The University of Asia Pacific
Department of Civil Engineering
Spring-2010
Mid-Term Examination
Course Title: Principles of Accounting (ACN301)

Time-80 Minutes Total Marks-20

Name	Registration No.

Answer two questions including question no. 3

1. 10

a) State the different users of accounting information. How do you think accounting knowledge will help the civil engineers?
b) Define financial accounting. Mention the steps in the financial accounting cycle.
c) Write down the golden rules of accounting.
d) Why trial balance is prepared?

2. XYZ Consulting is a provider of taxation services. The following unadjusted trial balance has been taken from the books of accounts of the XYZ Consulting. 10

XYZ Consulting
Trial Balance
August 31, 2008

Account titles	Debit (Tk.)	Credit (Tk.)
Cash	8,100	
Accounts Receivable	2,800	
Prepaid Insurance	2,400	
Supplies	1,300	
Equipment	60,000	
Notes Payable		30,000
Accounts Payable		2,400
Capital		30,000
Drawings	1,000	
Consulting Fees		17,600
Salary Expense	3,200	
Utilities Expense	800	
Advertising Expense	400	
Total	**80,000**	**80,000**

Prepare Financial Statements for the month of August, 2008.

3. **10**

Sohana started her own Consulting Firm, named Consult Sohana, on January 1, 2009. During the first month of operation the following transactions occurred.

Date	Transactions
Jan-1	Sohana invested Tk. 20,000 in cash in the business.
Jan-5	Sohana opened a bank account by depositing Tk.5000.
Jan-15	Purchased Office Equipment on Account Tk.3,000.
Jan-19	Rendered consulting services to the clients for cash Tk.1,500.
Jan-22	Borrowed Tk. 700 cash on a note Payable
Jan-25	Rendered consulting services to the clients on credit Tk.2,000.
Jan-28	Paid monthly salary Tk.500 by writing a cheque.
Jan-29	Paid Tk.800 for the monthly rent.
Jan-30	Paid Tk. 1,000 for equipment purchased on Jan 15.
Jan-31	Cash received Tk.1,000 for services rendered on Jan-25.
Jan-31	Sohana withdrew Tk. 200 from business for personal use

Required:

1. Prepare Journal for the above transactions.
2. Prepare ledgers from the Journal.
3. Prepare trial balance as at January 31, 2009.

The End

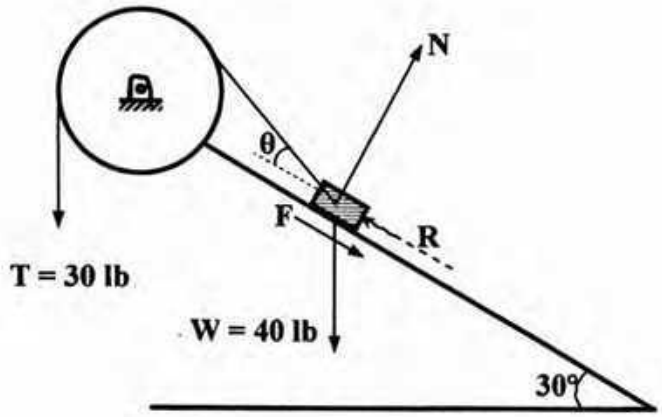
Good Luck !!!

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010

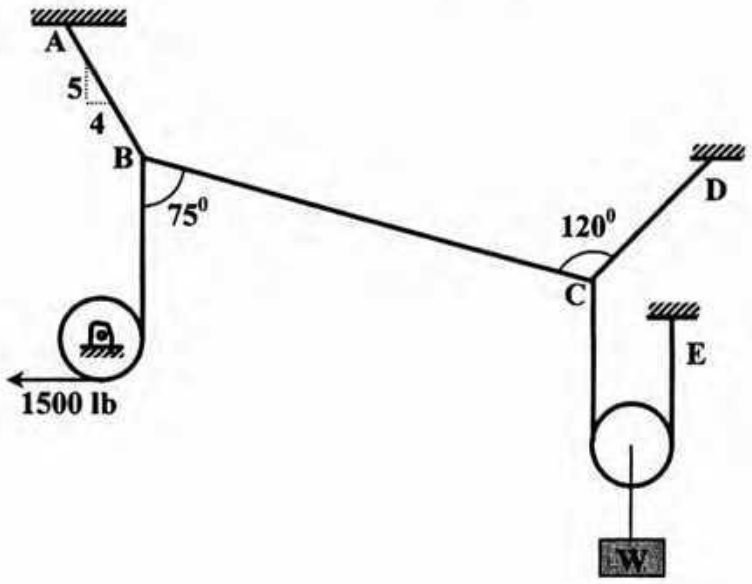
Course # CE 101 | Course Title: Engineering Mechanics I
Full Marks: 30 | Time: 1 hr

There are FOUR questions. Answer any **THREE**.
Each question carries equal number.

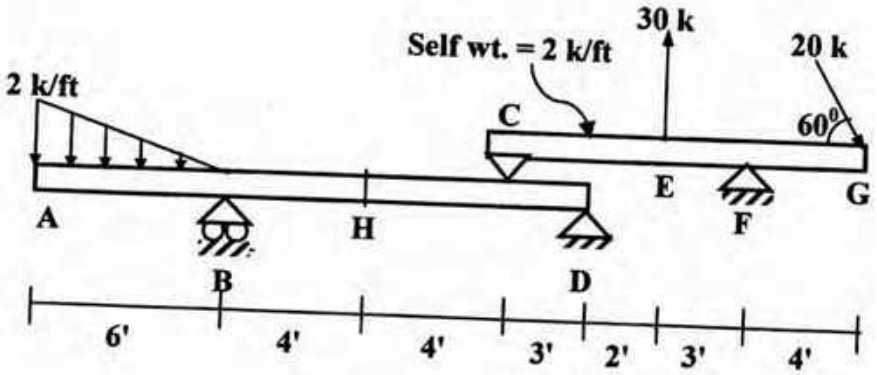
1. In the figure shown below, N = 25 lb and the frictional force F = (0.20)(N). If R is the resultant of W, T, N and F, calculate the magnitudes of F, R and θ.



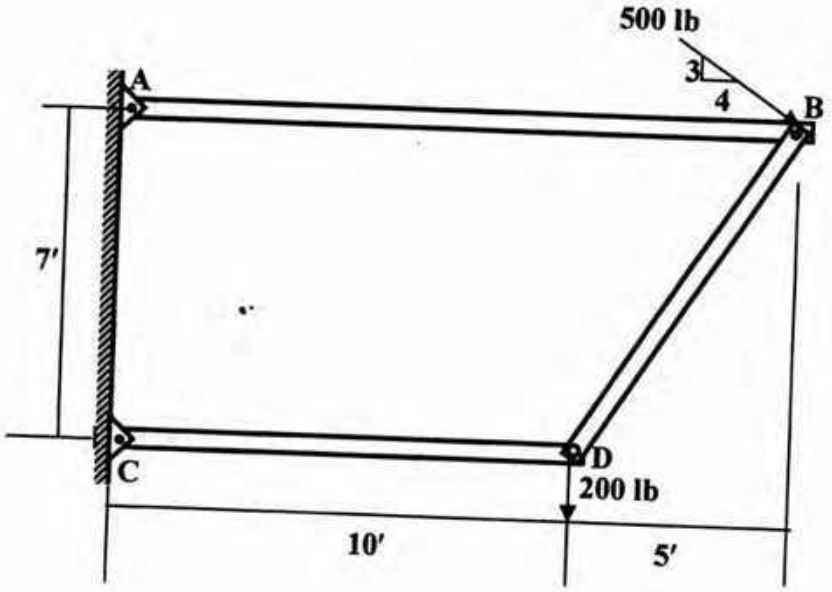
2. In the following system, calculate the magnitude of W.



3. In the beam system shown below, calculate the reactions at supports B, D and F and also calculate the axial force, shear force and bending moment at H. Self weight of beam CG is 2 k/ft.



4. In the structure shown below, calculate the reactions at A and C.



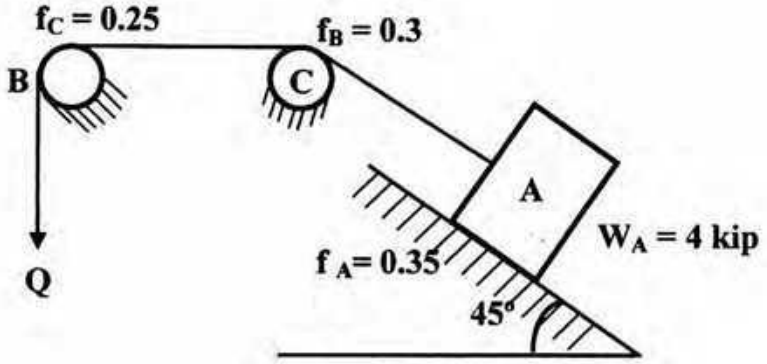
The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B.Sc. Engineering (Civil)

Course Title: Engineering Mechanics II Course Code: CE 103 Credit: 3.00
Time: 1.0 hour Full Marks: 40

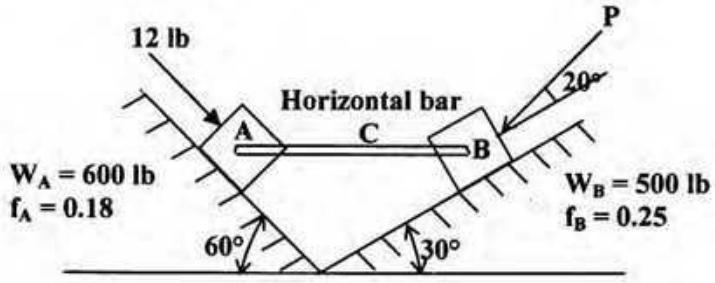
There are **FIVE** questions. Answer any **FOUR**. ***(4X10 = 40)***

1. A car is moving such that it's acceleration is $a = 8t^3 - 6t^2 + 2t + 5$ ft/sec^2. If the initial velocity is 10 ft/sec, what is it's velocity and displacement at the 6th sec? What is the change in acceleration between 5th and 6th sec?

2. For the figure shown below, what is the value of **Q**, when the block **A** will impend to slide upward?



3. In the following figure, what force **P** will cause the block **B** to impend downward? What is the force in the horizontal bar **C**.



4. Derive the expressions for the moment of inertia of mass of a sphere-
(a) About an axis through its diameter.
(c) If the diameter of a sphere is 30 inch and the material of the sphere weighs 450 lb/ft^3, what is the mass moment of inertia of the sphere about any axes 4 ft away from its centre?

5. A rotating body follows the law $\theta = 5t^3+4t^2+20$ rad, where t is in seconds. Determine the angular displacement, velocity and acceleration after 10 sec. Is the acceleration constant?

The University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Spring 2010
Program: B.Sc. Engineering (Civil)

Course Title: Surveying **Course Code: CE 105** **Credit: 4.00**
Full Marks: 40 Time: 1 hr

There are two sections in the question paper namely "SECTION A" and "SECTION B". You have to answer from both sections according to the instruction mentioned in each section.

SECTION A

There are **THREE** questions in this section. Answer any **TWO**

1. (a) Write short notes on i) Tie line ii) Precision (3)
   (b) The table below gives the bearings of the lines of a traverse ABCDE. Calculate the interior angles. (7)

Line	Length (m)	Bearing
AB	150.0	N 00^0 00' E
BC	225.0	N 25^0 12' E
CD	188.0	S 75^0 06' E
DE	193.0	S 56^0 24' E
EA	87.85	N 35^0 30' E

2. (a) Explain Reciprocal Ranging with diagram. (3)
   (b) A steel tape 20 m long standardized at 15^0C with a pull of 120 N was used for measuring a base line. Find the correction per tape length, if the temperature at the time of measurement was 32 ^{0}C and the pull exerted was 140 N. Weight of 1 cubic m of steel = 75.6 kN/m^3, Wt of tape = 9 N and E = 2.08 X 10^8 kN/m^2. Coefficient of expansion of tape per 1^0 C = 12 x10^{-6}. (7)

3. (a) What are the different instruments that used in Plane Table Surveying? (1.5)
   (b) The following bearings were observed in running a compass traverse: (8.5)

Line	Fore bearing	Back bearing
AB	67^0 25'	244^0 0'
BC	128^0 55'	312^0 0'
CD	217^0 30'	36^0 30'
DA	305^0 45'	126^0 45'

At what stations do you suspect local attraction? Find the corrected bearings of the lines.

SECTION B

There are **THREE** questions in this section. Answer any **TWO.**

4.(a) What are the types of spherical co-ordinate system? Write down the co-ordinates and great circles of reference for both of the Independent and the Dependent Equatorial Systems. (5)

(b) Compare (i) Terrestrial Latitude with Celestial Latitude and (ii) Terrestrial Longitude with Celestial Longitude. (5)

5.(a) Define (i) Principal Point (ii) Focal Length (iii) Oblique Photograph (iv) Exposure Station (v) Flying Altitude. (5)

(b) A camera having the focal length of 25 cm is used to take a vertical photograph of an object having an elevation of 500 m above datum. The distance from the principal point to the image of the object on a photograph is 7 cm. What is the relief displacement of the point if the datum scale is 1/15,000. (5)

6.(a) Define (i) Terrestrial longitude (ii) Altitude (iii) Zenith distance (iv) Declination and (v) Polar distance. (5)

(b) Determine the number of photographs required to cover an area of 250 km^2, if the scale of the photograph is 1 cm = 150 m. and the size is 20 cm × 20 cm. The forward lap is 65% and side lap is 30%. (5)

Given formula:

1. $L = (1 - p_l)sl, \quad W = (1 - p_w)sw$

2. $d = \frac{rh}{H}$

Note: Here the symbols have their usual meanings.

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B. Sc. Engineering (Civil)

Course Title : Engineering Materials | Course Code: CE 201
Time: One Hour | Full Marks: 60

Answer any <u>THREE</u> questions (3 x 20 = 60) including Question No. 1.
<u>Question No. 1 is compulsory.</u> The figures in the right margin indicate the marks of the questions.

1. The specified FM of fine aggregate of a bridge project is 2.6. The sieve analysis data of a fine aggregate sample collected for the bridge project are summarized below: 20

ASTM Sieve	Materials Retained (g)
3 inch	0
1.5 inch	0
¾ inch	0
½ inch	0
3/8 inch	0
#4	0
#8	70
#12	60
#16	30
#30	50
#40	5
#50	5
#100	40
#200	20
Pan	20

(i) Calculate the FM of the sample,
(ii) Draw the grading curve of the sample,
(iii) Make a brief discussion on the FM, sieve analysis data, and grading curve,
(iv) What measures are necessary to improve the grading of the sand sample?
(v) In what ratio the sand sample is to be mixed with another sand sample of FM 2.4 to obtain the required fineness modulus of 2.6?

Sieve openings of #40 and #200 sieves are 0.425 mm, and 0.075 mm respectively.

2. A mixture proportion of mortar is to be prepared based on the following data: 20

Sand to cement ratio (weight ratio) = 2.4,
W/C=0.45,
Absolute unit weight of cement = 3100 kg/m^3,
Absolute unit weight of sand = 2600 kg/m^3,
Air content = 2%.

(i) Calculate the unit contents (amount necessary for one cubic meter of mortar) of sand, cement, and water,
(ii) Calculate the unit weight of mortar,
(iii) Calculate the volumetric ratio of the mortar (consider the unit weight of cement with void is 1350 kg/m^3, and the unit weight of sand with void is 1300 kg/m^3),
(iv) How do you consider the bulking of sand in the volumetric mix-design?

3. **(a)** Define fineness of cement. "A finer cement will give more early strength compared to a coarser cement" – Why? 3

(b) Explain the reason of addition of gypsum with cement (show the chemical reactions). What will happen if more amount of gypsum is added with cement? 4

(c) How do you determine the Young's modus of high grade steels from the stress-strain curve? 2

(d) Define malleability, ductility, and brittleness. 3

(e) Write the steps of cement manufacturing process. What will happen if gypsum is added with very hot clinker? 5

(f) Write short notes on fly ash cement, slag cement, and quick setting cement. 3

4. **(a)** Explain the strength development mechanism of brick during burning. 2

(b) Write the characteristics of good quality aggregates. 3

(c) What factors are to be considered during selection of an engineering material? 2

(d) Write short notes on the followings: 4

i. Resilience
ii. Endurance Limit
iii. Creep
iv. Relaxation

(e) Explain the functions of cement, sand, and water in mortar. 3

(f) "W/C ratio is a key factor related to the strength and durability of concrete" – Explain briefly. 3

(g) Explain three harmful ingredients of brick earth. 3

The University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2010

Course # : CE-203 | Course Title: Engineering Geology & Geomorphology
Full Marks: 40 (4 X 10 = 40) | Time: 1 hour

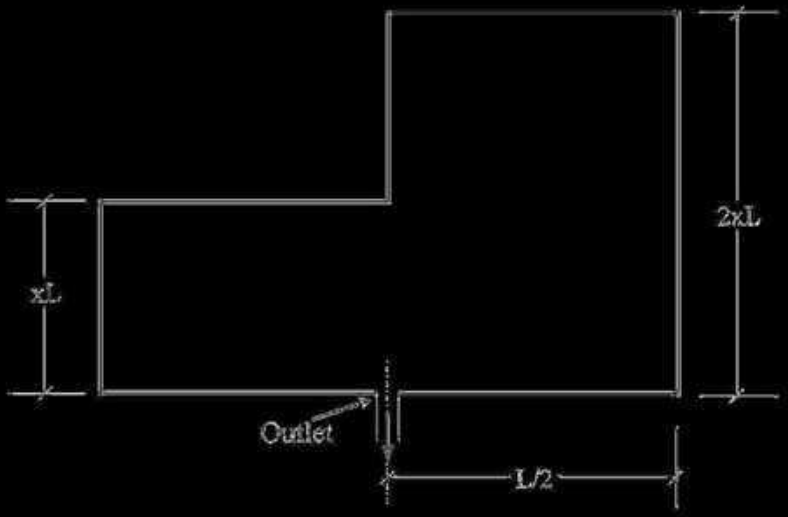
Answer any four (4) questions of your choice out of the following five (5)

1a) Discuss, in brief, the principal zones of the earth from geologic point of view. 6

1b) Draw a schematic diagram of the rock cycle and provide one example of each type of rock. 4

2a) What is geomorphic process? Classify (mention names only) geomorphic processes based on origin. 4

2b) In the following basin, for what value of x, the flow rate (Q) or runoff will be the maximum? Also find the FF and CC of the basin for maximum runoff. 6



3a) Define infiltration and percolation. With a sketch show different components (routes/ways) of total flow. 2.5

3b) Define with sketch: (1) Axial length (2) Time of Concentration. 2

3c) Write down (names only) the factors affecting runoff. 2

3d) A stadium has the following surface conditions: 3.5

Area of concrete race track (C = 0.8):	25%
Area of sandy soil (C = 0.10):	55%
Area of impervious surface (C = 1.0):	remaining portion
Total surface area:	180,000 ft^2

It rained with an intensity of 0.10 cm/min. Calculate peak runoff in m^3/s.

4a) What is diastraphism? Classify folds (mention names only) based on their origin. Draw neat sketches of any two types of folds. 4.5

4b) Define fold, fault and joint. Classify fault (mention names only) according to net slip. Draw neat sketches of normal and reverse faults. 5.5

5a) Write down the factors affecting drainage pattern. Classify drainage patterns (mention names only). 4

5b) Draw neat sketches of any four types of drainage pattern. Discuss, in brief, any two of them. 6

The University of Asia Pacific
Department of Civil Engineering
Midterm Examination –Spring 2010

Course No: CE 205
Course Title: Numerical Analysis & Computer Programming

Full Marks: 40
Time: 1 hour

There are three questions. Answer any two.

1(a) Using Regula Falsi Method, find the real root of the following equation: (10)
$6x^3 - x^2 \sin(2x) - 12 = 0$. Desired accuracy = 0.001

1(b) Using Iteration Method, solve the following equation: (10)
$x^3 - 3.7x^2 + 6.25 \ln(x) - 4.069 = 0$, near to x = 4
Desired accuracy = 0.0001

2(a) Solve the following system of equations: (12)
$6u + 0.5v + 3w = 20$
$2u + 0.7v + 10w = 24$
$6u + 0.9v - 6w = 16$
using *Gauss Jordan* Method.

2(b) Using Newton's Iterative formula, (08)
(i) Find the square root of 55, desired accuracy, $\varepsilon = 0.00001$.
(ii) Find the inverse of 19, desired accuracy, $\varepsilon = 0.00001$.

3(a) Solve the following system of equations, using Matrix Inversion: (12)
$6.5x + 5.8y - -3.1z = -4.25$
$4.5x + 6.2y = 3.85$
$8.0x - 2.2y + 7.6z = -0.58$

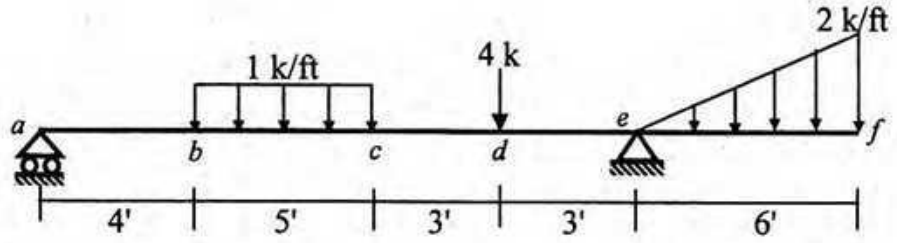
3(b) Using Cramer's rule solve the following system of equations: (08)
$3p + 2q - 6r = 12$
$-5p + 6q + 2r = 10$
$4p - 10q - 8r = 9$

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B.Sc. Engineering (Civil)

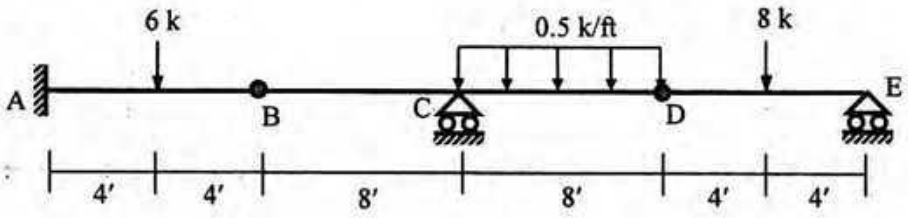
Course No.: CE 211 — Course Title: Mechanics of Solids I
Full Marks: 30 (= 3 × 10) — Time: 1 hour

There are **four (4)** questions. Answer any **three (3)**

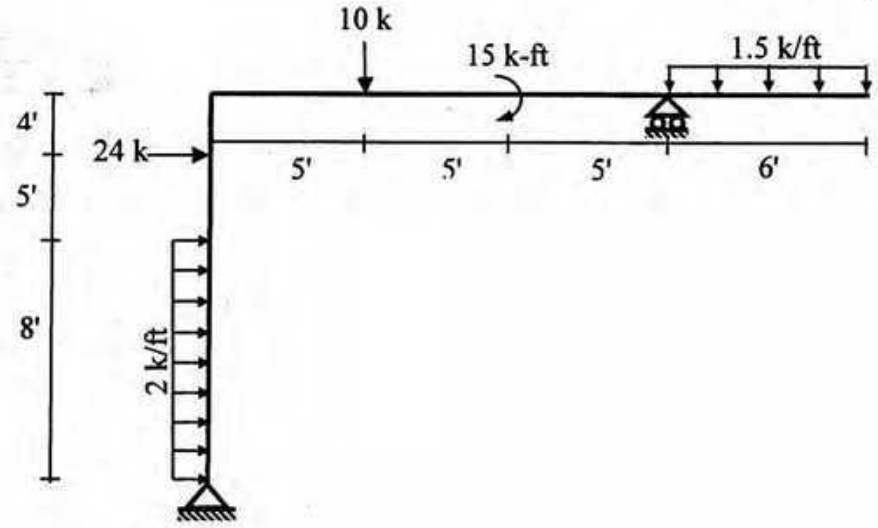
1. For the beam *abcdef* loaded as shown in the figure below
   i) Derive the equation of shear force and bending moment using Singularity Functions,
   ii) Also calculate shear force at right of point *d* and bending moment at point *c*.



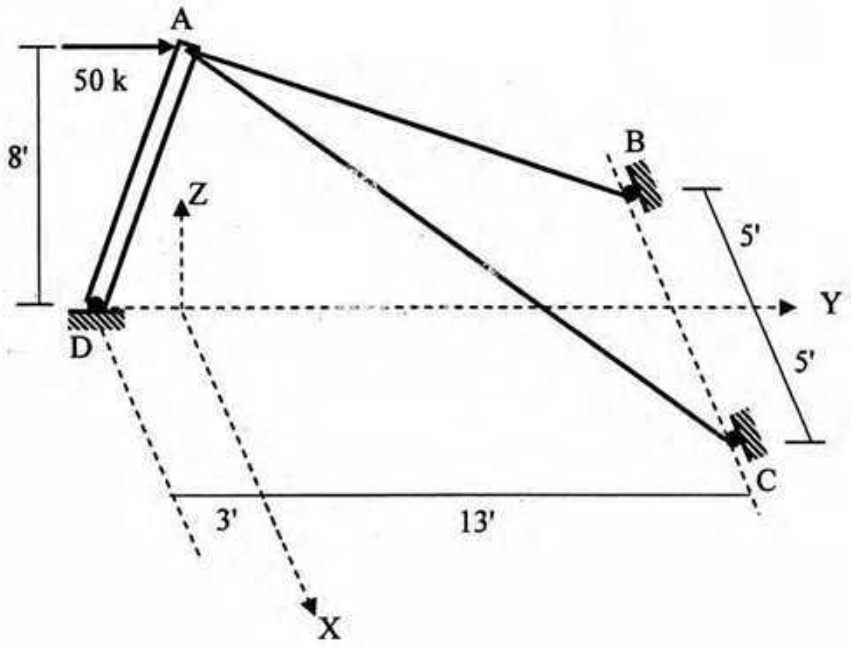
2. Draw the shear force and bending moment diagram of the following beam.



3. Draw the shear force and bending moment diagram of the frame loaded as shown below.



4. To support the load as shown, determine the necessary diameter for rods AB and AC for the tripod shown in the figure. Neglect the weight of the structure and assume that the joints are pin-connected. No allowance has to be made for threads.
Given: Allowable tensile stress and compressive stress are 12 ksi and 15 ksi respectively.

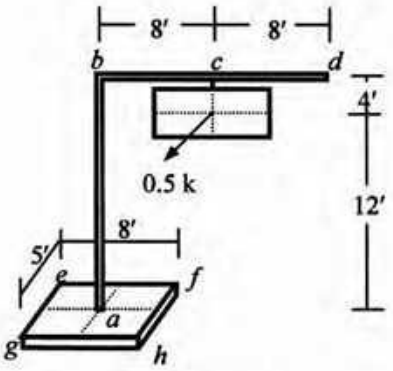


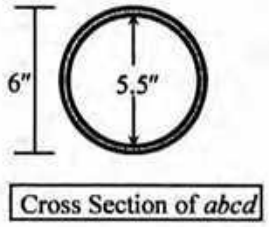
The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010 (Set B)

Course #: CE 213 — Course Title: Mechanics of Solids II

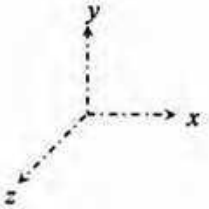
Full Marks: 40 (= 4 × 10) — Time: 1 hour

1. For members *ab* and *bcd* (each weighing 0.25 k) of the frame *abcd* loaded as shown in the figure below,
   (i) draw the torque diagram,
   (ii) calculate the maximum torsional shear stress and maximum torsional rotation
   [Given: Shear Modulus = 12000 ksi].

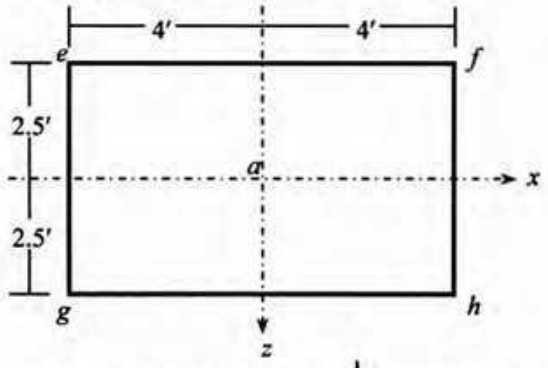




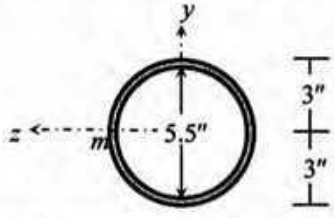
Cross Section of *abcd*



2. The figure below shows footing *efgh* at the base *'a'* of the frame *abcd* loaded as described in Question 1. If the footing weighs 10 kips (members *ab* and *bcd* weigh 0.25 k each), calculate the maximum combined normal stress at each corner (*e, f, g, h*) of the footing.
   Also comment if the footing will overturn.



3. For the frame *abcd* described in Question 1, calculate the principal stresses and direction of principal planes for the point *m* at joint *b* of the member *bcd*.



Cross-Section at *b* of member *bcd*

4. The coordinates of the center of a Mohr's circle is $(-q_0/2, 0)$ and its radius is q_0.
   Calculate the maximum allowable value of q_0 if the material is to avoid yielding using all the criteria suggested below, by
   (i) Rankine, (ii) St. Venant, (iii) Tresca, (iv) Von Mises
   [Given: Yield Strength of the material = 300 MPa, Poisson's ratio = 0.30].

The University of Asia Pacific

Department of Civil Engineering

Mid-Term Examination Spring 2010

Program: B.Sc. Engineering Civil

Course Title: Fluid Mechanics | Course No : CE 221 | Credit: 3.00

Time : 1.0 hour | Full Marks : 20

Answer all questions. The figure in the right margin indicates full marks.

1. Differentiate between, (i) Lagrangian Method and Eulerian Method (5)
   (ii) Uniform and Non-Uniform Flow

   Or, Define (i) Surface Tension
   (ii) Capillarity

2. Compute "y" in Figure 1 if the pressure differences between points A and B is 250.00 kN/m^2. ($P_A > P_B$) (3)

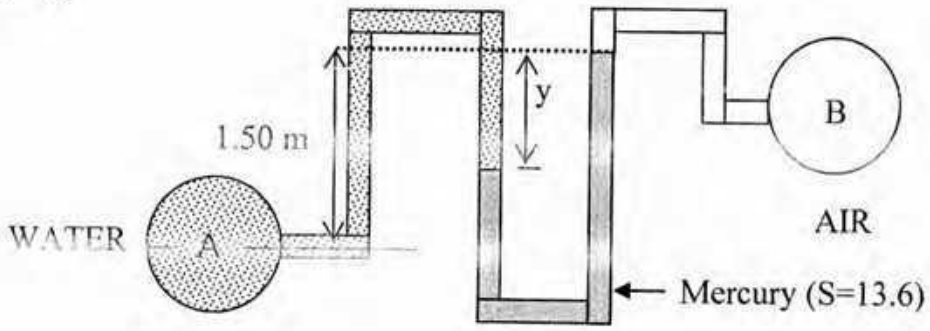


Figure 1

3. A space of 8.0 cm between two large plane surfaces is filled with glycerine as shwon in Figure 2. Determine the force (F) required to drag vertically a very thin plate 0.90 m^2 in area between the plane surfaces at a constant speed of 0.9 m/s, if the plate is at a distance of 4.25 cm from one of the surfaces. Take dynamic viscosity 0.06 N-s/m^2 and weight of the plate 5 N. (4)

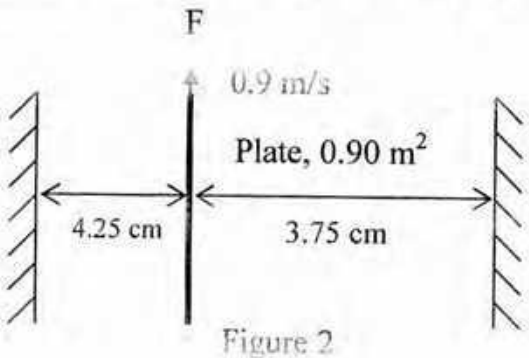


Figure 2

4. Determine the horizontal and vertical forces acting on the curve surface DB on the cylinder in Figure 3.

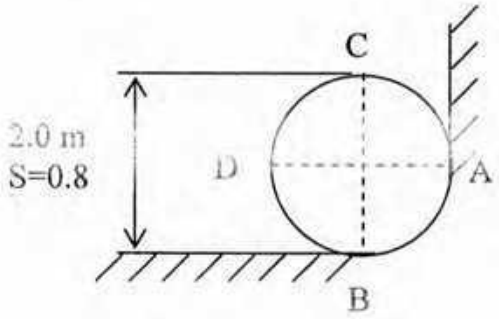


Figure 3

5

5. Oil flows through a pipe of 50 cm diameter (Figure 4). The pipe contracts from 50 cm diameter at point A to 35 cm diameter at point B. At point B, it bifurcates into two branches consisting of pipes of 25 cm and 20 cm diameters. If the velocity at A is 1.5 m/sec, calculate the discharge at A and the velocities at B and C. The velocity at D is 3 m/s.

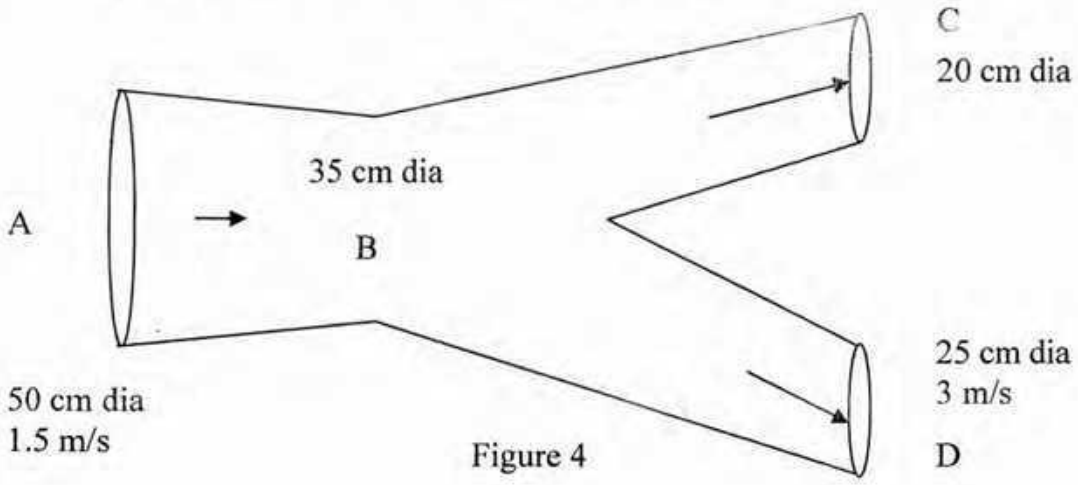


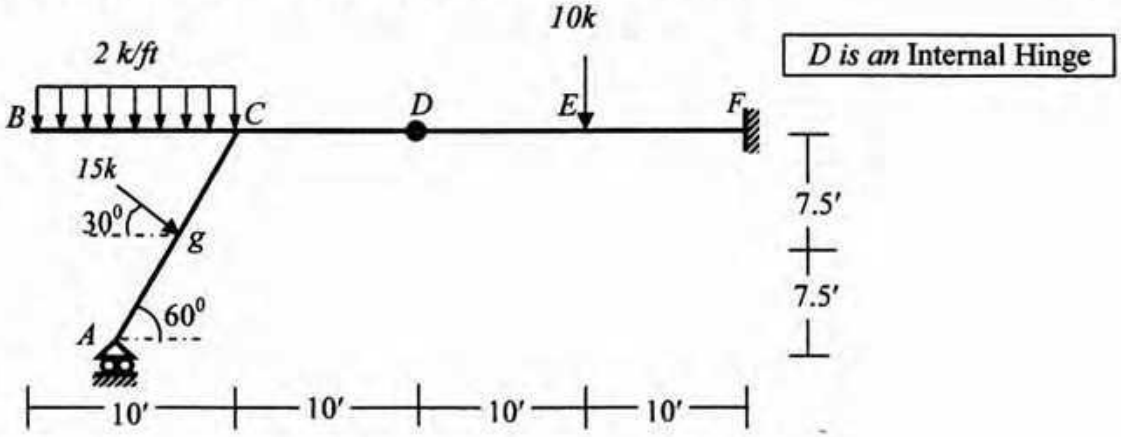
Figure 4

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B. Sc Engineering (Civil)

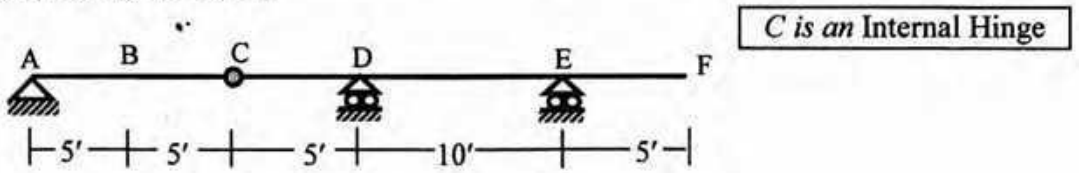
Course Code: CE 311 | Course Title: Structural Engineering I
Credit: 3.00 | Time : 1.00 Hour | Full Marks:30 (= 10 × 3)

[Answer **any 03 (three)** of the following 04 questions]

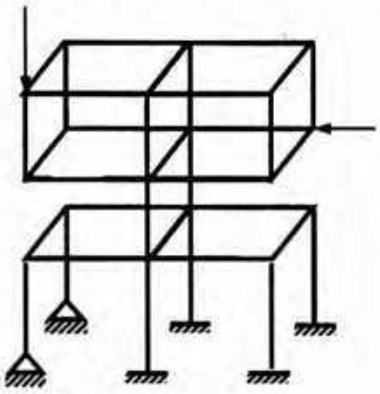
1. Draw the AFD, SFD and BMD of the frame loaded as shown below. [10]



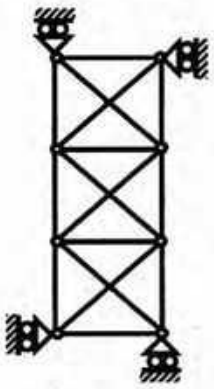
2.(a) For the beam shown below, draw the influence lines for [06]
i) R_D ii) $V_{E(Left)}$ iii) V_B and iv)M_D



(b) Determine the degree of statical indeterminacy (dosi) of the structures shown below. [04]

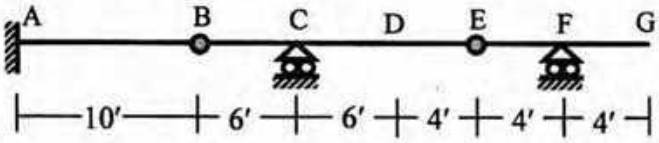


3D Frame



2D Truss

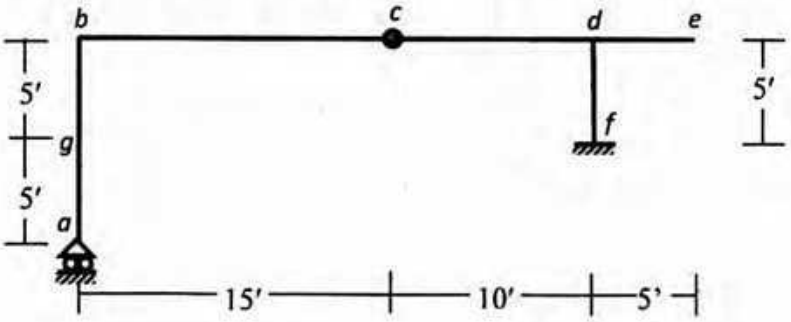
3. For the beam shown below, draw the influence lines for [10]
(i) R_A, R_C, (ii) V_B, $V_{C(Left)}$, (iii) M_A, M_D



B and E are Internal Hinges

4. For the frame shown below, draw the influence lines for [10]
(i) X_f, Y_a, (ii) V_g (iii) M_f

if the unit load moves over (a) column ab, (b) column fd and (c) beam be.



c is an Internal Hinge

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010 (Set B)

Course #: CE 313 — Course Title: Structural Engineering II
Full Marks: 40 (= 4 × 10) — Time: 1 hour

1. For the 2-storied frame loaded as shown in Fig. 1, calculate the applied force P using the (i) *Portal Method*, (ii) *Cantilever Method* (assuming columns *bf* and *cg* to have twice the cross-sectional areas of the other columns), if there is no bending moment in beam *ef*.

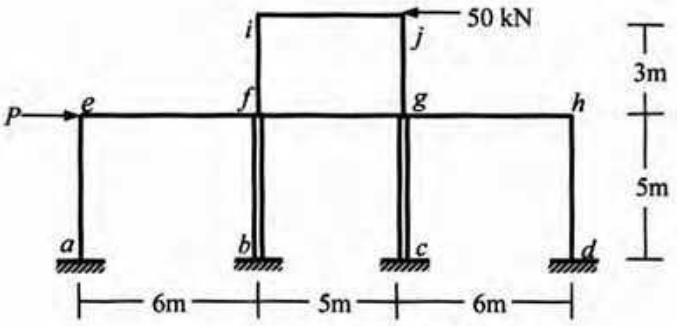


Fig. 1 (for Question 1)

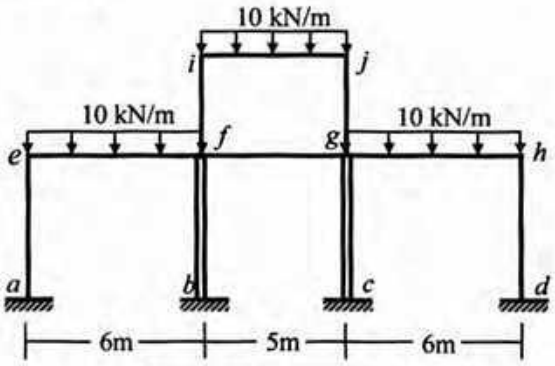


Fig. 2 (for Question 2)

2. For the 2-storied frame loaded as shown in Fig. 2,
   (i) Draw the SFD and BMD of all beams and the AFD of all columns, using approximate locations of inflection points,
   (ii) Approximately calculate the vertical deflection at joints *e*, *i* and *f*, using the *Unit Load Method* [Given: EA = 2.0×10^6 kN for columns *bf* and *cg*, and = 1.0×10^6 kN for all other columns].

3. For the Mill Bent loaded as shown in Fig. 3, use the
   (i) *Portal Method* to draw the SFD and BMD of columns *abc* and *jkl*,
   (ii) *Unit Load Method* (considering shear and flexural deformations) to approximately calculate the horizontal deflection of joint *l* [Given: GA* = const = 100×10^3 k, EI = const = 40×10^3 k-ft^2].

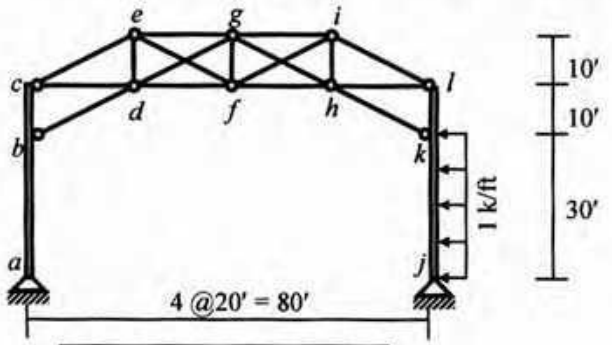


Fig. 3 (for Question 3 and 4)

4. For the Mill Bent shown in Fig. 3 (without the external load), calculate the vertical deflection at joint *g* due to (i) temperature drop of 20°F in the bottom cords, (ii) bottom cords being constructed 0.02′ short (analyze the truss assuming the diagonal members to take equal share of the sectional shear force)
   [Given: Coefficient of thermal expansion $\alpha = 5.5 \times 10^{-6}$/°F].

University of Asia Pacific
Department of Civil Engineering
CE 315: Design of Concrete Structures I

Time: 1 hr. Mid-Term Examination Marks: 50
(shall be reduced to 20)

Answer all the questions

1(a) Draw sketches for strain distribution and stress distribution diagrams of a RC beam section when subjected to bending for uncracked condition, cracked but elastic condition and ultimate condition. 8

1(b) In the design of reinforced concrete beams the usual practice is to use under reinforced beam sections, explain. 6

2. A beam section showing the dimensions and embedded reinforcements is shown in Fig. 1. This beam is of 30 ft span and carries a single load P at mid-span as shown in Fig. 2. (**Always neglect the self-weight of the beam**). Solve the following problems with $f'_c = 3{,}500$ psi $f_y = 60{,}000$ psi, $f'_t = 400$ psi, $n = 9$, $Es = 29\times10^6$ psi.

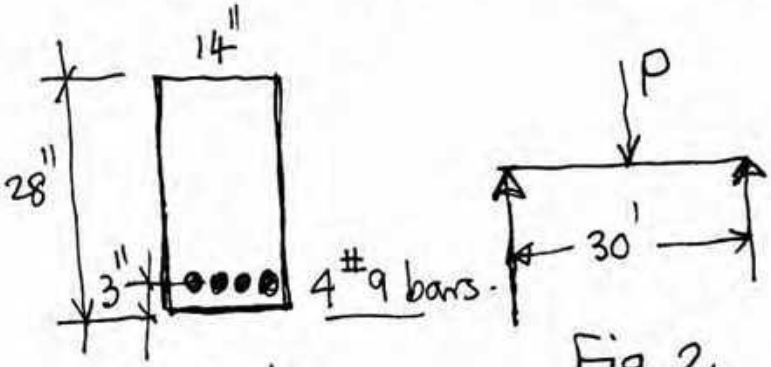


Fig. 1

Fig. 2

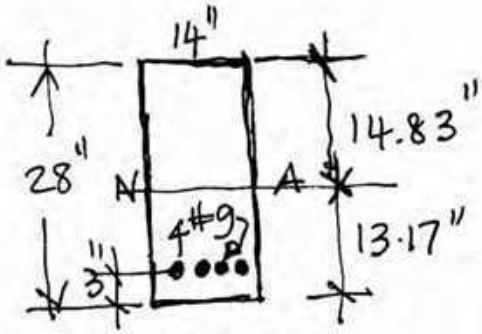


Fig. 3 ($I_{NA} = 29200$

2(a) All the sectional properties such as location of neutral axis, moment of inertia i.e. I_{NA}, etc. for the beam section shown in Fig. 1 for uncracked condition is given in Fig. 3. Calculate the concrete stresses at extreme fibres and also the steel stress for a bending moment of 50 kft. 7

2(b) For the 30 ft span simply supported beam with a concentrated load P at middle as shown in Fig. 2. calculate the maximum value of P (neglecting the self weight of the beam) for uncracked condition. 7

2(c) For the 30 ft span simply supported beam with a concentrated load P at middle as shown in Fig. 2. calculate the maximum value of P (neglecting the self weight of the beam) when the beam is cracked but stresses elastic. 11

2(d) For the 30 ft span simply supported beam with a concentrated load P at middle as shown in Fig. 2. calculate the maximum value of P (neglecting the self weight of the beam) at the ultimate condition. 11

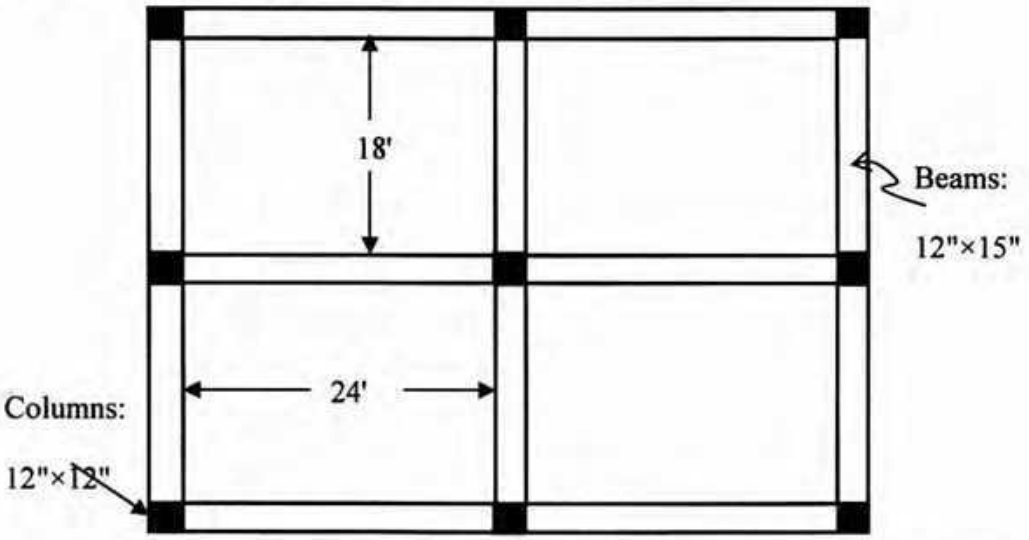
The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2010
Program: B. Sc Engineering (Civil)

Course Title: Design of Concrete Structures II Course Code: CE317 Credit: 3.00

Time: 1.00 Hour Full Marks: 50

Answer any two questions (2 x 25 = 50) of the following 03 questions

1(a) Refer to the following slab system of a two-storied building: [20]



LL = 60 psf, partition wall = 30 psf, floor finish = 20 psf, f_c' = 3,000 psi, f_y=50,000 psi
f_s = 20,000 psi. , n=9, k=0.378, j=0.874, R=223 psi

Design the slab by **WSD**. Follow the steps mentioned below:

(i) Calculation for minimum slab thickness
(ii) Determination of moment coefficients and calculation for design moments
(iii) Check for slab thickness to avoid compression failure of concrete
(iv) Calculation for flexural reinforcements
(v) Check for temperature and shrinkage reinforcements
(vi) Neat sketches of reinforcements(including corner reinforcement) (plan only)

1(b) Why is special arrangement of reinforcement is needed at the exterior corners of a two way slab system? Discuss the possible special arrangements? [05]

[15]

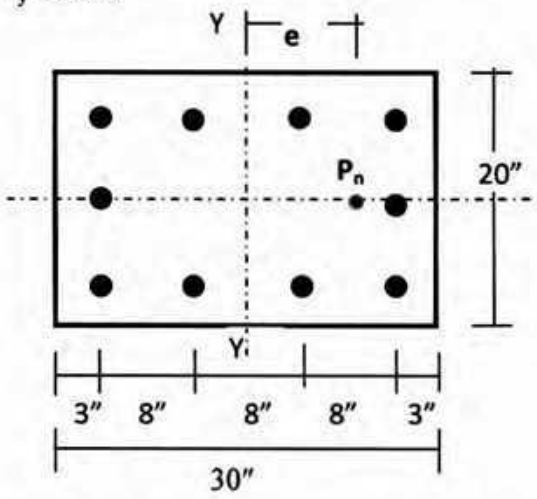
2.(a) A flat plate interior panel measuring 24 ft × 26 ft is to be designed by **USD** for a parking garage. Use f_c' = 4 ksi, f_y= 60 ksi. Column size 24"×24", FF=20 psf, Random wall load 30 psf and LL=70 psf. Find slab thickness and moments in column and middle strips using Direct Design method.

2.(b) What are the limitations in ACI Code for using semi-empirical direct design method (DDM) to determine moments in two-way slabs? [05]

2.(c) Design a square tied column with reasonable amount of reinforcement to support P_{DL}= 250 kips and P_{LL}=200 kips. Use f_c'=3 ksi, f_s=24 ksi psi. Use **WSD** method. [05]

3(a) The Column in the following figure is reinforced with 10-#14 bars (Area of #14 bar, A_s=2.25 in^2) distributed around the perimeter as shown. Load P_n will be applied with eccentricity e about the Y axis. Find the load and moment corresponding to a failure point with neutral axis c= 22 in. from the right face. Use **USD** method. [12]

Given: f_c'= 4 ksi and f_y=60 ksi

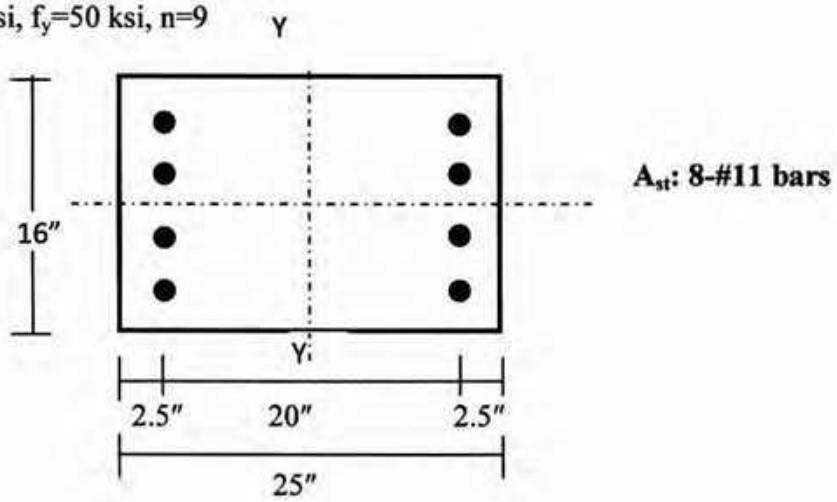


3(b) In reviewing the capability of a building a particular column of the same existing framed building is found to be reinforced with bars as shown in the following figure. The service loads calculated for different combinations are found to be as following, either [13]

(1) P= 350 k M=200 k-ft
or (2) P=100 k M=275 k-ft

Check the adequacy of the column section by ***WSD*** method.

Use f_c'= 3 ksi , f_s=20 ksi, f_y=50 ksi, n=9



6.5.2 **Scope and Limitations**

6.5.2.1 The provisions of this section may be used as alternative to those of Sec 6.4 for two-way slabs supported on all four edges by walls, steel beams or monolithic concrete beams having a total depth not less than 3 times the slab thickness.

6.5.2.2 Panels shall be rectangular with a ratio of longer to shorter span centre to centre of supports not greater than 2.

6.5.2.3 The value of $(\alpha_1 \ell_2/\ell_1)$ shall be greater than or equal to 1.

6.5.3 **Analysis by the Coefficient Method**

6.5.3.1 The negative moments and dead load and live load positive moments in the two directions shall be computed from Tables 6.6.11, 6.6.12 and 6.6.13 respectively. Shear in the slab and loads on the supporting beams shall be computed from Table 6.6.14.

6.5.4 **Shear on Supporting Beam**

The shear requirements provided in Sec 6.4.7.6 shall be satisfied.

6.5.5 **Deflection**

Thickness of slabs supported on walls or stiff beams on all sides shall satisfy the requirements of Sec 6.4.3.1 (b) and (c).

Table 6.6.11
Coefficients for Negative Moments in Slabs †

$M_{a,\text{neg}} = C_{a,\text{neg}} w \ell_a^2$

$M_{b,\text{neg}} = C_{b,\text{neg}} w \ell_b^2$ where w = total uniform dead plus live load per unit area

Ratio $m = \frac{\ell_a}{\ell_b}$		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
1.00	$C_{a,\text{neg}}$		0.045		0.050	0.075	0.071		0.033	0.061
	$C_{b,\text{neg}}$		0.045	0.076	0.050			0.071	0.061	0.033
0.95	$C_{a,\text{neg}}$		0.050		0.055	0.079	0.075		0.038	0.065
	$C_{b,\text{neg}}$		0.041	0.072	0.045			0.067	0.056	0.029
0.90	$C_{a,\text{neg}}$		0.055		0.060	0.080	0.079		0.043	0.068
	$C_{b,\text{neg}}$		0.037	0.070	0.040			0.062	0.052	0.025
0.85	$C_{a,\text{neg}}$		0.060		0.066	0.082	0.083		0.049	0.072
	$C_{b,\text{neg}}$		0.031	0.065	0.034			0.057	0.046	0.021
0.80	$C_{a,\text{neg}}$		0.065		0.071	0.083	0.086		0.055	0.075
	$C_{b,\text{neg}}$		0.027	0.061	0.029			0.051	0.041	0.017
0.75	$C_{a,\text{neg}}$		0.069		0.076	0.085	0.088		0.061	0.078
	$C_{b,\text{neg}}$		0.022	0.056	0.024			0.044	0.036	0.014
0.70	$C_{a,\text{neg}}$		0.074		0.081	0.086	0.091		0.068	0.081
	$C_{b,\text{neg}}$		0.017	0.050	0.019			0.038	0.029	0.011
0.65	$C_{a,\text{neg}}$		0.077		0.085	0.087	0.093		0.074	0.083
	$C_{b,\text{neg}}$		0.014	0.043	0.015			0.031	0.024	0.008
0.60	$C_{a,\text{neg}}$		0.081		0.089	0.088	0.095		0.080	0.085
	$C_{b,\text{neg}}$		0.010	0.035	0.011			0.024	0.018	0.006
0.55	$C_{a,\text{neg}}$		0.084		0.092	0.089	0.096		0.085	0.086
	$C_{b,\text{neg}}$		0.007	0.028	0.008			0.019	0.014	0.005
0.50	$C_{a,\text{neg}}$		0.086		0.094	0.090	0.097		0.089	0.088
	$C_{b,\text{neg}}$		0.006	0.022	0.006			0.014	0.010	0.003

† A crosshatched edge indicates that the slab continues across, or is fixed at the support; an unmarked edge indicates a support at which torsional resistance is negligible.

Table 6.6.12
Coefficients for Dead Load Positive Moments in Slabs †

$M_{a,\text{pos},dl} = C_{a,dl} w \ell_a^2$

$M_{b,\text{pos},dl} = C_{b,dl} w \ell_b^2$ where w = uniform dead load per unit area

Ratio $m = \frac{\ell_a}{\ell_b}$		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
1.00	$C_{a,dl}$	0.036	0.018	0.018	0.027	0.027	0.033	0.027	0.020	0.023
	$C_{b,dl}$	0.036	0.018	0.027	0.027	0.018	0.027	0.033	0.023	0.020
0.95	$C_{a,dl}$	0.040	0.020	0.021	0.030	0.028	0.036	0.031	0.022	0.024
	$C_{b,dl}$	0.033	0.016	0.025	0.024	0.015	0.024	0.031	0.021	0.017
0.90	$C_{a,dl}$	0.045	0.022	0.025	0.033	0.029	0.039	0.035	0.025	0.026
	$C_{b,dl}$	0.029	0.014	0.024	0.022	0.013	0.021	0.028	0.019	0.015
0.85	$C_{a,dl}$	0.050	0.024	0.029	0.036	0.031	0.042	0.040	0.029	0.028
	$C_{b,dl}$	0.026	0.012	0.022	0.019	0.011	0.017	0.025	0.017	0.013
0.80	$C_{a,dl}$	0.056	0.026	0.034	0.039	0.032	0.045	0.045	0.032	0.029
	$C_{b,dl}$	0.023	0.011	0.020	0.016	0.009	0.015	0.022	0.015	0.010
0.75	$C_{a,dl}$	0.061	0.028	0.040	0.043	0.033	0.048	0.051	0.036	0.031
	$C_{b,dl}$	0.019	0.009	0.018	0.013	0.007	0.012	0.020	0.013	0.007
0.70	$C_{a,dl}$	0.068	0.030	0.046	0.046	0.035	0.051	0.058	0.040	0.033
	$C_{b,dl}$	0.016	0.007	0.016	0.011	0.005	0.009	0.017	0.011	0.006
0.65	$C_{a,dl}$	0.074	0.032	0.054	0.050	0.036	0.054	0.065	0.044	0.034
	$C_{b,dl}$	0.013	0.006	0.014	0.009	0.004	0.007	0.014	0.009	0.005
0.60	$C_{a,dl}$	0.081	0.034	0.062	0.053	0.037	0.056	0.073	0.048	0.036
	$C_{b,dl}$	0.010	0.004	0.011	0.007	0.003	0.006	0.012	0.007	0.004
0.55	$C_{a,dl}$	0.088	0.035	0.071	0.056	0.038	0.058	0.081	0.052	0.037
	$C_{b,dl}$	0.008	0.003	0.009	0.005	0.002	0.004	0.009	0.005	0.003
0.50	$C_{a,dl}$	0.095	0.037	0.080	0.059	0.039	0.061	0.089	0.056	0.038
	$C_{b,dl}$	0.006	0.002	0.007	0.004	0.001	0.003	0.007	0.004	0.002

† A crosshatched edge indicates that the slab continues across, or is fixed at the support; an unmarked edge indicates a support at which torsional resistance is negligible.

Table 6.6.13
Coefficients for Live Load Positive Moments in Slabs †

$M_{a,\text{pos},ll} = C_{a,ll} w \ell_a^2$

$M_{b,\text{pos},ll} = C_{b,ll} w \ell_b^2$ where w = uniform live load per unit area

Ratio $m = \frac{\ell_a}{\ell_b}$		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
1.00	$C_{a,ll}$	0.036	0.027	0.027	0.032	0.032	0.035	0.032	0.028	0.030
	$C_{b,ll}$	0.036	0.027	0.032	0.032	0.027	0.032	0.035	0.030	0.028
0.95	$C_{a,ll}$	0.040	0.030	0.031	0.035	0.034	0.038	0.036	0.031	0.032
	$C_{b,ll}$	0.033	0.025	0.029	0.029	0.024	0.029	0.032	0.027	0.025
0.90	$C_{a,ll}$	0.045	0.034	0.035	0.039	0.037	0.042	0.040	0.035	0.036
	$C_{b,ll}$	0.029	0.022	0.027	0.026	0.021	0.025	0.029	0.024	0.022
0.85	$C_{a,ll}$	0.050	0.037	0.040	0.043	0.041	0.046	0.045	0.040	0.039
	$C_{b,ll}$	0.026	0.019	0.024	0.023	0.019	0.022	0.026	0.022	0.020
0.80	$C_{a,ll}$	0.056	0.041	0.045	0.048	0.044	0.051	0.051	0.044	0.042
	$C_{b,ll}$	0.023	0.017	0.022	0.020	0.016	0.019	0.023	0.019	0.017
0.75	$C_{a,ll}$	0.061	0.045	0.051	0.052	0.047	0.055	0.056	0.049	0.046
	$C_{b,ll}$	0.019	0.014	0.019	0.016	0.013	0.016	0.020	0.016	0.013
0.70	$C_{a,ll}$	0.068	0.049	0.057	0.057	0.051	0.060	0.063	0.054	0.050
	$C_{b,ll}$	0.016	0.012	0.016	0.014	0.011	0.013	0.017	0.014	0.011
0.65	$C_{a,ll}$	0.074	0.053	0.064	0.062	0.055	0.064	0.070	0.059	0.054
	$C_{b,ll}$	0.013	0.010	0.014	0.011	0.009	0.010	0.014	0.011	0.009
0.60	$C_{a,ll}$	0.081	0.058	0.071	0.067	0.059	0.068	0.077	0.065	0.059
	$C_{b,ll}$	0.010	0.007	0.011	0.009	0.007	0.008	0.011	0.009	0.007
0.55	$C_{a,ll}$	0.088	0.062	0.080	0.072	0.063	0.073	0.085	0.070	00.063
	$C_{b,ll}$	0.008	0.006	0.009	0.007	0.005	0.006	0.009	0.007	0.006
0.50	$C_{a,ll}$	0.095	0.066	0.088	0.077	0.067	0.078	0.092	0.076	0.067
	$C_{b,ll}$	0.006	0.004	0.007	0.005	0.004	0.005	0.007	0.005	0.004

† A crosshatched edge indicates that the slab continues across, or is fixed at the support; an unmarked edge indicates a support at which torsional resistance is negligible.

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B. Sc. Engineering (Civil)

Course Title: Environmental Engineering I — Course Code: CE 331
Time: 1 Hour — Full Marks: 40

Answer any eight out of nine questions. All questions are of equal value.

1. What are the general considerations for planning and design of a low-cost water supply scheme in developing countries?

2. Describe briefly the factors affecting per capita water consumption.

3. Briefly explain the problems of ground water development in Bangladesh?

4. Write a note on 'fluctuations in the rate of water consumption'; explaining its significance in the design of water works system.

5. Determine the future population of a satellite town by the geometric progression method for the year 2020 and 2035 from the following data:

Year	1970	1980	1990	2000
Population	96000	118000	145000	178000

Also calculate the fire demand for the population in 2035 by Kuichling's method.

6. A well penetrates into an unconfined aquifer having a saturated depth of 100 metres. The discharge is 260 litres per minute at 13 metres drawdown. Assuming equilibrium flow conditions and a homogeneous aquifer, estimate the discharge at 17 metres drawdown. The distance from the well where the drawdown influences are not appreciable may be taken to be equal for both the cases.

7. What is water-hammer? How can you reduce the water-hammer effect in water works practices?

8. The velocity of water flowing from a reservoir into a 1 m diameter steel pipe is 2.5 m/s. If a valve is situated in the pipe line at a point 2.5 km from the reservoir, evaluate water hammer pressure developed by the closure of this valve, if
   a) the closure time is 3 sec
   b) the closure time is 6 sec

   Take pipe shell thickness = 2.5 cm, $E_w = 21000$ kg/cm^2 and $E_p = 2100000$ kg/cm^2

9. What is an intake? What are the important considerations for designing an intake?

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination, Spring 2010
Program: B.Sc. Engineering (Civil)

Course No : CE 333 | Course Title: Environmental Engineering II
Full Marks : 60 | Time: 1.0 hour

There are **FOUR** questions. Answer any **THREE.**
[Assume reasonable value of missing data (if any)]

1.a) What are thy major functions of a sanitary system? What are the types of sanitary systems? Briefly discuss. *10*

b) Design a leach pit for both single and alternate twin off set pit pour-flush latrines serving a family of ten members. Water consumption of the family is 35 gpcd and the soil is a porous silty loam having the infiltration rate of 20 l/m2/day. *10*

2. a) Compare the advantages and disadvantages of SBS and Conventional sewerage system. In case of a densely populated low-income community which type of sewer system would you suggest? Justify your answer. *10*

b) Calculate the peak discharge from Area A1, A2 and A3 in the figure 1. If there any data missing, assume any reasonable value and do not forget to mention why you assumed it. *10*

3. a) Define the following terms, (i) Domestic sewage (ii) Sullage (iii) Sewer (iv) Trunk Sewer and, (v) Sewerage, (vi) Peak dry weather flow (vii) Peak wet weather flow *5*

b) Design a two compartment septic tank to serve a household of twelve persons having the water consumption rate of 100 lpcd. The tank is to be desludged in every three years. Assume, the design temperature for sludge digestion is 25 °C and sludge accumulation rate is 0.06 m^3/person/year. *15*

4. a) List the salient features of Hydraulic element diagram. *6*

b) What are the main controlling factors in case of establishing manhole location? *4*

c) What is the current practice in Bangladesh for selecting manhole location? Make some suggestion for improving this condition. *4*

d) Referring to the figure and the population information shown in the following plan of a mixed area, show the location of manholes and the discharge points of each locality on the plan. **Attach the following page with your answer script and show the manhole locations and discharge points on it.** *6*

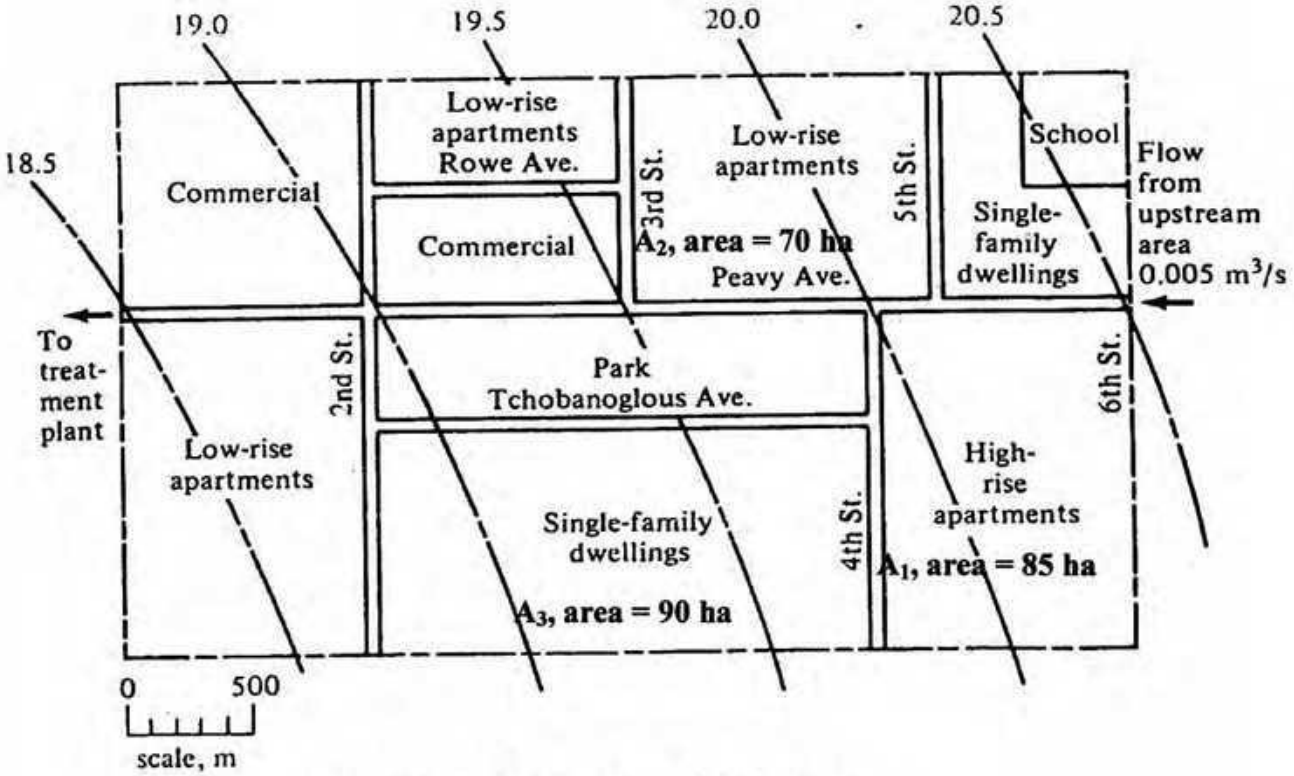


Figure 1 of Question 2.b) & 4.b)

Table: For population densities use the following data table

Zooning	Type of Development	Saturation population density, person/ha	Wastewater flow, L/capita/day
Residential	Single family dwellings	40	380
Residential	Duplexes	60	300
Residential	Low-rise apartments	120	220
Residential	Mixed housing	70	250

Formulae:

$V=V_h+V_d+1.4\ V_{sl}$
$V_{sc}= 0.4\ V_{sl}$
$t_h = 1.5 - 0.3 \log (Pq)$
$V_h =10^{-3}\ Pqt_h$
$t_d = 30\ (1.035)^{35-T}$
$V_d=0.5x10\text{-}3Pt_d$
$V_{sl}=C \times P \times N$
$d_{sc}=0.82-0.26A$

The University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Spring 2010
Program: B.Sc. Engineering (Civil)

Course Title: Transportation Engineering I **Course Code: CE 351** **Credit: 3.00**
Full Marks: 60 Time: 1 hr

*The figures in the right margin indicate full marks. There are **FOUR** questions. Answer any **THREE***

1. (a) Discuss the activities of the following Ministries and related department on transportation system's operation and maintenance in Bangladesh : (12)
   i) Ministry of Communication
   ii) Ministry of Civil Aviation and Tourism
   iii) Ministry of Shipping
   (b) What are the different methods of volume measurement? (6)
   (c) Write a short note on Contra Flow. (2)

2. (a) Briefly differentiate between (6)
   i) Recurrent delay and Non-recurrent delay
   ii) Running Speed and Journey Speed
   (b) What are the different factors that influence the development of transportation sector in global points of view? (12)
   (c) Write a short note on 85th Percentile speed. (2)

3. (a) Discuss briefly the various modes of transport. (10)
   (b) Classify and describe traffic signs according to function. (8)
   (c) How can you present the result of O-D survey? (2)

4. (a) Design a two-phase signal of an isolated cross-junction for the following data. Assume any other missing data (10)

	N – S	E – W
Inter-green (sec)	9	7
Lost time (sec)	3	2

	N	S	E	W
Arrival flow (PCU/hr)	760	550	600	700
Saturation flow (PCU/hr)	2000	1950	1800	1800

   (b) Describe different types of road markers. (8)
   (c) Write a short note on VMS. (2)

The University of Asia Pacific

Department of Civil Engineering

Mid-Term Examination Spring 2010

Course No : CE 361 | Credit Hour : 3.0

Time : 1 hour | Total Marks : 20

Answer all questions. The figures in the right margin indicate full marks.

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1. Why the velocity distribution in open channel flows is not uniform? *2.0*

2. Draw typical specific energy curve and mention its three properties *2.0*

3. Water flows at a depth of 2.5 m and a velocity of 1.60 m/s in a 4.5 m wide channel. Find (i) the width at contraction ($\mathbf{B_c}$)which just causes critical flow without a change in the upstream depth and (ii) the depth in the contraction when the width at the throat is 50 percent more (B= 1.50$\mathbf{B_c}$) than the above value. (ii) the depth in the contraction when the width at the throat is 50 percent smaller (B= 0.50$\mathbf{B_c}$) than the above value. *8.0*

4. A rectangular channel 3.0 m wide has a specific energy of 1.50 m when carrying a discharge of 8.0 m^3/s. Calculates the alternate depths. *4.0*

5 The depths in a short distance upstream and downstream of a sluice in a horizontal channel are 2.50 meter and 0.50 metre, respectively. The channel is rectangular and 2.00 metre wide. Find the discharge under the gate and determine the state of flow both upstream and downstream of the gate. Neglect energy losses and upstream water velocity is 1.28 m/s. *4.0*

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010

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

Answer all question

1. Describe the importance and engineering relevance of hydrology. (5)

2. At a climate station, the following measurements are made:air temperature = 15^0C, relative humidity = 35%, calculate the vapor pressure, specific humidity and air density. Assume standard atmospheric pressure = 101.3 kPa. (6)

3. Four rain gauges located within a rectangular area with four corners at (0,0), (0,13), (14,13) and (14,0) have the following coordinates and recorded rainfalls: (10)

Raingauge location	Rainfall (cm)
(2, 9)	1.5
(7, 11)	2.0
(12, 10)	2.4
(6, 2)	4.3

Find avg. precipitation using Theisen polygon

4. List the various data that are needed to use Penman's equation for estimating the potential evaporation from a given area. (6)

5. List different factors affect the evaporation from a water body. (6)

6. A reservoir had an average area of 20 km^2. In a particular month the mean rate of inflow = 10 m^3/s, outflow = 15 m^3/s, monthly rainfall = 10 cm and increase in storage = 16 million m^3. Assuming the seepage losses to be 1.8 cm, estimate the evaporation in that month. (6)

7. Explain: (4x3=12)
   i) methods for estimating the missing rainfall data at a station in a basin.
   ii) method for testing the consistency of rainfall records at a station and necessary adjustment.
   iii) how you would determine the optimum number of rain-gauges in a given basin.

8. Distinguish between: (3x3=9)
   a) Actual and potential evapotranspiration
   b) Field capacity and permanent wilting point
   c) Recording and non-recording rain gauges

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B. Sc Engineering (Civil)

Course Code: CE403 Course Title: Professional Practices and Communication
Credit: ~~3~~ 2.00 Time: 1.00 Hour Full Marks: 60 (= 20 × 3)

[Answer **any 03 (three)** of the following 04 questions]

1. a) What is a report? What are the objectives of writing a report? (2+5)

   b) Describe briefly the differences between 'Informational Reports' and 'Analytical Reports'. Give an example for each one of them. (7)

   c) Explain different parts of a standard report. (6)

2. a) Explain three steps of a standard writing process. (7)

   b) Point out three main purposes of writing. (3)

   c) Describe when oral communication is more advantageous than written communication. (5)

   d) How can 'Denotative Meaning' and 'Connotative Meaning' affect our writing? (5)

3. a) Draw a flow diagram of the communication process. (8)

   b) Explain the 7 C's of communication. (8)

   c) What are the qualities that impress the employer to be put into a standard resume? (4)

4. a) What is the role of a 'Source' in handling a crisis? Explain with example. (5)

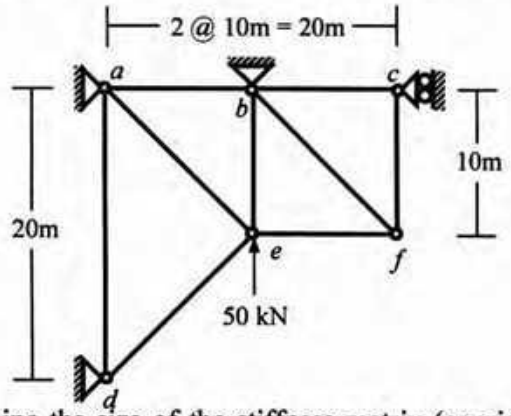
   b) Name the four basic categories of appeals to gain reader's attention. Write any four approaches of persuasive writing. (8)

   c) Explain briefly four basic steps of making effective oral presentation. (7)

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010 (Set B)

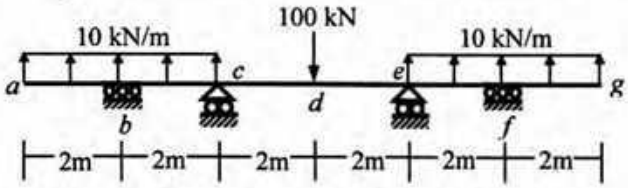
Course #: CE 411 — Course Title: Structural Engineering III
Full Marks: 40 (= 4 × 10) — Time: 1 hour

1. Use the Stiffness Method to calculate the horizontal and vertical deflections at joint *e* of the truss *abcdef* loaded as shown below [Given: S_x = constant = 7500 kN/m].



2. Determine the size of the stiffness matrix (considering boundary conditions also) of the beam shown below. Also determine the size of its stiffness matrix if axial deformations are neglected.

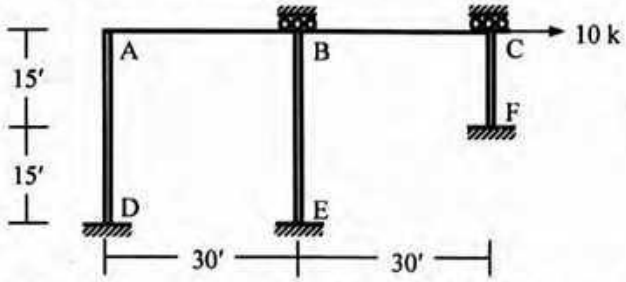
   Use the Stiffness Method (neglecting axial deformations) to calculate the rotation at *c* and vertical deflection at joint *d* of the beam if loaded as shown below [Given: EI = constant = 20,000 kN-m^2].



b and *f* are Guided Rollers

3. Determine the size of the stiffness matrix (considering boundary conditions also) of the frame shown below. Also determine the size of its stiffness matrix if axial deformations are neglected.

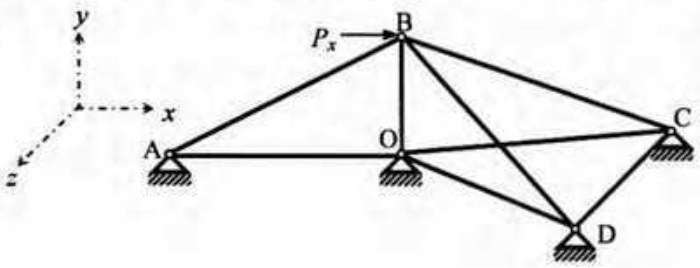
   Use the Stiffness Method (considering flexural deformations only) to calculate the horizontal deflection and rotation at joint A, if in addition to the applied load, support D settles 0.10 ft
   [Given: $EI_{Beams} = 40 \times 10^3$ k-ft^2, $EI_{Columns} = 80 \times 10^3$ k-ft^2].



B and C are Guided Rollers

4. Use the Stiffness Method to calculate applied force P_x in the truss OABCD shown below (with nodal coordinates), if it causes joint B to move 0.10 ft in the *x*-direction.

   Also calculate the deflections along the *y*- and *z*-axes [Given: S_x = constant = 500 k/ft].



Nodal Coordinates
O (0, 0, 0), A (-60, 0, 0), B (0, 30, 0),
C (60, 0, –30), D (60, 0, 30)

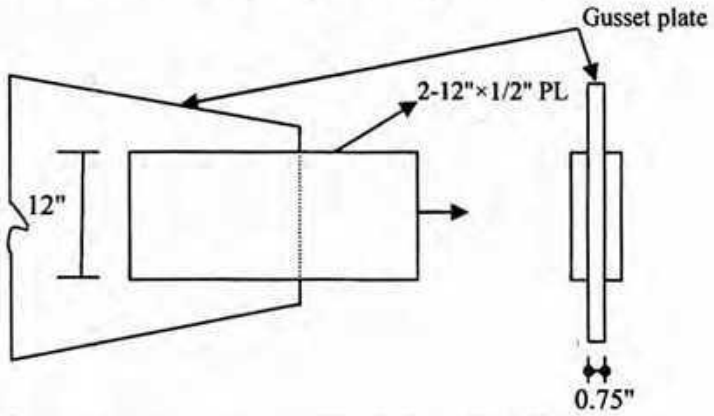
The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2010

Course #: CE 417 Course Title: Structural Engineering VI
Full Marks: 50 Time : 1 hr

Answer all the questions

1. Select the lightest single angled tension member for a roof truss of A 572 Grade 50 steel (F_y=50 ksi, F_u=65 ksi) using AISC/ASD method. The member is to be carried by DL=65 kips and LL=22 Kips and it is 12 ft long. Assume 7/8" diameter bolts are located on a single gage line in standard holes. Assume the preferable limit on slenderness ratio l/r is 240. Use U=0.85. *[Tables are attached]* [10]

2. Determine the number of bolts required and an appropriate layout to transmit DL =80 kips and LL= 200 kips through 2-12"×1/2" PL to a 0.75" gusset plate. [08]
Given: F_y=36 ksi, F_u=58 ksi, Allowable bolt shear stress= 21 ksi, Bolt dia=¾"
Solve the problem by AISC/ASD method.
(Don't need to check the capacity for tearing across the bolts.)



3.a. Draw Stress –strain curve for various types of steel. [03]

b. Define gage length (g). How can you find the gage length when bolts are staggered on two legs of an angle? Explain with sketches. [04]

c. List common ASTM structural bolt and write their minimum tensile strength. [03]

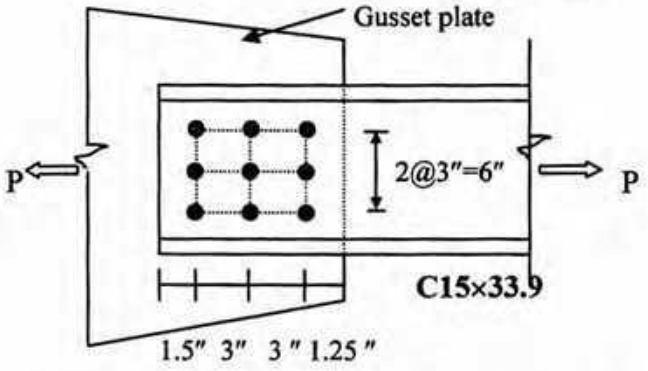
4. Determine the design load, P by **AISC/LRFD** for a single channel C15×33.9 (Gross area, A_g=9.96 in^2, web thickness, t_w=0.40″) connected a 0.5″ thick gusset plate as shown below. Holes are for 7/8″ diameter bolts and the plate is made from A36 structural steel(F_y=36 ksi, F_u=58 ksi). Assume design shearing strength in the bolts = 48 ksi. [14]

[Base answer on tension strength of the channel, bolt shearing, bearing of the plate and includes block shear strength.]

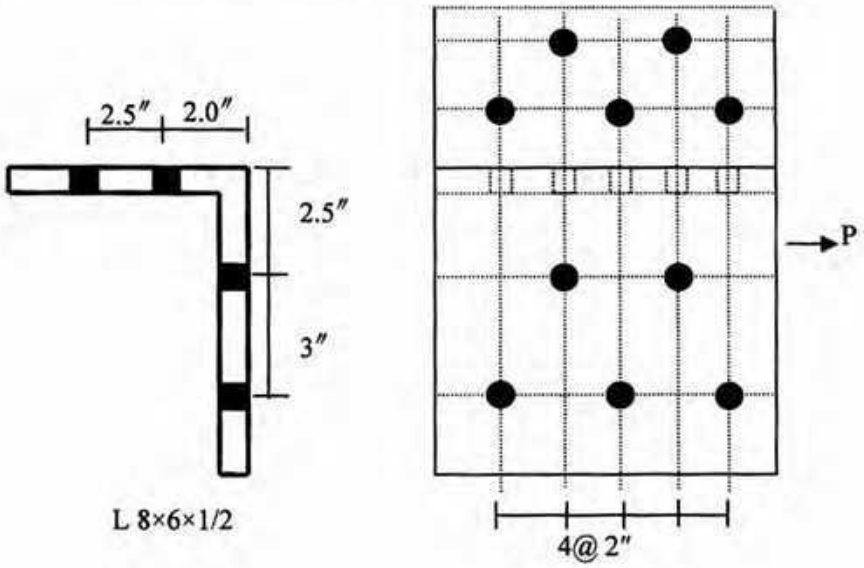
Given: Design strength on gross area, $\phi_t P_n = 0.9 F_y A_g$

Design strength on effective net area, $\phi_t P_n = 0.75 F_u A_e$

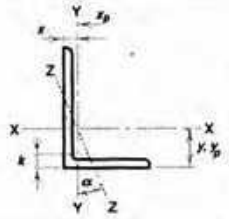
Design strength for block shear, $\phi R_n = \begin{cases} 0.75(0.60F_yA_{gv} + F_uA_{nt}) \\ 0.75(0.60F_uA_{nv} + F_yA_{gt}) \end{cases}$



5. A 8×6×1/2 angle is connected by two rows of ¾ in. bolts in the 8-in. leg and in the 6-in leg. Standard holes are used. Using **AISC/LRFD**, find the design tensile strength of the angle (Given:F_y=36 ksi, F_u=58 ksi). (08)

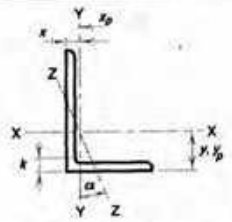


ANGLES
Equal legs and unequal legs
Properties for designing



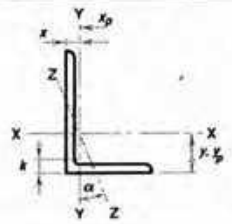
Size and Thickness	k	Weight per ft	Area	Axis X-X					
				I	S	r	y	Z	y_p
in.	in.	lb	in.^{2}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.
L6×6×1	1½	37.4	11.0	35.5	8.57	1.80	1.86	15.5	0.917
7/8	1⅜	33.1	9.73	31.9	7.63	1.81	1.82	13.8	0.811
¾	1¼	28.7	8.44	28.2	6.66	1.83	1.78	12.0	0.703
5/8	1⅛	24.2	7.11	24.2	5.66	1.84	1.73	10.2	0.592
9/16	1 1/16	21.9	6.43	22.1	5.14	1.85	1.71	9.26	0.536
½	1	19.6	5.75	19.9	4.61	1.86	1.68	8.31	0.479
7/16	15/16	17.2	5.06	17.7	4.08	1.87	1.66	7.34	0.422
3/8	7/8	14.9	4.36	15.4	3.53	1.88	1.64	6.35	0.363
5/16	13/16	12.4	3.65	13.0	2.97	1.89	1.62	5.35	0.304
L6×4×7/8	1⅜	27.2	7.98	27.7	7.15	1.86	2.12	12.7	1.44
¾	1¼	23.6	6.94	24.5	6.25	1.88	2.08	11.2	1.38
5/8	1⅛	20.0	5.86	21.1	5.31	1.90	2.03	9.51	1.31
9/16	1 1/16	18.1	5.31	19.3	4.83	1.90	2.01	8.66	1.28
½	1	16.2	4.75	17.4	4.33	1.91	1.99	7.78	1.25
7/16	15/16	14.3	4.18	15.5	3.83	1.92	1.96	6.88	1.22
3/8	7/8	12.3	3.61	13.5	3.32	1.93	1.94	5.97	1.19
5/16	13/16	10.3	3.03	11.4	2.79	1.94	1.92	5.03	1.16
L6×3½×½	1	15.3	4.50	16.6	4.24	1.92	2.08	7.50	1.50
3/8	7/8	11.7	3.42	12.9	3.24	1.94	2.04	5.76	1.44
5/16	13/16	9.80	2.87	10.9	2.73	1.95	2.01	4.85	1.41
L5×5×7/8	1⅜	27.2	7.98	17.8	5.17	1.49	1.57	9.33	0.798
¾	1¼	23.6	6.94	15.7	4.53	1.51	1.52	8.16	0.694
5/8	1⅛	20.0	5.86	13.6	3.86	1.52	1.48	6.95	0.586
½	1	16.2	4.75	11.3	3.16	1.54	1.43	5.68	0.475
7/16	15/16	14.3	4.18	10.0	2.79	1.55	1.41	5.03	0.418
3/8	7/8	12.3	3.61	8.74	2.42	1.56	1.39	4.36	0.361
5/16	13/16	10.3	3.03	7.42	2.04	1.57	1.37	3.68	0.303

ANGLES
Equal legs and unequal legs
Properties for designing



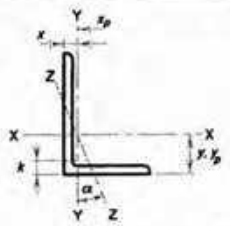
Size and Thickness	Axis Y-Y						Axis Z-Z	
	I	S	r	x	Z	x_p	r	Tan
in.	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.	α
L6×6×1	35.5	8.57	1.80	1.86	15.5	0.917	1.17	1.000
7/8	31.9	7.63	1.81	1.82	13.8	0.811	1.17	1.000
¾	28.2	6.66	1.83	1.78	12.0	0.703	1.17	1.000
5/8	24.2	5.66	1.84	1.73	10.2	0.592	1.18	1.000
9/16	22.1	5.14	1.85	1.71	9.26	0.536	1.18	1.000
½	19.9	4.61	1.86	1.68	8.31	0.479	1.18	1.000
7/16	17.7	4.08	1.87	1.66	7.34	0.422	1.19	1.000
3/8	15.4	3.53	1.88	1.64	6.35	0.363	1.19	1.000
5/16	13.0	2.97	1.89	1.62	5.35	0.304	1.20	1.000
L6×4×7/8	9.75	3.39	1.11	1.12	6.31	0.665	0.857	0.421
¾	8.68	2.97	1.12	1.08	5.47	0.578	0.860	0.428
5/8	7.52	2.54	1.13	1.03	4.62	0.488	0.864	0.435
9/16	6.91	2.31	1.14	1.01	4.19	0.442	0.866	0.438
½	6.27	2.08	1.15	0.987	3.75	0.396	0.870	0.440
7/16	5.60	1.85	1.16	0.964	3.30	0.349	0.873	0.443
3/8	4.90	1.60	1.17	0.941	2.85	0.301	0.877	0.446
5/16	4.18	1.35	1.17	0.918	2.40	0.252	0.882	0.448
L6×3½×½	4.25	1.59	0.972	0.833	2.91	0.375	0.759	0.344
3/8	3.34	1.23	0.988	0.787	2.20	0.285	0.767	0.350
5/16	2.85	1.04	0.996	0.763	1.85	0.239	0.772	0.352
L5×5×7/8	17.8	5.17	1.49	1.57	9.33	0.798	0.973	1.000
¾	15.7	4.53	1.51	1.52	8.16	0.694	0.975	1.000
5/8	13.6	3.86	1.52	1.48	6.95	0.586	0.978	1.000
½	11.3	3.16	1.54	1.43	5.68	0.475	0.983	1.000
7/16	10.0	2.79	1.55	1.41	5.03	0.418	0.986	1.000
3/8	8.74	2.42	1.56	1.39	4.36	0.361	0.990	1.000
5/16	7.42	2.04	1.57	1.37	3.68	0.303	0.994	1.000

ANGLES
Equal legs and unequal legs
Properties for designing



Size and Thickness	k	Weight per ft	Area	Axis X-X					
				I	S	r	y	Z	y_p
in.	in.	lb	$in.^2$	$in.^4$	$in.^3$	in.	in.	$in.^3$	in.
L5×3½×¾	1¼	19.8	5.81	13.9	4.28	1.55	1.75	7.65	1.13
⅝	1⅛	16.8	4.92	12.0	3.65	1.56	1.70	6.55	1.06
½	1	13.6	4.00	9.99	2.99	1.58	1.66	5.38	1.00
⅜	⅞	10.4	3.05	7.78	2.29	1.60	1.61	4.14	0.938
5/16	13/16	8.70	2.56	6.60	1.94	1.61	1.59	3.49	0.906
¼	¾	7.00	2.06	5.39	1.57	1.62	1.56	2.83	0.875
L5×3×½	1	12.8	3.75	9.45	2.91	1.59	1.75	5.16	1.25
7/16	15/16	11.3	3.31	8.43	2.58	1.60	1.73	4.57	1.22
⅜	⅞	9.80	2.86	7.37	2.24	1.61	1.70	3.97	1.19
5/16	13/16	8.20	2.40	6.26	1.89	1.61	1.68	3.36	1.16
¼	¾	6.60	1.94	5.11	1.53	1.62	1.66	2.72	1.13
L4×4×¾	1⅛	18.5	5.44	7.67	2.81	1.19	1.27	5.07	0.680
⅝	1	15.7	4.61	6.66	2.40	1.20	1.23	4.33	0.576
½	⅞	12.8	3.75	5.56	1.97	1.22	1.18	3.56	0.469
7/16	13/16	11.3	3.31	4.97	1.75	1.23	1.16	3.16	0.414
⅜	¾	9.80	2.86	4.36	1.52	1.23	1.14	2.74	0.357
5/16	11/16	8.20	2.40	3.71	1.29	1.24	1.12	2.32	0.300
¼	⅝	6.60	1.94	3.04	1.05	1.25	1.09	1.88	0.242
L4×3½×½	15/16	11.9	3.50	5.32	1.94	1.23	1.25	3.50	0.500
⅜	13/16	9.10	2.67	4.18	1.49	1.25	1.21	2.71	0.438
5/16	¾	7.70	2.25	3.56	1.26	1.26	1.18	2.29	0.406
¼	11/16	6.20	1.81	2.91	1.03	1.27	1.16	1.86	0.375

ANGLES
Equal legs and unequal legs
Properties for designing



Size and Thickness	Axis Y-Y						Axis Z-Z	
	I	S	r	x	Z	x_p	r	Tan α
in.	$in.^4$	$in.^3$	in.	in.	$in.^3$	in.	in.	
L5×3½×¾	5.55	2.22	0.977	0.996	4.10	0.581	0.748	0.464
⅝	4.83	1.90	0.991	0.951	3.47	0.492	0.751	0.472
½	4.05	1.56	1.01	0.906	2.83	0.400	0.755	0.479
⅜	3.18	1.21	1.02	0.861	2.16	0.305	0.762	0.486
5/16	2.72	1.02	1.03	0.838	1.82	0.256	0.766	0.489
¼	2.23	0.830	1.04	0.814	1.47	0.206	0.770	0.492
L5×3×½	2.58	1.15	0.829	0.750	2.11	0.375	0.648	0.357
7/16	2.32	1.02	0.837	0.727	1.86	0.331	0.651	0.361
⅜	2.04	0.888	0.845	0.704	1.60	0.286	0.654	0.364
5/16	1.75	0.753	0.853	0.681	1.35	0.240	0.658	0.368
¼	1.44	0.614	0.861	0.657	1.09	0.194	0.663	0.371
L4×4×¾	7.67	2.81	1.19	1.27	5.07	0.680	0.778	1.000
⅝	6.66	2.40	1.20	1.23	4.33	0.576	0.779	1.000
½	5.56	1.97	1.22	1.18	3.56	0.469	0.782	1.000
7/16	4.97	1.75	1.23	1.16	3.16	0.414	0.785	1.000
⅜	4.36	1.52	1.23	1.14	2.74	0.357	0.788	1.000
5/16	3.71	1.29	1.24	1.12	2.32	0.300	0.791	1.000
¼	3.04	1.05	1.25	1.09	1.88	0.242	0.795	1.000
L4×3½×½	3.79	1.52	1.04	1.00	2.73	0.438	0.722	0.750
⅜	2.95	1.16	1.06	0.955	2.11	0.334	0.727	0.755
5/16	2.55	0.994	1.07	0.932	1.78	0.281	0.730	0.757
¼	2.09	0.808	1.07	0.909	1.44	0.227	0.734	0.759

CE 433

Environmental Engineering IV (Environmental Pollution and Its Control)

Mid-Term Examination, Spring – 2010

(There are **five** questions. Answer any **four** of them)

Total Marks: **50** Time: 60 minutes

1. a) What are the major sources of air pollution? **5**
   b) Draw a schematic diagram to illustrate "Air Pollution System". **5**

2. a) Classify the pollutants according to their origin? **4**
   b) Define "criteria pollutants". Write the name of the criteria pollutants? **4**
   c) What are the purposes of Air Quality Index (AQI)? **2**

3. a) What is aerodynamic diameter of particulate matter? **3**
   b) Sulfur di-oxide concentration of a typical summer day at Dhaka is 250 μg/m3. Express the concentration in **ppm** unit. **7**

4. a) Draw a typical size distribution curve for particulate matter. Why particulate matter of anthropogenic sources is more dangerous? **7**
   b) Why SOx is particularly harmful in dusty atmosphere? **3**

5. a) Explain the health effects of carbon mono-oxide. **6**
   b) Define "thermal NOx" and "fuel NOx". **4**

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2010
Program: B. Sc Engineering (Civil)

Course Title: Environmental Impact Assessment — Course Code: CE 439
Time : 1.00 Hour — Credit Hours: 2.0 — Full Marks: 60 (= 15 × 4)

There are 5 (Five) questions. Answer any 4 (Four).

1. (a). Define environmental aspects & impacts with three examples. (06)
   (b). Describe briefly the objectives of EIA process. (09)

2. State the kinds of EIA methodology and describe the checklist method briefly. (15)

3. What are the major environmental issues facing Bangladesh? (15)

4. (a). Why is the environmental conservation rules needed to develop? (04)
   (b). State the elements of environmental conservation rule-1997. (06)
   (c). Mention the water quality parameters which are applicable for textile unit as per ECR-1997 (05)

5. What are the steps to get the environment clearance for a red category factory ? Describe them in brief. (15)

The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination
CE 461: Irrigation and Floof Control
Spring 2010

Time: 1 hour | Total Marks: 60

Section A

Answer all question

1. Define the following (any Four) (10)
   a. Water application efficiency
   b. Optimum Utilization of Irrigation water
   c. Consumptive Irrigation Requirement
   d. Net Irrigation Requirement
   e. Effective Rainfall
   f. Soil-moisture-Irrigation relationship

2. Sketch the typical layout of a canal system. (4)

3. What are the different ways in which the irrigation canals can be aligned? (4)

4. Find the relationship between discharge through an irrigation system, the average depth of water, the rate of infiltration, the area of the land irrigated and the approximate time required to cover the given area with irrigation. Also find the maximum area that can be irrigated with the supply. (5)

5. Write two advantages and two disadvantages of irrigation. What is meant by 'Duty' and 'Delta'? Derive a relationship between duty and delta for a given base period. (2+2+2)

6. An irrigation canal has gross commanded area of 80,000 hectares out of which 85% is cultivable irrigable. The intensity of irrigation for Kharif season is 30% the Duty at its head is 800 hectares/cumecs for Kharif season and 1700 hectares/cumec for Rabi season. Find the discharge required at the head of the watercourse(Rabi – 60%) (6)

7. Sketch a typical cross section of an irrigation canal. What are the purposes of having berms in an irrigation canal? (2+3)

Section B

Answer Question #1 and any ONE from the rest

1. Explain the following (any FOUR) (10)
   - i) Measurable characteristics of flood
   - ii) Return period
   - iii) Drainage congestion
   - iv) Design flood
   - v) Flood plain

2. Write short note on impacts of flood. (10)

3. What are the types and causes of flood in Bangladesh? (10)

The University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination, Spring 2010

Course No : CE 531 Credit Hour : 2.0
Time : 1 hour Total Marks : 20

Name:.....Registration No:.....

Roll No:.....

Instructions:
1. Answer all questions.
2. Call your teacher whenever you finish the task.
3. The figures in the right margin indicate full marks.

(6+1+2+1=10)

1. Add a theme called **districts.shp** to your view. The theme contains 64 districts in Bangladesh. The Department of Environment (DoE) wants to prepare a map of arsenic affected districts in Bangladesh. The districts may be divided into three zones:
(a) Red (**highly affected**) (b) Yellow (**affected**) (c) Green **(not-affected)**.

The status of 64 districts are as follows (For data entry go first top to down, and then left to right)

Red	Yellow	Red	Green	Green
Green	Red	Yellow	Red	Red
Red	Green	Red	Green	Red
Green	Red	Yellow	Red	Yellow
Yellow	Red	Green	Yellow	Green
Red	Yellow	Red	Green	Green
Green	Red	Yellow	Red	Red
Red	Green	Red	Green	Red
Red	Red	Yellow	Red	Green
Green	Red	Yellow	Red	Red
Red	Green	Red	Green	Red
Red	Red	Yellow	Red	Yellow
Yellow	Red	Green	Yellow	-

(a) Prepare a map of arsenic affected districts in Bangladesh.

(b) Give the theme name as "level".

(c) Create a layout which should contains the followings,

(i) Title Name : Arsenic Affected District in Bangladesh
(ii) Scale bar
(iii) North Arrow
(iv) Chart which you previously developed
(v) A photo (attached herewith as a photo.jpg file)

(d) Export the file as Windows Bitmap

4

2. The UAP campus (campus.gif) is situated at Dhaka, Khulna and Sylhet districts. Hot link UAP proposed permanent campus building at those areas.

6

3. Please create an EXCEL dbf file called population. Add this table to the main table. Create a chart showing the relation between 'code' and 'district'.

code	Popn*1000		Pop*1000	Popon*1000		Population*1000	Population*1000
1	253		23	215		45	362
2	255		24	221		46	370
3	221		25	225		47	605
4	360		26	362		48	380
5	260		27	370		49	465
6	536		28	605		50	215
7	215		29	380		51	221
8	221		30	465		52	225
9	225		31	215		53	465
10	362		32	221		54	229
11	370		33	225		55	253
12	605		34	465		56	255
13	380		35	229		57	221
14	465		36	225		58	360
15	229		37	252		59	260
16	225		38	312		60	536
17	252		39	523		61	215
18	312		40	412		62	221
19	523		41	695		63	225
20	412		42	112		64	362
21	695		43	465			
22	112		44	229			

The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Spring 2010
Program: B. Sc. Engineering (Civil)

Course Title: Chemistry | Course Code: CHEM 111
Time: 1 Hour | Full Marks: 40

There are FIVE Questions. Answer any **FOUR.**

1	(a) Distinguish between (i) internal energy (E) and (ii) enthalpy (H).	5.0
	(b) Show that, for a solid, ΔE and ΔH are equal.	5.0
2	(a) What is thermochemical equation? Give two examples.	5.0
	(b) Define heat of solution. Show the thermochemical equations for the dissolution of KCl and $MgSO_4$.	5.0
3	(a) State and explain the thermochemical law of Lavoisier and Laplaces.	5.0
	(b) Show that heat of neutralization of strong acid and strong base is always equal.	5.0
4	(a) What are proton number and mass number? How are they related?	5.0
	(b) Uranium has atomic number 92 and atomic weight 238.029. Find its number of fundamental particles.	5.0
5	(a) What is Hund's rule? Show the application of Hund's rule in the electronic distribution of nitrogen (N) atom.	5.0
	(b) Write the electronic configurations of O^{3-} and O^{2+} ions.	5.0

The University of Asia Pacific
Department of Civil Engineering

Mid -Semester Examination, Spring - 2010
Program: B. Sc Engineering (2nd Year 1st Semester)

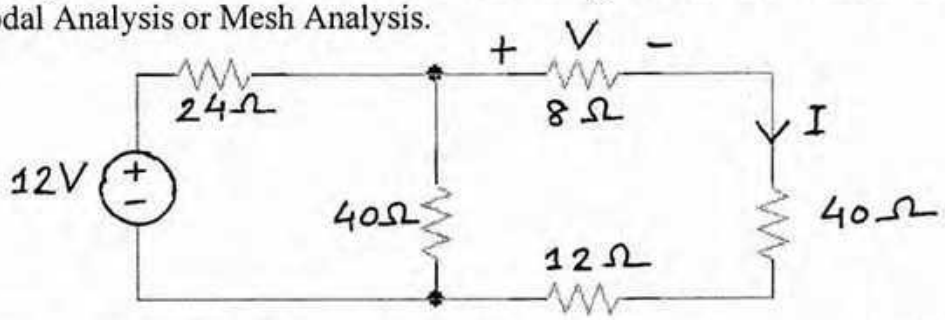
Course Title: Basic Electrical Engineering
Course Code: ECE 201

Time: 1.00 Hour **Credit Hours: 3.00** **Full Marks: 60**

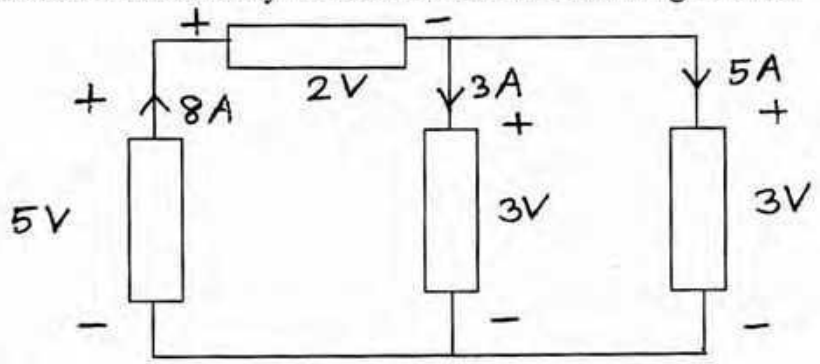
[There are four questions. Answer any three. Figures in the right margin indicate marks]

Q1. (a) State and Explain KVL and KCL. What do you mean by Open Circuit and Short Circuit? 10

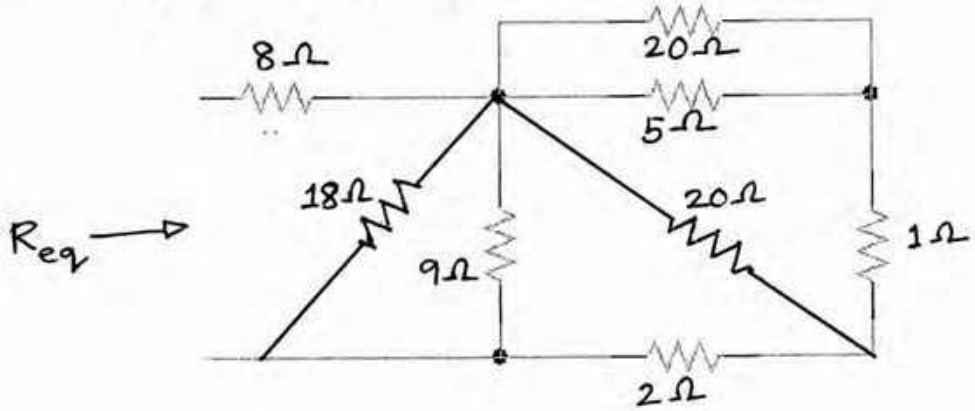
(b) Find I_x and then find I and V in the following circuit. You cannot use Nodal Analysis or Mesh Analysis. 10



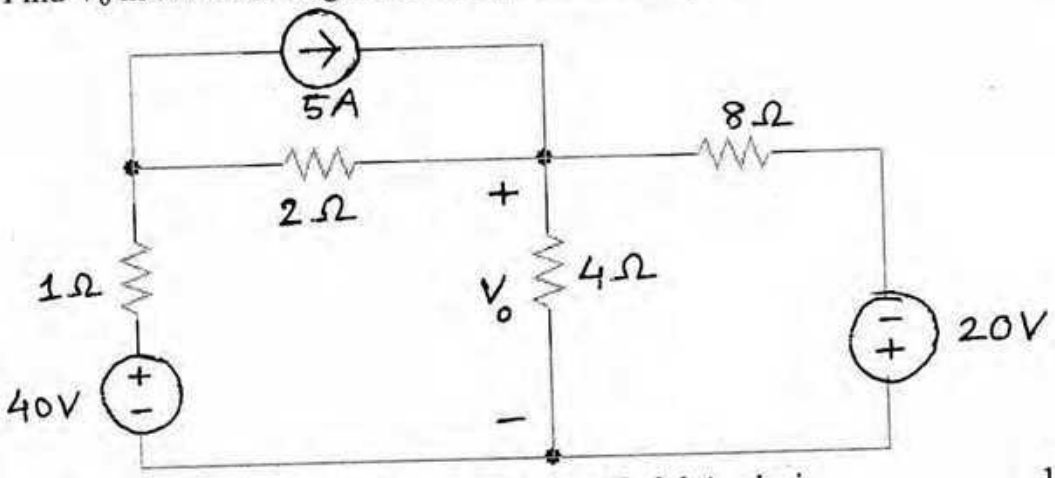
Q2. (a) Show that the Total Power Absorbed by the elements is equal to the Total Power Delivered by the elements in the following circuit. 08



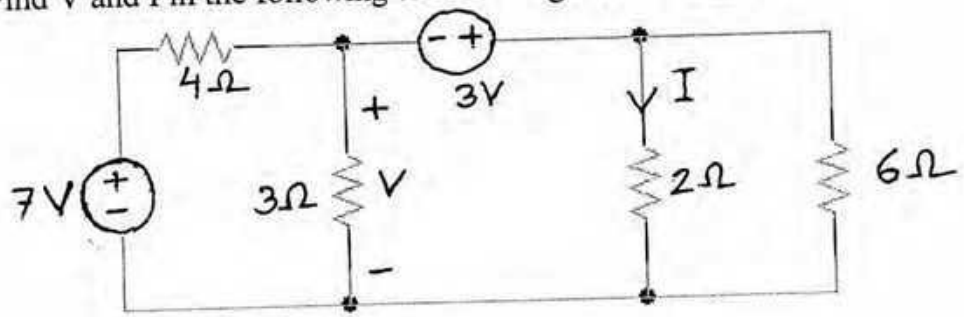
(b) Find R_{eq} in the following circuit. 12



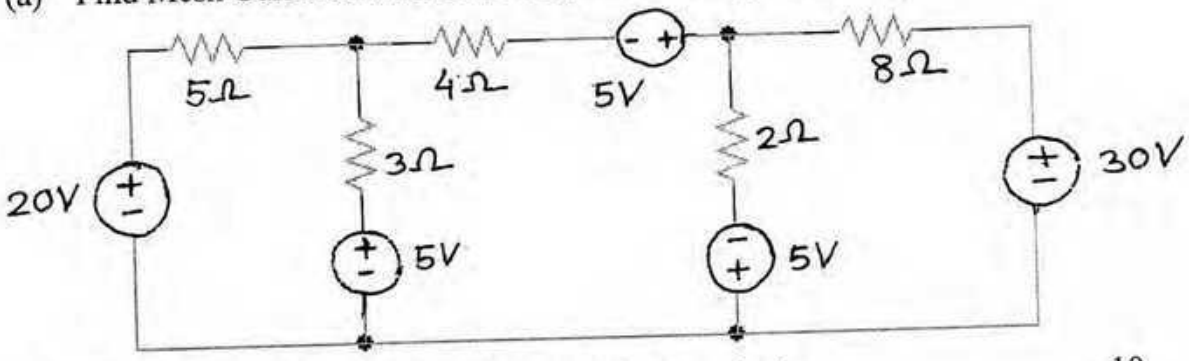
Q3. (a) Find V_o in the following circuit using Nodal Analysis. 10



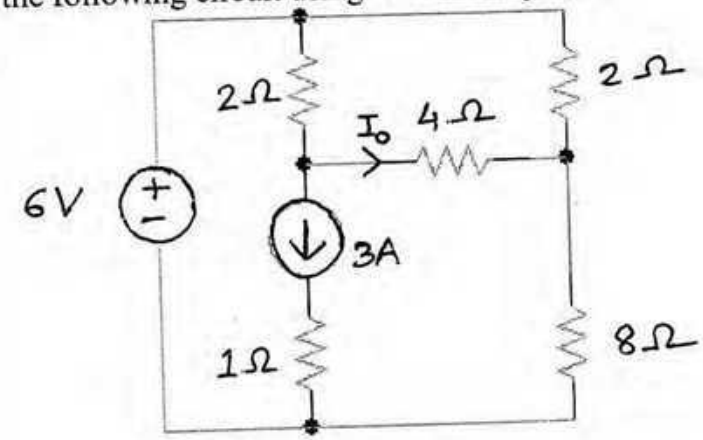
(b) Find V and I in the following circuit using Nodal Analysis. 10



Q4. (a) Find Mesh Currents in the following circuit using Mesh Analysis. 10



(b) Find I_o in the following circuit using Mesh Analysis. 10



The University of Asia Pacific
Dept. of Civil Engineering
Midterm Examination
Spring Semester 2010
Program: B.Sc.

Course Title: Principles of Economics | Course Code: ECN-201 | Credit: 2
Time: 2.00 Hour | Full Marks: 20

Answer any TWO of the following Questions (No. 1 - 4) ***Marks: 10 x 2 = 20***

1. a) Explain- 'Economics is the science of choice'. *[3+3+4]*
   b) Distinguish between microeconomics and macroeconomics?
   c) Describe the circular flow of economic activities with a diagram.

2. a) Why is the term 'opportunity cost' so important in the decision-making process of any business? *4+6]*
   b) How can you use the idea of 'production possibilities frontier' in measuring opportunity cost?

3. a) Define 'supply' as an economic terminology. *[3+4+3]*
   b) Describe the 'law of supply' with some of its exceptions.
   c) What factors cause rightward shift of a supply curve?

4. a) What is market equilibrium? Explain with a figure. *[4+4+2]*
   b) Describe the major determinants of demand.
   c) Draw an initial equilibrium and then show the effect of technological change and increasing competition in real estate market of Dhaka city.

Marks Obtained

Signature of Examiner/Date

The University of Asia Pacific
Mid Term Examination
Spring 2010
Course No.: HSS 101
Course Title: English Language 1

Signature of Invigilator
Date:

Time: 1 hour **Full marks: 20**

Name:

Registration no.:

Department:

Write all answers on the question paper

Q. 1. The following extract is about *Jim Allen.* Read and complete the questions. 2.5

"Hello. My name's Jim Allen and I come from the North of England, near Manchester. I live in a village just outside the city. I live alone now, because my wife died three years ago. But I 'm near my daughter and her family, so that's ok. Until last year, I worked in a paper factory, but now I'm tired. I never liked my job much but now I'm really enjoying life! I'm a student again. I'm studying with the University of the Third Age. It helps retired people like me who want to study again, and it's really wonderful. You see, I left school when I was 15 and started work in the factory, because we needed the money. Now I'm studying Spanish. I love it. My son lives in Spain with his wife. Next year I'm going to visit them for six months, so I want my Spanish to be good."

a. ---------- live?

b. When----------his wife---------- ?

c. Who ----------help?

d. Why----------?

e. What ---------- next year?

Q.2. Complete the following passage using appropriate forms of Pronouns (any five) 2.5

Last night we were talking about a friend of (a) ----------named Nina. She comes from a good family but (b)----------has made (c)---------- unpopular by quarrelling with others.(d)---------- think (e)---------- should leave this habit of (f)----------.

Q.3. Complete the following passage using *any, a little, some, a few*, etc. **2.5**

So, we're going to make summer pudding. We've got ---------- nice fruit. First, wash the fruit and put it in a saucepan with ---------- sugar. Add ---------- water. Then cook the fruit for ---------- minutes. Try the fruit and add ----------more sugar, if you need it.

Q.4. Complete the following sentences with negatives. (Any five) **2.5**

a. They are homeless. They----------.
b. The boy is old enough to know that the sun ----------west.
c. She knows how to write sentences in English but----------fluently.
d. Good students----------.
e. Last year she completed her studies but----------yet.
f. A fish----------wings.
g. She has written the letter but----------it.

Q.5. Complete the following sentences using appropriate preposition. (Any three) **3**

a. Lisa was looking ---------the window --------- the busy street.
b. It's my holiday ---------- next week and we are going to Sylhet----------train.
c. She is free ---------- the 15 March but busy --------the moment.
d. She was looking---------- the bag she had lost. She has some money ------it

Q.6. Write a biography of Bill Gates, one of the most influential people of this age, from the information below **7**

Name : William Henry Gates
Date of birth ; 28-10-1955
Place of birth : Seattle, Washington

Education : Lakeside School
1973 –got admitted at Harvard University but left in his junior year
Gates Details:

***1975**: Co- founded the Microsoft Company with friend Paul Allen.*
***2000**: founded the Bill and Melinda Gates Foundation –one of the world's largest charitable foundations*
***2005**: received "honorary" knighthood from Queen of England*
***2006**: with an estimated wealth of $53 billion became the richest man in the world.*
***2008**: retired as Microsoft CEO*

Family:

Parents: (father-William H. Gates, an attorney
Mother-Mary Maxwell -- a teacher)

Wife-Melinda Gates
3 children-Jennifer, Rory and Phoebe

Start writing from here:

The University of Asia Pacific
The Department of Interdepartmental Courses
Mid Semester Examination, Spring 2010
Programme: BArch, BBA, BSc Engineering (CE, CSE, EEE)

Course Title: Bangladesh Studies: Society and Culture **Course Code: HSS 111(a)**
Credit: 2:00 **HSS 211(a) [for CE]**

Time: 1 Hour **Full Marks: 20**

All questions are of equal value

Answer ANY FOUR of the following

1. Define Sociology? What is the focus of Sociology?
2. Mention the branches of Sociology. Discuss on any two branches of Sociology.
3. Briefly discuss on any two research methods taken from secondary sources.
4. Define social survey. How do you conduct a social survey?
5. Discuss in brief the characteristics of human society.
6. Define association and institution. Distinguish between the two.

THE UNIVERSITY OF ASIA PACIFIC

Mid-Term Examination, Spring 2010
Course Title: Bangladesh Studies: History of Bangladesh
Course No. HSS 111(b), HSS 211(b)
Department of BBA, CSE, CE & EEE
Credit 2.00

Full Marks: 20 **Times: 1 hour**

Answer any four of the following questions: **(4X5=20)**

1. What is *janapada*? Write the names of the principle *janapadas* of ancient Bengal with its present location.
2. Give a short description of the Vanga *janapada*.
3. Who was Shashanka? Discuss his achievements in the history of ancient Bengal?
4. What is Matsyanyayam? How did Gopala succeed to end it?
5. Briefly describe the tripartite struggle during Dharmapala's reign.
6. Give a short account of the Sena kings in Bengal.

The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination, Spring – 2010

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

Time: 1 hour **Total Marks: 30**

Answer any **three** out of the following **four** questions:

1. a) Define Management and briefly discuss the Management Process. (5)
   b) List all the skills that a manager must possess and discuss only four (4) of them with examples. (5)

2. a) What is business environment? Identify and discuss the dimensions of Task Environment with Bangladeshi examples. (10)

3. a) What is organizational culture and where does it come from? (4)
   b) Explain the various factors of Internal Environment of an organization. (6)

4. a) Briefly write about the purposes of Goals. (5)
   b) With a diagram only show the Planning Process and explain kinds of goals according to Level. (5)

Good Luck

THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid Semester Examination Spring-2010
Program: B.Sc. Engineering (CE)

Course Title: Math-I **Course Code: MTH-101** **Credit: 3.00**
Time: 1.00 Hr. **Full Marks: 20**

Answer any four of the following questions: **4×5 = 20**

1. If the equality of limiting value and functional value, define continuity and functions given below as 1+1+1+2=5

$$f(x) = \frac{x^2-4}{x-2};\ g(x) = \begin{cases} \frac{x^2-4}{x-2}, & x \neq 2 \\ 3, & x = 2 \end{cases};\ h(x) = \begin{cases} \frac{x^2-4}{x-2}, & x \neq 2 \\ 4, & x = 2 \end{cases}$$

a) Draw the graph of the three functions.
b) Find the domains and ranges of these functions.
c) Find the limit of these above functions at $x = 2$.
d) Determine whether the above functions are continuous at $x = 2$.

2. a) If $y = a\sin(\ln x) + b\cos(\ln x)$ then show that 3+2=5
$x^2y_{m+2} + (2m+1)xy_{m+1} + (m^2+1)y_m = 0$ using Leibniz's theorem.
b) Find the n^{th} derivative of the following functions $y = (ax + b)^m$.

3. a) State Rolle's theorem. Discuss the application of Rolle's theorem for the function $f(x) = x^2$ in $(-1, 1)$. 3+2=5
b) Verify mean value theorem for the function $f(x) = \sqrt{25 - x^2}$ in the interval $[-5,3]$.

4. Let $f(x) = e^{\sin x}$ can be differentiated n times. 2.5+2.5=5
a) Find the first four Taylor polynomials at $x = \frac{\pi}{2}$.
b) Find the Maclaurin polynomials.

5. Evaluate (any two): 2.5+2.5=5
i) $\lim_{x\to 0} \frac{1-\cos x}{x^2}$ ii) $\lim_{x\to 0^+} \left(\frac{1}{x} - \frac{1}{\sin x}\right)$ iii) $\lim_{x\to 0} (e^x + x)^{\frac{1}{x}}$

6. Find the intervals where the function $f(x) = x^4 + 2x^3 - 3x^2 - 4x + 4$ is increasing and decreasing. Also find the maximum and minimum values of y.

THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid-Semester Examination Spring - 2010
Program: B.Sc. Engineering (CE)

Course Title: Math-II **Course Code: MTH-103** **Credit: 3.00**
Time: 1.00 Hr. **Full Marks: 20**

Answer any four of the followings: **4×5 = 20**

1. a) How differ unit vector from vector? Explain it..
   b) Prove that, the diagonals of a parallelogram bisect each other.

2. a) Determine a unit vector perpendicular to the plane of $\vec{A}=2\vec{i}-6\vec{j}-3\vec{k}$ and $\vec{B}=4\vec{i}+3\vec{j}-\vec{k}$
   b) Prove that diagonals of a rhombus are perpendicular.

3. a) How can you define ordinary derivatives of vectors.
   b) A particle moves along the curve $x = 2\sin 3t$, $y = 2\cos 3t$, $z = 8t$, where t is the time. Find the magnitude of the velocity and acceleration at time t and also at $t = 0$.

4. a) Define nabla and the gradient . $\vec{\nabla}\varphi$ defines a vector field, justify it using $\varphi(x,y,z) = 3x^2y - y^3z^2$ at the point (1, -2, -1).
   b) If $\vec{\nabla}U = 2r^4\vec{r}$ then find U.

5. a) The acceleration of a particle at any time $t \geq 0$ is given by,
   $$\vec{a}=\frac{d\vec{v}}{dt} = 12\cos 2t\,\hat{i} - 8\sin 2t\,\hat{j}+16t\,\hat{k}$$
   If the velocity and displacement are zero at t=0. Find $\vec{v}$ and $\vec{r}$ at any time.
   b) Evaluate $\int_0^{\pi/2}\left(3\sin u\,\hat{i}+2\cos u\,\hat{j}\right)du$

6. a) Write down the statement of Green's theorem. Verify Green's theorem in the plane for $\oint_c\left(xy+y^2\right)dx + x^2dy$, where c is the closed curve of the region bounded by $y = x$ and $y = x^2$.
   b) Evaluate $\iint_s \vec{r}.\vec{n}\,ds$, where S is a closed surface.

THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid-Semester Examination 'Spring-2010
Program: B.Sc. Engineering (CE)

Course Title: Math-III **Course Code: MTH-201** **Credit: 3.00**
Time: 1.00 Hr. **Full Marks: 20**

There are Two questions, Answer any 01(One) of the following questions:

Q.1. (a) Find the Standard deviation, Quartile deviation, the coefficient of quartile for the following data:

Class Interval	60-62	63-65	66-68	69-71	72-74
Frequency	5	18	42	19	27

(b) Calculate first four central moments for the above data.

Q.2.(a) Find Arithmetic mean, Median, Mode for the following data:

Class Interval	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	11	20	35	20	8	6

(b) Calculate first four moments about mean of 2,3,7,9,12

There are Four questions, Answer any 03(Three) of the following questions

Q.3. (a) If $A = \begin{pmatrix} 1 & 1+i & 2+3i \\ 1-i & 2 & -i \\ 2-3i & i & 0 \end{pmatrix}$ Show that A and the conjugate of A is Hermitian.

(b) Given $A = \begin{pmatrix} 1 & 1 & -1 \\ 2 & 0 & 3 \\ 3 & -1 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 3 \\ 0 & 2 \\ -1 & 4 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 2 & 3 & -4 \\ 2 & 0 & -2 & 1 \end{pmatrix}$ verify that (AB)C=A(BC).

Q.4. (a) Verify that the product of conjugate of A and A is symmetric where $A = \begin{pmatrix} 1 & 1+i & 2+3i \\ 1-i & 2 & -i \\ 2-3i & i & 0 \end{pmatrix}$.

THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid-Semester Examination Spring - 2010
Program: B.Sc. Engineering (CE)

Course Title: Math-IV **Course Code: MTH-203** **Credit: 3.00**
Time: 1.00 Hr. **Full Marks: 20**

Answer any four of the followings: **4×5 = 20**

1. a) Define Laplace transform. Using integration by parts evaluate
   i) $L\{e^{at}\}$ ii) $L\{\sin at\}$
   b) If $L\{F(t)\} = f(s) = \int_0^\infty e^{-st}F(t)dt$, then $L\{F''(t)\} = s^2f(s) - sF(0) - F'(0)$

2. a) Answer the followings:
   i) $L^{-1}\left\{\frac{1}{s^{\frac{3}{2}}}\right\}$ ii) $L\{e^{4t}\sin 3t\}$ iii) $L\{t^2e^{-3t}\}$
   iv) $L^{-1}\left\{\frac{s-2}{(s-2)^2-16}\right\}$
   b) Evaluate i) $L^{-1}\left\{\frac{5s+4}{s^3} - \frac{2s-18}{s^2+9} + \frac{24-18\sqrt{s}}{s^3}\right\}$ ii) $L^{-1}\left\{\frac{6s-4}{s^2-4s+20}\right\}$

3. State and Prove convolution theorem.

4. a) Solve $Y''(t) + 4Y(t) = 9t$, $Y(0) = 0$, $Y'(0) = 7$ and also check it.
   b) Solve $\begin{cases} X'(t) = 2X - 3Y \\ Y'(t) = Y - 2X \end{cases}$ subject to $X(0) = 8$, $Y(0) = 3$.

5. a) Define order and degree of a differential equation. Form the differential equation in the following cases:
   i) $c(y + c)^2 = x^3$ ii) $y = a e^{2x} + b e^{-3x} + c e^{x}$ (a, b, c parameters)
   b) Find the differential equation of all circles passing through the origin and having their centers on the y-axis.

6. Solve of the followings:
   i) $\frac{dy}{dx} = e^{x-y} + x^2e^{-y}$ ii) $(x+y)^2\frac{dy}{dx} = a^2$ iii) $(x^2+y^2)dx = 2xy\,dy$

The University of Asia Pacific
Department of Interdepartmental Courses
Mid Semester Examination Spring- 2010
Program: B.Sc Engineering (CSE/CE/ARCH)

Course Title: Physics I | Course Code: PHY-101 | Credit: 3.00
Time: 1.00 Hour | Full Mark: 40

There are Six Questions. Answer any four

1. Find out the relation between elastic constants K, Y & σ and prove that
$$K=\frac{Y}{3(1-2\sigma)}$$ 10

2. (a) What is called elastic fatigue and modulus of Rigidity? 3

(b) Find the total work done in stretching a wire 1.5 sq mm cross section and 3 m long through 0.4 mm. ($Y=3\times10^{12}$ n/m^2) 7

3. Describe the construction and working principle of constant volume air thermometer. 10

4. (a) State and explain the first law of thermodynamics. 6

(b) Calculate the RMS velocity of the oxygen molecules at 27^0C. 4

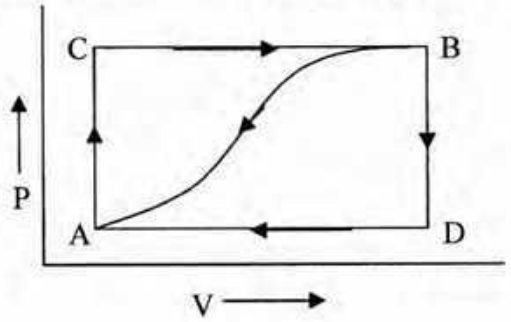
5. (a) Show that the work done during an isothermal process is $W = RT\times2.3026\times\log_{10}\frac{P_1}{P_2}$ 6

(b) At what Celsius temperature, oxygen molecules will have the same root mean square velocity as that of hydrogen molecules at -100^0C ? 4

6. (a) State the equipartition theorem. Show that the average kinetic energy associated with each degree of freedom is $\frac{1}{2}$KT , where the symbols have their usual meaning. 6

(b) When a system is taken from the state A to the state B, along the path ACB, 80 joules of heat flows into the system and the system does 30 joules of work. 4

(i) How much heat flows into the system along the path ADB, if the work done is 10 joules.
(ii) The system is returned from the state B to the state A along the curved path. The work done on the system is 20 joules. Does the system absorb or liberate heat and how much.
(iii) If $U_A = 0$, $U_D = 40$ joules, fid the heat absorbed in the process AD and DB.



(b) Find the Rank of A where $A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \\ -1 & 3 & -4 & 7 \end{bmatrix}$.

Q.5. Find the Inverse of $A = \begin{bmatrix} 3 & -2 & -1 \\ -4 & 1 & -1 \\ 2 & 0 & 1 \end{bmatrix}$ hence verify that the product of the inverse of A and A is Identity matrix.

Q.6 (a) Compute the adjoint of $\begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{pmatrix}$.

(b) If $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$ show that $A^2 - 4A - 5I = 0$