1-2

University of Asia Pacific
Department of Civil Engineering
Final Examination Fall 2019
Program: B. Sc. Engineering (Civil)

Course Title: Surveying | Course Code: CE 105
Time: 3 (Three) hours | Full Marks: 80

[Assume Reasonable Values for Any Missing Data]

PART – A (Answer all questions)

Q.1. Suppose, you have to do surveying on a flat land with mild undulations. Suggest a suitable surveying method with proper justification. (15)

Q.2. Describe the obstacles to both chaining and ranging. (10)

Or

Write down the uses of – pegs, ranging rods, arrow, optical square.

Q.3. The following consecutive readings were taken with a dumpy level: (15)

6.21, 4.92, 6.12, 8.42, 9.81, 6.63, 7.91, 8.26, 9.71, 10.21.

The level was shifted after 4th, 6th and 9th readings. The reduced level at first point was 100 ft. Rule out a page of your answer-book as a level field book and fill all the columns. Use **Rise & Fall *OR* Height of the instrument** method to determine the **RLs** of other points.

Q.4. The following bearings were observed in running a closed traverse: (15)

Line	**F.B.**	**B.B.**
AB	75°5′	254°20′
BC	115°20′	296°35′
CD	165°35′	345°35′
DE	224°50′	44°5′
EA	304°50′	125°5′

At what station do you suspect the local attraction? Determine the correct magnetic bearings. If declination was 5°10′ E, what are the true bearings?

Q.5. 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	87^0 30'
BC	226	20^0 20'
CD	187	280^0 0'
DE	192	210^0 3'
EA	--	--

Q.6. A surveyor measured the distance between two points on the plan drawn to a scale of 1 cm= 40 m and the result was 468 m. Later, she discovered that she used a scale of 1 cm= 20m , **Find the true distance between the two points.** (10)

University of Asia Pacific
Department of Basic Sciences & Humanities
Mid Examination, Fall-2019
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 three questions including Questions 1 and 2.** 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 coordinate of that point. Then find the distance between that point and the origin. **12**

(b) Find the Direction Cosines of the line which is equally inclined to the axes. **8**

2. (a) Find the equation of the parabola $x^2 - 2xy + y^2 + 2x - 4y + 3 = 0$ when the direction of axes is turned through an angle 45°. where as the origin of co-ordinates remains the same. **12**

(b) Remove the first degree terms in $3x^2 + 4y^2 - 12x + 4y + 13 = 0$. **8**

3. (a) Show that the plane $2x - 2y + z + 16 = 0$ touches the sphere $x^2 + y^2 + z^2 + 2x - 4y + 2z - 3 = 0$. **10**

(b) Find the equation of the plane passing through the line of intersection of two planes $x - 2y + 3z + 4 = 0$ and $2x - 3y + 4z - 7 = 0$ and also passing through the point $(1, -1, 1)$. **10**

OR

4. (a) Show that the following equation represents an ellipsoid. Also find its centre and lengths of the semi-axes $2x^2 + 3y^2 + z^2 - 8x + 6y - 4z - 3 = 0$. **10**

(b) Find the equation of plane perpendicular to each of the planes $x - 4y + z = 0$ and $3x + 4y + z - 2 = 0$ and at a distance unity from the origin. **10**

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination, Fall 2019
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 including questions no. 3 & 4.***

[Questions 3 & 4 are compulsory]

Write your answers neatly and cleanly. Good Luck!

1. (a) State and explain Heisenberg's uncertainty principle. List all of the possible sets of the four quantum numbers if n = 3. [6]
   (b) Describe the experimental basis for believing that the nucleus is located at the center of an atom and occupies a very small fraction of the volume of the atom. [9]
   (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]

2. (a) Explain why the ground-state electron configurations of Cr and Cu are different from what we might expect. [5]
   (b) Describe the experimental basis for believing that the electrons in an atom behave as tiny bar magnets. [10]
   (c) How is electron affinity differed from ionization energy? Explain. [5]

3. (a) Dilithium, Li_2, is considered as the lightest stable neutral homonuclear diatomic molecule after H_2. [6+5+4=15]
      (i) Describe the molecular orbital structure of this molecule. Give the molecular orbital diagram and electron configuration of Li_2.
      (ii) What is the bond order for Li_2?
      (iii) Is the Li_2 a diamagnetic or paramagnetic substance?
   (b) Explain the term bond dissociation energy. What is the relationship between bond order and bond energy? [5]

4. (a) Nitrogen is the primary component of our atmosphere. It is also used as an inert reagent to fill containers of chemicals that might react with the oxygen in air. Draw a Lewis structure of nitrogen and use this drawing to explain why nitrogen does not react readily with other molecules. [5]
   (b) Describe the bonding in CH_4 using the concept of valence bond theory. [8]
   (c) How is the geometry of a molecule defined and why is the study of molecular geometry important? Predict the geometries of the following species using the VSEPR method: (a) PBr_3 (b) $CHCl_3$ (c) AsF_5 [7]

University of Asia Pacific
Department of Civil Engineering
Mid-Semester Examination, Fall 2019
Program: B.Sc. in Civil Engineering
Year: 1st, Semester: 2nd

Course Title: English ll: Language Composition Skill Course Code: HSS (CE) 103

Credit: 3.00 Time: 1.00 Hour Full Marks: 20

Instructions:

*Marks are indicated in the right margin.

*Answer all the questions

1. **Complete the following sentences using the rules of conditionals.** **0.5 x 8 = 4**

   a. If you help me, _____.

   b. If I were you, _____.

   c. If you want to be a civil Engineer, _____.

   d. I could drive you to the station_____.

   e. If you heat ice, _____.

   f. _____, you should eat nutritious food.

   g. If he had lived near to his mother, _____.

   h. _____, we might have saved his life.

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

Civil Engineering encompasses the design, application and basically a perpetuation of civic and private works. With goals of altering the geography to meet the human needs, this discipline enables the prospective graduates to understand and design the structures of monuments, highways, hydraulics, roads, government buildings, dams, and bridges among others. Since this field of engineering is related to a country's development, each and every nation, more so in the recent decennium, has added schools with courses in this field. The degree in the field provides a comprehensive knowledge of the end to end process of developing a structure, and this includes cost estimation and safety review while taking care of the environmental issues.

Inquisitive professionals with a creative bent of mind are more suited in this field. However, before selecting this field, professionals should learn more about different types of civil engineering and available job options. As aforementioned, being a civil engineer in a country that is going through a phase of development is great in terms of number of job opportunities that might be available upon graduation.

Saudi Arabia is one such place; the country has good institutions that offer different types of civil engineering courses, with each having a great scope in terms of jobs. Therefore, a large population of prospective professionals both nationals and expats, are turning towards this field of engineering with a hope of creating a future for themselves as civil engineers. However, it is advisable that before taking a step in this direction, civil engineers should clearly understand the field of civil engineering, its different branches, and requirements to be able to successfully land a job and also be good at it.

a) What does Civil Engineering encompass?
b) What does the degree in Civil Engineering provide?
c) Who are more suited in this field?
d) What is the advice for the civil engineers?

3. Write a **memo** to all the faculty members of Civil Engineering department from the convener of the cultural club, CE, inviting them to the upcoming cultural fest of the department. **(1x5=5)**

4. Write a **report** for the monthly newsletter of the University of Asia Pacific describing the orientation program of the newly arrived batches of various departments held on 19 October, 2019. **(1x7=7)**

University of Asia Pacific
Department of Civil Engineering
Mid Term Examination, Fall 2019
Program: B.Sc. Engineering (Civil)

Course Title: Engineering Mechanics II | Course Code: CE 103
Time: 1.0 hour | Full Marks: 20

1. A lever system is shown in ***Figure 1***, where each block (A, B and C) weighs 550 lb. Determine the force F if counterclockwise rotation of the lever is impending. Given: Coefficient of static friction for all the surfaces = 0.23. (08)

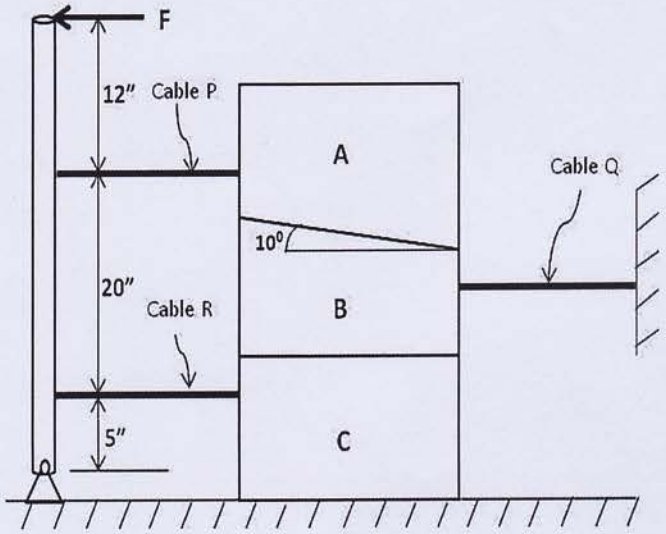

Figure 1

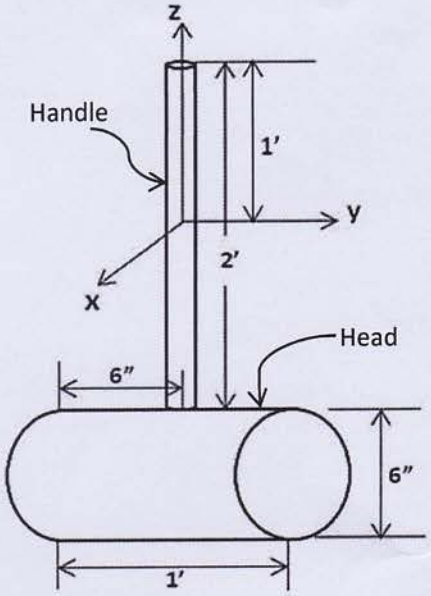

Figure 2

2. A wooden mallet is shown in ***Figure 2.*** The handle of the mallet weighs 3.25 lb and has a uniform cross-section. The head, weighing 18 lb, is a cylinder of diameter 6 inch. Determine the radius of gyration of the mallet with respect to the x axis. (08)

3. A rotating body whose motion follows the equation $\alpha = -4\theta^{0.5}$, where α and θ has their conventional meanings. The body has an initial angular velocity of 50 rad/sec. If the radius of a point on the body is 18″, Determine the tangential and normal accelerations of the point after a rotation of 7 revolutions. (04)