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

Course Title: Surveying
Time: 1 Hour

Course Code: CE 105
Full Marks: 20

1. Answer any five: (5x2=10)

- a. Write the principle of Chain Survey. Give one example of cumulative error and one example of compensating error in survey work.
- b. Explain briefly the method of testing and adjusting chain.
- c. What is ranging? Explain the method of direct ranging.
- d. Define: Bench Mark, Elevation.
- e. Distinguish between Line of Collimation and Line of Sight.
- f. Explain Hypotenusal Allowance.

2. Answer Any One: (1x10=10)

- a. The following consecutive readings were taken with a level and 3 m levelling staff on continuously sloping ground at a common interval of 20 m:

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 field 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.

- b.
 - i. The true length of a line is known to be 500 m. The line was again measured with 20 m tape and found to be 502 m. What is the correct length of the 20 m tape?
 - ii. An offset is laid out 2° from its true direction on the field. If the scale of plotting is 10 m to 1 cm, find the maximum length of the offset so that the displacement of the point on the paper may not exceed 0.25 mm.

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

Course Title: Surveying (B)
Time: 1 Hour

Course Code: CE 105
Full Marks: 50

1. Answer any five: (5x5=25)

- a. Write the principle of Chain Survey. State the purpose(s) of 'Check Line' and 'Tie Line' in case of Chain Surveying.
- b. Write short note on Reconnaissance.
- c. What are the considerations for marking and fixing survey stations?
- d. What are the obstacles in both chaining and ranging?
- e. Define: Bench Mark, Elevation.
- f. What is contouring? What are the characteristics of contour line?

2. Answer the following:

- a. A railway is 20 m wide with side slopes 2 to 1. Assuming the ground to be level in a direction transverse to the centre line, calculate the volume contained in a length of 100 meters, the centre heights at 15 m intervals being in meters 2.3,3.8,4.2,3.8,2.5,2.9.

10

- b. The table below gives the lengths and bearings of the lines of a traverse ABCDE, the length and bearing of EA having been omitted. Calculate the length and bearing of the line EA.

15

Line	Length (m)	Bearing
AB	204.0	87°30'
BC	227.0	20°20'
CD	187.0	280°0'
DE	198.0	210°20'
EA	?	?

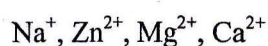
University of Asia Pacific
Department of Civil Engineering
Mid term Examination Fall 2016
Program: B.Sc. Engineering (Civil)

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 meant by isoelectronic? Which pair of the following species is isoelectronic? [3+2]



(b) Predict and draw the geometry of the H_2S , PH_3 , IF_5 , SF_6 , XeF_4 molecules by VSEPR model. You must show your work to get full credit on this question. [15]

2. (a) Can you explain why NH_3 has such a large dipole moment compared with NF_3 ? [6]

(b) Order the following molecules according to their bond angles and explain your answer.



(c) Define dipole moment. Explain why H_2O is a polar molecule but CO_2 is not. [3+5]

3. (a) What is wave function, Ψ ? What are the physical significances of Ψ^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) What is hybridization? Predict the hybridization state of the central atoms in BF_3 , H_2O , XeF_2 . Using VBT explain the bonding in CH_4 molecule. [2+6+5]

(b) Explain the photoelectric effect using a diagram. [4]

(c) Write down the electronic configuration of Cr ($Z=24$) and Mo ($Z=42$). [3]

University of Asia Pacific
Department of Civil Engineering
Mid Semester Examination Fall-2016
Program: BA (Honours) in Civil Engineering

Course Code: HSS 103
Time: 1 hour

Course Title: English Language II
Full Marks: 20

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

- a. We talked during three hours this morning.
- b. Yesterday, I must sent a very important email to a client.
- c. Mars is one of the planet in the solar system.
- d. Mozaffar, I and you are guilty for this.
- e. She's pretty, doesn't she?
- f. I look forward to hear from you.
- 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. Compare | Ancient | Admit | Excuse |
| Contrast | Old | Acknowledge | Forgive |

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

- a. If I go to a friend's house for dinner, I usually _____ (take) some flowers.
- b. Mary _____ (get) the job and moved to Japan if she had studied Japanese in school instead of French.
- c. If I owned a car, I _____ (drive) to work.
- 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. I _____ (read) more if I didn't watch so much TV.
- i. She only sings if 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

Deliberate, Humorous, Annoy, Humble, Fascinate

5. UAP has decided launch an Inter Departmental Drama Competition at the end of the final exams. Write a memorandum to this effect. 5

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

Course Title: Engineering Mechanics II
Time: 1 hr

Course Code: CE 103 (A)
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.

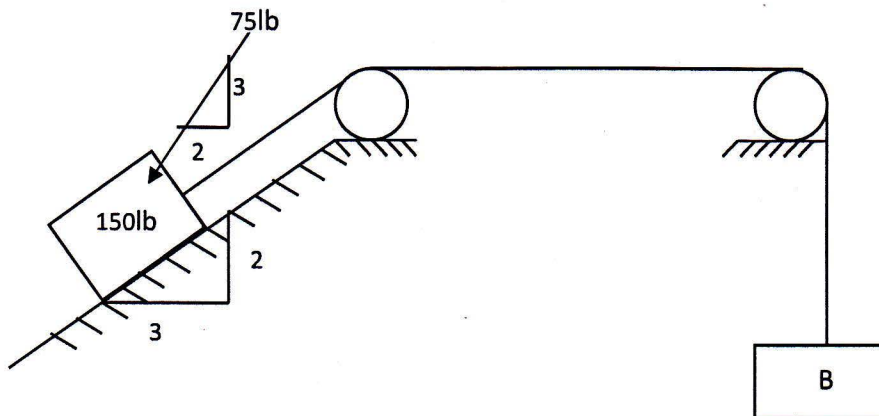


Figure 1

2. What is the maximum value of 'd' in figure-2 that will allow the box to slide along the surface before tipping? (The box is 60 kg and the value of static friction is 0.62)

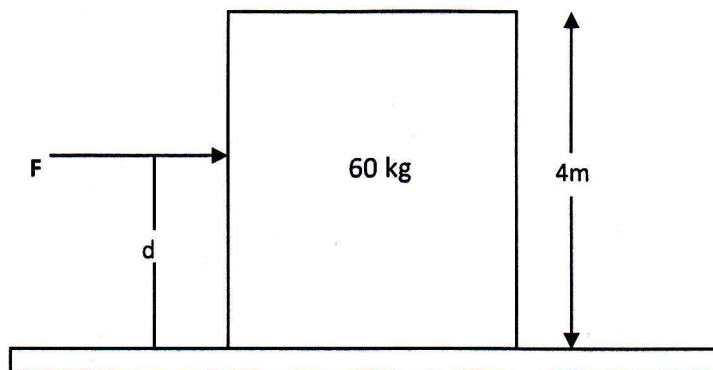


Figure 2

3. Calculate the mass moment of inertia for the following figure-3 about the axis A-B. The center of two spheres and the cylinder are in the same line. The unit weight of the material is 490lb/ft^3 .

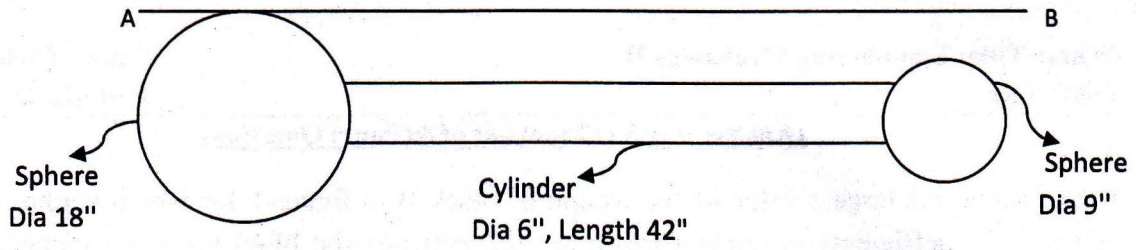


Figure 3

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 2016

Course # : CE 103
Full Marks: 30

Course Title: Engineering Mechanics II (13)
Time: 1 hour

(Answer any three out of four Questions)

1. Block ABCD weighing 55 lbs. is placed on an inclined plane. 'F' is force acting on the block at height d, as shown in Figure 1. Calculate range of height d that would cause the block ABCD to tip over. (Given, AB= CD= 3 feet; AC= BD= 6 feet)

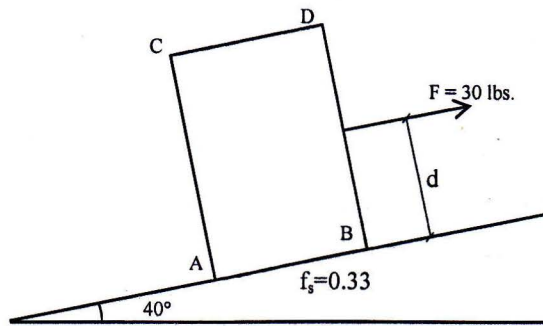


Figure 1

2. PQRS is composed of four elements. P is a circular pipe with thickness 3 inch and height 2 inch. Q is a solid disc of radius 18 inch and thickness 1 inch. R is a cylindrical rod of radius 1.5 inch and length 24 inch. S is a sphere of radius 3 inch. Calculate mass moment of inertia of this composite body with respect to axis X shown in Figure 2. ($\rho_P = \rho_R = 40 \text{ lb / ft}^3$; $\rho_Q = \rho_S = 25 \text{ lb / ft}^3$)

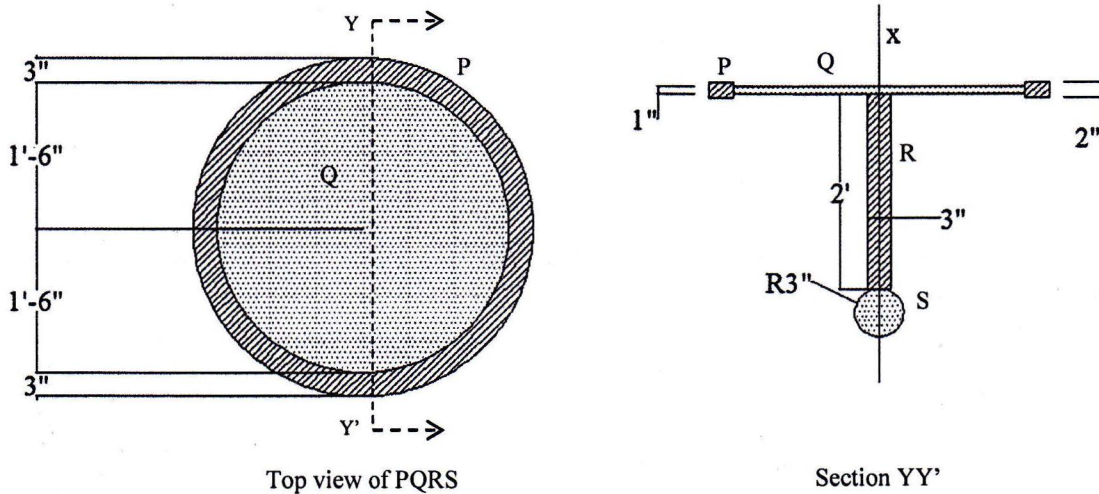


Figure 2

3. An object is thrown from point A with an initial velocity of 15 m/s, making a 50° angle with ground. Calculate the time required for reaching point C. Also calculate horizontal distance x shown in Figure 3.

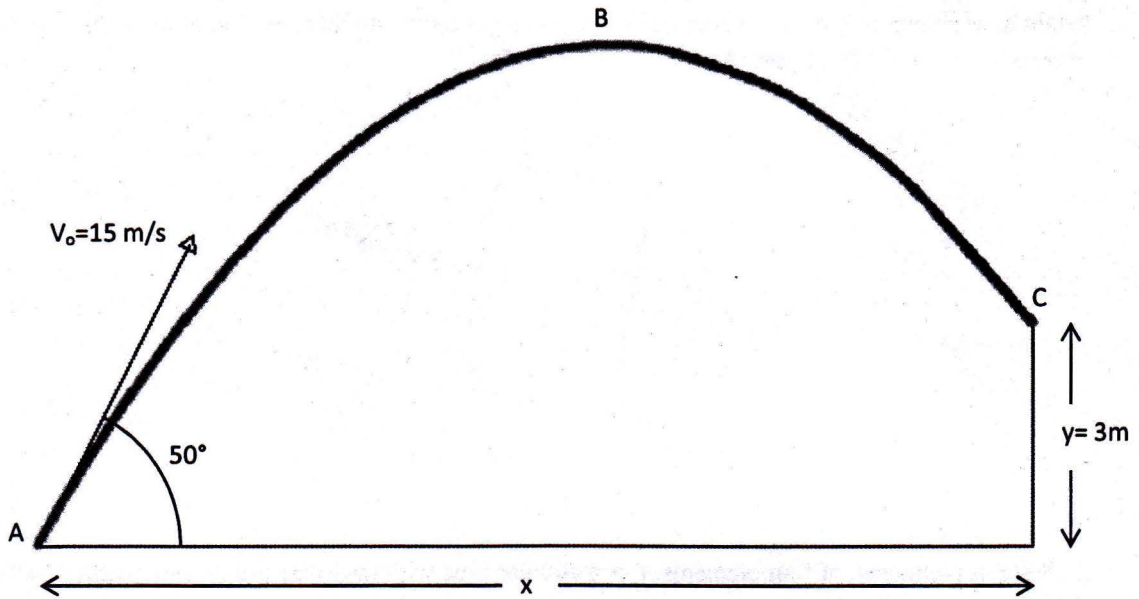


Figure 3

4. Two spheres are connected by a cord. 'd' weighs 300 lbs., co-efficient of friction between cord and pulley 'a' and 'b' is 0.2 and 0.1 respectively. Calculate minimum weight of 'c' to lift 'd' from ground.

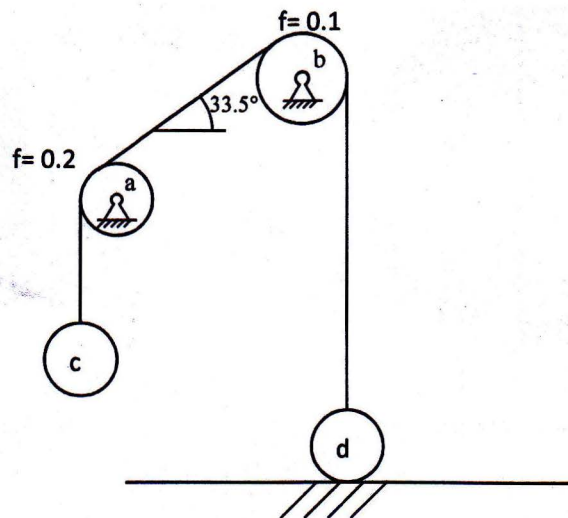


Figure 4

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

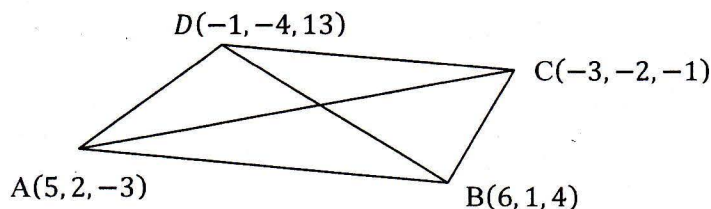
Course Title: Mathematics II
 Time: 1 hr

Course Code: MTH 103

Course credit: 3.00
 Full Marks: 60

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

1. (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) Define direction cosines. Find the direction cosines of the diagonals of the following quad $ABCD$. Also find the angle between the diagonals. 2+6+2



2. (a) Find the equation of the plane perpendicular to each of the planes $x - 4y + z = 0$ and $3x + 4y + z - 2 = 0$ at a distance unity(1) from the origin. 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 the angle between this plane and the plane $8x + 3y - z = 2$. 10
3. (a) Find the equation of the line through $(1, -1, 2)$ at right angles to $\frac{x}{1} = \frac{y}{1} = \frac{z}{2}$ and $\frac{x+7}{2} = \frac{y-8}{-1} = \frac{z-3}{1}$. 10
- (b) Find the angle of rotation for removing the " xy -term" from the equation $17x^2 - 7y^2 + 18xy - 10 = 0$. 10
4. (a) Show that the equation $3x^2 + y^2 + 2z^2 + 3x + 3y - 4z = 0$ represents an ellipsoid. Also find its centre and lengths of the semi-axes. 10
- (b) Find the centre and radius of the sphere $7x^2 + 7y^2 + 7z^2 - 14x + 21y + 7z + 6 = 0$. Also find the perpendicular distance from the centre to the plane $x + 2y + 2z + 1 = 0$. 10