

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Semester Examination (Fall 2017)**  
**Program: B.Sc. (Honours) in Civil Engineering**  
**Year: 1st      Semester: 2nd**

Course Code: HSS 103  
Time: 1 Hour

Course Title: English Language II  
Full Marks-20

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**Instructions:**

\* Marks are indicated in the right margin.

**1. Read the following passage and answer to the following questions** 1 x 4 = 4

Anthropologists have pieced together the little they know about the history of left - handedness and right - handedness from indirect evidence. Though early men and women did not leave written records, they did leave tools, bones, and pictures. Stone Age hand axes and hatchets were made from stones that were carefully chipped away to form sharp cutting edges. In some, the pattern of chipping shows that these tools and weapons were made by right handed people designed to fit comfortably into a right hand. Other Stone Age implements were made by or for left-handers prehistoric pictures painted on the walls of caves provide further clues to the handedness of ancient people. A right - hander finds it easier to draw faces of people and animals facing toward the left whereas a left - hander finds it easier to draw faces facing toward the right. Both kinds of faces have been found in ancient painting. On the whole, the evidence seems to indicate that prehistoric people were either ambidextrous or about equally likely to be left - or right- handed. But, in the Bronze Age, the picture changed. The tools and weapons found from that period are mostly made for right-handed use. The predominance of right - handedness among humans today had apparently already been established.

- I) What is the main topic of the passage?**
- (A) The purpose of ancient implements
  - (B) The significance of prehistoric cave paintings
  - (C) The development of right - handedness and left - handedness
  - (D) The similarities between the Stone Age and Bronze Age
- II) Which of the following helped lead to conclusions about whether Stone Age people preferred one hand to the other?**
- (A) Petrified forms of vegetation
  - (B) Patterns of stone chipping
  - (C) Fossilized waste material
  - (D) Fossilized footprints
- III) In line 7, the word "further" is closest in meaning to which of the following?**
- (A) advanced
  - (B) additional
  - (C) artistic
  - (D) factual
- IV) According to the passage, a person who is right - handed is more likely to draw people and animals that are facing**
- (A) upward
  - (B) downward

(C) toward the right

(D) toward the left

2. Complete the following sentences by using correct conditional structures: 0.5 x 8 = 4

- i) If she were at the office, she \_\_\_\_\_ (answer) the phone.
- ii) If you had spoken English, she \_\_\_\_\_ (understand).
- iii) She only sings if she \_\_\_\_\_ (be) in a good mood.
- iv) If she earns a lot of money, she \_\_\_\_\_ (fly) to New York.
- v) He would have been happier if he \_\_\_\_\_ (stay) at home.
- vi) When it's cold, water \_\_\_\_\_ (freeze).
- vii) If he \_\_\_\_\_ (be) more careful, he would have spotted the mistake.
- viii) If we had had enough money, we \_\_\_\_\_ (go) to the concert.

3. Fill in the blanks with the correct forms of verbs: 0.5 x 6 = 3

- i) Either my shoes or your coat \_\_\_\_\_ (be) always on the floor.
- ii) There \_\_\_\_\_ (be) fifteen candies in that bag.
- iii) The Prime Minister, together with his wife, \_\_\_\_\_ (greet) the press cordially.
- iv) Eight dollars \_\_\_\_\_ (be) the price of a movie these days.
- v) Nobody \_\_\_\_\_ (know) the trouble I've seen.
- vi) The world \_\_\_\_\_ (change) so rapidly that we can hardly keep up.

4. Make sentences with the following pairs of words: (any two) 2 x 2 = 4

Excuse  
Forgive

Among  
Between

Empty  
Vacant

5. Suppose you are the convener of the Cultural Club of your university and you are going to arrange a day-long festival. Write a memorandum to the Registrar of your university asking for his/her permission to arrange the event.

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Midterm Examination Spring 2017**  
**Program: B.Sc. Engineering (Civil)**

Course Title: Chemistry  
Time: 1 hour

Course Code: CHEM 111  
Full Marks: 60

There are *four* questions. Answer *any three* questions.

1. (a) What is lattice energy for ionic solids? Draw the Born-Haber cycle for determining the lattice energy of LiCl. [2+3]  
(b) What are isoelectronic species? Which pair of the following species is isoelectronic? [3+2]  
$$\text{Na}^+, \text{Zn}^{2+}, \text{Mg}^{2+}, \text{Ca}^{2+}$$
  
(c) Predict the geometry of the  $\text{BF}_3$ ,  $\text{NH}_3$ ,  $\text{PCl}_5$ ,  $\text{XeF}_4$  molecules by VSEPR model. You must show your work to get full credit on this question. [10]
2. (a) What is dipole moment? Can you explain why  $\text{NH}_3$  has such a large dipole moment compared with  $\text{NF}_3$ ? [6]  
(b) Explain the bonding in  $\text{H}_2\text{O}$  and  $\text{N}_2\text{F}_2$  molecules using VBT. [8]  
(c) Write down the electronic configuration of Na(11). Is it diamagnetic or paramagnetic? Why? [2+4]
3. (a) What is wave function,  $\Psi$ ? What are the physical significances of  $\Psi^2$ ? [5]  
(b) Write down all the possible quantum numbers for  $n = 2$ . Sketch the general shape and orientations of the 2p orbitals. [4+3]  
(c) Define ionization energy and electron affinity. How do they change in the periodic table? [5+3]
4. (a) (b) Normal boiling point of ethanol is  $78.2^\circ\text{C}$ . Calculate the vapor pressure of ethanol at  $50^\circ\text{C}$ . Heat of vaporization of ethanol is  $40.6\text{ kJ/mol}$ . [6]  
(b) Draw and label the phase diagram of  $\text{CO}_2$ . Calculate the degrees of freedom using the phase rule at all the regions, curves and at the triple point. [4+5]  
(c) The critical temperature of  $\text{NH}_3$  and  $\text{N}_2$  are  $132^\circ\text{C}$  and  $-147^\circ\text{C}$ , respectively. Which one of these two gases can be liquefied easily at room temperature? Explain. [5]

**University of Asia Pacific**  
**Department of Basic Sciences & Humanities**  
**Mid Examination, Fall-2017**  
**Program: B.Sc. in Civil Engineering**

Course Title: Mathematics II  
Time: 1.00 Hour

Course Code: MTH 103

Credit: 3.00  
Full Marks: 60

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

1. (a) Determine the equation of the curve  $2x^2 + 3y^2 - 8x + 6y - 7 = 0$ , when the origin is transferred to the point  $(2, -1)$ . 8
- (b) Determine the equation of the curve  $x^2 - 2xy + y^2 + 2x - 4y + 3 = 0$  after rotating of axes through  $45^\circ$ . 12
2. (a) Prove that  $21x^2 - 21y^2 + 40xy + 44x + 122y - 17 = 0$  represents a pair of straight lines. Find the point of intersection and the angle between them. 14
- (b) Find for what value of  $\lambda$  the equation  $x^2 - 4xy - y^2 + 6x + 8y + \lambda = 0$  represents a pair of straight lines. 6
3. (a) Show that the lines whose direction cosines are proportional to  $2, 1, 1$  ;  $4, \sqrt{3} - 1, -\sqrt{3} - 1$  ;  $4, -\sqrt{3} - 1, \sqrt{3} - 1$  are inclined to one another at angle  $\frac{\pi}{3}$ . 10
- (b) Find the equation of the straight line that intersect the lines  $4x + y - 10 = 0 = y + 2z + 6$  and  $3x - 4y + 5z + 5 = 0 = x + 2y - 4z + 7$  and passing through the point  $(-1, 2, 2)$ . 10
4. (a) Find the equation of the plane through the points  $(-1, 1, 1)$  and  $(1, -1, 1)$  and also perpendicular to the plane  $x + 2y + 2z = 5$ . 10
- (b) Find the equation of the plane through the point  $(1, 1, 2)$  and perpendicular to each of the planes  $x - y - 2z - 3 = 0$  and  $3x + y + 6z - 4 = 0$ . 10

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Semester Examination Fall 2017**  
**Program: B.Sc Engineering (Civil)**

Course Title: Engineering Mechanics II

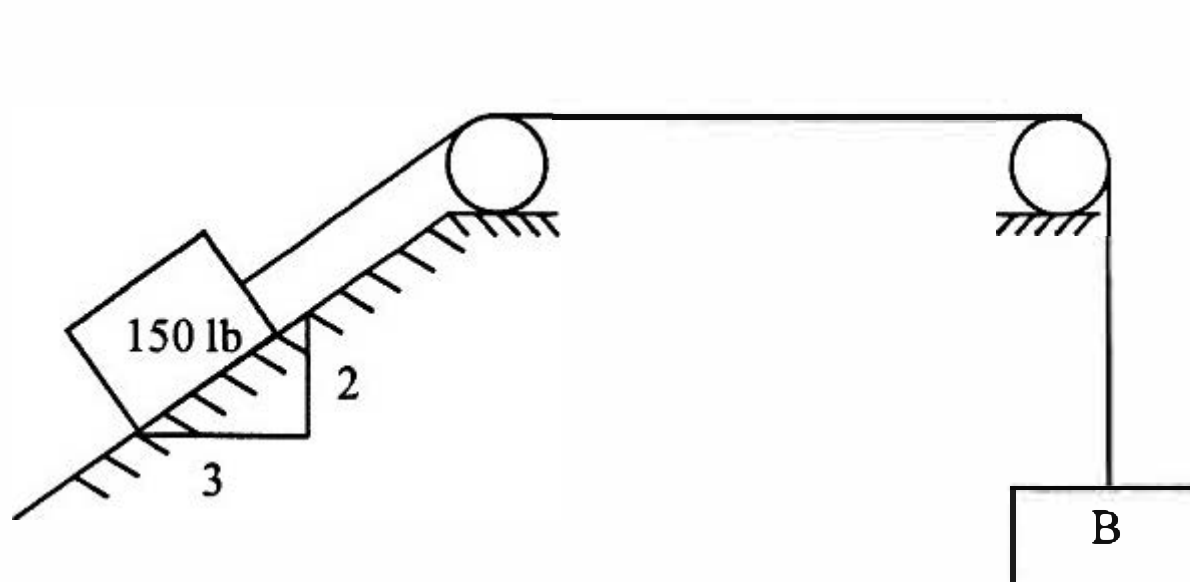
Course Code: CE 103

Time: 1 hr

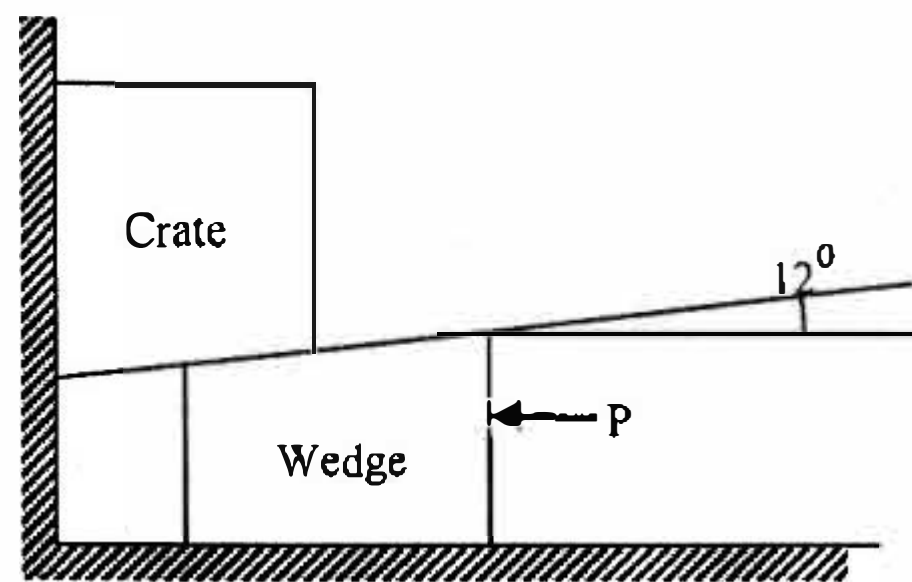
Full Marks: 30

[Answer any 3 (Three) out of 4 (Four) Questions]

1. Determine the largest value of the weight of block B in **Figure 1** for which neither block will move. The coefficients of static friction are 0.2 between the blocks and the planes, and 0.25 between the cord and the drums.



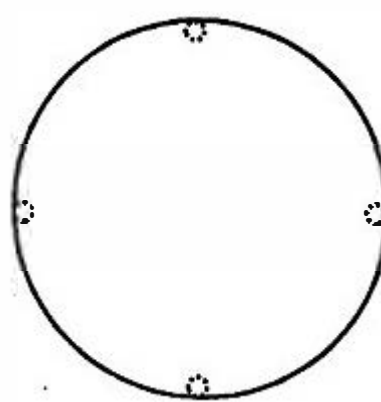
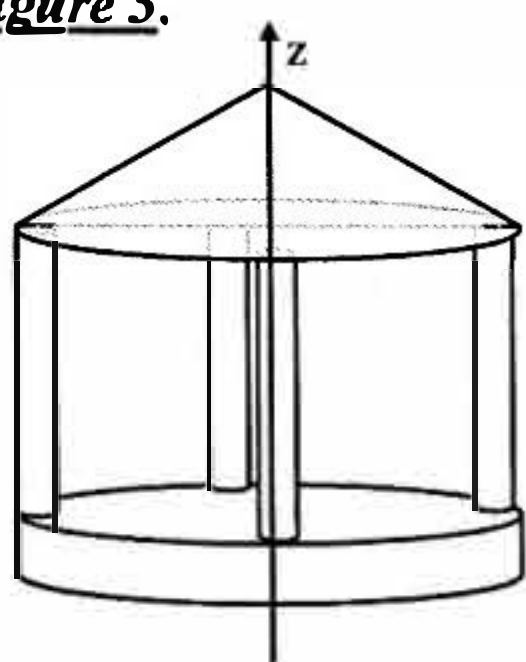
**Figure 1**



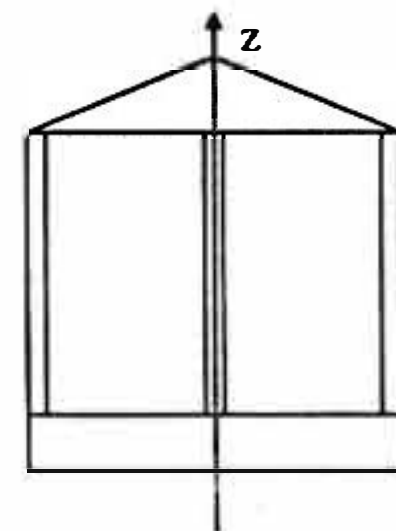
**Figure 2**

2. Determine the smallest horizontal force 'P' in **Figure 2** required to lift the 200 lb crate. Coefficient of friction at all contacting surface is 0.20. Neglect the weight of the wedge.

3. Calculate mass moments of inertia of the following composite object with respect to z axis as shown in **Figure 3**.



a) Plan view



b) Side view

**Figure 3**

Cylindrical base:	Radius 8 ft	Height 2 ft	Unit weight 60 pound/cft
Vertical poles:	Radius 6 inch	Height 10 ft	Unit weight 40 pound/cft
Solid Cone:	Radius 8 ft	Height 3 ft	Unit weight 0.5 pound/cft

4. A point P moves in the path of the hyperbola  $x^2/36 - y^2/16 = 1$ . The x component of the velocity is constant at  $v_x = 9$  fps. At the instant that P is at the position  $(12, 4\sqrt{3})$ . What is the velocity  $v_y$  and acceleration  $a_y$  in the y direction?

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Mid Term Examination Fall 2017**  
**Program: B. Sc. Engineering (Civil)**

Course Title: Surveying  
Time: 1 hour

Course Code: CE 105  
Full Marks: 35

[Assume Reasonable Values for Any Missing Data]

**SECTION – A**

There are **SIX** questions in this section. Answer any **FIVE**.

**5 x (3) =15**

1. (a) Differentiate between Plane Surveying and Geodetic Surveying.
- (b) Write short note on reconnaissance in case of chain surveying.
- (c) Define Local Attraction in compass surveying.
- (d) What are the differences between open traverse and closed traverse.
- (e) Distinguish between line of collimation and line of sight.
- (f) Define: i. Turning point, and ii. Intermediate station

**SECTION – B**

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

**2 x (10) = 20**

1. The following consecutive readings were taken with a level and 3 metre leveling staff on continuously sloping ground at a common interval of 20 metres:  
0.602, 1.234, 1.860, 2.574, 0.238, 0.914, 1.936, 2.872, 0.568, 1.824, 2.722. The reduced level of the first point was 192.122. Rule out a page of a level book and enter the above readings. Calculate the reduced levels of the points and also the gradient of the line joining the first and last points.
2. The following are the bearings taken on a closed traverse:

Line	F.B.	B.B.
AB	S 37° 30' E	N 37° 30' W
BC	S 43° 15' W	N 44° 15' E
CD	N 73° 00' W	S 72° 15' E
DE	N 12° 45' E	S 13° 15' W
EA	N 60° 00' E	S 59° 00' W

Compute interior angles and correct them for observational errors. Assuming observed bearing of the line AB to be correct, adjust the bearing of the remaining sides.

3. (a) The distance between two stations was found to be 1200 m when chained with a 20 m chain. The same distance when measured with a 30 m chain was 1195 m. If the 20 m chain was 0.04 m too long, what was the error in 30 m chain?

(b) A railway embankment 400 m long is 15 m wide at the formation level and has the side slope 2 to 1. The ground levels at every 100 m along the centre line are as under:

Distance :	0	100	200	300	400
R.L. :	204.8	206.3	207.5	207.2	208.3

The formation level at 0 chainage is 207.00 and the embankment has a rising gradient of 1 in 100. The ground is level across the centre line. Calculate the volume of earthwork.

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