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

Course Title: Engineering Mechanics I    Credit Hours: 3.0    Course Code: CE 101
Time: 1 hour    Full Marks: 40 (= 4 × 10)

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**ANSWER ALL THE QUESTIONS**

1. What force P will cause the wheel (as shown in **_Fig.1_**) to be on the point of moving over the block A? The wheel weights 2000 lb.    **10**
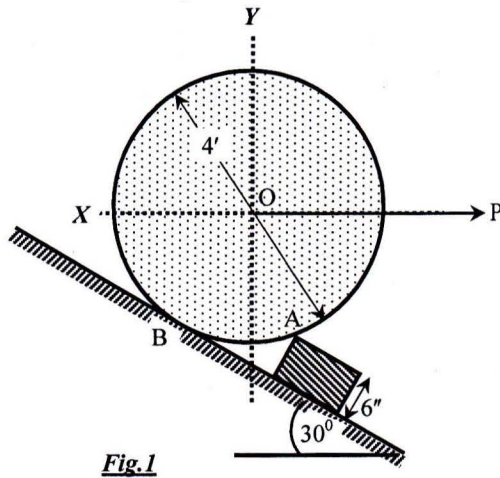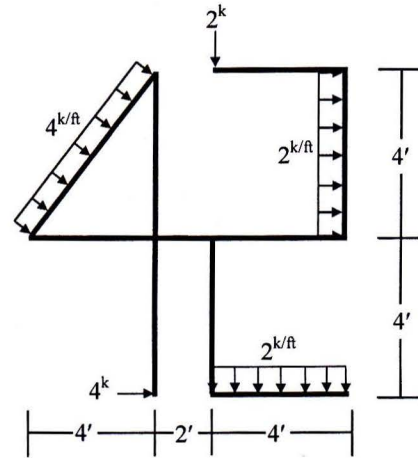


_Fig.1_



_Fig.2_

2. **_Fig.2_** shows a system of forces acting on a structure (shown by bold lines). Calculate the magnitude, direction and location of resultant of the forces.    **4+4+2**

3. In the truss loaded as shown in **_Fig.3_** (i) Identify zero force member(s), (ii) Calculate reactions at supports **_a_** and **_f_** and (iii) Calculate forces in member **_ih_** and **_eh_**.    **2+4+4**
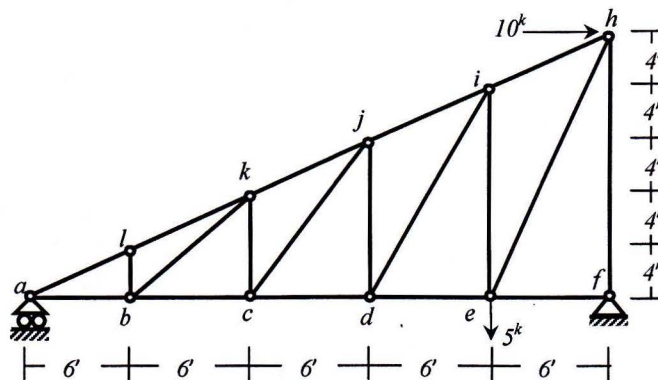


_Fig.3_

4. In the beam loaded as shown in **_Fig.4_**, calculate the (i) reactions at supports A and D and (ii) Shear Force (SF) and Bending Moment (BM) at point C.    **4+6**
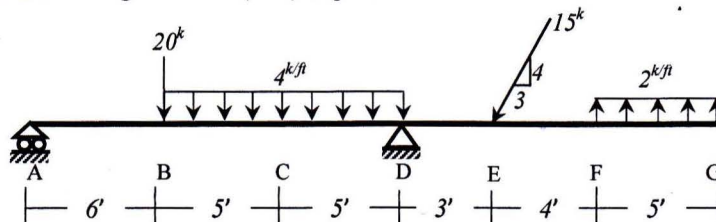


_Fig.4_

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

Course No: CE 107                                    Course Title: Introduction to Civil & Env. Engg.
Full Marks: 60                                          Time: 1 hour

## PART I
Answer all the questions.

1.    Explain the following terms:
         i) Environment      ii) Environmental ethics                                    [10]

2. (a)  What are the objectives of environmental education?                        [3]

   (b)  Explain the concept of "Green Engineering". How green engineering process differentiate from traditional engineering process?                        [3+4]

3. (a)  What is 3R principle?                                                       [3]
   (b)  Discuss, in short, the five layers of atmosphere.                           [7]

## PART II
Answer all the questions.

4. (a)  Using a schematic diagram, mention some important features of scientists, engineers, society and technology.                                             [8]
   (b)  What should be the major foci of any civil engineering project?            [2]

5. (a)  Define civil engineering according to ASCE. What are the major branches of civil engineering?                                                          [3+2]
   (b)  Mention five major roles of civil engineers in infrastructure development. [5]

6. (a)  Calculate (showing unit detail) the weight of a brick ($W_b$) in kg if its size is about 241.3 mm x 11.43 cm x 2.75 in. Consider unit weigh of brick material, $\gamma_{bm}$ = 122.5 lb/ft$^3$.                                             [5.5]
   (b)  For the brick as mentioned above (in question no. 6(a)), calculate the pressures on the suface in (i) psi, (ii) Pa (N/m$^2$) and (iii) kg/cm$^2$, according to its position as shown below.                                                    [4.5]
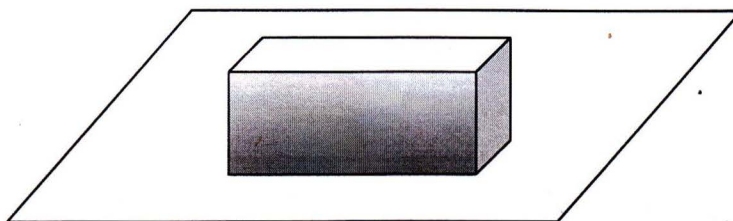
Figure: A brick resting on a plane surface

# University of Asia Pacific

## Department of Civil Engineering

## Mid Semester Examination, Spring 2018

## Program: B.SC. in Civil Engineering

## Year ...1st...    Semester ...1st...

Course Title: English Language I      Course Code: HSS 101      Credit: 3.00

Time: 1.00 Hour                                                     Full Marks: 20

**Instructions:**

*Marks are indicated in the right margin.

*Answer all the questions.

**1. Fill in the blanks with appropriate preposition.**      4

a) When I was younger, I was always so afraid _____ going to the dentist's.

b) _____ Saturday night I went to bed _____ midnight.

c) Instead _____ sitting _____ home and complaining about having nothing to do, go and do something constructive!

d) Did you know that Paul is married _____ Susie?

**2. Fill in the blanks with appropriate pronouns or possessives.**      4

a) My mobile needs to be fixed, but _____ is working.

b) _____ computer is a Mac, but _____ is a PC.

c) We gave them _____ telephone number, and they gave us _____ .

d) _____ is the place _____ I grew up.

**3. Insert articles where necessary.**      3

a) Do you wish to take _____ walk with me? Do you like _____ weather?

b) Last night we had _____ dinner in _____ restaurant.

c) Have you never seen       elephant? You look so       scared.


## 4. Change the following sentences according to the directions:       0.5x6= 3

a) Very few cities in India are as rich as Mumbai. (Comparative)
b) This is not the kind of dress to be worn for a school function. (Interrogative)
c) I didn't notice his presence in the room. (Affirmative)
d) Everybody will admit that he did his best. (Negative)
e) No one could deny that she is intelligent. (Affirmative)
f) We were not sent to this world simply to make money. (Interrogative)


## 5. Write a biography of Barack Hussein Obama, 44th and the former President of the United States, as well as the first African American to hold the office, from the information given below. (Use tense appropriately.)       6

**1961**: born on August 4, 1961, in Hawaii.

**1983**: earned degrees from Columbia University and Harvard Law School. He worked as a community organizer in Chicago.

**1992**: met and married Michelle La Vaughn Robinson in 1992. His daughter Malia Ann and Natasha (Sasha) were born in 1998 and 2001 respectively.

**1996**: elected to the Illinois state senate in 1996 and served there for eight years.

**2004**: elected by a record majority to the U.S. Senate from Illinois. February 2007 announced his candidacy for President and wins the contest.

**2009: January 20**: Barack Obama was inaugurated as the 44th President of the United States— the first African American man.

**2009**: Awarded with Nobel peace prize.

**2010**: worked with Congress to improve the U.S. economy, passed health-care reform, and withdrew U.S. troops from Iraq.

**2012**: won reelection, Obama began his second term focused on immigration reform and gun control.

**2015:** President Obama received appreciation for dealing foreign crisis and addressing climate change issues.

**2017**: left the presidency, at age fifty-five, after his constitutionally limited two terms ended on January 20, 2017

Course Title: Mathematics-I                                    Course Code: MTH 101
Time: 1.00 Hour.                                               Full Marks: 60

There are **Four** questions. Answer any **Three**. All questions are of equal values, indicated in the right margin.

1. **(a)** Sketch the graphs of the functions:                                    8

   i)    $y = \sqrt{x-1} + 2$

   ii)   $y = 3 - \sqrt[3]{x-2}$

   **(b)** Define Continuity of a function. Let $f(x) = \begin{cases} 3+2x & if \quad x \geq 2 \\ kx^2 & if \quad x < 2 \end{cases}$. Find the value of $k$,    12

   which will make the function $f(x)$ continuous everywhere.

2. **(a)** For $y = e^x \cos x$, show that $y_2 - 2y_1 + 2y = 0$.                    6

   **(b)** Find for what values of $x$, $2x^3 - 21x^2 + 36x - 20$. is maximum and minimum    14
   respectively. Also find the maximum and minimum values of the expression.

3. **(a)** State Leibnitz's theorem. If $y = e^{m\cos^{-1}x}$, then show that,          10

   $$(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - (m^2 + n^2)y_n = 0.$$

   **(b)** State Rolle's theorem for a function $f(x)$. Verify this theorem for $f(x) = x^3 - 4x$ over    10
   the interval $[0, 2]$.

4. **(a)** Expand $e^x$ in power of $x$.                                           8

   **(b)** Expand $(x + h)^m$ in power of $h$ with Lagrange's and Cauchy's form of remainder, where    12
   $m$ is a constant.

# University of Asia Pacific
## Department of Basic Sciences and Humanities
## Mid-Semester Examination Spring – 2018
## Program: B. Sc Engineering (CE)

Course Title: Physics       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.

1. (a) Prove that work done per unit volume, w = $\frac{1}{2}$ x stress x strain for volume strain energy.    [10]

   (b) A steel wire 10 m long and 7 mm in diameter is fixed to two rigid supports. Calculate the increase in tension when the temperature falls by $30^0C$.    [10]

2. Define flexural rigidity and cantilever. Prove that bending moment of a beam is equal to $\frac{YI_g}{R}$, where the terms have their usual meanings.    [20]

3. (a) Define Poisson's ratio and Elastic fatigue. Prove that Poisson's ratio $\sigma = 0.5$    [10]

   (b) Find the work done in stretching a wire 1 sq mm cross section and 2 m long through 0.1 mm. [Y=$2\times10^{11}$ N/m$^2$]    [10]

4. (a) State and explain Stoke's law and prove that $\eta = \frac{2r^2(\rho-\sigma)g}{9v}$, where the terms have their meanings.    [10]

   (b) Two equal drops of water (surface tension T), each of radius r, are falling through air (viscosity $\eta$) with a steady velocity v. If the two drops coalsce to form a bigger drop, (i) compute the energy released and (ii) find the new velocity of fall.    [10]