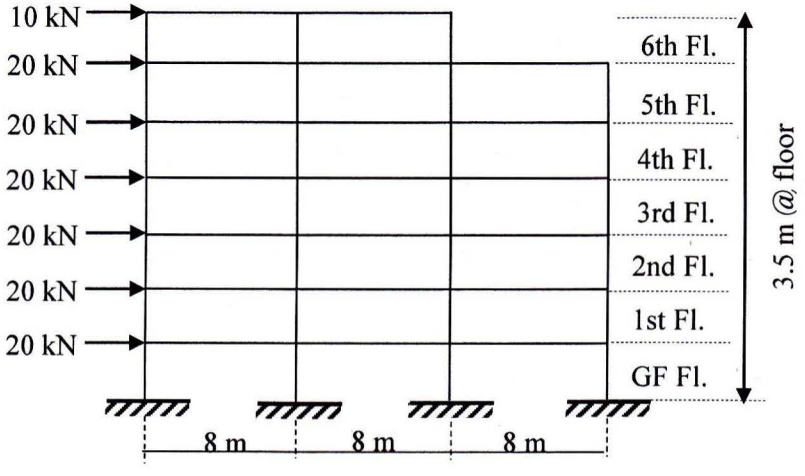


Fig. 1: Frame of residential building

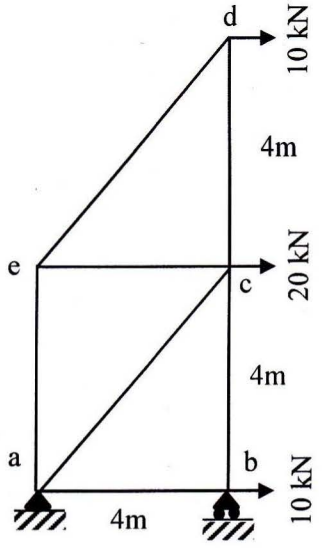


Fig.2: Truss of Bill Board

QUESTION 3 [8 MARKS]

A bill board steel truss structure has joint forces due to wind as shown in **Fig. 2**. The maximum allowable deflection of the truss (at joint d) is 25 mm. **Analyze the truss** using virtual work method to get required cross sectional area of members [Given: Modulus of elasticity of steel is 200 GPa]. [8 marks]

University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Spring 2018

Course Code: CE 317 Time: 1 (one) Hour
Course Title: Design of Concrete Structures II Full Marks:(4+8+8)=20

QUESTION 1 [4 MARKS]

a. Mention the conditions necessary for using the Direct Design Method of flat slab analysis. Define the factors α, β_t and explain their effect on the structural analysis of flat slabs. [2 marks]

b. State the procedures and criteria to check punching shear of footings. [2 marks]

QUESTION 2 [8 MARKS]

Use USD to design Panel A in the beam-supported two-way slab system shown in **Fig.1,** if Floor Finish = 30 psf, Random wall = 50 psf, Live load = 60 psf. Moment co-efficient data has been provided in exam [Given, fc' = 4 ksi and fy = 60 ksi]. [8 marks]

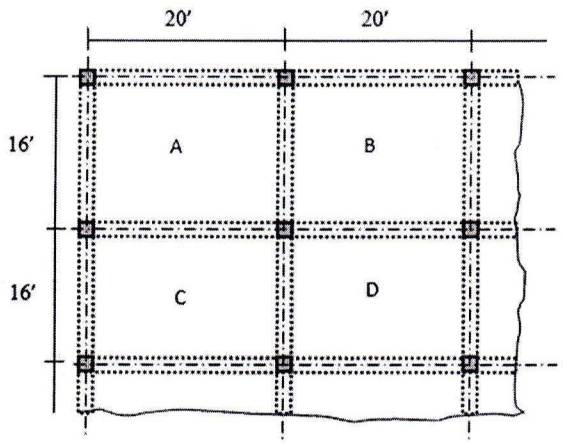


Fig.1: Slab layout plan

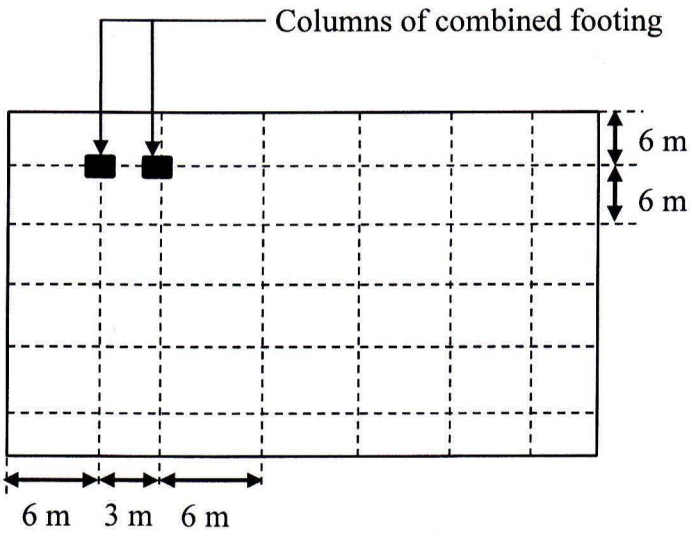


Fig.2: Columns at foundation level

QUESTION 3 [8 MARKS]

Two interior columns (as shown in **Fig.2)** of 6-storeyed car park are supported by a combined footing. Each column transfers 1235 kN dead load and 405 kN live load to the footing. The bearing capacity of soil is 150 kN/m^2. **Design** the combined footing for flexural reinforcements only. Assume the effective depth of the footing is 800 mm and column size is 400 mm x 400 mm [Given, f_c' = 30 N/mm^2 and f_y = 410 N/mm^2]. [8 marks]

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2018
Program: B.Sc. Engineering (Civil)

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

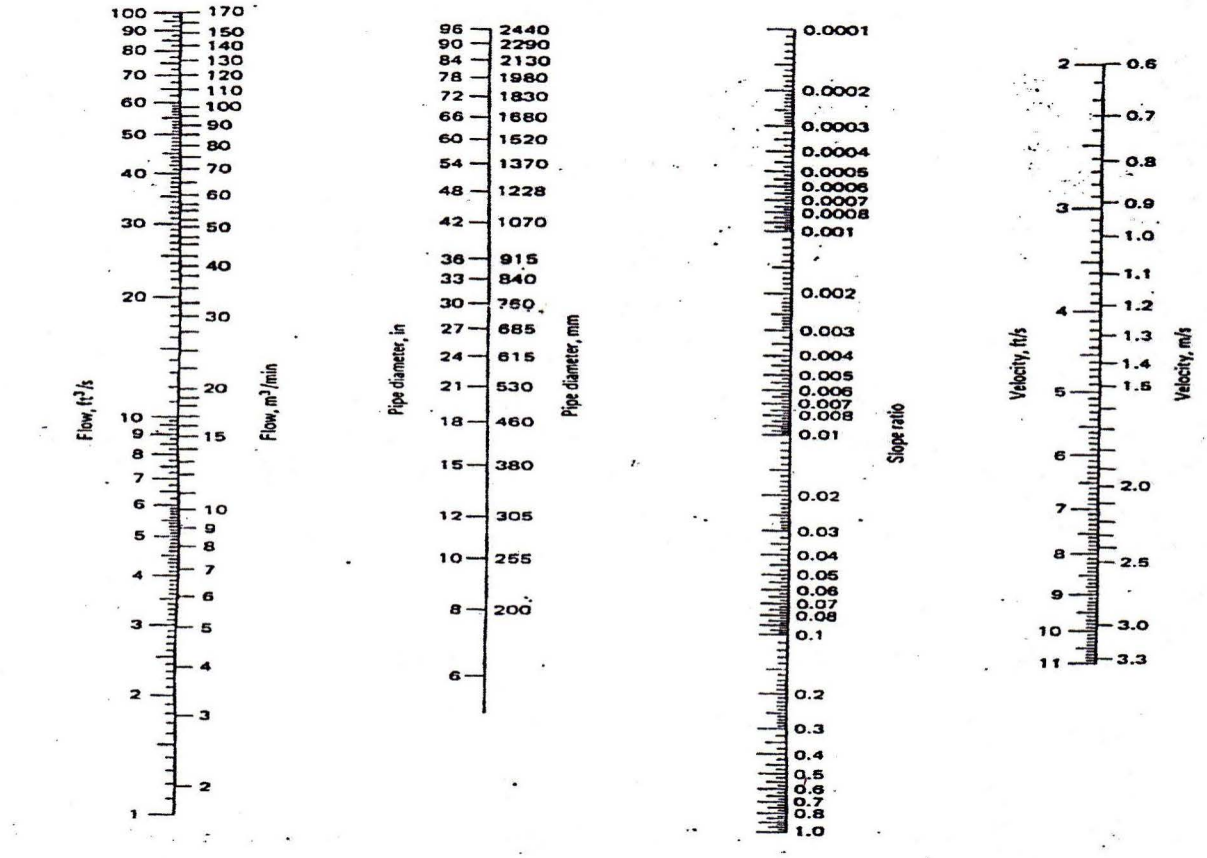
There are Four (4) questions. Answer any Three (3).

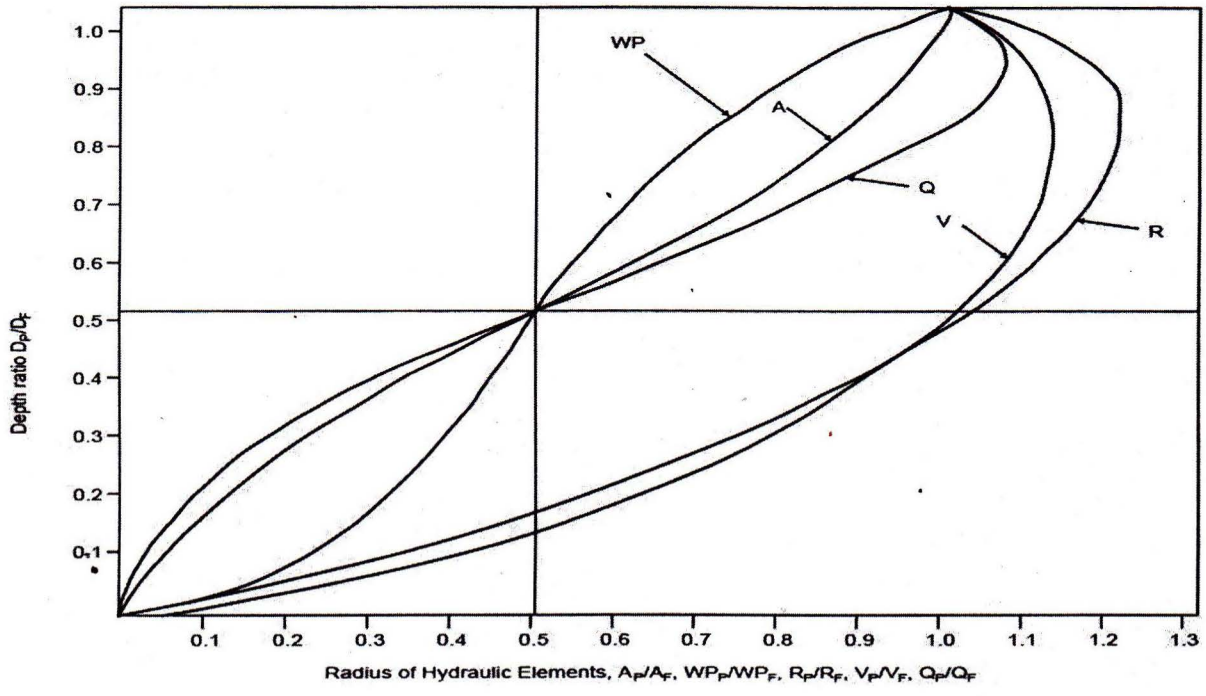
1. (a) With schematic diagrams show the transmission routes of the following water and waste related diseases: (i) Diarrhea causing infections and enteric fevers; and (ii) Worm Infection with no intermediate host. **[3]**
   (b) Explain the challenges encountered during the implementation of sanitation technologies. **[3]**
   (c) With a neat engineering diagram explain the principles of a VIP latrine. **[4]**

2. (a) Explain major sewer types often found in a sewer network. **[3]**
   (b) Describe different approaches of sewer network maintenance. **[3]**
   (c) A 840 mm (33 inches) sewer is laid in a slope of 0.003; what will be the depth of flow and velocity when the flow is 8.5 m^3/ min? Use the graphs available in Page 2. **[4]**

3. (a) Why equalization tank is necessary for industrial wastewater treatment plants? **[3]**
   (b) Discuss the main principles of Fossa Alterna latrines. **[3]**
   (c) Calculate the velocity through a rack, when approach velocity is 0.80 m/s, flow open area through clean bar rack is 0.12 m^2 and headloss across the rack is 40 mm. Also estimate the headloss, when 50% area of the flow area is blocked off due to coarse solids accumulation. **[4]**

4. (a) What is the importance of comminuting process in wastewater treatment plants? **[3]**
   (b) Why inverted siphons are used in sewer networks? **[3]**
   (c) Derive Stokes equation for determining settling velocity of a discrete particle in water column. **[4]**





Graphs for Question 2(c).

University of Asia pacific
Department of Civil Engineering
Midterm Examination
Spring 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. Spot speed data was collected during conducting speed studies at certain section of an urban primary road. Determine: 10

   a) Safe speed
   b) Design speed
   c) Average speed and
   d) Median speed

Speed Range (mph)	No. of Vehicle
20 - 24	0
25 - 29	52
30 - 34	61
35 - 39	150
40 - 44	95
45 - 49	55
50 - 54	40
55 - 59	23
60 - 64	15
65 - 69	6
70 - 74	2
75 - 79	1

2. a) Compare on-street and off-street method of parking. 6
   b) Arrange the data collection techniques for traffic volume study. 3
   c) Explain VMS. 1

3. 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	6
Lost time	2	3

	Approaches			
	North	South	East	West
Flow, veh/hr	620	790	875	710
Saturation flow veh/hr	1910	2380	2700	2130

   Draw the phase diagram.

   b) Summarize the crossing behaviors of pedestrians in Dhaka city. 2

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2018

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. a. Explain 4
   i) Dalton's law
   ii) Water budget method & estimate evaporation rate.
   b. Why pan coefficient is introduced to calculate evaporation using evaporation pan? 3
   c. Explain the variation of actual evapotranspiration (AET) with respect to available moisture for clay and sandy soil. 3

2. There were seven rain gauge stations namely A, B, C, D, E, F, G where station D was inoperative for a month. At that month rainfall recorded in the other six stations were 3.9, 6.2, 9.9, 5.5, 9.0, 8.3 cm respectively. If the average annual rainfalls for the stations are 125, 145.6, 165.3, 118.9, 129.9, 156.1 and 110 cm. Estimate the missing rainfall data at station D. 10

3. Using Horton's equation $f_{ct} = f_c + (f_0 - f_c)\, e^{-kt}$, find the infiltration rate at 6^{th} hour given an initial infiltration capacity f_0 of 3.9 in./hr and a time constant k of 0.29 hr-I, ultimate infiltration capacity is 0.65 in./hr. 7

4. Broadly discuss the factors on which rate of evaporation is influenced. 5

5. How to find air pressure at any height in a saturated air column. 3

6. 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

7. For a drainage basin of 50 km diameter, a catchment with five rain gauge stations (see page 2) are recorded as follows: 15

Raingauge stations	A	B	C	D	E
Annual rainfall (cm)	80	55	92	67	45

Estimate the average depth of precipitation over the catchment, using Thiessen Polygon Method.

University of Asia Pacific
Department of Civil Engineering
Mid-Semester Examination Spring-2018
Program: B. Sc Engineering (3rd Year/2nd Semester)

Course Title: Principles of Management Course No. IMG 301 Credit: 2.00
Time: 1.00 Hours. Full Marks: 60

There are **Four** Questions. Answer any **Three**. All questions are of equal value/Figures in the right margin indicate marks.

1. (a) "Developing all workers to fullest extent possible for their own and their company's highest prosperity." Who included the stated principle in scientific approach to management? 1.5
   (b) "*Esprit de corps.* This is the principle that "in union there is strength," as well as an extension of the principle of unity of command, emphasizing the need for teamwork and the importance of communication in obtaining it." Who identified the stated management principle? 1.5
   (b) Draw a figure with three different kinds of skills showing the use at different levels of administration. 6
   (c) What gave Taylor ample opportunity to know the problems and attitudes of workers and to see the great possibilities for improving the quality of management? 3
   (d) What is Hawthorne effect? 8

2. (a) Draw a figure of an organization and its external environment. 3
   (b) What are the first-wave, second-wave, and third-wave economies? 3
   (c) What rethinking does the knowledge age economy require regarding organizational structure? 3
   (d) What is ecology? What may be the causes of land, water, and air pollution? What are manager's responsibilities? 8
   (e) Write an example of the social responsiveness of business. 3

3. (a) Write about different types of multinational corporations. 12
   (b) Write four advantages of multinational corporations. 8

4. Describe different types of plans in the perspective of an organization that you know most. 20