1-2

University of Asia Pacific

Department of Civil Engineering

Mid-Semester Examination, Fall 2018

Program: Bachelor of Civil Engineering

1st Year2nd Semester

Course Title: English Language II Course Code: HSS 103 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 each blank with the appropriate verb that agrees to the subject. **.5×6=3**

a. The choice of words_____ (is/are) excellent
b. The MP and Minister _____ (join/joins) the session
c. The jury _____ (was/were) divided into two groups.
d. The chairperson, along with the members_____ (enter/enters) the playground.
e. Neither she nor her sisters _____ (has found/have found) the mistake.
f. Fifty miles _____ (was/were) a long distance for us.

2. Rewrite the following sentences correctly: **.5×6=3**

a. We talked during three hours this morning.
b. Mars is one of the planet in the solar system.
c. She's pretty, doesn't she?
d. I, you and Maria are guilty for this.
e. Four fifths of the cargos are lost.
f. Take care of air born diseases.

3. Complete the following sentences by using correct conditional structures: **.5×6=3**

a. We would buy the house if we_____ (decide) to stay here.
b. I _____ (watch) the film only if the reviews are good.
c. Ferdous _____ (get) the job and moved to Japan if he had studied Japanese in school instead of French.
d. Jenny is going to Australia, if she _____ (get) her visa.
e. If I _____ (be) on holiday today, I would go to the beach.
f. She only sings if she _____ (be) in a good mood.

4. Write the antonym of each of the following words. **.5×6=3**

a) Increase
b) Knowledge
c) Mature
d) Active
e) Temporary
f) Wealth

5. Make sentences with the following words. **.5×6=3**

a) Ancient - Old b) Discover - Invent c) Hire - Rent

6. UAP has decided to 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 Term Examination, Fall 2018
Program: B.Sc. Engineering (Civil)

Course Title: Chemistry | Course Code: CHEM I 11

Time: 1 Hour | Full Marks: 60

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

Write your answers neatly and cleanly. Good Luck!

1. (a) How does the photon concept explain the Photoelectric Effect? [5]
   (b) Describe the experimental basis for believing that the nucleus occupies a very small fraction of the volume of the atom. [10]
   (c) What is the wavelength (in picometers) associated with an electron, whose mass is 9.11×10^{-31} kg, traveling at a speed of 4.19×10^{6} m/s? [5]

2. (a) Draw a potential-energy diagram for a molecule such as Cl_2. Indicate the bond length (194 pm) and the bond dissociation energy (240 kJ/mol). [6]
   (b) Describe the bonding in XeF_4 using the concept of valence bond theory [9]
   (c) H_2 molecules are stable and used as rocket fuel. However, He_2 molecules are unstable. Why do H_2 molecules exist in nature while He_2 does not exist? (Use MOT) [5]

3. (a) Explain the meaning of diamagnetism and paramagnetism. Give an example of an element that is diamagnetic and one that is paramagnetic. [6]
   (b) Describe the experimental basis for believing that the electrons in an atom behave as tiny bar magnets. [9]
   (c) How is electron affinity differed from electronegativity? Explain. [5]

4. (a) The C_2 molecule exists in the vapor phase over carbon at high temperature.
      (i) Describe the molecular orbital structure of this molecule; that is, give the orbital diagram and electron configuration. [4+4=8]
      (ii) What is the bond order for C_2? [2]
   (b) Arrange the following in order of increasing ionic radius: F^-, Na^+, and N^{3-}. Explain this order. [5]
   (c) What is the wavelength of light emitted when the electron in a hydrogen atom undergoes a transition from energy level $n = 3$ to level $n = 2$? [5]

University of Asia Pacific
Department of Basic Sciences & Humanities
Mid Examination, Fall-2018
Program: B.Sc. in Civil Engineering

Course Title: Mathematics II | Course Code: MTH 103 | Credit: 3.00
Time: 1.00 Hour | 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 co-ordinate of the point and the ratio in which the $yz - plane$ divides the line joining points $A(-2,4,7)$ and $B(3,-5,8)$. Also find direction cosines of OA, OB and AB, where O is the point $(2,3,4)$. **10**

(b) The equation $3x^2 + 2xy + 3y^2 - 18x - 22y + 50 = 0$ is transformed to $4x^2 + 2y^2 = 1$ when referred to rectangular axes through the point (2,3). Find the inclination of the latter axes to the former. **10**

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

(b) Find the equation of the sphere through the points **10**

$$(0,0,0), (0,1,-1), (-1,2,0), (1,2,3)$$

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

(b) Find the equation of the plane through the points (2,2,1) and (9,3,6) and perpendicular to the plane $2x + 6y + 6z = 9$. **10**

4. (a) Find the change in the co-ordinates of a point when the direction of axes is turned through an angle θ where as the origin of co-ordinates remains the same and transform the axes inclined at 30° to the original axes the equation $x^2 + 2\sqrt{3}\,xy - y^2 = 2b^2$, where b is a constant. **12**

(b) Find the distance of the point (3,2,5) from the point of intersection of the line $\frac{x+3}{2} = \frac{y-2}{-1} = \frac{z-4}{5}$ and the plane $x - 2y + z = 2$. Also find the angle between this line and the plane **8**

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination Fall 2018
Program: B.Sc. Engineering (Civil)

Course Title: Engineering Mechanics II | Course Code: CE 103
Time: 1 hour | Full Marks: 30(=3×10)

[Answer any 3 (Three) of the following 4 (Four) questions]

1. ABC is a composite homogenous object having unit weight 220 lb/ft^2 as shown in ***Figure 1***. Q is constant force acting on ABC at 4ft height from surface. If coefficient of static friction between object and surface is 0.35, calculate minimum force Q required to
   a. slide the object ABC.
   b. overturn the object ABC.

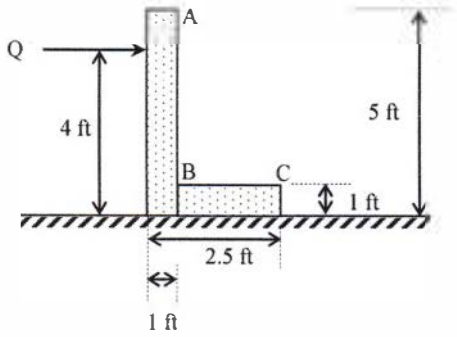


Figure 1

2. Block A is connected to 2 (two) weightless inflexible rough cords as shown in ***Figure 2***. If all the contact surfaces are rough, calculate minimum weight of A to prevent motion either way. Relevant information is provided along with ***Figure 2***.

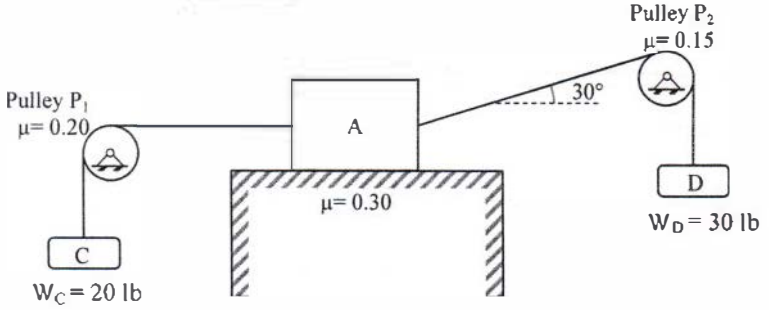


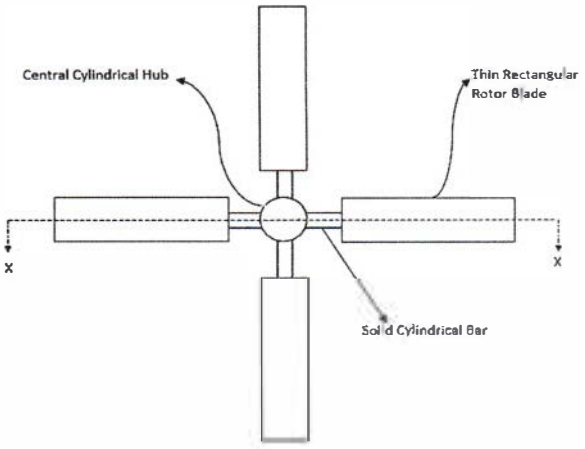
Figure 2

3.a The acceleration of a particle moving with rectilinear motion is a = 0.5($e^{0.5t}$-1) fps^2, where t is in seconds. If the initial velocity is 6 fps, then determine the distance traversed during the interval between t=2 sec. and t = 5 sec. (06)

3.b Two elevators in adjoining shafts approach one another simultaneously after starting from rest when they are 300 ft apart. Downward moving elevator has acceleration of 2 fps^2 and the upward moving elevator has 1.5 fps^2. At what time are they at the same elevation? (04)

4. A Rotor system is shown in ***Figure 3.*** Calculate the mass moment of inertia about the *axis of rotation* of:

a. Solid Frustum (03+03+01+02+01)
b. Rotor blade
c. Central Cylindrical Hub
d. Cylindrical Bar
e. Total Rotor System



Component	Dimension	Value	Unit Weight
Rotor Blade	Length	4 ft	490 pcf
	Width	9 inch	
	Thickness	0.2 inch	
Central Hub	Diameter	1 ft	
	Height	1 ft	
Solid Cylindrical Bar	Length	6 inch	
	Diameter	4 inch	
Solid Frustum	Height	1 ft 2 inch	
	Bottom Diameter	1 ft	
	Top Diameter	8 inch	

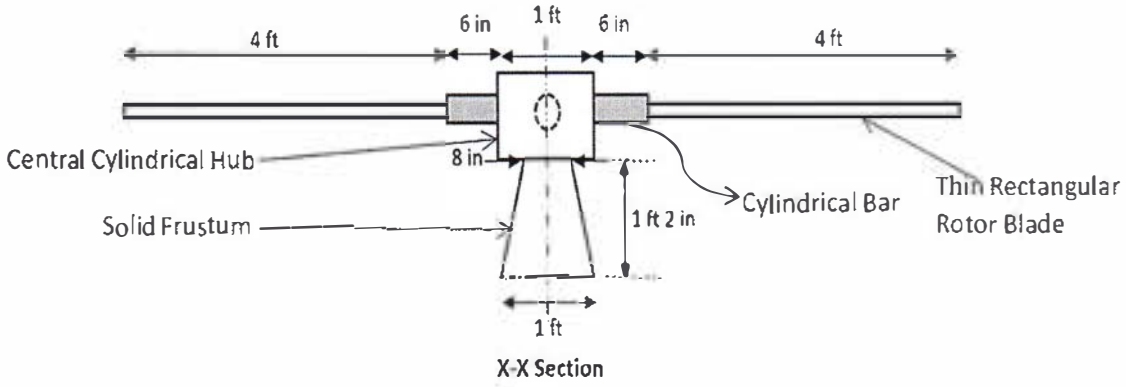


Figure 3

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

Course Title: Surveying
Time: 1 Hour

Course Code: CE 105
Full Marks: 30

Answer any three

1 a) Describe "Reciprocal Ranging" with neat sketches. **4**

b) The following bearings were observed in running a closed traverse: **6**

Line	F.B.	B.B.
AB	38°30′	219°15′
BC	100°45′	278°30′
CD	25°45′	207°15′
~~DE~~ DA	325°15′	145°15′

At what stations do you think the local attraction? Determine the corrected bearings.

2 a) What is "Surveying"? Differentiate between "Plan" and "Map". **5**

b) What are the different bases to classify surveying? Describe various types of surveying based upon the nature of the field survey. **5**

3 a) How can you overcome the obstacle to ranging but not chaining? **4**

b) A survey line ABC cuts the banks of a river at B and C, and to determine the distance BC, a line BE, 60 m long was set out roughly parallel to the river. A point D was then found in CE produced and middle point F of DB determined. EF was then produced to G, making FG equal to EF, and DG produced to cut the survey line in H. GH and HB were found to be 50 and 100 meters long respectively. Find the distance from B to C. **6**

4 a) Define "True Bearing" and "Magnetic Bearing". **2**

b) The magnetic bearing of a line AB is N 30^0 25' W. Calculate the true bearing if the declination is 5^0 35' East. **8**

The following interior angles were measured with a sextant in a closed traverse. The bearing of the line AB was measured as 75^0 with prismatic compass. Calculate the bearings of all other lines if –

$\angle A = 165^0 15'$, $\angle B = 85^0 10'$, $\angle C = 45^0 35'$, $\angle D = 55^0 15'$.