University of Asia Pacific
Department of Civil Engineering
Final Examination (Fall 2014)
Program: B.Sc. Engg(3rd year 1st semester)

Course Title: Principles of Accounting **Course: ACN 301** **Credit Hours: 2.0**
Time : 2 hrs. **Full marks : 50**

(Answer any four from the followings)

Q.1. Superior Development Company Ltd. has the following cost and expense data for the year ended December 31, 2014.

Raw Material, 1/1/14	$30,000	Factory Insurance	$14,000
Raw Material, 31/12/14	20,000	Factory –Property tax	6,000
Finished Goods, 1/1/14	110,000	Raw material purchases	205,000
Finished Goods, 31/12/14	120,000	Administrative Expense	300,000
Work in process, 1/1/14	80,000	Sales (Net)	1,500,000
Work in process, 31/12/14	50,000	Utilities, Factory	65,000
Direct labor	350,000	Delivery Expense	100,000
Indirect labor	90,000	Sales commission	150,000
Indirect material	15,000	Machine rent, Factory	40,000
Factory Manager's Salary	35,000	Depreciation, Factory Building	24,000

INSTRUCTION:

A. **Prepare a cost of goods manufactured schedule for Superior Development Company Ltd.for the year ended, December 31, 2014.** **(6.5)**
B. **Prepare an income statement for the year ended, December 31, 2014.** **(6.0)**

Q.2. On May 31, 2012, Sabre Company had a cash balance per books of $6,781.50. The bankstatement from New York State Bank on that date showed a balance of $6,404.60. A comparisonof the statement with the cash account revealed the following facts.

a. The statement included a debit memo of $40 for the printing of additional company checks.
b. Cash sales of $836.15 on May 12 were deposited in the bank. The cash receipts journal entry and the deposit slip were incorrectly made for $886.15. The bank credited Sabre Company for the correct amount.
c. Outstanding checks at May 31 totaled $576.25. Deposits in transit were $1,916.15.
d. On May 18, the company issued check No. 1181 for $685 to Carol Stills on account. The check, which cleared the bank in May, was incorrectly journalized and posted by Sabre Company for $658.
e. A $2,500 note receivable was collected by the bank for Sabre Company on May 31 plus $80 interest. The bank charged a collection fee of $20. No interest has been accrued on the note.
f. Included with the cancelled checks was a check issued by Rapier Company to Tom Lujak for $800 that was incorrectly charged to Sabre Company by the bank.
g. On May 31, the bank statement showed an NSF charge of $680 for a check issued by Jo Bennett, a customer, to Sabre Company on account.

INSTRUCTION:
Prepare the bank reconciliation at May 31, 2012. **(12.5)**

Q.3.a. Carver Construction Company is under contract to build a condominium at a contract price of $4,000,000. The building will take 18 months to complete at an estimated cost of $2,800,000. Construction began in November 2011, and was finished in April 2013. Actual construction costs incurred in each year were: 2011, $280,000; 2012, $1820,000; and 2013, $700,000.

PTO

INSTRUCTION:
Compute the gross profit to be recognized in each year keeping in mind revenue recognition and matching principles. **(6.5)**

Q.3.b. The controller of Loran Industries has collected the following monthly expense data for use in analyzing the cost behavior of maintenance costs.

Month	Total Maintenance Costs	Total Machine Hours
January	$2,400	300
February	3,000	400
March	3,600	600
April	4,500	790
May	3,200	500
June	4,900	800

INSTRUCTION:
Determine the fixed and variable cost components using the high-low method and write down the cost function for the maintenance cost. **(6.0)**

Q.4. Wales Company sells small commercial spaces of a mall that sell for $3000 each. Each shop has similar floor space and facility. For the coming year, management expects fixed costs to total $200,000 and variable costs to be $2000 per unit.

(a) Compute the break-even point in dollars.
(b) Compute the margin of safety percentage assuming actual sales are $750,000.
(c) Compute the sales required in units to earn net income of $120,000.
(d) Due to tough market competition management at Wales is thinking of reducing the selling price to $2900 per commercial space. If the selling price is reduced, compute the sales required in units to earn the net income of $12,000. **(3+3+3+3.5)**

Q.5. DDC Ltd. supervises construction of an extension to a residential building. The standard cost per unit of per square feet is as follows:

Direct materials 2 pounds at $5.00 per pound	$10.00
Direct labor 2 hours at $12.00 per hour	24.00
Variable manufacturing overhead	12.00
Fixed manufacturing overhead	6.00
Total standard cost per unit	$52.00

Actual costs for November in producing 7,700 square feet were as follows:

Direct materials (15,000 pounds)	$ 72,000
Direct labor (14,900 hours)	183,270
Variable overhead	88,990
Fixed overhead	44,000
Total manufacturing costs	$388,260

PTO

INSTRUCTIONS:

Compute the followings and make comments:

(1) **Material price variance, where MPV= AQ(AP-SP)**
(2) **Material quantity variance, where MQV= SP(AQ-SQ)**
(3) **Labor price variance, where LPV= AH(AR-SR)**
(4) **Labor quantity variance, where LQV=SR(AH-SH)** **(12.5)**

Q.6.a. Armando Company is considering a capital investment project of $150,000 in its construction facilities. The new machinery bought for the project is expected to have a useful life of 5 years with no salvage value. Depreciation is by the straight-line method. During the life of the investment, annual net income and cash inflows are expected to be $18,000 and $48,000, respectively. Armando has a 12% cost of capital rate, which is the minimum acceptable rate of return on the investment.

INSTRUCTION:

Using the discounted cash flow technique, compute the net present value. Should Armando accept the project? **(5.5)**

Q.6.b. Gabriela Herzog, a recent graduate of Rolling's architecture program, evaluated the operating performance of real estate-Emaar's six divisions. Gabriela made the following presentation to Emaar board of directors and suggested the Graphics Division be eliminated. "If Graphics Division is eliminated," she said, "our total profits would increase by $16,870.

	The Other Five Divisions	Graphics Division	Total
Sales	$1,664,200	$ 98,200	$1,762,400
Cost of goods sold	978,520	76,470	1,054,990
Gross profit	685,680	21,730	707,410
Operating expenses	527,940	38,600	566,540
Net income	$ 157,740	$(16,870)	$ 140,870

In the Graphics Division, cost of goods sold is $56,000 variable and $20,470 fixed, and operatingexpenses are $12,000 variable and $26,600 fixed. None of the Graphics Division's fixed costs willbe eliminated if the division is discontinued.

INSTRUCTION:

Is Gaby right about eliminating the Graphics Division? Prepare a schedule to supportyour answer.

(7.0)

TABLE 2 Present Value of $1

$$PV = \frac{\$1}{(1 + i)^n}$$

n/i	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%	4.5%	5.0%	5.5%	6.0%	7.0%	8.0%	9.0%	10.0%	11.0%	12.0%	20.0%
1	0.99010	0.98522	0.98039	0.97561	0.97087	0.96618	0.96154	0.95694	0.95238	0.94787	0.94340	0.93458	0.92593	0.91743	0.90909	0.90090	0.89286	0.83333
2	0.98030	0.97066	0.96117	0.95181	0.94260	0.93351	0.92456	0.91573	0.90703	0.89845	0.89000	0.87344	0.85734	0.84168	0.82645	0.81162	0.79719	0.69444
3	0.97059	0.95632	0.94232	0.92860	0.91514	0.90194	0.88900	0.87630	0.86384	0.85161	0.83962	0.81630	0.79383	0.77218	0.75131	0.73119	0.71178	0.57870
4	0.96098	0.94218	0.92385	0.90595	0.88849	0.87144	0.85480	0.83856	0.82270	0.80722	0.79209	0.76290	0.73503	0.70843	0.68301	0.65873	0.63552	0.48225
5	0.95147	0.92826	0.90573	0.88385	0.86261	0.84197	0.82193	0.80245	0.78353	0.76513	0.74726	0.71299	0.68058	0.64993	0.62092	0.59345	0.56743	0.40188
6	0.94205	0.91454	0.88797	0.86230	0.83748	0.81350	0.79031	0.76790	0.74622	0.72525	0.70496	0.66634	0.63017	0.59627	0.56447	0.53464	0.50663	0.33490
7	0.93272	0.90103	0.87056	0.84127	0.81309	0.78599	0.75992	0.73483	0.71068	0.68744	0.66506	0.62275	0.58349	0.54703	0.51316	0.48166	0.45235	0.27908
8	0.92348	0.88771	0.85349	0.82075	0.78941	0.75941	0.73069	0.70319	0.67684	0.65160	0.62741	0.58201	0.54027	0.50187	0.46651	0.43393	0.40388	0.23257
9	0.91434	0.87459	0.83676	0.80073	0.76642	0.73373	0.70259	0.67290	0.64461	0.61763	0.59190	0.54393	0.50025	0.46043	0.42410	0.39092	0.36061	0.19381
10	0.90529	0.86167	0.82035	0.78120	0.74409	0.70892	0.67556	0.64393	0.61391	0.58543	0.55839	0.50835	0.46319	0.42241	0.38554	0.35218	0.32197	0.16151
11	0.89632	0.84893	0.80426	0.76214	0.72242	0.68495	0.64958	0.61620	0.58468	0.55491	0.52679	0.47509	0.42888	0.38753	0.35049	0.31728	0.28748	0.13459
12	0.88745	0.83639	0.78849	0.74356	0.70138	0.66178	0.62460	0.58966	0.55684	0.52598	0.49697	0.44401	0.39711	0.35553	0.31863	0.28584	0.25668	0.11216
13	0.87866	0.82403	0.77303	0.72542	0.68095	0.63940	0.60057	0.56427	0.53032	0.49856	0.46884	0.41496	0.36770	0.32618	0.28966	0.25751	0.22917	0.09346
14	0.86996	0.81185	0.75788	0.70773	0.66112	0.61778	0.57748	0.53997	0.50507	0.47257	0.44230	0.38782	0.34046	0.29925	0.26333	0.23199	0.20462	0.07789
15	0.86135	0.79985	0.74301	0.69047	0.64186	0.59689	0.55526	0.51672	0.48102	0.44793	0.41727	0.36245	0.31524	0.27454	0.23939	0.20900	0.18270	0.06491
16	0.85282	0.78803	0.72845	0.67362	0.62317	0.57671	0.53391	0.49447	0.45811	0.42458	0.39365	0.33873	0.29189	0.25187	0.21763	0.18829	0.16312	0.05409
17	0.84438	0.77639	0.71416	0.65720	0.60502	0.55720	0.51337	0.47318	0.43630	0.40245	0.37136	0.31657	0.27027	0.23107	0.19784	0.16963	0.14564	0.04507
18	0.83602	0.76491	0.70016	0.64117	0.58739	0.53836	0.49363	0.45280	0.41552	0.38147	0.35034	0.29586	0.25025	0.21199	0.17986	0.15282	0.13004	0.03756
19	0.82774	0.75361	0.68643	0.62553	0.57029	0.52016	0.47464	0.43330	0.39573	0.36158	0.33051	0.27651	0.23171	0.19449	0.16351	0.13768	0.11611	0.03130
20	0.81954	0.74247	0.67297	0.61027	0.55368	0.50257	0.45639	0.41464	0.37689	0.34273	0.31180	0.25842	0.21455	0.17843	0.14864	0.12403	0.10367	0.02608
21	0.81143	0.73150	0.65978	0.59539	0.53755	0.48557	0.43883	0.39679	0.35894	0.32486	0.29416	0.24151	0.19866	0.16370	0.13513	0.11174	0.09256	0.02174
24	0.78757	0.69954	0.62172	0.55288	0.49193	0.43796	0.39012	0.34770	0.31007	0.27666	0.24698	0.19715	0.15770	0.12640	0.10153	0.08170	0.06588	0.01258
25	0.77977	0.68921	0.60953	0.53939	0.47761	0.42315	0.37512	0.33273	0.29530	0.26223	0.23300	0.18425	0.14602	0.11597	0.09230	0.07361	0.05882	0.01048
28	0.75684	0.65910	0.57437	0.50088	0.43708	0.38165	0.33348	0.29157	0.25509	0.22332	0.19563	0.15040	0.11591	0.08955	0.06934	0.05382	0.04187	0.00607
29	0.74934	0.64936	0.56311	0.48866	0.42435	0.36875	0.32065	0.27902	0.24295	0.21168	0.18456	0.14056	0.10733	0.08215	0.06304	0.04849	0.03738	0.00506
30	0.74192	0.63976	0.55207	0.47674	0.41199	0.35628	0.30832	0.26700	0.23138	0.20064	0.17411	0.13137	0.09938	0.07537	0.05731	0.04368	0.03338	0.00421
31	0.73458	0.63031	0.54125	0.46511	0.39999	0.34423	0.29646	0.25550	0.22036	0.19018	0.16425	0.12277	0.09202	0.06915	0.05210	0.03935	0.02980	0.00351
40	0.67165	0.55126	0.45289	0.37243	0.30656	0.25257	0.20829	0.17193	0.14205	0.11746	0.09722	0.06678	0.04603	0.03184	0.02209	0.01538	0.01075	0.00068

University of Asia Pacific
Department of Civil Engineering
Final Examination Fall 2014
Program: B. Sc. Engineering (Civil)

Course # : CE 203 Course Title: Engineering Geology & Geomorphology
Full Marks: 120 (6 X 20 = 120) Time: 3 hours

Section A

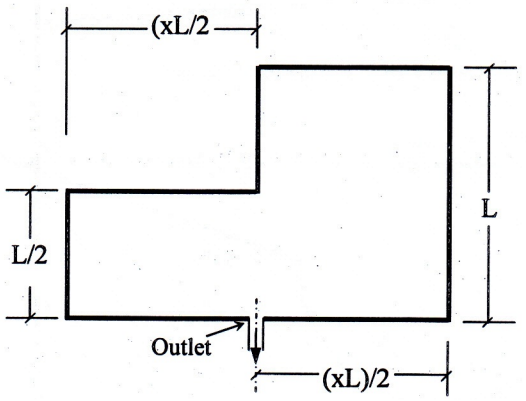
There are **four (4)** questions in this section. Answer **any three (3)**:

1. (a) Draw a schematic diagram of the rock cycle and discuss (with at least two examples of each) about igneous, sedimentary and metamorphic rocks according to the cycle. 14

(b) Describe, in brief, the principal zones of the earth from geologic point of view. 6

2. (a) What is geomorphic process? Distinguish between physical and chemical weathering processes. Mention the names of major chemical weathering processes and discuss any two of them. 7

(b) For the following basin, x is a constant factor. For what value of x, the flow rate (Q) will be the maximum for the basin? Find the FF and CC of the basin for maximum runoff. 7



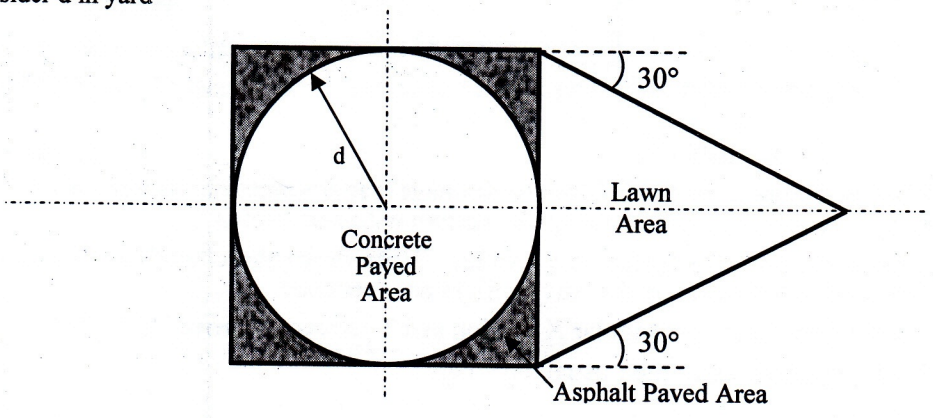
(c) Classify (mention names only) and draw sketches of different types of faults. 6

3. (a) Discuss with neat sketch of different routes/ways of total runoff (total flow). 7

(b) Discuss, in brief, the factors affecting runoff. 8

(c) Calculate Peak runoff for the following facility under the following conditions: 5

- Rainfall Intensity for the whole area = 2.25 in/hr
- Co-efficient of runoff for-----
  Concrete paved area = 0.85
  Asphalt paved area = 0.75
  Lawn area = 0.25
- Consider d in yard



4. Briefly discuss, mention or draw sketches, as asked for, on **any four** of the following topics: 5 X 4 = 20

(i) Neat sketches of Horst and Graben.
(ii) Classification (names only) of folds (based on geometry) and neat sketches of Homocline and Syncline.
(iii) Rational method, hydrogaph and time of concentration.
(iv) Fault classification according to net slip.
(v) Surface waves of earthquake (no sketch required)

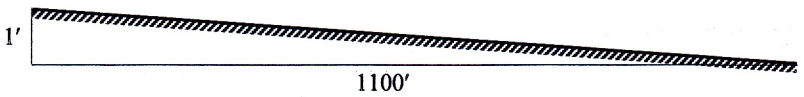
Section B

There are **four (4)** questions in this section. Answer **any three (3)**:

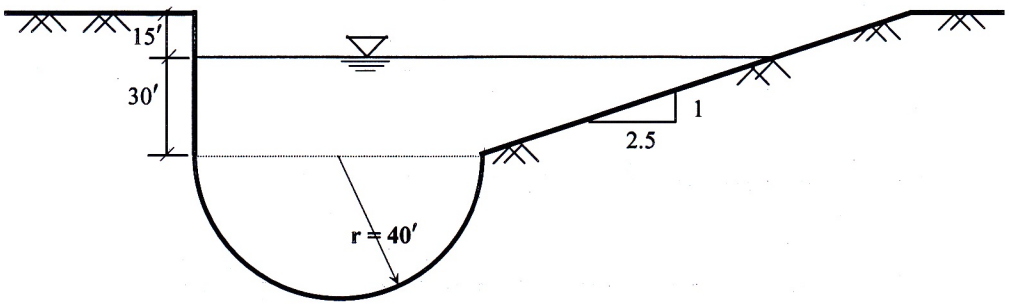
5. (a) Prove that $\tau = \gamma_\omega R_H s$; where symbols carry their usual meanings. 5

(b) Prove that $H = ae^{-bx}$; where symbols carry their usual meanings. 4

(c) The longitudinal and cross-sectional profiles of a channel are shown below. Calculate the tractive pressure along the channel. 6

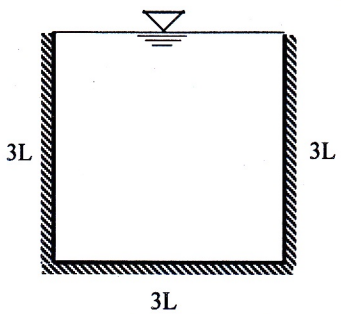


(Longitudinal Profile of Channel Course)

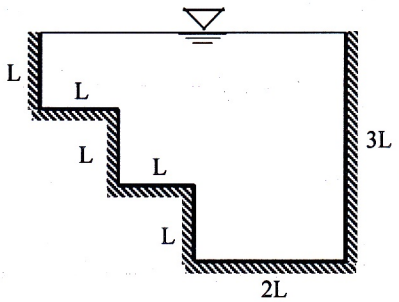


(X-Sectional Profile of Channel Course)

(d) The cross-sectional profiles at two locations (location-1 and location-2) of a river are shown in the figures below. If all other factors affecting erosion remain constant, which location will exhibit more erosion? Justify your answer. 5



Location - 1



Location - 2

6. (a) What is drainage pattern? Classify drainage pattern(mention names only). Write short notes of denditric, basin and ring like pattern with neat sketch. 9

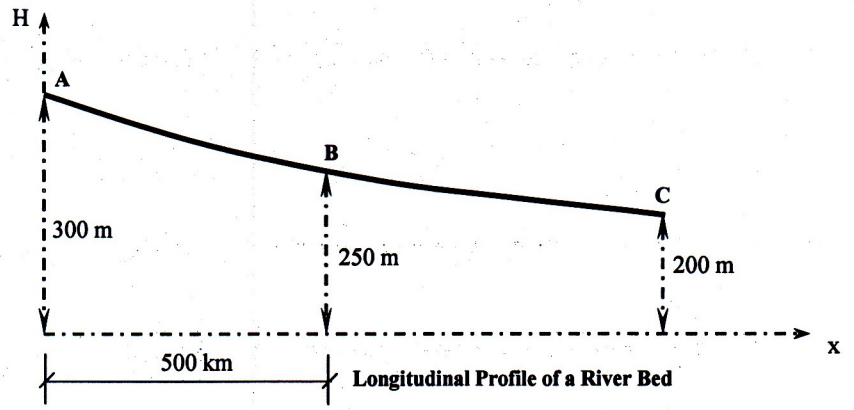
(b) Draw x-section of a typical river valley. Write down the classification of river valley. Also write short notes on the ways valleys are deepened. 7

(c) For a stream having triangular X-section and T <<<<< D, prove: $\tau \propto T$ 4

Where symbols carry their usual meanings.

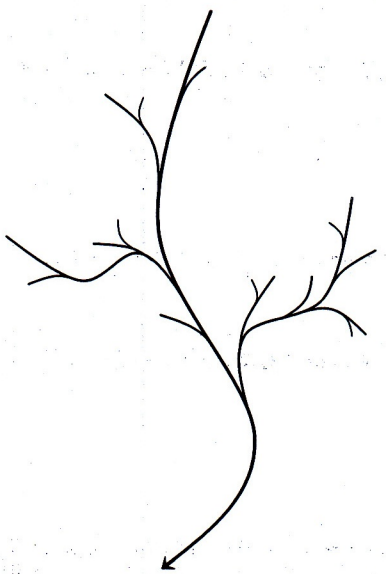
7. (a) Define river transportation, load, capacity and competence. Write short notes on various types of loads of a river. 6

(b) Using the figure shown below, calculate the horizontal distance between A and C. 4



Longitudinal Profile of a River Bed

(c) Rank the streams of the following drainage basin having a total catchment area of 8,999 square kilometer. The results of the survey are summarized in the table below. 10



Steam Rank	Average Length (km)
1	7.0
2	18.9
3	44.8
4	99.9

Calculate the following parameters:
(i) Average Bifurcation Ratio (ABR)
(ii) Average Length Ratio (ALR)
(iii) Stream Frequency

8. (a) Define earthquake. Mention the causes of earthquake. Define the major earthquake parameters (geometric) with neat sketches. 8

(b) Discuss liquefaction phenomenon (with basic mechanism) due to earthquake. 7

(c) Tabulate Modified Mercalli intensity scales of earthquake (V to IX). 5

University of Asia Pacific
Department of Civil Engineering
Final Examination Fall 2014
Program: B.Sc Engineering (Civil)

Course Title: Numerical Analysis & Computer Programming — Course Code: CE 205
Time: 3 Hours — Full Marks: 90

Section- A :Answer any 6(Six) out of 8(Eight)

1. Determine the root of the equation $5x^3 - 3x^2 + 2x - 9 = 0$ by Bisection method. Correct upto 4 decimal places. 10

2. Using Euler's modified method, obtain a solution of the equation 10

$$dy/dx = x + |\sqrt{y}|$$

with initial condition y=1 at x=0 for the range $0 \leq x \leq 0.6$ in steps of 0.2

3. Use Cramer's rule to approximate the solution of the following system of linear equations. 10

$$x - 3z = -5$$
$$2x - y + 2z = 16$$
$$7x - 3y - 5z = 19$$

4. Fit a second degree parabola to the following data by Least Squares Method. 10

X	1945	1946	1947	1948	1949	1950	1951	1952	1953
Y	382	386	389	390	395	396	396	388	386

5. Using Lagrangian polynomials, find **f(0.25)** for 10

x	0.1	0.2	0.3	0.4	0.5
f(x)	9.9833	4.9667	3.2836	2.4339	1.9177

6. Use Gauss Jordan method to approximate the solution of the following system of linear equations. 10

$$4x - 2y + 3z = 1$$
$$x + 3y - 4z = -7$$
$$3x + y + 2z = 5$$

7. Find y(1.0) using R-K method of order four by solving the equation 10

$$dy/dx = 3x^2 + 2y$$

y(0) = 1 with step length 0.5

8. Using Rombergs method, compute 10

$$I=\int_1^3 [1/(1+x+x^2)]dx$$

Take at least up to eight intervals for better accuracy.

Section- B :Answer any 3 (Three) out of 4 (Four)

9. Write a program to find the area (A) and moment of inertia (I) of a circular X-section where diameter is known. $A = \frac{\pi d^2}{4}$, $I = \pi d^4/64$ 10

10. Write a program that calculates the real roots of any quadratic equation $ax^2+bx+c=0$ for given values of a, b and c. 10

11. Write a program to find the summation of $1+3^3+5^3+7^3+.....+n^3$. 10

12. Write a program that takes two integer variables as input and interchanges them. 10

University of Asia Pacific
Department of Civil Engineering
Final Examination Fall 2014 (Set 2)
Program: B. Sc. Engineering (Civil)

Course Title: Mechanics of Solids II — Course Code: CE 213
Time: 3 hours — Full Marks: 100 (= 10 × 10)

[Answer **any 10 (ten)** of the following 14 questions]

1. Calculate the equivalent polar moments of inertia (J_{eq}) for the three cross-sections shown in Fig. 1 by centerline dimensions [Given: Wall thickness = 0.10″ throughout].

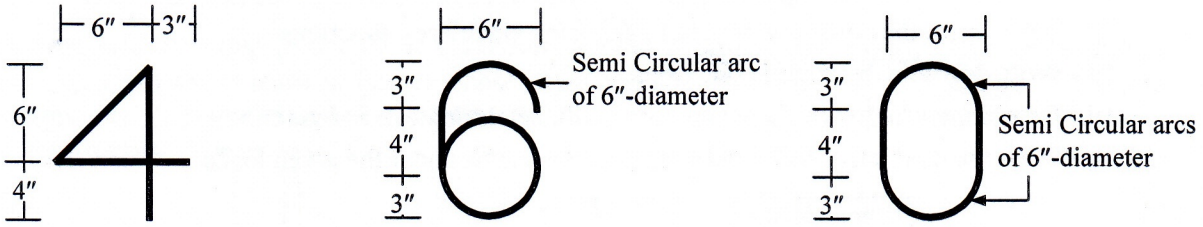


Fig. 1

2. Calculate the torsional rotation at A for the cricket bat $OABC$ subjected to the eccentric force F_z (and resulting torque) as shown in Fig. 2(a), if the point O is
   (i) Free (as shown), (ii) Fixed [Given: Shear Modulus = 2×10^3 MPa].

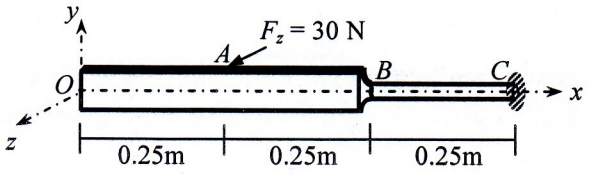


Fig. 2(a)

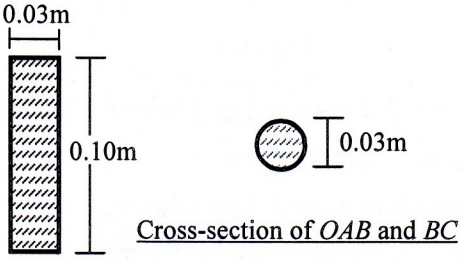


Fig. 2(b)

3. Fig. 3 shows a cricket stump (weighing 1.4 lb) *abc* inclined 45° with the horizontal. At section *b* of the stump, calculate the
   (i) Combined normal stress and shear stress
   (ii) Principal stresses and angle of corresponding principal planes.

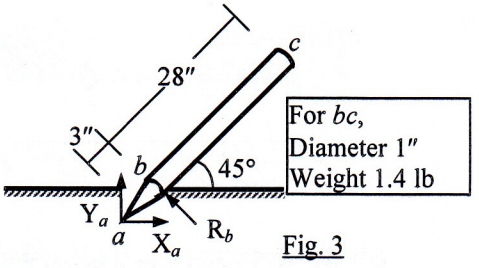


Fig. 3

4. Determine the maximum possible radius of the Mohr's circle of stresses for a cricket ball (with yield strength equal to 100 kPa) if it satisfies the
   (i) Von Mises yield criterion.
   (ii) Tresca yield criterion.

5. Fig. 4(a) shows a cricketer in his bowling action, supporting the entire body-weight on his right footstep, which is approximated by the section shown in Fig. 4(b).

   If his weight (W = 150 lb) works through the point G [in Fig. 4(b)], calculate the combined normal stress at point A of his footstep.

Fig. 4(a)

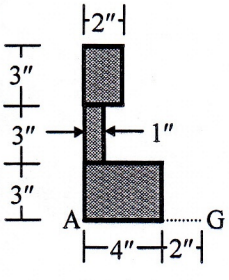


Fig. 4(b)

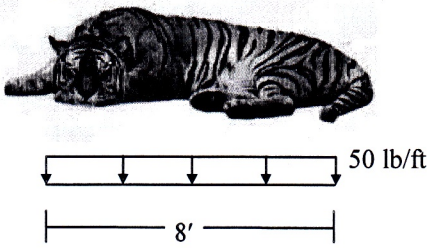


Fig. 5(a)

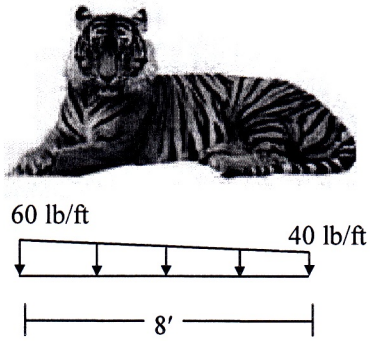


Fig. 5(b)

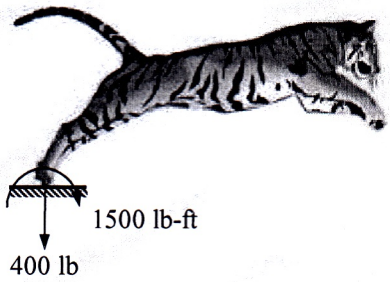


Fig. 5(c)

6. For the beams shown in Fig. 6(a), 6(b) and carrying loads shown in Fig. 5(a), 5(b), 5(c)
   (i) Write down the equations for load $w(x)$ using singularity functions.
   (ii) Write down the boundary conditions.
   (iii) Determine whether the beams are statically determinate or indeterminate.
   (iv) Draw the qualitative deflected shapes of the beams under the given loads.

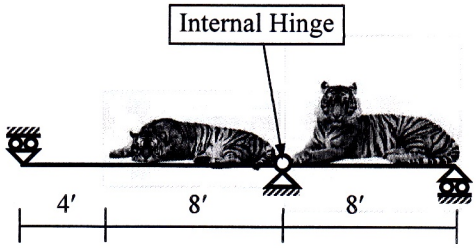


Fig. 6(a)

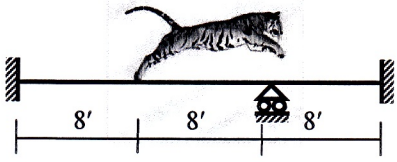
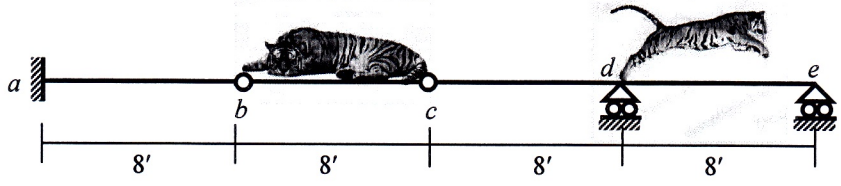


Fig. 6(b)

7. For beam *abcde* shown in Fig. 7 carrying loads of Fig. 5(a), 5(c), use *Singularity Functions* to calculate
   (i) Vertical deflection at joint *b*
   (ii) Rotation just left and right of joint *c*
   [Given: EI = constant = 30×10^3 lb-ft^2].



b and *c* are Internal Hinges

Fig. 7

8. Answer Question 7 using the *Moment-Area Theorems*.

9. Answer Question 7 using the *Conjugate Beam Method*.

10. Fig. 8 shows statically indeterminate beam *abc* carrying the load shown in Fig. 5(c).
    Calculate the vertical deflection at *a* (support movement) required to make deflection at *b* equal to zero
    [Given: $EI_{ab} = 60 \times 10^3$ lb-ft^2, $EI_{bc} = 30 \times 10^3$ lb-ft^2].

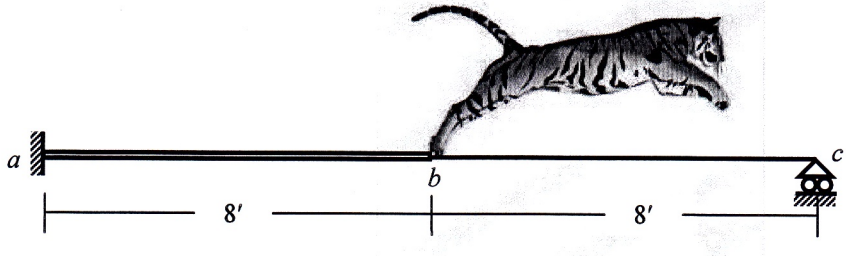


Fig. 8

11. Fig. 9(a) shows an initially imperfect simply supported beam AB [with $v_i(x) = v_{0i}\sin(\pi x/L)$] subjected to concentric compressive force P, and is connected to an initially straight beam BC subjected to the same eccentric compressive force P. Fig. 9(b) shows the cross-section of both beams.

If $v_{0i} = 1''$, $v_{m(a)} = 2''$, $E = 2000$ ksi, determine the eccentricity e required to make $v_{m(b)} = v_{m(a)}$.

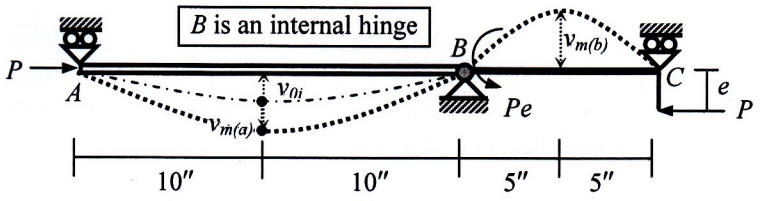
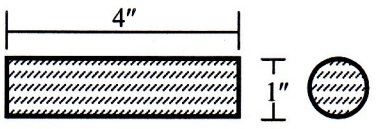


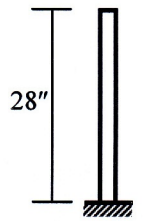
Fig. 9(a)



Cross-section of AB and BC

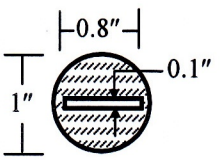
Fig. 9(b)

12. A 28-in long cricket stump [modeled as cantilever column shown in Fig. 10(a)] has a cross-section shown in Fig. 10(b) and is made of timber whose stress-strain relationship is $\sigma = 12\,(\varepsilon/\varepsilon_u)(e^{-\varepsilon/\varepsilon u})$, where σ is the stress (ksi), ε is the strain and $\varepsilon_u = 0.004$. Calculate the critical load for the column.



Cantilever Column

Fig. 10(a)



Cross-section

Fig. 10(b)

13. Calculate the Euler buckling force of the columns bc and fg shown in Figs. 11(a), (b), (c) [Given: $E = 2000$ ksi].

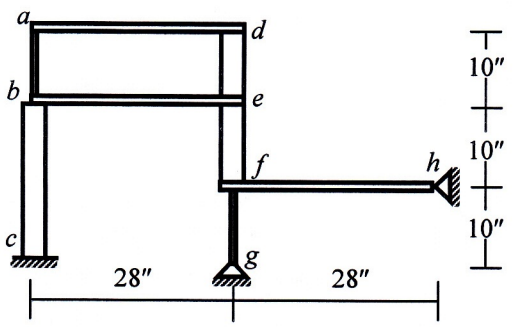
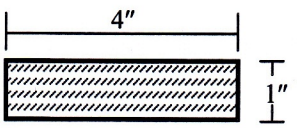


Fig. 11(a)



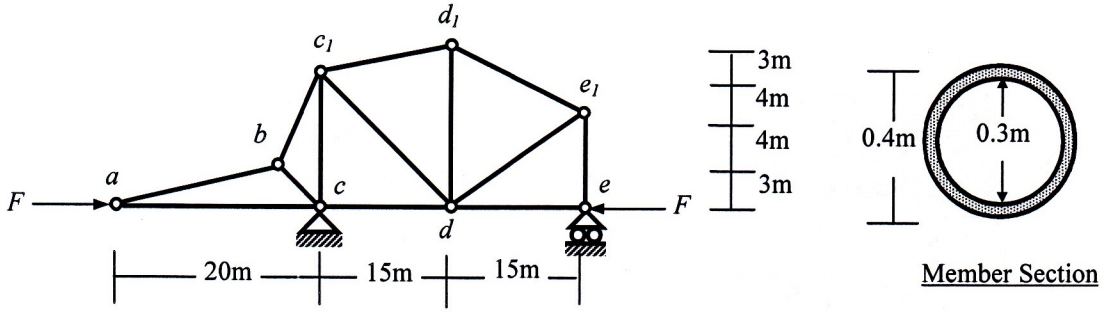
Cross-section of columns bc, de, ef

Fig. 11(b)

Cross-section of columns ab, fg and all beams

Fig. 11(c)

14. Use the AISC-ASD criteria to calculate the allowable value of F to avoid buckling of any member of the truss shown in Fig. 12 [Given: $E = 200 \times 10^3$ MPa, $f_y = 300$ MPa].



Member Section

Fig. 12

University of Asia Pacific
Department of Civil Engineering
Final Examination Fall 2014
Program: B.Sc. Engineering (Civil)

Course Title: Fluid Mechanics | Course Code: CE 221

Time: 3 hours | Full Marks: 150

SECTION I

(There are **Four** questions in this section. Answer any **Three** of them.)

1. (a) Prove that "Hydrostatic pressure at a point is same in all directions". (08)

   (b) Find the pressure difference between point A and B shown in figure 1(b). (09)

   (c) Explain stability of floating/submerged body. (08)

2. (a) What is center of pressure? Derive an expression to determine center of pressure for submerged plane surface. (13)

   (b) Draw the hydrostatic pressure variation on the inclined surface AB shown in figure 2(b). Also find the value and location of total hydrostatic force on that inclined Surface. All values in the figure 2(b) are in meter. [Unit weight of fluid=12.0 kN/m^3, width of AB is 10 m.] (12)

3. (a) Derive Bernoulli's energy equation. Also state its limitation. (13)

   (b) A liquid (S=1.50) with a P_v=40 kN/m^2, abs flows through the horizontal pipe as shown in figure 3(b). P_{atm}= 70 cm of Hg. Find the maximum theoretical flow rate without cavitation to occur. Neglect head loss. (12)

4 (a) Classify different types of energy associated with fluid flow. (05)

   (b) A fluid (S=1.50) is flowing through a pipe of 1.0 m diameter. The actual velocity is expressed by an equation of $u = 0.25\ [1 - 2.25(\frac{r}{0.75})^2]$ where u=velocity (m/s) and r = radius (m). Find out mean velocity and energy correction factor. (10)

   (c) A fluid (S=2.8) is flowing through a pipe of 4 inch radius under an absolute pressure of 150 kN/m^2 and with a discharge of 3.5 m^3/s. Neglecting friction, determine the total head if the pipe is 1 ft below the datum line. (10)

SECTION II

(There are **Four** questions in this section. Answer any **Three** of them.)

5. (a) What is cavitation? What are the effects and remedies of cavitation? (09)

   (b) Draw actual and ideal velocity distribution for a pipe flow. (04)

   (c) A fluid (S=1.75) is flowing as shown in figure 5(c). Section 1-1 has an absolute pressure of 175 kN/m^2 and elevation of +15 m. Section 2-2 has an elevation of (12)

+5m and absolute pressure of 125kN/m^2. Section 1-1 and 2-2 has diameter of 250 cm and 150 cm respectively. Find out velocities at section 1-1 and section 2-2. Neglect head loss.

6. (a) What is Reynolds Number? How can you classify fluid flow on the basis of Reynolds Number? (05)

   (b) What is momentum correction factor? Why is it needed? Derive an equation for momentum correction faction. (15)

   (c) What is equivalent roughness? List different losses in pipe flow. (05)

7. (a) Determine the magnitude of the resultant force exerted on the double nozzle shown in figure 7(a). Both nozzle jets have a velocity of 10 m/s. The axis of the pipe and both nozzles lie in a horizontal plane. Neglect friction. [S=1.35]. (10)

   (b) State impulse momentum equation. (05)

   (c) An oil (S=1.5) having a kinematic viscosity of 60 stokes is flowing through a pipe of 400 cm radius. Find the theoretical maximum discharge under laminar flow condition. (10)

8. (a) A fluid is flowing in a series of pipes which is shown in figure 8(a). Determine total head loss for flowing liquid from A to B. Consider both major and minor loss. Use moody diagram for friction factor. Given that velocity in pipe 1 is 1.50 m/s and k_e=0.04. Use table 8(1) for k_c. Pipe properties are given as below: (20)

Pipe No	Diameter (mm)	Length (km)	Equivalent Roughness(e), mm
1	500	0.50	0.25
2	300	0.85	0.30
3	400	0.65	0.275

   (b) Define Cross sectional mean velocity and discharge. (05)

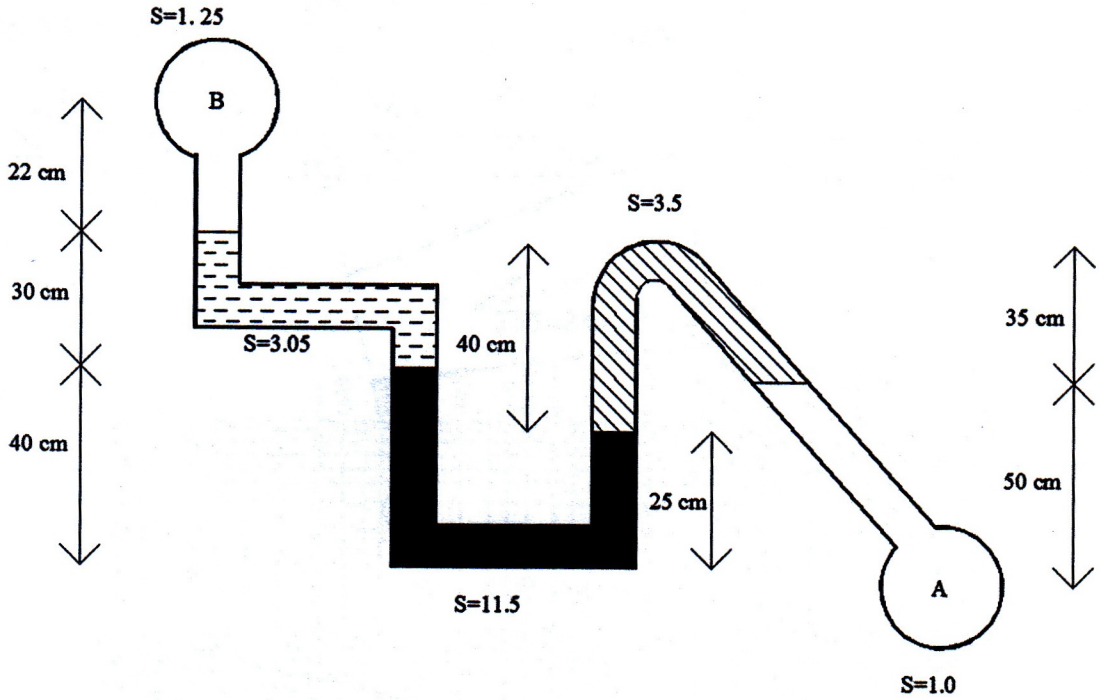


Figure 1(b)

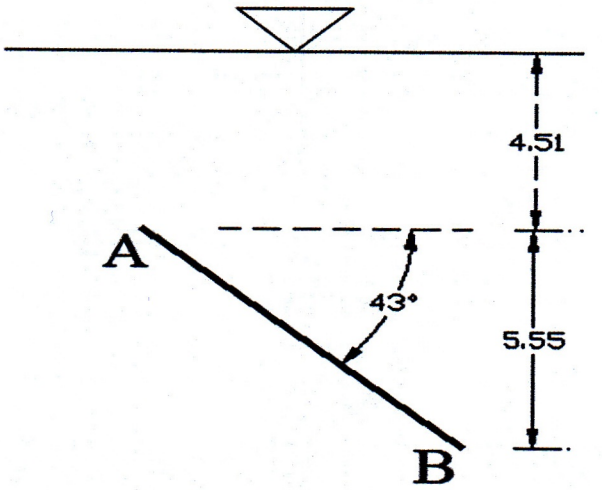


Figure 2(b)

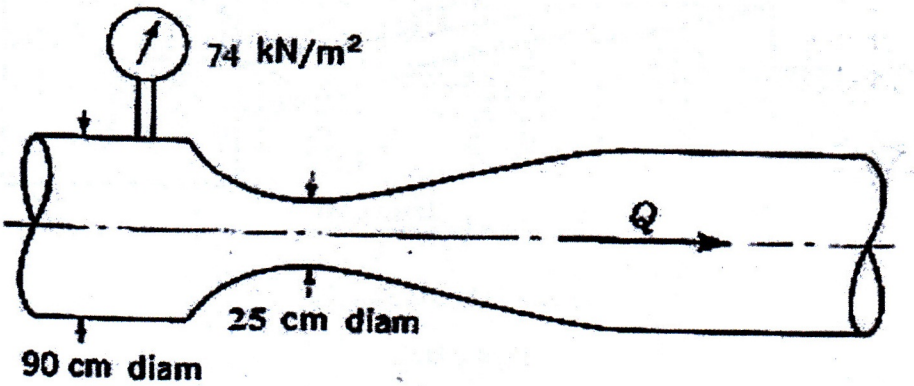


Figure 3(b)

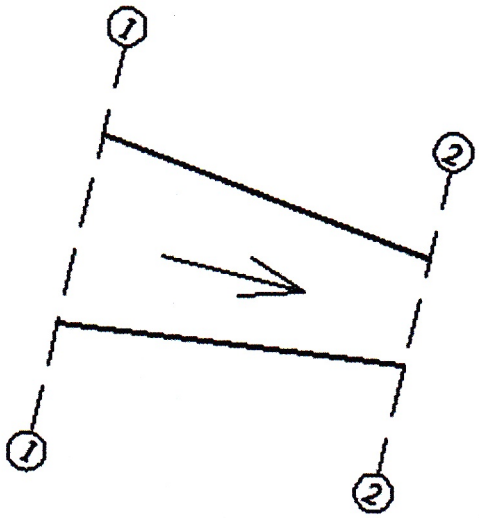


Figure 5(c)

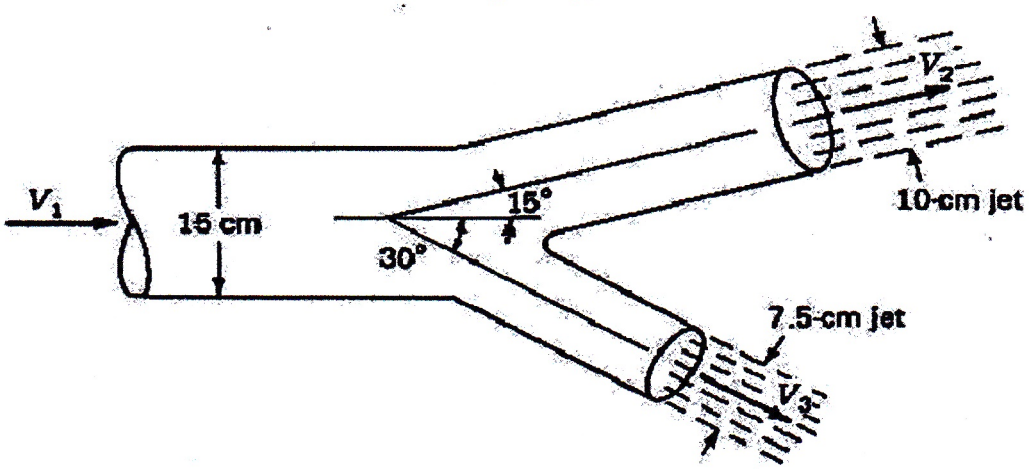


Figure 7(a).

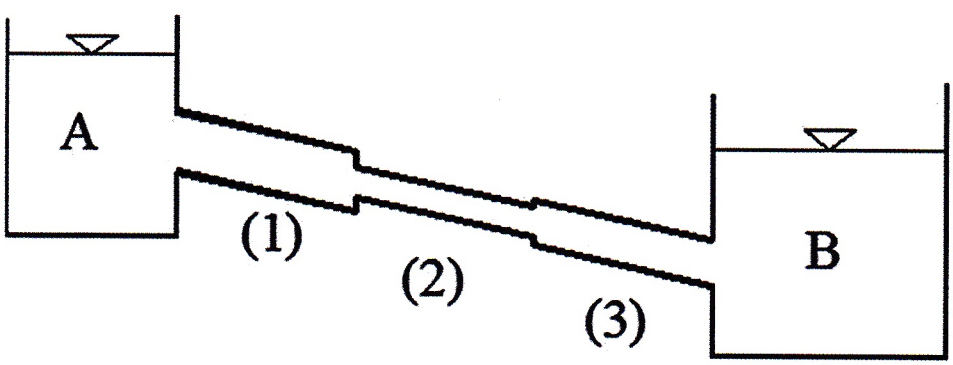


Figure 8(a).

Table 8.1

D_2/D_1	0.0	0.2	0.4	0.6	0.8
k_c	0.5	0.42	0.36	0.28	0.15

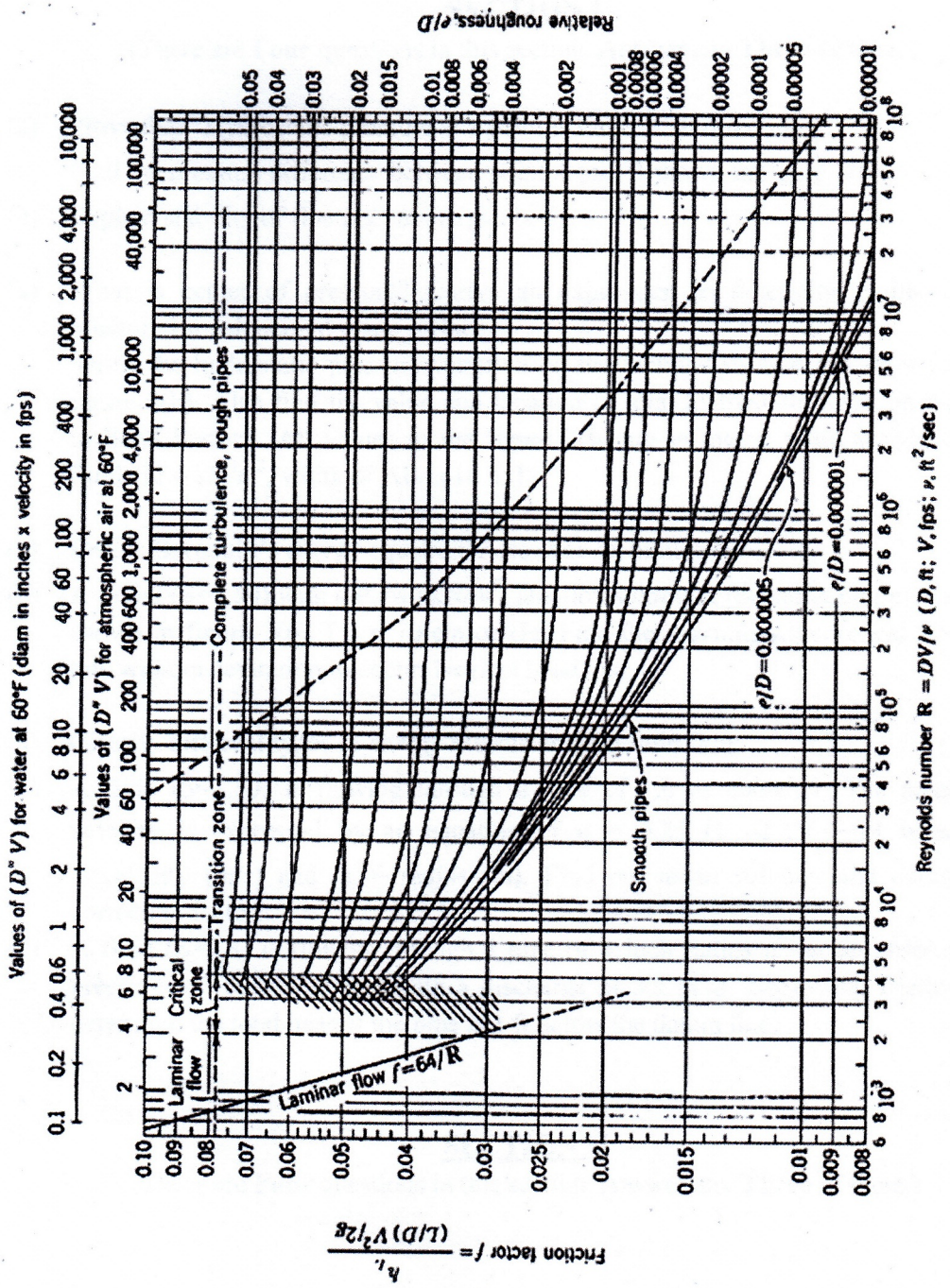


Figure Moody Diagram

University of Asia Pacific

Department of Civil Science and Engineering

Semester Final Examination, Fall-2014

Program: B.SC Engineering (2nd Year/2nd Semester)

Course Title: Principle of Economics Course Code: ECN 201 Credit: 2.00

Time: 2 Hours Full Marks: 50

Answer any **five** from the following questions:

1. (a) What are the features of monopoly ? Explain deadweight loss with a diagram. (6)

(b) In case of a monopolist: P= 200-4Q, TC= 5Q+4 (4)

Find out the profit maximizing price and quantity.

2. (a) Calculate Nominal GDP, Real GDP, GDP Deflator : Here, Base Year = 2010 (6)

Year	Price of X	Quantity of X	Price of Y	Quantity of Y
2010	240	25	210	30
2013	265	30	300	36

i. Estimate the Nominal GDP for 2010 and 2013. ii. What is the Real GDP in 2013?

iii. Find the GDP deflator for 2013

(b) What are the differences between GDP Deflator and CPI? Define: GDP Deflator. (4)

3. How can economy revive itself after recession? What kind of policies should be taken to tackle the problem of recession? Explain (10)

4. What is inflation? Explain the reasons behind inflation (10)

5. (a) Suppose price of a consumer basket of goods in year 2000=160 and in 2010=235. Find the CPI in 2010. What is the inflation rate for 2010? [Base Year= 2000] (5)

(b) What are the consequences of inflation? Explain. (5)

6. Explain different types of unemployment. (10)

University of Asia Pacific
Department of Basic Sciences & Humanities
Semester Final Examination, Fall-2014
Program: B. Sc. Engineering (Civil)
2nd year/ 2nd semester

Course Title: Mathematics IV | Course Code: MTH 203 | Credit: 3.00
Time: 3(Three) hour | Full Marks: 150

N.B: 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 **FOUR** questions in this section. Answer any **THREE**.

1. Solve the differential equation $y''-2y'-y=2e^x-10\sin x$. [25]

2. Solve the differential equation $y''-4y'+3y=9x^2+4,\ y(0)=6,\ y'(0)=8$. [25]

3. Find the orthogonal trajectories of the family of curves $x^2+y^2=c^2$ [25]

4. Find a family of oblique trajectories that intersect the family of straight lines $y=cx$ at angle 45° [25]

SECTION B
There are **FOUR** questions in this section. Answer any **THREE**.

5. Find the Fourier series for the function $f(x)=x^2, -\pi<x<\pi$. [25]

   Hence show that $\frac{\pi^2}{12}=1-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\cdots\cdots$

6. (a) Define Laplace Transform and Inverse Laplace Transform. Show that $\int_0^\infty \frac{\sin at}{t}dt=\frac{\pi}{2}$ [15]

   (b) Evaluate $L^{-1}\left\{\frac{4s+2}{s^2+8s+16}\right\}$ [10]

7. Solve the IVP by Laplace Transform: $Y''-3Y'+2Y=4e^{2t}, Y(0)=-3, Y'(0)=5$ [25]

8. Solve the partial differential equation by Laplace Transform: $\frac{\partial u}{\partial t}+\frac{\partial u}{\partial x}=x,\ x>0,\ t>0$ [25]

   with the boundary and initial condition: $u(0,t)=0, t>0$ & $u(x,0)=0, x>0$

Best of Luck