University of Asia Pacific
Department of Basic Sciences & Humanities
Mid Semester Examination, Spring-2016
Program: B.Sc. Engineering (Civil)
1st Year /2nd Semester

Course Title: Mathematics II | Course Code: MTH 103 | Course credit: 3.00
Time: 1 hr | Full Marks: 60
Answer any **three** of the followings | 3×20 = 60

1. (a) Find the angle of rotation for removing the "$xy - term$" from the equation $17x^2 - 7y^2 + 18xy - 16x - 32y - 18 = 0$. **10**

(b) Define direction cosines. Find the direction cosines of AC and BD. Also find the angle between them where $A(5, 2, -3)$, $B(6, 1, 4)$, $C(-3, -2, -1)$ and $D(-1, -4, 13)$ **2+8**

2. (a) Find the equation of the plane which passes through the intersection of planes $7x - 4y + 7z + 16 = 0$ and $4x + 3y - 2z + 3 = 0$ and is parallel to the plane $3x - 7y + 9z + 5 = 0$. **10**

(b) Find the equation of the plane parallel to the plane $3x - 4y + 7z = 0$ and passing through the point $(2, 3, -1)$. Also find distance between these planes. **10**

3. (a) Find the distance between the point $(-1, -5, -10)$ and the point of intersection of the straight line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ and the plane $x - y + z = 5$. **10**

(b) Check whether the straight lines $x - 2y + 2 = 0 = 2y + z + 4$ and $7x + 4y - 15 = 0 = y + 14z + 40$ are parallel or perpendicular. **10**

4. (a) Find the ratio in which the $zx - plane$ divides the line joining points $(2, -1, 3)$ and $(1, 3, -2)$, Also Find the co-ordinates of that point. **10**

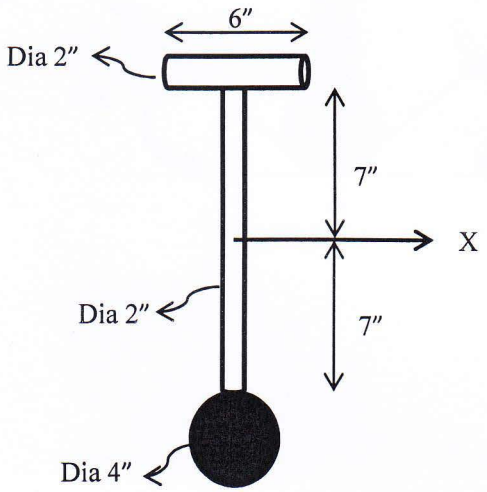
(b) Show that the equation $12x^2 + 3y^2 + 4z^2 - 12x - 16y + 4z - 4 = 0$ represents an ellipsoid. Also find its centre and lengths of the semi-axes. **10**

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2016
Program: B.Sc. Engineering (Civil)

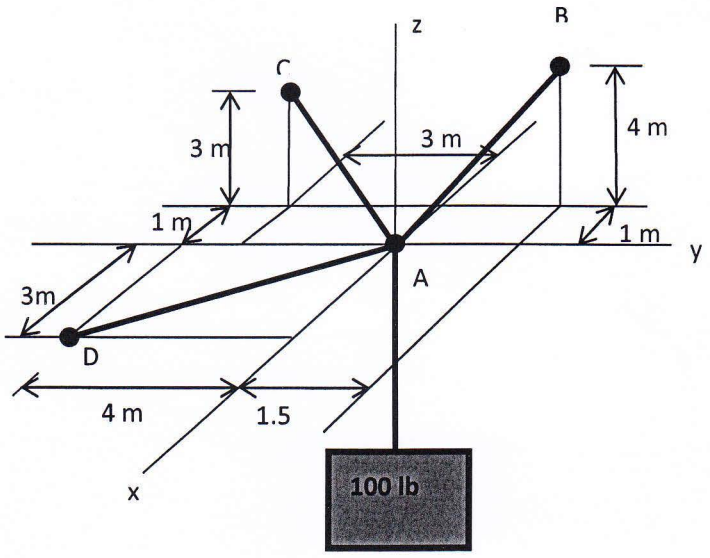
Course Title : Engineering Mechanics II — Course Code: CE 103
Time : 1 hour — Full Marks: 3X20=60

(There are **FOUR** questions. Answer **any THREE.**)

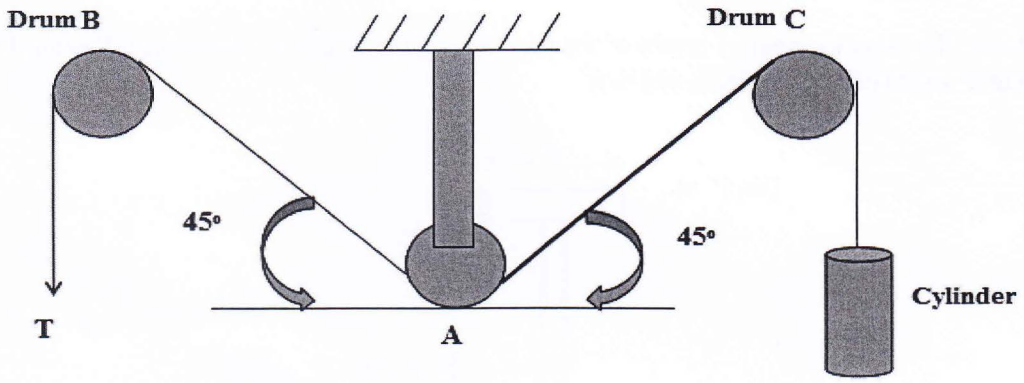
1. Determine the mass moment of inertia of the pendulum about X axis as shown in following **Figure** when unit weight of the material is 450 lb/ft^3.



2. Determine the force in each cable to support the 100 lb crate as shown in following **Figure.**



3. The maximum tension that can be developed in the cord shown in following **Figure** is 1000 N. If the pulley at A is free to rotate and the coefficient of static friction at the fixed drums B and C is $\mu_s = 0.3$, determine the largest mass of the cylinder that can be lifted by the card.



University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring-2016
Program: B.Sc. (Honours) in Civil Engineering
Year: 2015 Semester: Spring 2016

Course Code: HSS 103 Course Title: English Language II
Time: 1 hour Full Marks: 20

1. Rewrite the following sentences correctly: .5x8=4

a. There is only one answer of it
b. He took to smoke while in school.
c. How do you waste your spare time?
d. The bird flapped it's wings.
e. She's pretty, doesn't she?
f. Can you borrow me your book for a few days?
g. Constant practise made him a good speaker.
h. People who gamble loose money.

2. Make sentences with the following pairs of words: (any three) 1x3=3

a.	Ceiling Roof	b.	Ancient Old	c.	Admit Acknowledge	d.	Mistake Error

3. Complete the following sentences by using correct conditional structures: .5x10=5

a. If they all do their best, the party _____ (be) great.
b. She would have told me if she _____ (do) it.
c. If she were at the office, she _____ (answer) the phone.
d. If they _____ (invite)me, I wouldn't have said no.
e. Jenny is going to Australia, if she _____ (get) her visa.
f. If you had spoken English, she _____ (understand).
g. If Shumi _____ (cut) the onions for the salad, Masud will peel the tomatoes.
h. What would you do if you _____ (accuse) of murder?
i. She only singsif she (be) in a good mood.
j. I _____ (watch) the film only if the reviews are good.

4. Provide both synonyms and antonyms to the following words and make sentences out of them: (any three) 1x3=3

Compulsory, Humorous, Cruel, Admire, Familiar

5. UAP has decided to launch an Inter Departmental Basketball tournament at the end of the final examination. Write a memorandum to this effect. 5

University of Asia Pacific
Department of Civil Engineering
Midterm Examination Spring 2016
Program: B.Sc. Engineering (Civil)

Course Title: Chemistry | Course Code: CHEM 111
Time: 1 hour | Full Marks: 60

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

1. (a) In your own words, briefly describe photoelectric effect. [6]

   (b) Using Bohr's atomic model calculate the wavelength of light emitted when the electron in a hydrogen atom undergoes a transition from energy level $n = 3$ to level $n = 2$? [7]

   (c) State and explain de Broglie relation. Why this relation cannot be applied directly to an electron in an atom. [7]

2. (a) Predict the geometries of the following molecules using VSEPR model: XeF_2, SF_4 [6]

   (b) What is meant by self-ionization of water? What is the concentration of H_3O^+ ion in human blood if the pH of blood is 7.4 [7]

   (c) Draw the phase diagram of water. Using the phase rule calculate the degrees of freedom (F) in each of the curves and the triple point on the diagram. [7]

3. (a) What is wave function, Ψ? What are the physical significances of Ψ^2? [6]

   (b) Which of the following orbitals are NOT permissible? Explain.
   3p, 2d, 3f, 2s [6]

   (c) Define ionization potential and electron affinity. How do they change in the periodic table? [4+4]

4. (a) What is lattice energy? Draw the Born-Haber cycle for the formation of ionic bond in LiF. [8]

   (b) Applying VBT explain the bonding of NH_3 molecule. [6]

   (c) What are σ bond and π bond? Draw the orbital pictures to show the formation of these bonds. [6]

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2016
Program: B.Sc. Engineering (Civil)

Course Title: Surveying **Course Code:** CE 105

Time: 1 Hour **Full Marks:** 60

There are **Four** questions. Answer any **Three**

1. (i) Write short note on following: (3x3=9)
   a) Mean Sea Level
   b) Reduced Bearing System
   c) Errors in Chaining

   (ii) Define Contour. Describe five characteristics of contour plan. (06)

   (iii) Define: (2x2.5=5)

   (a) Bench Mark
   (b) Magnetic Declination

2. (i) The following consecutive staff readings were taken with a dumpy level: 1.205; 1.860; 0.125; 1.915; 0.395; 2.615; 0.880; 1.760; 1.960; 0.920;
   The level position was moved after 4^{th}, 6^{th} readings. The reduced level at first point was 330 m. Find out the final R.L. Also, apply check at the end. (10)

   (ii) An instrument was set up at A and the angle to the top point of a building at B was measured 24°30'. R.L. of the top point of the building was 1560 m. The distance between point A and B was 2500 m. R.L. of B.M. was 415m. Find the height of instrument axis from B.M. (10)

3. (i) The following bearings were taken in running a compass traverse

Line	F.B.	B.B.	Line	F.B.	B.B.
AB	124°30'	304° 30'	CD	310° 30'	135° 15'
BC	68°15'	246° 0'	DA	200° 15'	17° 45'

   Mention which stations were affected by local attraction and determine the corrected bearings. (10)

(ii) In an old Survey made when the declination was 4° W, the magnetic bearing of a given line was 210°. The declination in the same locality is now 10°E. What are the true and present magnetic bearings of the line? (05)

(iii) The distance between two stations was measured with a 20 m chain and found to be 1500 m. The same was measured with a 30 m chain and found to be 1476 m. If the 20 m chain was 5 cm too short, what was the error in the 30 m chain? (05)

4. (a) The following offsets were obtained from a chain line to an irregular boundary:

Distance (m)	0	20	40	60	80	100	120	140
Offset (m)	2.4	6.1	4.9	5.4	5.3	3.6	4.8	2.9

Calculate the area by (i) *Trapezoidal Rule* , (ii) *Simpson's Rule* (10)

(b) A canal of 600 m long is 15m wide at the formation level and has the side slope 2:1. The ground levels along the center line are as under:

Distance (m)	0	100	200	300	400	500	600
R.L. (m)	85.6	89.3	88.7	90.5	86.5	88.9	87.2

Find out the excavation volume required to get an R.L. of 85 m for the complete length of the canal. (10)

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Spring 2016
Program: B.Sc. Engineering (Civil)

Course Title: Surveying
Time: 1 Hour

Course Code: CE 105
Full Marks: 25

1. Define any two (2X2 =4)

a) Hypotenusal Allowance, b) Datum, c) Benchmark

2. Answer all (3X1= 3)

a) Is this statement correct "Height of Instrument means the height of telescope above the ground where the level stand".

b) Is this statement correct "In chain survey to get good result in plotting, the framework should consist of triangles which are as nearly equilateral as possible".

c) Is this statement correct "If the backsight and foresight distances are balanced, the elevation between two points are not equal to the difference between the rod readings taken to the two points and no correction for curvature and refraction is necessary".

3. Answer any three (4X3= 12)

a) The true length of a line is known to be 500 metres. The line was again measured with a 20 m tape and found to be 502 metres. What is the true length of the 20 metres tape.

b) A surveyor measured the distance between two points on the plan drawn to a scale of 1 cm= 40m and the result was 468m. Later, however, he discovered that he used a scale of 1cm= 20m. Find the true distance between the two points.

c) A survey line BAC crosses a river, A and C being on the near and distant banks respectively. Standing at D, a point 50 metres measured perpendicularly to AB from A, the bearings of C and B are 320 and 230 degree respectively. AB being 25 metres. Find the width of the river.

d) In passing an obstacle in the form of a pond, stations A and D on the main line, were taken on the opposite sides of the pond. On the left of AD, a line AB, 200 m long was laid down, and a second line AC, 250 m long, was ranged on the right of AD, the points B, D and C being in the same straight line. BD and DC were chained and found to be 125m and 150m respectively. Find the length of AD.

4. Answer any one (1X6= 6)

a) The following figures were extracted from a level field book, some of the entries being illegible owing to exposure to rain. Insert the missing figures and check your results. Rebook all the figures by the 'rise' and 'fall' method.

Station	B.S.	I.S.	F.S.	Rise	Fall	R.I.	Remarks
1	2.285					232.460	B.M. 1
2	1.650		X	0.020			
3		2.105			X		
4	X		1.960	X			
5	2.050		1.925		0.300		
6		X		X		232.255	B.M. 2
7	1.690		X	0.340			
8	2.865		2.100		X		
9			X	X		233.425	B.M. 3

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b) The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eight readings: 2.228; 1.606; 0.988; 2.090; 2.864; 1.262; 0.602; 1.982; 1.044; 2.684 metres.

Enter the above readings in a page of a level book and calculate the R.L. of points if the first reading was taken with a staff held on a bench mark of 432.384 m.