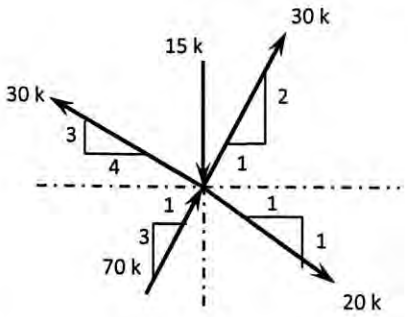
University of Asia Pacific
Department of Civil Engineering
Mid-Term Examination Fall 2015

Course Code: CE 101 (A)
Course Title: Engineering Mechanics I

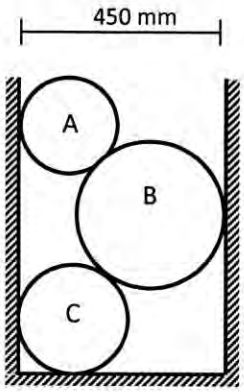
Time: 1 (one) Hour
Full Marks: (3x20) = 60

Answer any 3 (Three) questions.
Each question carries equal marks

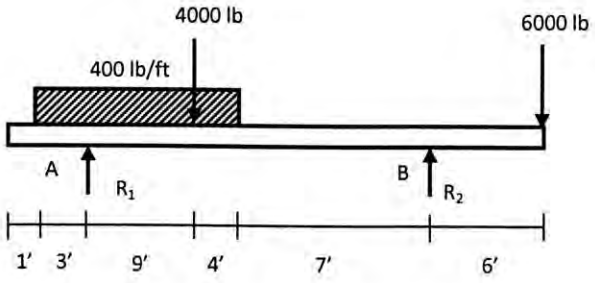
1. Find the resultant and its direction for following concurrent force system.



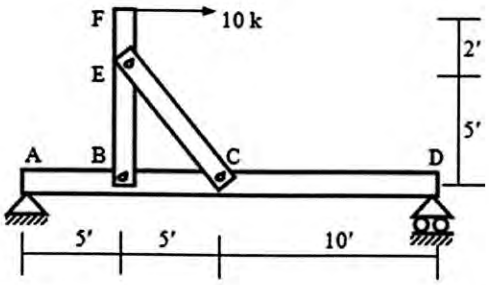
2. Three cylinders are kept in ditch as shown. Determine the reactions between cylinder A and vertical wall. Given, Cylinder A: Weight 75 N, radius: 100 mm, Cylinder B: Weight 200 N, radius 150 mm, Cylinder C: Weight 100 N, radius 125 mm.



3. A simple beam is loaded as shown below. Determine the reaction R_1 and R_2. Also find the bending moment at support B.



4. In the structure below, calculate the force in member EC and the reactions at pin B



University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall 2015
Program: B.Sc. Engineering (Civil)

Course No: CE 107 | Course Title: Introduction to Civil & Environmental Engineering
Full Marks: 60 (= 4 x 15) | Time: 1 hour

PART I

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

1. (a) Define the term *Environment*. [5]
   (b) What do you mean by *Fundamental of Environmental Engineering* and *Fundamental of Environmental Pollution*? [10]

2. (a) Write down the importance of an *Environmental Engineer*. [5]
   (b) Describe the five layers of atmosphere with sketch. [10]

3. (a) Show the distribution of world total water resource using pie charts. [5]
   (b) Define *Environmental Ethics*. What are the objectives of *Environmental Ethics*? [10]

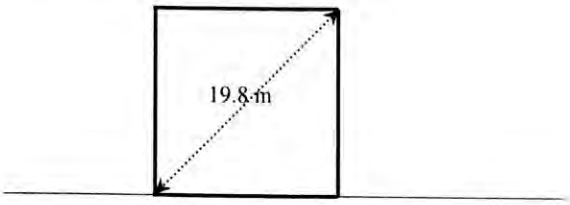
PART II

There are **THREE** questions. Answer any **TWO**.
[Use Appendix, as necessary, provided on the other side]

4. (a) With a diagram, show the ways science, engineering and technology are interrelated. [9]
   (b) Write a short note on technology. [6]

5. (a) Define civil engineering according to ASCE. [4]
   (b) What are the major foci of any civil engineering project? [3]
   (c) Write down two major roles of civil engineers in infrastructure development. [2]
   (d) Discuss, in short, "Civil Engineering" as a career. [6]

6. For the following square plot, calculate the total floor area and the number of stories that can be built for a residential building. [15]



PLOT LAYOUT

APPENDIX

সারণী ২

ইমারতের সেটব্যাক

ইমারতের উচ্চতাঃ ৩৩ মিটার অথবা ১০ তলা পর্যন্ড়				
প্লটের পরিমাণ		ন্যূনতম সেটব্যাক		
বর্গমিটার	কাঠা	সম্মুখ (মিটার)	পশ্চাৎ (মিটার)	প্রতি পার্শ্ব (মিটার)
১৩৪ বঃমিঃ বা ইহার নীচে	২ কাঠা বা ইহার নীচে	১.৫০	১.০০	০.৮০
১৩৪ বঃমিঃ এর উর্ধ্ব হইতে ২০১ বঃমিঃ পর্যন্ড়	২ কাঠার উর্ধ্ব হইতে ৩ কাঠা	১.৫০	১.০০	১.০০
২০১ বঃমিঃ এর উর্ধ্ব হইতে ২৬৮ বঃমিঃ পর্যন্ড়	৩ কাঠার উর্ধ্ব হইতে ৪ কাঠা	১.৫০	১.৫০	১.০০
২৬৮ বঃমিঃ এর উর্ধ্ব হইতে ৩৩৫ বঃমিঃ পর্যন্ড়	৪ কাঠার উর্ধ্ব হইতে ৫ কাঠা	১.৫০	২.০০	১.২৫
৩৩৫ বঃমিঃ এর উর্ধ্ব হইতে ৪০২ বঃমিঃ পর্যন্ড়	৫ কাঠার উর্ধ্ব হইতে ৬ কাঠা	১.৫০	২.০০	১.২৫
৪০২ বঃমিঃ এর উর্ধ্ব হইতে ৪৬৯ বঃমিঃ পর্যন্ড়	৬ কাঠার উর্ধ্ব হইতে ৭ কাঠা	১.৫০	২.০০	১.২৫
৪৬৯ বঃমিঃ এর উর্ধ্ব হইতে ৫৩৬ বঃমিঃ পর্যন্ড়	৭ কাঠার উর্ধ্ব হইতে ৮ কাঠা	১.৫০	২.০০	১.২৫

সারণী-৩ (ক)

ইমারতের জন্য রাস্ড়ার স্বাভাবিক প্রস্থ, ফ্লোর এরিয়া অনুপাত (FAR) এবং সর্বোচ্চ ভূমি আচ্ছাদন (MGC) ঃ

[Type: A (A1-A5)ঃ আবাসিক বাড়ী ও হোটেল

প্লটের পরিমাণ		ইমারতের শ্রেণীঃ (A1 - A4) [ক] (আবাসিক বাড়ী)			ইমারতের শ্রেণীঃ (A5) [খ] (আবাসিক হোটেল)		
বর্গমিটার	কাঠা	রাস্ড়ার প্রস্থ (মিটার)	FAR	MGC (%)	রাস্ড়ার প্রস্থ (মিটার)	FAR	MGC (%)
১৩৪ বঃমিঃ বা ইহার নীচে	২ কাঠা বা নীচে	৬.০	৩.১৫	৬৭.৫	৬.০	২.৫০	৬৭.৫
১৩৪ বঃমিঃ এর উর্ধ্ব হইতে ২০১ বঃমিঃ পর্যন্ড়	২ কাঠার উর্ধ্ব হইতে ৩ কাঠা	৬.০	৩.৩৫	৬৫.০	৬.০	২.৭৫	৬৫.০
২০১ বঃমিঃ এর উর্ধ্ব হইতে ২৬৮ বঃমিঃ পর্যন্ড়	৩ কাঠার উর্ধ্ব হইতে ৪ কাঠা	৬.০	৩.৫০	৬২.৫	৬.০	৩.০০	৬২.৫
২৬৮ বঃমিঃ এর উর্ধ্ব হইতে ৩৩৫ বঃমিঃ পর্যন্ড়	৪ কাঠার উর্ধ্ব হইতে ৫ কাঠা	৬.০	৩.৫০	৬২.৫	৬.০	৩.২৫	৬২.৫
৩৩৫ বঃমিঃ এর উর্ধ্ব হইতে ৪০২ বঃমিঃ পর্যন্ড়	৫ কাঠার উর্ধ্ব হইতে ৬ কাঠা	৬.০	৩.৭৫	৬০.০	৬.০	৩.৫০	৬০.০
৪০২ বঃমিঃ এর উর্ধ্ব হইতে ৪৬৯ বঃমিঃ পর্যন্ড়	৬ কাঠার উর্ধ্ব হইতে ৭ কাঠা	৬.০	৩.৭৫	৬০.০	৬.০	৩.৭৫	৬০.০
৪৬৯ বঃমিঃ এর উর্ধ্ব হইতে ৫৩৬ বঃমিঃ পর্যন্ড়	৭ কাঠার উর্ধ্ব হইতে ৮ কাঠা	৬.০	৪.০০	৬০.০	৬.০	৪.৫০	৫৭.৫

University of Asia Pacific

Mid Semester Examination (Fall 2015)

Program: B.Sc. Engineering

Department of Civil Engineering

Year: 1st, Semester: 1st

Course Code: HSS101 **Course Title: English Language I**

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

*Marks are indicated in the right margin

1. Fill in the blanks using the right form of the verbs: **3**

a. He _____ (talk) with his friend when the telephone _____ (ring).

b. I _____ (meet) already my cousin. He _____ (arrive) yesterday.

c. He usually _____ (go) to Sylhet by train but today he _____ (go) by plane.

2. Read the sentences and make (WH-) questions for the underlined parts: **3**

a. Susan went to the park with her friends.

b. He wanted a piece of paper.

c. Mr. Rashid spends most of his time studying in the library.

d. My uncle is a banker.

e. Her hobby is fishing.

f. Mrs. Sen is their neighbour.

3. Fill in the blanks with appropriate prepositions: **3**

a. Most men are not very fond _____ going to wedding parties.

b. Norman was dying _____ a cigarette but he was determined to give it up.

c. Most students have lunch_____ school.

d. Walter is not mean; he is just very careful _____ money.

e. The students walk five kilometers to school, so they need to get up very early _____ the morning.

f. When do you go_____the office?

4. Fill in the blanks using the appropriate form of the words: **3**

a. He called back _____. (Immediate)
b. You should _____ clash with your neighbor. (Avoidance)
c. The girl did the job with _____. (Satisfy)
d. The boy_____ his father to solve the problem. (Courage)
e. His _____ is what I like most about him. (Generous)
f. He exports _____ shrimps to European countries.(Freeze)

5. Fill in the blanks using pronouns or possessives: **3**

a. People are always engaged with _____ own problems.
b. She asked _____ sister to help her.
c. The car was wonderful. _____ colour was black.
d. Christina _____ called the police.
e. He read the letters and burned _____.
f. It is _____ responsibility to save water.

6. Rearrange the given information in chronological order to write about Barack Obama, the President of the United States: **5**

- When he is a student of University of Hawaii at Manoa, Obama Sr. meets fellow student Ann Dunham, and they marry in 1961.
- 44th and current president of the United States
- He wins a second term of presidency in 2012
- Date of Birth: 4 August, 1961, Place of Birth: Honolulu, Hawaii
- The first African American to serve as the American President
- Community organizer, civil-rights lawyer and teacher before pursuing a political career
- Elected to the Illinois State Senate in 1996 and to the U.S. Senate in 2004
- Obama's father, Barack Obama Sr., born of Luo ethnicity in Nyanza Province, Kenya.
- First elected to the presidency in 2008
- Obama Sr. grows up herding goats in Africa and, eventually earns a scholarship that allows him to leave Kenya and pursue his dreams of going to college in Hawaii.

University of Asia Pacific
Department of Basic Sciences & Humanities
Mid Semester Examination, Fall-2015
Program: B.Sc. Engineering (Civil)
1st Year / 1st Semester

Course Title: Mathematics-I Course No. MTH 101 Credit: 3.00

Time: 1.00 Hour Full Mark: 60

N.B: There are Four questions. Answer any **Three (3)** of the following:

1. (a) Define Continuity. Show that the function $f(x) = |x|$ is continuous at $x = 0$ but not differentiable at $x = 0$. 10

   (b) If $y = e^{ax}\sin(bx + c)$, *Find* y_n 10

2. (a) If $y = e^{m\cos^{-1}x}$, then show that 10
   $$(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - (n^2 + m^2)y_n = 0$$

   (b) State Mean value theorem. Discuss the applicability of the Mean value theorem for the function $f(x) = x(x - 1)(x - 3)$ over [2,4]. 10

3. (a) State Taylor's theorem with Lagrange's form of remainder. Expand 10

   $f(x) = lnx$ in power of $(x - 2)$ by Taylor's theorem.

   (b) State Euler's theorem on homogeneous functions in two variables. 10

   If $u = \tan^{-1}\dfrac{x^3 + y^3}{x + y}$, show that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = Sin2u$

4. (a) Find the maximum and minimum values of $x^4 - 8x^3 + 22x^2 - 24x + 5$ 10

   (b) If $u = \sqrt{x^2 + y^2}$, then show that $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} = \dfrac{1}{u}$ 10

University of Asia Pacific
Department of Basic Sciences and Humanities
Mid-Semester Examination Fall – 2015
Program: B. Sc Engineering (CE)

Course Title: Physics I | Course Code: PHY-101 | Credit: 3.00
Time: 1.00 Hour | Full Mark: 60

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

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1. (a) Prove that in case of shearing strain, the work done per unit volume is equal to $\frac{1}{2} \times Stress \times Strain$. **[10]**

   (b) A wire of length 1 m and diameter 10^{-3} m is stretched by 6×10^{-4} m by a load 10 kg. Calculate the Young's modulus of the wire. **[10]**

2. (a) Derive that the bending moment of a beam under the action of deforming forces is equal to $\frac{YI_g}{R}$, where Y is the Young's modulus and I_g is called the geometrical moment of inertia of the beam. **[10]**

   (b) Calculate the work done in stretching a uniform metal wire of area of cross section 10^{-6} m^2 and length 1.5 m through 4×10^{-3}m. Given $Y = 2 \times 10^{11}$ N/m^2. **[10]**

3. (a) Show that the moment of inertia of a uniform circular disk is $\frac{1}{2}MR^2$, where the symbols have their usual meanings. Consider that the disk rotates about an axis passing through its centre and perpendicular to its plane. **[10]**

   (b) A flat circular disc of mass *5 kg* and diameter *0.1 m* is set rolling on a table with a velocity of *0.2 m/s* along a straight line on a horizontal surface. Calculate its kinetic energy. **[10]**

4. (a) What is Newton's ring? Find out the radius of the dark and bright ring when they are formed by reflected and transmitted light respectively. **[10]**

   (b) A thin equiconvex lens of focal length 4 metres and refractive index 1.5 rests on and in contact with an optical flat and using the light of wavelength 5460 Å. Newton's ring are viewed normally by reflection. What is the diameter of the 5^{th} bright ring? **[10]**