4-2

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Fall 2018
Program: B. Sc. Engineering (Civil)

Course Title: Structural Engineering VI (Design of Steel Structures) Course Code: CE 417
Time: 1 hour Full Marks: 3×10=30

Answer all 03 (Three) questions
[Assume Reasonable Values for Any Missing Data]

1. (a) Define limit state. List the classification of limit states with necessary examples. **(3)**

   (b) From the following table, **select the lightest channel section** used as a tension member (which is 16 feet long), to resist a service dead load of 50 kips and a service live load 1 50 kips. Use A36 steel (F_u= 58 ksi). The tension member shall be connected to a gusset plate using 10 nos. 7/8- in dia. bolts with standard holes in two rows as shown in **Figure 1**. **Neglect block shear failure mode** and follow **AISC-LRFD** principle. **(7)**

   Assume U=0.7 and check preferable L/r ≤ 250.

Shape	A_g (in^2)	r_x (in)	r_y (in)	Flange thickness, t_f (in)	Web thickness, t_w (in)
C15×50	14.7	5.24	0.865	0.650	0.716
C15×40	11.8	5.43	0.883	0.650	0.520
C15×33.9	10.0	5.61	0.901	0.650	0.400
C12×30	8.81	4.29	0.762	0.501	0.510

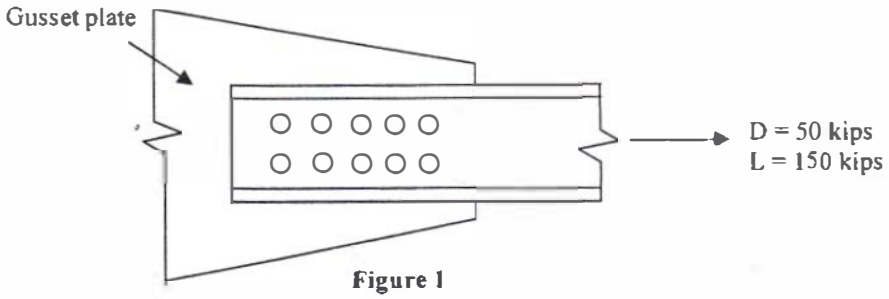


Figure 1

2. (a) Draw the typical steel sections that can be used as tension members. **(3)**

   (b) Investigate the design tension capacity of the plate PL 6"×1/2" attached to a gusset plate with four bolts as shown in **Figure 2** on the following page. Consider **block shear mode only** and assume uniform tension stress. The material is A36 (F_u= 58 ksi) and bolts are 3/4- in dia. with standard holes. Use both **AISC-ASD and AISC-LRFD** principles. **(7)**

   Block shear capacity: Nominal strength

   $R_n = 0.6F_yA_{gv} + U_{bs}F_uA_{nt}$

   $R_n = 0.6F_uA_{nv} + U_{bs}F_uA_{nt}$

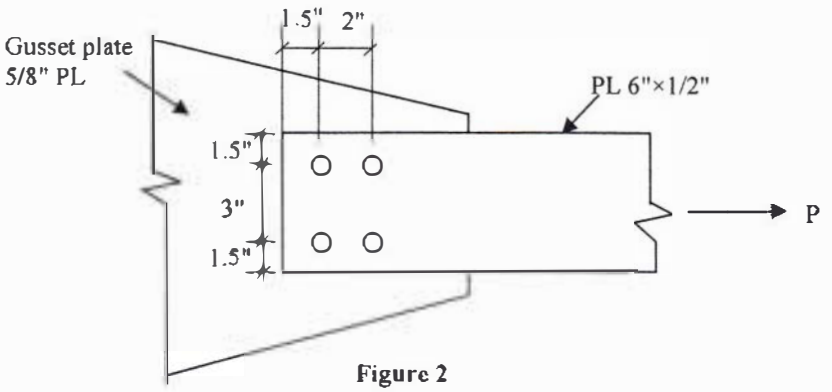


Figure 2

3. (a) Compare between rivets and bolts as structural fasteners. Which one is more advantageous? Justify your opinion. **(3)**

(b) Determine the design load P for the bolted connection shown in **Figure 2**. Consider **bearing and shear strength of bolts** only. All bolts are 3/4-in dia. A325 (F_y=90 ksi, F_u= 120 ksi) in standard holes and plates are made of A36 steel (F_u= 58 ksi). Assume that the **strength of gusset plate is sufficient** and hence does not govern the design. Follow AISC-LRFD principle. **(7)**

Nominal strength, $R_n = F_{nv} m A_b$ (shear)

$R_n = 1.2 L_c t F_u \leq 2.4 F_u dt$ (bearing)

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2018
Program: B. Sc. Engineering (Civil)

Course Title: Environmental Engineering IV | Course Code: CE 433
Time- 1 hour | Full marks: 50

There are **THREE** questions. Answer all the questions (*20+15+15= 50*).
[Assume reasonable data if any]

1. (a) What are the principal sources of "Oxygen Demanding Wastes", "Nutrients", "Toxic Metals" and "Heat" (both point and non-point sources)? (6)

(b) Enlist the properties of "Persistent Organic Pollutants". (5)

OR

If there is a sudden outbreak of a disease with gastrointestinal disturbance in an area, identify the water quality problem and the water quality variables that are to be checked. Which uses of this water should be prevented?

(c) 20 mL wastewater is mixed with dilution water to fill 300 mL BOD bottle. The drop of DO after 5 days is 4.8 mg/L. For a BOD bottle filled with only dilution water, DO drop is 1.2 mg/L after 5 days. Again, the total concentration of organic and ammonia nitrogen in wastewater is 4.0 mg/L. If $k = 0.21\ d^{-1}$ at 20°C, estimate the ultimate strength of the sample. (9)

2. (a) What the key assumptions of a simple "Dissolved Oxygen Model"? Provide a detailed schematic of a "Streeter Phelps dissolved oxygen sag curve". (7)

OR

Discuss the thermal stratification and its impact on Dissolved Oxygen using schematic.

(c) Consider a lake with $200 \times 10^6\ m^2$ of surface area for which the only source of phosphorus is the effluent from a wastewater treatment plant. The effluent flow rate is $0.45\ m^3/s$ and its phosphorus concentration is 10.0 mg/L (= 10.0 g/m^3). The lake is also fed by a stream having $30\ m^3/s$ of flow with no phosphorus. If the phosphorus settling rate is estimated to be 10 m/year, What level of phosphorus removal at the treatment plant would be required to keep the average lake concentration below 0.010 mg/L? (8)

3. (a) Define "waste assimilation capacity" of streams. What are the sources of groundwater pollution? How can we protect groundwater? (8)

OR

Discuss how effluent flow can be reduced and upstream flow can be increased in order to control the water pollution. List the considerations to select particular control measures?

(b) What is "Green house effect" and which are the "greenhouse gases"? List down the human (7)

activities that directly contribute towards climate change.

OR

Discuss briefly in your own words the possible effects of a warmer world on "Agriculture", "Biodiversity" and "human population".

Given Formula:

$BOD_m \cdot V_m = BOD_w \cdot V_w + BOD_d \cdot V_d$

$BOD_t = L_0 (1 - e^{-kt})$

$$P = \frac{S}{Q + \upsilon_s \cdot A}$$

$k_T = k_{20} \theta^{T-20}$, $\theta = 1.047$

Ultimate Strength = Ultimate CBOD + Ultimate NBOD

Ultimate NBOD = 4.57 * TKN ~ 4.6* TKN

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

Course Code: CE 415 | Time: 1 (one) Hour
Course Title: Structural Engineering V (Prestressed Concrete) | Full Marks:(4+8+8)=20

Answer all QUESTIONS
Use E_c 30,000 N/mm^2, E_s 200,000 N/mm^2 and f_c' 40 N/mm^2

QUESTION 1 [4 MARKS]

a. Pre-stressing system is economical in terms of effective usage of concrete, justify the statement. [2 marks]

b. Derive the equation ($ES = \frac{nF_0}{A_c}$) to calculate loss of pre-stressing due to elastic shortening. [2 marks]

QUESTION 2 [8 MARKS]

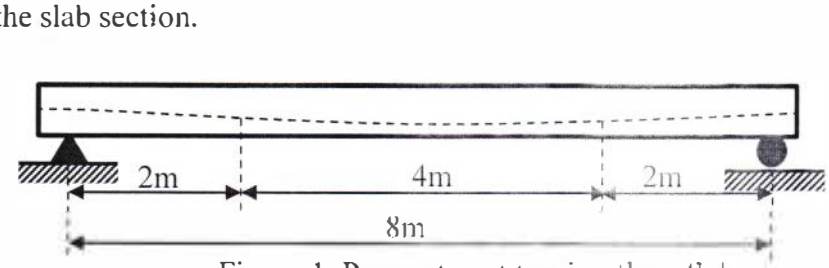
If the required number of post-tension tendon of the slab as shown in **Figure 1** is 13, cross sectional area of each tendon is 195 mm^2 and allowable tensile stress of tendon is 1100 N/mm^2, analyze the pre-stressing system to calculate.

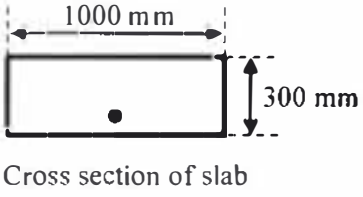
a. total loss of pre-stress due to elastic shortening. [3 marks]

b. loss of pre-stress of single tendon due to friction. Radius of curvature (R) of tendon is 50 m, length of curvature is 4 m, μ is 0.4 and k is 0.0026 [$F_2 = F_1 e^{-\mu\alpha - KL}$]. [5 marks]

QUESTION 3 [8 MARKS]

A simply supported precast post-tension pre-stressed concrete floor slab of office building (shown in **Figure 1**) is carrying 2.4 kN/m live load and 8 kN/m dead load due to random wall and finishes (excluding slab self weight). The width and thickness of slab is 1000 mm and 300 mm respectively. A curved tendon is provided at an eccentricity of 100 mm below the centroid of the slab section.





Cross section of slab

Figure 1. Pre-cast post tension floor flab

a. Analyze the slab to obtain the minimum pre-stressing force (no tension at bottom of mid span of the slab) at service loading condition and check stresses of pre-stressing tendon and concrete at mid span under pre-stressing force at transfer. [5 marks]

b. If the usage of floor changes to store of garment with live load of 7 kN/m, justify whether the slab would sustain the new load without showing any tensile crack at mid-span of the slab under the same minimum pre-stressing force obtained in QUESTION 3-a [modulus of rupture $f_r = 0.62\sqrt{f_c'}$ in psi, f_c' is in psi]. [3 marks]

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2018
Program: B. Sc. Engineering (Civil)

Course Title: Environmental Engineering III — Course Code: CE 431
Time- 1 hour — Full marks: 50

There are **THREE** questions. Answer all the questions (*20+15+15= 50*).
[Assume reasonable data if any]

I. (a) Provide certain strategies to implement "source reduction" and "on-site processing". (6)

(b) A summary table for the chemical components of a solid waste sample is given below. Determine approximate chemical formulas with and without sulfur. Also calculate the energy content of the waste using Dulong's formula. (14)

Component	Moisture	Carbon	Hydrogen	Oxygen	Nitrogen	Sulfur	Ash
Mass (kg)	25.60	50.20	5.56	35.00	0.45	0.26	7.14
Molar Mass (kg/mol)	-	12.00	1.00	16.00	14.00	32.00	-

2. (a) Why is it important to know the composition of solid waste? (4)

OR

How can you forecast future waste quantities?

(b) Compare the solid waste collection systems with respect to the parameters "level of service" and "collection cost". (4)

(c) Solid wastes from a newly build up area is to be collected in large containers (drop boxes to be replaced). Based on traffic studies in similar type of areas, it is estimated that the average time to drive from the garage to the first container and from the last container to the garage each day will be 25 minutes and 40 minutes respectively. If the average time required to drive between containers is 5 minutes and the one way distance to the disposal site is 20 km (speed limit 72 km/h), determine the number of containers that can be emptied per day, based on 8-hr working day. Assume Off-route factor 0.15 for this case. (7)

3. (a) Show the difference between the "direct haul" and "transfer station" systems of waste collection in a schematic. Also show qualitative cost curves for the two options demonstrating the break-even point. (5)

OR

Enlist the parameters that are included in the economic analysis of solid waste collection.

(b) Using the data for total energy values given in the table, estimate the energy of the remaining solid wastes if 10% food waste and 75% of plastics is recovered by the homeowner. Estimate the % (decrease or increase) change in total energy per unit weight of waste after recovery based on 100 kg of waste. (10)

Constituent	Food waste	Paper	Newsprint	Card board	rubber	Plastics
Weight (%)	32.5	35	12	6	5.5	9
Total Energy, (kJ)	628,615	527,520	88,305	61,460	20.688	78,573

Given Formula:

Energy Content (KJ/Kg) = 338.2C+1430 (H-O/8) + 95.4S

Haul Container System	Stationary Container System
$T_{hcs} = (PT_{hcs} + q + m + nx)$ $PT_{hcs} = pc + uc + dbc$ $Md = \{(1-W)L - (t_1 + t_2)\} / Thcs$	$T_{scs} = (PT_{scs} + q + m + nx)$ $PT_{scs} = C_t uc + (S-t)(dbc)$ $C_t = \frac{V_c z}{V_c f}$ $M_{dc} = \frac{V_s}{V_c z}$ $L = \frac{(t_1 + t_2) + M_{dc}(PT_{scs} + q + m + nx)}{1 - W}$

Table 1: Typical values for haul constant coefficients m and n

Type of haul	Speed limit km/h	m h/trip	n h/km
Communal	88	0.016	0.011
Block	72	0.032	0.014
Kerbside	56	0.034	0.018
Door-to-door	40	0.05	0.025

Table 2: Typical data for computing equipment and labour requirements for hauled- and stationary-container collection

Collection			Pick up loaded container and deposit empty container, h/trip	Empty contents of loaded container, h/container	At-site time q, h/trip
Vehicle	Loading method	Compaction ratio, z			
Hauled container (Tilt-frame)	Mechanical	2.0-4.0	0.5		0.129
Stationary container (Compactor)	Mechanical	2.0-4.0		0.05	0.15

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

Course Title: Environmental Engineering - VII | Course Code: CE 439
Time: 1 hour | Full Marks: 40

There are Three (3) questions. Answer any Two (2)

1. (a) Define Environmental Impact Assessment (EIA) given by United Nations Environmental Program (UNEP, 1978) and by Larry W. Canter (1996). What commonalities and differences can you identify from these two definitions? **[10]**
   (b) The fundamental objective of EIA is to 'Safeguard the Environment'. How this objective can be achieved through EIA? What environmental aspects/effects are addressed by EIA? **[10]**

2. (a) The Environment Conservation Act (ECA) 1995 constitutes the legal basis for undertaking EIA for any industry or development project in Bangladesh. Elaborate this statement and explain the processes/steps of obtaining 'Environmental Clearance Certificate (ECC)' from the Director General of the Department of Environment, for any 'RED' category project. **[10]**
   (b) Give at least five examples of renewable and non-renewable energy related development projects in Bangladesh and mention their categories according to the 'Environment Conservation Rules, ECR (1997). Identify at least five important environmental issues/aspects that can be impacted by a RED category energy project. **[10]**

3. (a) Prepare a neat EIA process flowchart indicating the points where public involvement is important. **[10]**
   (b) What is 'Screening' in EIA? Explain the role of IEE in conducting screening exercise. **[10]**

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2018 (Set 1)

Course #: CE 423 — Course Title: Structural Engineering IX
Full Marks: 40 (= 4 × 10) — Time: 1 hour

(Points on the right within parentheses indicate full marks)

[Given: f_c' = [3 + (Roll No. /100)], ksi, $f_y = 15f_c'$, $E_c = 1000f_c'$, E_s = 29000 ksi for all questions]

1. (i) The Sangsad Bhaban is designed for a seismic Zone Factor $Z = 0.15$. Use Esteva and Villaverde (1974) equation to calculate the maximum seismic magnitude it can survive if the earthquake originates at the Election Commission Office at depth 50 km and Epicentral distance 2 km. (5)

   (ii) Explain the special seismic detailing measures required for (a) RC column ends, (b) soft stories. (5)

2. Fig. 1 shows a person (Mr. MP) who carries the weight (= 3×10^4 kips) of the people (who are all sitting down) of his area on his two legs (each 30″-long circular column of 2.5″-dia and modulus $E_{Leg} = E_c/1.5$).

   (i) Use the BNBC 1993 to calculate the elastic base shear force, elastic deformation and shear stress at his legs (Soil S_2). (7)

   (ii) Calculate *Yield Reduction Factor* and *Ductility Factor* needed to reduce the shear stress to 20% of the value calculated in Question 2(i). (3)

   Also calculate the resulting maximum deformation.

3. Figs. 2(a), 2(b) show a person (Mr. MP) weighing 0.15 kip with two legs (each 30″-long circular column of 2.5″-dia and modulus $E_{Leg} = E_c/1.5$).

   The 3×10^5 people in his area weigh 0.10 kip each and is standing on two 30″-long legs (2″-dia circular columns).

   Determine the *First Natural Frequency* and *First Modal Shape* of the system, if

   (i) Mr. MP carries all the people [Fig. 2(a)] (5)

   (ii) The people carry Mr. MP [Fig. 2(b)]. (5)

Fig. 2(a)

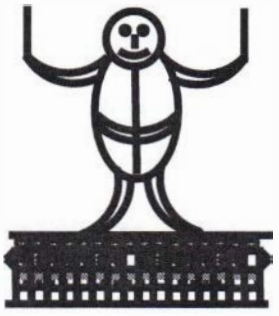


Fig. 2(b)

4. Fig. 3(a) and Fig. 3(b) show member crosssections and elevation of a 12-storied RC building Mr. MP has decided to build to mitigate the housing problem in his area.

   (i) Calculate the distributed load w_u k/ft on beams *cd~ef* of frame *abcd....yz* shown in Fig. 3(b), if

   (a) Beam *cd~yz* is to fail in flexure before shear failure (4)

   (b) Column *ac* is to satisfy the 'Weak-Beam-Strong-Column' condition. (5)

   (ii) Calculate the number of such frames required for the people of the area if their total weight is 3×10^4 kips. (1)

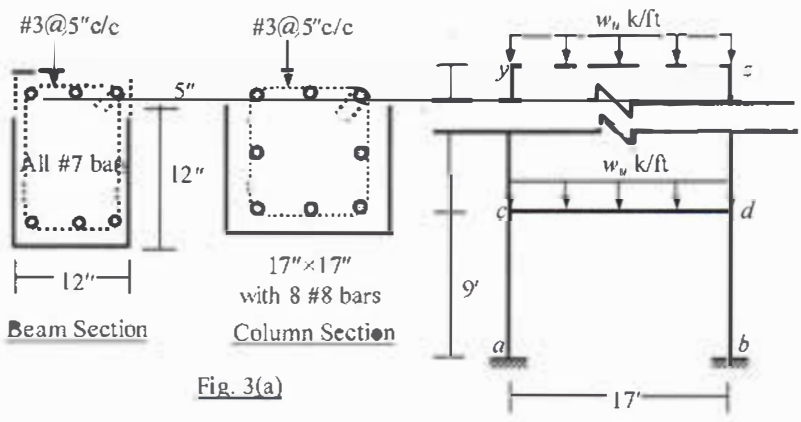


Fig. 3(a)

Fig. 3(b)

List of Useful Formulae for CE 423

* $Z = 279 \times 10^{-6}\, e^{(1.8M)}/R_e^{1.64}$ [Davenport (1972)]

  $Z = 0.0069\, e^{(1.64M)}/\{1.1\, e^{(1.1M)} + R_e^2\}$ [Milne and Davenport (1969)]

  $Z = 5.6\, e^{(0.8M)}/(R_h + 40)^2$ [Esteva and Villaverde (1974)]

* Governing equation of motion of SDOF system for ground motion $\Rightarrow m\, d^2u_r/dt^2 + c\, du_r/dt + k\, u_r = -m\, d^2u_g/dt^2$
* For SDOF system, $\omega_n = \sqrt{(k/m)}$, and $\xi = c/(2\sqrt{km})$

* For lumped 2-DOF system

$$\begin{bmatrix} m_1 & 0 \\ 0 & m_2 \end{bmatrix} \begin{Bmatrix} d^2u_1/dt^2 \\ d^2u_2/dt^2 \end{Bmatrix} + \begin{bmatrix} c_1 + c_2 & -c_2 \\ -c_2 & c_2 \end{bmatrix} \begin{Bmatrix} du_1/dt \\ du_2/dt \end{Bmatrix} + \begin{bmatrix} k_1+k_2 & -k_2 \\ -k_2 & k_2 \end{bmatrix} \begin{Bmatrix} u_1 \\ u_2 \end{Bmatrix} = \begin{Bmatrix} f_1(t) \\ f_2(t) \end{Bmatrix}$$

* Eigenvalue problem (to calculate natural frequencies and modal vector)

  $|\mathbf{K} - \omega_{nr}^2\, \mathbf{M}| = 0$ and $[\mathbf{K} - \omega_{nr}^2\, \mathbf{M}]\, \boldsymbol{\phi}_r = \mathbf{0}$

* BNBC 93

  $V_b = ZICW/R$, where $C = 1.25S/T_n^{2/3} \le 2.75$

* Proposed New BNBC

  $V_b = (2/3)\, ZICW/R$, where

  $C = S\,[1 + (T_n/T_B)\,(2.5\eta - 1)]$ for $0 \le T_n \le T_B$

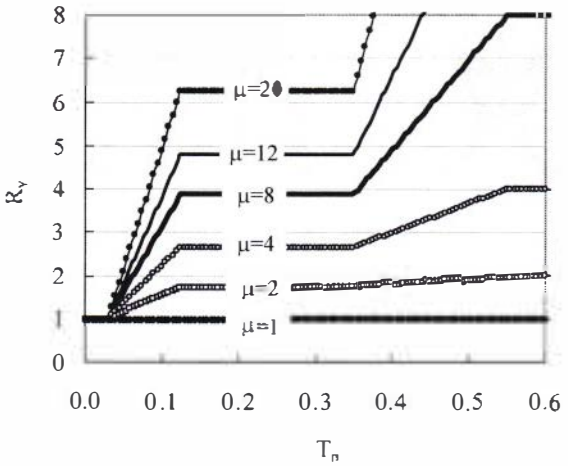
  $= S\,(2.5\eta)$ for $T_B \le T_n \le T_C$

  $= S\,[(2.5\eta)\,(T_C/T_n)]$ for $T_C \le T_n \le T_D$

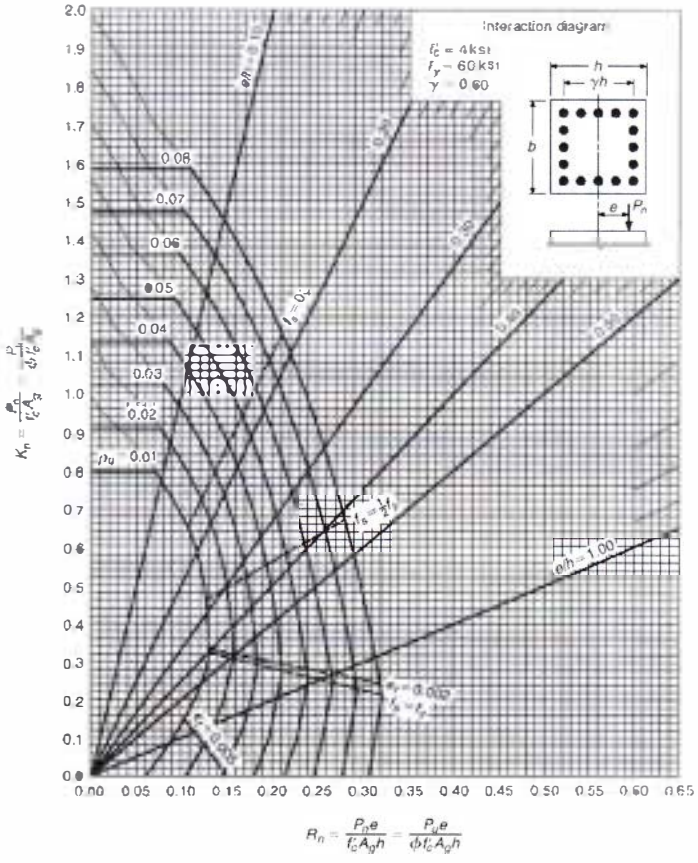
  $= S\,[(2.5\eta)\,(T_C T_D/T_n^2)]$ for $T_D \le T_n$

Soil Type	S	T_B	T_C	T_D
S_A	1.20	0.15	0.40	2.00

* $R_y = f_e/f_y$ $\mu = u_m/u_y$



Variation of R_y with T_n



* Kent-Park (1971) model

  $\varepsilon_{sc} = 0.002$ $\varepsilon_{50c}\,(= \varepsilon_u) = \varepsilon_{50u} + \varepsilon_{50h}$

  with $\varepsilon_{50u} = (3 + 2f'_c)/(f'_c - 1) \times 10^{-3}$

  $\varepsilon_{50h} = 0.75\rho_{st}\sqrt{(b_c/S_t)}$

  where $\rho_{st} = Vol_{st}/Vol_{con}$

  $= 2(b'' + h'')A_{st}/(b_c\, h_c\, S_t)$ for rectangular section

* Shear vs. Flexural Failure

  $V_{Des} \ge 1.4\,(M_{u1} + M_{u2})/L_n + V_{Vert}$

* Weak-Beam Strong-Column: $\Sigma M_{c,ult} \ge 1.2\, \Sigma M_{b,ult}$

* Moderate seismic detailing of Columns

  Tie Spacing, $S_0 \le 8d_b$, $24d_{st}$, $b_c/2$, 12″

* Special confining reinforcement ($S_t \le b_c/4$, 4″)

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

Course Title: Professional Practices & Communication | Course Code: CE 403
Time: 1 hour | Full Marks: 40

PART– A

1. (a) In different contract documents different dates of completion of a project has been stated. If a dispute arises as to when the project has to be completed, mention in order of priority the documents you will consider to establish the actual date. **(5)**

   (b) Mention the role of the Tender Evaluation Committee (TEC). **(5)**

   (c) With the help of a flow chart depict the tendering process. **(5)**

   (d) Which situations may lead to forfeiture of tender security provided by prospective tenderers? **(5)**

PART– B

2. Read the following paragraph from the report of a final year thesis candidate of a university carefully and answer the questions:

   'The laboratory tests mentioned in this report were performed by the team members. A full report will be sent to the supervisor later, we hope he will give consideration to our innovative approach.'

   (a) Assess this paragraph and state the seven Cs of effective communication. **(3)**

   (b) Does this part of report lack any particular 'C'? Discuss how this can be improved to achieve effective communication. **(5)**

3. (a) Briefly explain how communication can be affected by denotation, connotation and euphemism. Include relevant examples where necessary. **(8)**

   (b) Do you think Bangladesh has a low or high context culture? Justify your opinion with relevant examples. **(4)**

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2018
Program: B.Sc. Engineering (Civil)

Course Title: Structural Engineering X (Concrete Technology) Course Code: CE 425
Time: 1 hour Full Marks: 40

Answer all questions

1. "Incorporating of pozzolanic material in Ordinary Portland Cement (OPC) decrease the amount of Calcium Hydroxide [$Ca(OH)_2$] and then enhance the performance of hardened concrete". Do you agree or disagree with this statement? Justify your answer with chemical reaction and proper comments. [7]

2. For a nuclear power plant construction, three types of cement (X, Y, and Z) have been chosen and technical data sheets are collected to pre-investigate the performance of cement in order to find suitable concrete for that construction. Based on the data given in Table 1, calculate the alumina modulus and Bogue compound contents of the following cement. [15]

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

Bulk Oxide Content	Percentage in Cement		
	X	Y	Z
CaO	62	63	69
SiO_2	20	22	26
Al_2O_3	7	11	7
Fe_2O_3	3	3.3	4.5
MgO	1.3	1.1	1.4
SO_3	0.1	0.1	0.2
K_2O	0.5	0.2	0.4
Na_2O	0.6	0.3	0.5
LOI	1.5	2.3	1.5

(i) Find the cements that will provide higher heat and higher strength of concrete and then explain the impact of those cements on the performance of concrete.

(ii) Based on the alumina modulus and Bogue analysis, propose a suitable cement for the nuclear power plant construction and justify your selection.

3. Report the causes of segregation of concrete and the effects on concrete performance due to segregation. [10]

Or

The demand of ready-mixed concrete is increasing rapidly due to better performance of fresh and hardened concrete not only abroad but also in Bangladesh, explain why? [10]

4a. "Addition of air entraining admixture in concrete prevent the formation of cracks due to freezing and thawing cycles". Explain the statement using the schematic diagram and proper comments. [5]

4b. Describe the disadvantages of concrete made with silica fume. [3]

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

Course Title: Environmental Engineering VIII | Course Code: CE 531(A)

Time: 1.00 Hour | Full Marks: 55

Section A

Answer the following questions

[Marks distribution: 6+4=10]

1. Write down the correct answer in your answer script. [6*1=6]

(i) GIS deals with which kind of data
(a)Numeric data
(b)Binary data
(c)Spatial data
(d)Complex data

(ii) Which of the following statements is true about the capabilities of GIS
(a)Data capture and preparation, presentation
(b)Data management, including storage and maintenance
(c)Data manipulation and analysis
(d) All of the above

(iii) By 'spatial data' we mean data that has
(a)Complex values
(b)Positional values
(c)Graphic values
(d)Decimal values

(iv) A ..... system involving the integration of spatially referenced data in a problem solving environment. (Cowen, 1988)
(a)Complex support
(b)decision support
(c)analysis support
(d)storage

(v) A ..... of the real world and its infrastructure.
(a)virtual representation
(b)summary
(c)common
(d)consistent

(vi) DBMS stands for
(a)Database Management System
(b)Database Monitoring System
(c)Database Manufacturing System
(d)Database Mixing Station

2. (a) What are the applications of GIS for an Environment Engineer . [2]
(b) Define GIS. [2]

Section B

Answer any 3 (three) from the following questions

[Marks distribution: 3*15=45]

3. (a) Geo-reference the image of Rajshahi district and then convert the file as Google earth format. [5]

(b) Digitize the geo-referenced image of Rajshahi district boundary along with its water bodies, water ways, road rail track. Which one is the mostly used transportation system in this area? [10]

4. (a) You have been provided with the satellite image of Ganges river for two different years. Find the river bank shifting. Which bank is shifting more towards the land area? [8]

(b) Water ways shape file is given. Calculate the total length of different types of water ways. Which water ways has minimum coverage throughout the whole country? [7]

5. (a) Prepare a map of Kurigram district showing different aquifer media situated within the area. Calculate the total area having medium sand type aquifer . [10]

(b) Thana bd shape file is given. Convert it to District bd shape file . [5]

6. (a) Prepare a layer file of Mohammodpur drainage area. Shape files of Drainage network of Dhaka and Mohammodpur thana are given. [7]

(b) Road map of Ward 35 has been given. You are being asked to build a new city where there cannot be any high rising building and the distance of the building from the secondary roads should be as near as possible (for example you can take those buildings which ate within 1m from the secondary road [8]