

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2008
Program: B.Sc. Engineering (Civil)

Course Title: Engineering Mechanics II
 Time: 1.0 hour

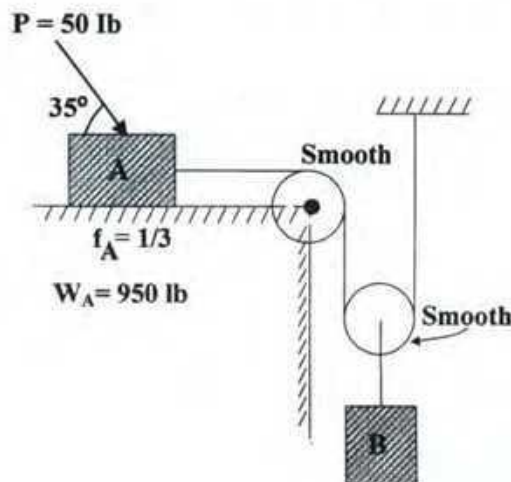
Course Code: CE 103

Credit: 3.00
 Full Marks: 60

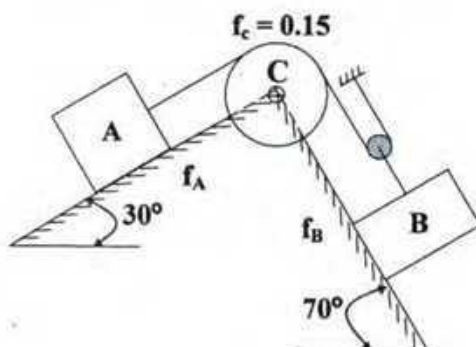
There are **FOUR** questions. Answer any **THREE**. ($3 \times 20 = 60$)

1. A body is rotating about a fixed axis with a radius of 10 inch so that its angular acceleration is $\alpha = 3t^3 + 5t^2 - t + 5$ rad. per sec². If the initial angular velocity is 8 rad per sec, what are the angular velocity and angular displacement at the 5th sec? What is the total acceleration at the 5th sec?

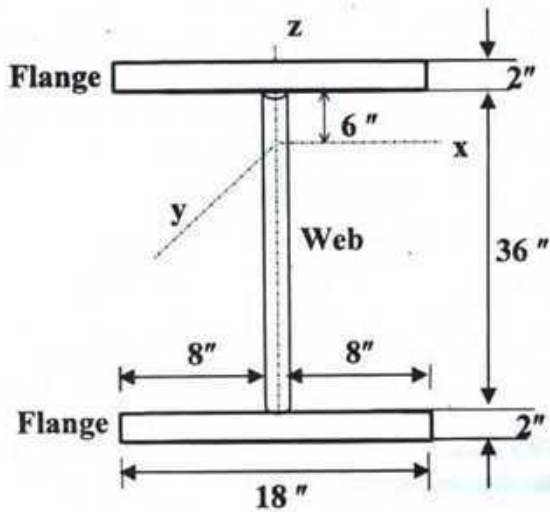
2. Refer to the following figure. The speed of A changes from 30 fps to 80 fps in 40 sec. Determine (i) the weight of B, (ii) the distance moved by B in 40 sec, and (iii) the tension in the cable.



3. From the following figure, determine the tension in the cables and weight of B for impending downward motion of B. Weight of A = 300 lb, $f_A = 0.35$ and $f_B = 0.25$.



4. The layout of an I-section is given below. The weight of each flange is 3.25 lb and the weight of the web is 6.5 lb. Find the radius of gyration of the section with respect to the y axis.



The University of Asia Pacific
Department of Civil Engineering
Mid -Term Examination, Fall 2008

Course # CE 105
Full Marks: 40

Course Title: Surveying
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**
10X2=20

1. (a) Explain with neat diagrams the construction and working principle of an optical square. (6)
(b) Write short note on i) Check line ii) Topographical surveying. (4)

2. (a) What is reciprocal ranging? (4)
(b) A steel tape 20 m long standardized at 10 °C with a pull of 100 N was used for measuring a base line. Find the correction per tape length, if the temperature at the time of measurement was 25 °C and the pull exerted was 160 N. Weight of 1 cubic m of steel = 78.6 kN/m³, Wt of tape = 8 N and E = 2.11 X 10⁸ kN/m². Coefficient of expansion of tape per 1° C = 12 x 10⁻⁶. (6)

3. (a) What is Local attraction? (1.5)
(b) The following bearings were observed in running a compass traverse: (8.5)

Line	Fore bearing	Back bearing
AB	66° 15'	244° 0'
BC	129° 45'	313° 0'
CD	218° 30'	37° 30'
DA	306° 45'	126° 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**.

10X2=20

1. a. Define: 2
 - i. Latitude
 - ii. Declination
- b. What is a circumpolar star? State the condition for a circumpolar star. 2
- c. Altitude of a star at lower transit is $22^{\circ}20'$. If the upper transit of the star is the zenith of the place find the declination of the star. Draw rough sketch. 6

2. a. Name the different co-ordinate system and explain the celestial latitude and longitude system. 6
- b. Find the G.A.T on February 26, 1987, when the G.M.T is $10^{\text{h}} 40^{\text{m}}$ A.M. 4
Given E.T. at G.M.N.(Greenwich mid noon) on February, 26, 1987= $-20^{\text{m}}10^{\text{s}}$
increased at a rate of 1.5 second per hour.

3. a. Explain how you measure the elevation of a point by photographic measurement. Derive necessary mathematical equations. 6
- b. State the different reasons for overlap in Aerial photogrammetry. 4

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The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Fall 2008

Course # : CE 107
Full Marks:40

Course Title: Introduction to Civil and Environmental Engg.

Time: 1 hours

1. Describe the following (any Two): (2x2=4)
 - a. Branches of Civil Engineering
 - b. Environmental Engineering
 - c. Water resources in Bangladesh

2. Define the following (any Three): (3x3=9)
 - a. Flood and hydrological drought.
 - b. Age Structure
 - c. Water quality
 - d. Affect of agricultural society
 - e. Bio-diversity

3. Describe various environmental issues. (5)

4. Prove that the time required for population to be double is $70/r$, where r is the growth rate expressed in percentage. (2)

5. In the year 2000, population of Dhaka city was about 50 lakh. When the population of Dhaka city can be expected to become double with a growth rate of 2.5%. Assume population follows exponential growth. (2)

6. Assume that a population follows a simple logistic growth curve. Find the maximum sustainable yield as a function of carrying capacity, the current population size and current growth rate. (4)

7. Suppose we stock a pond with 100 fish and note the population doubles every year for the first couple of years with no harvesting but after quite a number of years, the population stabilizes at its carrying capacity 2000 fish. Growth seems to have followed a logistic curve. What would be the maximum sustainable fish yield from this pond? (4)

8. Define water pollution? Write four different sources of water pollution for both surface and ground water. (2+4=6)

9. Define ecosystem and what are its components? (1+2=3)

10. If flood water puts raw sewage into a natural flowing stream what will be the possible relationship between dissolve oxygen and biochemical oxygen demand (BOD) along the up and downstream from the point of pollution. (3)

Specific gravity of cement = 3.1,
Specific gravity of sand = 2.6,
Air content = 2% ,
Mortar thickness = 1 inch.

- (i) Calculate the unit contents of sand, cement, and water,
 - (ii) Calculate the unit weight of mortar.
 - (iii) Estimate the amount of each ingredients of mortar necessary for the plastering work of the both surfaces of the wall. Assume 10% extra volume of material is necessary due to the loss of mortar during application on the wall.
3. (a) Write a short note on sulfate resisting cement? 2
- (b) Why is gypsum added in cement? What is false setting? 3
- (c) Define initial setting time and final setting time of cement. Write the ASTM specifications related to the setting time of cement. 4
- (d) Draw the typical stress-strain curves of concrete and steel. Compare their characteristics. 5
- (e) Explain the moisture states (different possible moisture conditions) of aggregates. 4
- (f) Compare creep and relaxation. 2
4. (a) Write the field tests of brick? 5
- (b) How does brick get strength during burning? 3
- (c) Explain segregation, bleeding, and laitance of concrete. 3
- (d) Explain bulking of sand. Compare bulking of a fine sand with a coarse sand. 3
- (e) Explain the properties of good quality sand. 3
- (f) "Permeability of concrete is a key factor related to durability of concrete" – why? 3

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2008
Program: B. Sc. Engineering (Civil)

Course Title : Engineering Materials
Time: One Hour

Course Code: CE 201
Full Marks: 60

Answer any **THREE** questions ($3 \times 20 = 60$) including Question No. 1.
Question No. 1 is compulsory. The figures in the right margin indicate the marks of the questions.

1. The sieve analysis data of a sand sample for a bridge construction project 20
are summarized below:

ASTM Sieve	Material Retained (g)
3 inch	0
1.5 inch	0
$\frac{3}{4}$ inch	0
$\frac{3}{8}$ inch	0
#4	0
#8	10
#16	0
#30	60
#40	40
#50	50
#100	60
#200	10
Pan	70

- (i) Calculate the FM of the sand sample,
- (ii) Draw the grading curve of the sand 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?

Sieve opening of #40 sieve is 0.425 mm and #200 sieve is 0.075 mm.

2. Mixture proportion of mortar is necessary for plastering work of a brick wall of 20 ft long and 10 ft height. The following data are provided: 20

Sand to cement ratio (weight ratio) = 2.0,
W/C=0.5,

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The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2008
Program: B.Sc. Engineering (Civil)

Course Title: Numerical Analysis &
Computer Programming

Course Code: CE 205

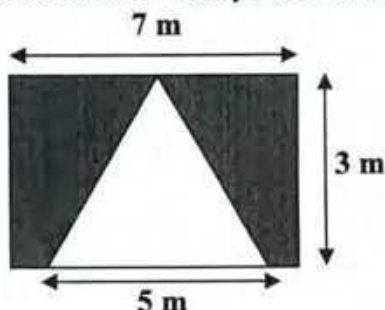
Credit:3.00

Time: 1 Hour

Full Marks: 50

There are Four questions. Three questions are to be answered.
(Question 4 is compulsory and answer any Two from the remaining ques.)

- 1.(a) Using Iteration Method, solve the following equation: (10)
 $3.5x^3 - 2.8x^2 - 5.9x + 1.029 = 0$, Desired accuracy = 0.00001
- (b) Using Cramer's rule solve the following system of equations: (10)
 $3p + 7q - 8r = 9$
 $-2p + 9q + r = 13$
 $5p - q + 3r = 17$
- 2.(a) Solve the following system of equations, using Matrix Inversion: (12)
 $3.4x + 4.7y - 7.2z = 5.35$
 $4.0x + 5.8y + 9.3z = 3.26$
 $9.0x + 7.1z = 0.39$
- (b) Using Newton's Iterative formula, evaluate the value of $\sqrt[3]{1/35}$, where desired accuracy, $\epsilon = 0.001$. Show at least four steps. (8)
- 3.(a) Using Newton Raphson Method, find the real root of the following equation: (10)
 $2x^2 + 6x \log x - 10 = 0$, Desired accuracy, $\epsilon = 0.0001$
- (b) Using Regula Falsi Method, find the real root of the following equation: (10)
 $15 + 2x \ln x - 3x^2 = 0$, Desired accuracy, $\epsilon = 0.0001$
4. A triangular area having a base of 5 m and height of 3 m has been excavated from a 7m x 3m rectangular field. Again the shaded area is equal to the volume of a cylinder, whose radius is 1.5 m. Write a C++ program to calculate the shaded area and the height of the cylinder. (10)
Take $\pi = 22.0 / 7$. Use r for radius, h for height, TA for triangular area, RA for rectangular area, SA for shaded area and CV for cylinder volume.



3. An interior slab panel of 14 ft by 14 ft is to be designed by USD based on the following data: 2

LL = 60 psf, Partition Wall = 30 psf, Floor Finish = 20 psf, $f'_c = 3000$ psi, $f_y = 40,000$ psi.

Show the detailed calculations of the following steps:

- (i) Load calculation and minimum slab thickness
- (ii) Calculation for design moments
- (iii) Calculation for slab thickness to avoid compression failure of concrete
- (iv) Calculation for reinforcements for moments
- (v) Calculation for temperature and shrinkage reinforcements and comparison with the reinforcements required for moments (step iv).










4. A flat slab with drop panel and column capital is to be designed for a parking garage by WSD. Column capital is a 90 degree truncated cone with 4 feet diameter at the intersection of the capital with the bottom of the drop panel of size 8 feet by 8 feet. Columns are 24 feet center to center in each direction. LL = 200 psf, $f_s = 20,000$ psi, $f'_c = 3000$ psi. 2

Show the detailed calculations of the following steps:

- (i) Calculation for slab thickness
- (ii) Check for punching shear around column capital
- (iii) Check for punching shear around drop panel
- (iv) Check for beam shear
- (v) Calculation for design moments

Table . Coefficients for dead-load positive moments in slabs*

$$\left. \begin{aligned} M_{A \text{ pos. DL}} &= C_{A \text{ DL}} \times w \times A^2 \\ M_{B \text{ pos. DL}} &= C_{B \text{ DL}} \times w \times B^2 \end{aligned} \right\} \text{ where } w = \text{total uniform dead load}$$

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

*A cross-hatched 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-term Examination
Principles of Accounting

Time: 1 hour

Full Marks: 20

Note: Answer any FOUR from section A and ALL from section B.

Section A (4X2=8)

Q. 1
Accounting is irrelevant for civil engineering graduates. Do you agree? Defense your response.

Q. 2
Why are balance sheet and income statement dated differently? Briefly explain.

Q. 3
How does revenue recognition principle add value to the reliability of financial statements?

Q. 4
Why are there some constraints defined in conceptual framework of accounting? How do they contribute in accounting?

Q. 5
How does going concern assumption play its role in preparing accounting statements?

Q. 6
Why is monetary unit assumption used as a scale of measurement in reflecting economic events in accounting?

Section B (6+6=12)

Q. 7
Steady decoration, Inc. was organized on May 1, 2008 to provide interior decoration service. The following transactions occurred during May:

May 1	Mr. Khan invested Tk. 50,000 cash in the business.
May 5	Billed customers Tk. 70,000 for services performed.
May 8	Purchased land to be used as the parking lot for a total price of Tk. 40,000.
May 12	Purchased office equipment on credit from Suzuki & Co. for Tk. 30,000.
May 20	Paid Tk. 10,000 of the amount owed to Suzuki & Co.
May 25	Withdrew Tk. 4,600 cash for personal use.

Instructions:
Prepare journal entries for the month of July.

Q. 8

The following transactions have been extracted from the accounting books of Softbyte Inc., a computer firm, based in Texas:

Transaction 1

On September 1, 2005 Ray Neal, the owner of Softbyte Inc., invests \$15,000 cash in the business.

Transaction 2

Softbyte purchases computer equipment for \$7,000 cash.

Transaction 3

Softbyte receives \$1,200 cash from customers for programming services it has provided.

Transaction 4

Softbyte receives a bill for \$250 from the *Daily News* for advertising but postpones payment of the bill until a later date.

Transaction 5

Softbyte provides \$3,500 of programming services for customers. Cash of \$1,500 is received from customers, and the balance of \$2,000 is billed on account.

Transaction 6

Expenses paid in cash for September are store rent \$600, salaries of employees \$900, and utilities \$200.

Transaction 7

Softbyte pays its \$250 *Daily News* advertising bill in cash.

Transaction 8

The sum of \$600 in cash is received from customers who have previously been billed for services.

Transaction 9

Ray Neal withdraws \$1,300 in cash from the business for his personal use.

Required:

Present the transactions using the basic accounting equation in the following format and indicate increase/ decrease in each transaction with upward or downward arrows.

	Assets (A)	=	Liabilities (L)	+	Owner's Equity (OE)
Transaction 1					
Transaction 2					
.....					

.....

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2008
Program: B. Sc. Engineering (Civil)

Course Title : Design of Concrete Structures II
 Time: One Hour

Course Code: CE 317
 Full Marks: 60

Answer any three questions (3 x 20 = 60) including Question No. 1.

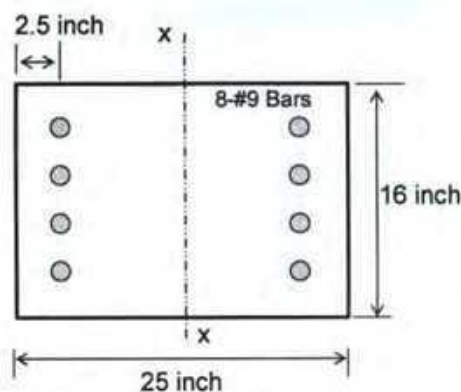
Question No. 1 is compulsory. The figures in the right margin indicate the marks of the questions.

1. (a) Compare ordinary beam-girder floor and flat slab floor. 3
- (b) Compare one-way slab and two-way slab. 3
- (c) Briefly explain the ACI guideline for corner reinforcement. 3
- (d) Why is the capacity reduction factor of a column much lower than the same for a beam? 3
- (e) Derive the following relationship for column at balanced condition : 8

$$P_b' = 0.72 f_c' b d \frac{0.003}{0.003 + \frac{f_y}{E_s}}$$

Symbols carry their usual meanings.

2. Draw the interaction diagram of the following rectangular column about x-x. Use WSD. 20



Given, $f_c' = 3500$ ksi, $f_y = 40$ ksi, and $f_s = 16,000$ psi.

The University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination, Fall 2008

Course No : CE 331

Credit Hour : 3.0

Time : 1 hour

Total Marks : 20

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

- | | | |
|----|---|-----|
| 1. | What are the objectives of water supply systems? | 2.5 |
| 2. | Write down the factors on which per capita consumption of water depends. | 2.0 |
| 3. | In Bangladesh which area is most suitable for harvesting rainwater? | 1.0 |
| 4. | How can you detect leaks in a water supply system? | 1.5 |
| 5. | What are the sources of water supply system in Bangladesh? Give your opinion which one is suitable for meeting future demand. | 2.0 |
| 6. | Draw schematic diagram of a water supply system. | 1.0 |
| 7. | At least five people including three children died and many others went missing as a fire gutted a slum at Rayerbazar in the capital on 25 th November 2007. During investigation lack of proper fire fighting systems are observed for 10000 people living in that area. Calculate (i) the fire flow of water in m ³ /s (ii) no of fire streams to meet the fire demand as per National Board of the Fires. It is also observed that it takes 5 hours to control the fire. Calculate the total volume of water to be stored for fire protection. | 4.0 |
| 8. | Suppose you are living in a hilly area where safe water is scarce. The number of members in your family is 6. Minimum per capita water requirement is 80 litre per day. You want to collect rainwater to meet your daily requirement. You have a roof area is 40 m ² with a runoff coefficient of 0.8.
(a) Calculate minimum rainwater requirement in metre per year in that area.
(b) Calculate minimum dimensions of the cylindrical storage tank to store water. (Assume depth : diameter= 1:2, and f = 0.45) | 4.0 |
| 9. | The population of Dhaka city is increasing at a very high rate eventually makes water demand very high. To predict the water demand after 20 years which method of population prediction will serve the best result, in your opinion? | 2.0 |

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The University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Fall'2008

Course No: CE 351
Full Marks: 60

Course Title: Transportation Engineering I
Time : 1 hour

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

1. (a) Discuss the activities of different Ministries and related department on transportation system's operation and maintenance in Bangladesh. (12)
(b) What are the different methods of speed measurement? (6)
(c) Write a short note on tidal flow. (2)

2. (a) Briefly differentiate between (6)
 i) Geometric delay and Operational delay
 ii) Off street and On street parking
(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 All-red-period. (2)

3. (a) Discuss briefly the various modes of transport. (10)
(b) Describe different types of road markers. (8)
(c) What are the different methods of collecting data for O-D survey? (2)

4. (a) Mention different strategies of fifth five-year plan related to transportation planning in Bangladesh. (10)
(b) Classify and describe traffic signs according to function. (8)
(c) Write a short note on PCE. (2)

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2008

Course # : CE 363

Course Title: Engineering Hydrology

Full Marks:60

Time: 1 hours

Answer all question

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

2. Distinguish between: (3x2=6)
- a) Actual and potential evapotranspiration
 - b) Field capacity and permanent wilting point
 - c) Depression storage and interception

3. Distinguish between recording and non-recording rain-gauges. (5)

4. A 3-hour storm occurred at a place and the precipitation in the neighboring rain-gauge stations P, Q and R were measured as 3.8, 4.1 and 4.5 cm respectively. The precipitation in the neighboring station S could not be measured since the rain-gauge bottle was broken. The normal precipitations in the four stations P, Q, R and S were 45, 48, 53 and 50 cm respectively. Estimate the missing precipitation at station S. (10)

46 cm

5. The average rainfall over a basin of area of 50 ha during a storm for the successive 1 hour period of a 7-h storms are 0.0, 6.0, 11.0, 34.0, 28.0, 12.0, 6.0 and 0.0 mm. If the volume of runoff from this storm was measured as $25 \times 10^3 \text{ m}^3$, find ϕ -index. (8)

8.75 mm/h

6. A reservoir had an average area of 20 km^2 . In a particular month the mean rate of inflow = $10 \text{ m}^3/\text{s}$, outflow = $15 \text{ m}^3/\text{s}$, 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. (4)

23.4 cm

$\rightarrow 10 - 15 +$

$10 \frac{\text{m}^3}{\text{s}}$

$\frac{1.68 \text{ m}^3 \times 10^6}{20 \times 10^6}$

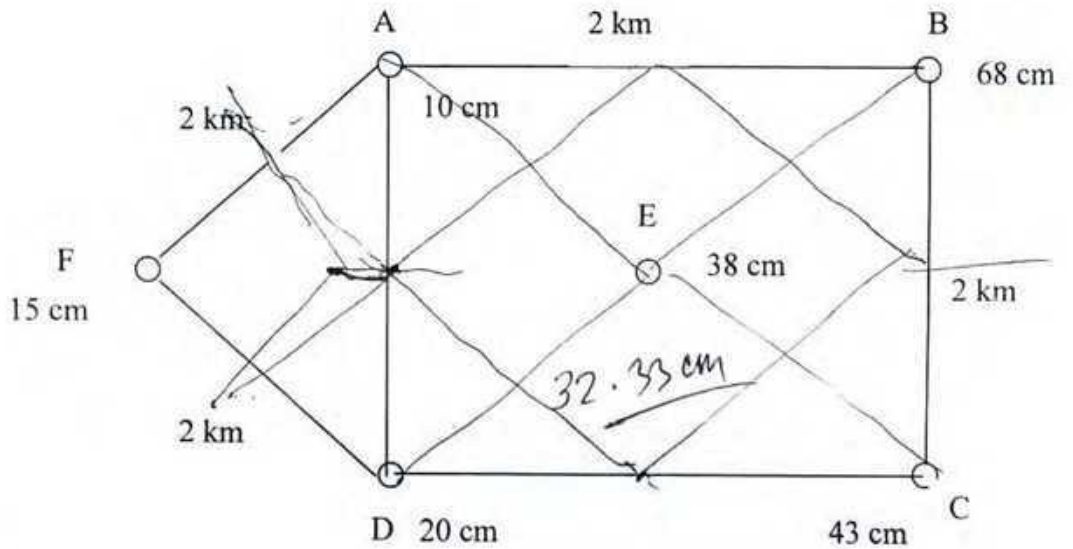
$+ \frac{1.296 \text{ m}}{1}$

$- 1.944$

$\frac{+ 10 \text{ cm} \times 20 \text{ km}^2}{30 \text{ days}}$

$\frac{0.8}{1}$

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7. Find the mean precipitation for the area shown in figure below by Thiessen polygon method. The area is composed of a square plus an equilateral triangular plot of side 2 km. Rainfall readings are in cm at the various stations indicated. (15)



$$\frac{35}{4} = 8 \frac{3}{4} = 8.75$$

$$\frac{97}{62} = \frac{3}{5}$$

$$\frac{4.5 - 3.8}{4.5} = \frac{0.7}{4.5} = \frac{70}{45} \div 1.5 \text{ km}$$

The University of Asia Pacific
Department of Civil Engineering
Midterm Examination Fall 2008

Course #: CE 401
Full Marks: 40 (= 4 × 10)

Course Title: Project Planning and Management
Time: 1 hour

ANSWER ANY FOUR QUESTIONS

- (a) What is the difference between project and functional activity? (4)
- (b) Briefly explain piece-meal system. What are the consequences of this system? (6)

Project manager is the person who is responsible for successful completion of the project. What are the characteristics that you need to look into a person to offer him this position? Discuss those characteristics. (10)

- (a) How does multicultural communication affect the project performance? What are the issues you need to take care of as a project manager where people from different cultures are involved in the team? (6)

- (b) What is the main limitation of Pay-back Period? How can you overcome this limitation? (4)

- (a) What do you understand by "Time Value of Money"? (3)

- (b) For the following cash flow table, calculate Net Present Value and Discounted pay-back period with a discount rate of 11%. (7)

Year	Cash flow
0	Tk. 600,000 (investment)
1	100,000
2	200,000
3	200,000
4	300,000
5	300,000
6	200,000

- (a) How can you distinguish Functional structure from Weak Matrix structure? (4)

- (b) Calculate IRR for the following cash flow table: (6)

Year	Cash flow
0	Tk. 1,000 (investment)
1	500
2	800

If the cost of capital is 15%, do you think you should accept the project or not? Why?

- (a) Briefly discuss Iterative budget. How is this budget better than top-down and bottom-up budgets? (4)

- (b) Consider a project that requires 25 units of products to be produced. An expert worker takes 12 hrs to complete a single part. However, 20 parts need to be produced for a worker to be an expert at 75% learning rate. How many hrs does the worker need to complete all 25 parts? (6)

The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Fall 2008
Program: B.Sc. Engineering (Civil)

Course Title: Environmental Engineering III Course Code: CE 431
 Time: 1.0 hour

Credit: 3.00
 Full Marks: 40

There are Five questions Answer any Four

- Q1.** For the solid waste sample, given in the table below estimate **(10)**
1. Moisture content
 2. Unit Energy content (Ash free dry basis).
 Assume 5.0% ash content.

Component	Percent by mass	Moisture content %	Energy kJ/kg
Food waste	25	70	69,750
Paper	20	6	753,750
Cardboard	16	5	163,000
Plastic	20	2	326,000
Garden Trimmings	5	60	65,000
Wood	10	20	93,000
Tine cane	4	3	3,500

- Q2.** (a) What are the ways to reduce the quantities of solid wastes? **(2)**
 (b) What are the functional elements of a solid waste management system? Show the interrelationship among these elements. **(4)**
 (c) What are the four steps that should be followed during laying collection route in a solid waste collection system? **(4)**

- Q3.** Determine the break-even time for a stationary-container system and a separate transfer and transport system for transporting wastes collected from a metropolitan area to a landfill disposal site. Assume the following cost and system data are applicable. **(10)**

1. Transportation costs:
 - a. Stationary-container system using an 18 cubic meter compactor =Tk.1400/h
 - b. Tractor-trailer transport unit with a capacity of 120 cubic meter =Tk. 1750/h
2. Other costs:
 - a. Transfer station operating cost, including amortization = Tk. 28/cubic meter
 - b. Extra cost for unloading facilities for tractor-trailer transport unit = Tk. 3.5/cubic meter
3. Other data:
 - a. Density of wastes in compactor =325 kg/cubic meter
 - b. Density of wastes in transport units =150 kg/cubic meter

- Q4. Based on traffic studies of an industrial part, where a hauled-container solid wastes collection system is practiced, it is found that average time to drive from the garage to the first container and from the last container to the garage each day is 20 and 25 min, respectively. If the average time required to drive between containers is 10 min and the one-way distance to the disposal site is 25 km (speed limit: 88 km/h), determine the number of trips that can be made per day, based on an 8-hour workday. Assume at-site time=0.133 h/trip, haul constant $a=0.016$ & $b=0.011$ and pick-up time 0.4 h/trip.
- Q5. (a) Define Pickup Time for both Hauled Container System and Stationary Container System. What are the factors that affect the generation rates of MSW.
 (b) What are the differences between two types of solid wastes collection system?

Formula:

$$1. H = [(t_1 + t_2) + N_d(T_{scs})]/(1 - W)$$

$$2. T_{hcs} = P_{hcs} + s + a + bx$$

$$3. P_{hcs} = pc + uc + dbc$$

$$4. T_{scs} = P_{scs} + s + a + bx$$

$$5. P_{scs} = C_t uc + (n_p - 1)dbc$$

$$6. C_t = \frac{vr}{cf}$$

$$6. N_d = [(1 - W)H - (t_1 + t_2)]/(P_{hcs} + s + a + bx)$$

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The University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Fall 2008

Course #: CE 437
Full Marks: 70 (= 7 × 10)

Course Title: Environmental Engineering VI
Time: 1 hour

Answer **ANY SEVEN** of the following **NINE** Questions

- (1) What are the major objectives of environmental management?
- (2) What do you understand by “biosphere”?
Why is it so important for the sustenance of all living organisms?
- (3) Name three important issues related to “Atmosphere” that are of “regional scale.”
Briefly discuss any one of these issues.
- (4) What do you understand by “niche”?
Draw the flow-chart showing niche interrelationships and material cycling in aquatic ecosystem.
- (5) What are the principal reasons behind the decline of yield in capture fisheries in Bangladesh?
- (6) What are the major causes of forest depletion in Bangladesh?
What are the principal human interventions affecting the coastal environment of Bangladesh?
- (7) List the major components of environmental management approaches.
- (8) What are Millennium Development Goals (MDGs)? Write down any 6 out of the 8 Goals.
- (9) Starting in 1972, when and where were the major UN Conferences on environment held?
How many principles were adopted in the first two Conferences?
Write down a principle either on “women” or “indigenous people” adopted in the second UN Conference.

The University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Fall 2008

Course No : CE 361
 Time : 1 hour

Credit Hour : 3.0
 Total Marks : 20

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

1. Define, (a) Froude Number (b) Transition 2.0
2. Why the velocity distribution in open channel flows is not uniform? 2.0
3. Show with neat sketches the pressure distribution in curved channels of convex and concave flows. 1.0
4. Draw typical specific energy curve and mention its three properties. 2.0
5. Find u, α, β from the following data: 3.0

y(mm)	0	3	10	15	20	40	60	80	100	120
u (m/s)	0	1.25	1.75	2.05	2.20	2.55	2.75	2.85	2.90	3.0
6. A trapezoidal channel 5.0 m wide and having a side slope of 1.5 horizontal: 1 vertical is laid on a slope of 0.00035. The roughness coefficient $n = 0.015$. Find the normal depth for a discharge of 20 m³/s throughout this channel. 3.0
5. Water flows at a depth of 2.0 m and a velocity of 1.5 m/s in a 4.0 m wide channel. Determine the downstream water surface elevation when the height of the hump is 0.50m. 3.0
7. Calculate the critical depth and the corresponding specific energy for a discharge of 5.0 m³/s in the Trapezoidal channel of width 2.0 m. Side slope = 1.5(H):1(V). 4.0

Formulae:

1. $Q = AU$
2. $E_1 = E_2$
3. $E = y + \frac{u^2}{2g} = y + \frac{Q^2}{2gA^2}$
4. $\frac{Q^2}{g} = \frac{A_c^3}{T_c} = \frac{(B + my_c)^3 y_c^3}{(B + 2my_c)}$
5. $y_c = \sqrt[3]{\frac{q^2}{g}}$
6. $E_c = 1.5y_c$

[2]

**THE UNIVERSITY OF ASIA PACIFIC
DEPARTMENT OF CIVIL ENGINEERING
MID TERM EXAMINATION, FALL 2008**

Course : CHEM – 111

Full Marks : 20

Course Title : Chemistry

Time : 1 hour

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

- Q. 1. a) Define isotopes and isobars. Choose isotopes and isobars from the following list. (3)
 $^{12}_6\text{C}$, $^{12}_5\text{B}$, $^{14}_7\text{N}$, $^{14}_8\text{O}$, $^{16}_8\text{O}$, $^{13}_6\text{C}$, $^{13}_7\text{N}$
- b) give the main features and limitations of Rutherford atomic model. (2)
- Q. 2. a) State and explain Henry's law. What is the effect of temperature on the solubility of Gases in liquid? (3)
- b) Define and classify Critical Solution Temperature (CST). What type of CST is present in phenol-water system? (2)
- Q. 3. a) Name the Colligative properties and explain why are they so called. (2)
- b) A solution containing 10.0g of a solute in 100g of water lowers the vapour pressure from 17.5mm of Hg to 17.4mm of Hg at 20°C . Calculate the molecular weight of the solute. (3)
- Q. 4. a) Define the terms : (i) heat of formation, (ii) heat of combustion and (iii) heat of neutralization. (3)
- b) What is heat of solution? Give the classification of heat of solution. (2)
- Q. 5. a) What is Equilibrium Constant (K) .Derive a relationship between K_p and K_c . (2.5)
- b) State LeChatelier's principle. What is the effect of pressure and catalyst on the equilibrium of a chemical reaction. (2.5)

The University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2008

Course #: ECN 201
Full Marks: 20 (= 4 × 5)

Course Title: Principles of Economics
Time: 1 hour

Answer any Four of the following Questions

1. a) Define economics and microeconomics. [3+2]
b) Principle of economics states that "People face tradeoff".
What do you mean by the term 'tradeoff'?

2. a) How can we use the concept of PPC in measuring 'opportunity cost'? [2.5+2.5]
b) Interpret the meanings of
i) A point inside PPC ii) A point on the PPC
iii) A point outside PPC iv) An upward shift of PPC v) An inward shift of PPC

3. a) Describe the 'Law of Demand'. [2+3]
b) When price of a commodity increases from Tk. 25 to Tk. 30 per unit, its demand falls from 1200 to 800 units.
Calculate the price elasticity of demand.

4. a) What is market equilibrium? [2+3]
b) Consider the following market demand and supply equations:
 $Q_D = 1200 - 6P$
 $Q_S = 900 + 4P$
Determine the equilibrium price and output algebraically or graphically.

5. Write Short Notes on **any two** of the following issues [2.5+2.5]
 - a) Incentive
 - b) Opportunity cost
 - c) Determinants of demand
 - d) Elasticity

Q.2 Add a prefix or a suffix to each word in parentheses that completes the sentence. (any five) 5

- a. Do you think that the bright colours are the most -----? (attract)
- b. Arif's ----- (negate) attitude makes it very difficult to work with him
- c. We need to ----- (arrange) the chairs
- d. The ----- (magic) took out a rabbit from his hat.
- e. The girls were singing----- (happy)
- f. The man gave the traveller the wrong----- (direct)

Q.3. In the following extract, some of the verbs are not used in the correct past tense. Find the words and transform them into \pm forms. 5

Sue Glass has a car accident when she was eight, so she doesn't like driving. When she grow up this was a problem, because she got a job with a car company. Then six years ago she meets Julian Swayland, a racing driver, and she told him she is afraid of cars. He wants to help, so he takes her to Brands Hatch, a Grand Prix racing circuit. He drives her round corners at 100 mph and she loves it. Then she hears about a special motor racing course. She did the course with five men and was amazed when she got top marks.

Q.4. Write questions for the following answers. (ASK question with the underlined words where necessary). (Any five) 5

- a. Yes, I also watched the movie "The Client"
- b. They are waiting for their grandmother.
- c. He takes English lessons.
- d. We went to my uncle's house
- e. The flight will come within an hour.
- f. We have gone to Sylhet and Comilla.

Q.5. Fill in the blanks with *a, an, the, some* where necessary. 5

- a. She gave her ----- biscuits and ----- cup of tea.
- b. ----- book on that shelf is----- interesting one.
- c. ----- handle of ----- suitcase is broken.
- d. Yesterday I came to know about ----- unique idea.
- e. There are ----- beautiful trees in ----- campus.
- f. He is going to ----- United States of America.

Q.6. Complete the following sentences using appropriate forms of pronouns. 5

- a. The women ----- didn't know what to do.
- b. I'm not going to do it for you. You can do it -----.
- c. We enjoyed ----- very much at the magic show.
- d. One should be careful about ----- own health.
- e. She has done her duty. Have we done -----

Q.7. Make the following statements negatives. 5

- a. They had to walk a mile to get the bus.
- b. Everybody appreciated her paintings.
- c. The lady will carry the box herself.
- d. We have a lot of eggs in the basket.
- e. Each of the students has a textbook.

The University of Asia Pacific

Mid-term Examination, Fall 2008

1st Year, 1st Semester

Course No: HSS-101

Course Title: English Language-1

Time: 1 Hour

Marks: 40 (20)

Answer all the questions

Q. 1. Write a biography of the person from the given information. (Word Limit-150)

Name : John Marshal

Date of birth : 25-01-1970

Home District : New York, U.S.A.

Religion : Christian

Education : S.S.C. Oak Grove High School
Year 1986 (G.P.A. 4.00)

H.S.C-Cupertino Community College, 1988. California.
(G.P.A. 4.00)

B.S.C-Computer Engineering
San Jose State University, 1992

M.B.A-Stanford University, 1994

Volunteer Service : Helped in American Heart Association.
Worked at the community center for two years.

Work Experience : 1995-1999 (Worked as an Engineer, Microsoft, San Jose,
California.)

2000-2003 (Engineer)
Cisco System
Santa Clara, California.

2004-2007 (Reliability Engineer)
Apple Computer, Santa Clara, California.

Family Status : Married
Child-One daughter
2 Years old

Personal Interest : Reading, Traveling, and Writing.

THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid-Semester Examination Fall-2008
Program: Department of Civil Engineering (CE)

Course Title: Vector Analysis Course Code: MTH-103 Credit:3.00
Time: 1.00 Hour Full Marks: 20

Answer any 04(Four) of the following questions: 4×5 = 20

Q-1. Define vector and unit vector. Find a unit vector parallel to the resultant of vectors $\vec{r}_1 = 2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\vec{r}_2 = \hat{i} + 2\hat{j} + 3\hat{k}$. 1+1+3

Q-2. If $\vec{A} \cdot \vec{B} = 0$ and if \vec{A} and \vec{B} are not zero, then show that \vec{A} is perpendicular to \vec{B} . Also shows that dot product of \vec{A} & \vec{B} obey commutative law. 3+2

Q-3. Prove that $\vec{A} \times (\vec{B} \times \vec{C}) + \vec{B} \times (\vec{C} \times \vec{A}) + \vec{C} \times (\vec{A} \times \vec{B}) = 0$. 5

Q-4. A particle moves along a curve whose parametric equations are $x = e^{-t}$, $y = 2\cos 3t$, $Z = 2\sin 3t$, where t is the time.
a) Determine its velocity and acceleration at any time. 2.5+2.5
b) Find the magnitudes of the velocity and acceleration at $t = 0$.

Q-5. Find $\nabla \Phi$ if i) $\Phi = \ln|\vec{r}|$ ii) $\Phi = \frac{1}{r}$ 2.5+2.5

6. (a) If $\vec{R}(u) = (u - u^2)\hat{i} + 2u^3\hat{j} - 3\hat{k}$ then find i) $\int_{-\infty}^{\infty} \vec{R}(u)du$ ii) $\int_1^2 \vec{R}(u)du$. 1.5+1.5
b) Evaluate $\int \vec{A} \times \frac{d^2 \vec{A}}{dt^2} dt$. 2

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THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid-Semester Examination Fall-2008
Program: Department of Civil Engineering (CE)

Course Title: Math IV
Time: 1.00 Hour

Course Code: MTH-203

Credit:3.00
Full Marks: 20

☐ **Answer any 04(Four) of the following questions:**

4×5 = 20

Q-1. Define differential equation. Find the differential equation of the family of the curves $y = e^x (A \cos x + B \sin x)$ and hence also define general solution. **1+3+1**

Q-2. Solve the following equations:

i) $y^2 + x^2 \frac{dy}{dx} = xy \frac{dy}{dx}$ **2.5+2.5**

ii) $(y^4 + 4x^3y + 3x)dx + (x^4 + 4xy^3 + y + 1)dy = 0$

Q-3. State and prove Convolution theorem.

5

Q-4. (a) Define Laplace transform of $F(t)$. Answer each of the followings:

i) $L\{t^4 e^{3t}\}$ ii) $L\{e^{-2t} \sin 5t\}$ i) $L\{t \sin t\}$

1+1.5

(b) Find $L\{F(t)\}$, if $F(t) = 7$, when $0 < t < 3$
 $= 0$, when $t > 3$

2.5

Q-5. Solve $Y'' + 9Y = \cos 2t$, if $Y(0) = 1$, $Y(\pi/2) = -1$

5

Q-6. Find $L^{-1} \left\{ \frac{5s+4}{s^3} - \frac{2s-18}{s^2+9} + \frac{24-30\sqrt{s}}{s^4} \right\}$.

5

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THE UNIVERSITY OF ASIA PACIFIC
Department of Interdepartmental Courses
Mid Term Examination, Fall-2008
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** of the following questions:

1. (a) What is interference of light? What are the necessary conditions for the inference of light? 6
(b) In a Young's double slit experiment the separation between the two coherent sources is 1.9 mm and the fringe width is 0.31 mm found at a distance of 100 cm from the slits. Calculate the wavelength of light. 4
2. (a) Distinguish between Fresnel and Fraunhofer type of diffraction. 6
(b) In a Fraunhofer diffraction, a screen is placed 100cm away from the screen. If the slit width is 0.2 mm and the first minima lies 5mm on either side of the central maximum, find the wavelength of light? 4
3. Prove that Bulk modulus $K = \frac{Y}{3(1 - 2\sigma)}$, where the terms have their usual meanings. 10
4. (a) Find out the force F, of a metallic bar due to contraction or expansion. 4
(b) A steel rod of cross-sectional area 4 cm^2 is heated to 160°C and then prevented from contracting when it is cooled to 20°C . Find the force exerted at the ends of the rod. 6
[$Y = 3 \times 10^{11} \text{ N/m}^2$ and $\alpha = 12 \times 10^{-6} / ^\circ\text{C}$]
5. Describe the construction and working principle of constant volume air thermometer. 10
6. (a) Show that the slope of an adiabatic curve is γ times steeper than the slope of an isothermal curve. 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?

