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University of Asia Pacific
Department: Civil Engineering
Semester Final Examination, Fall 2021
Program: B. Sc in Engineering
Year: 1st Semester: 2nd

Course Title: English II | Course Code: HSS 103 | Credit: 3.00

Time: 3.00 Hours | Full Marks: 50

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1. Read the passage carefully and answer the questions that follow:

With the advances in phone and camera technology as well as the invention of the selfie stick, travelers are finally able to include themselves in their own holiday snaps. Gone are the days of entrusting a stranger with your camera or phone for a flattering photo at a key landmark. However, an element of snobbery has developed between travel photos and selfie tourism. A **travel photographer** is someone you're still likely to find on Instagram and Facebook. S/he will probably have his or her own blog too and the photo galleries will certainly include some selfies but there will be significantly fewer selfies and instead, an abundance of stunning landscapes and images, intentionally capturing the beauty, people or atmosphere of a location, possibly from unique angles. A travel photographer does not just rush straight to the locations everyone else posts photos of. His or her images may well not be posted until several hours or days after they were taken and the caption will include lots of information about the location or situation captured. On the other hand, a **selfie tourist** is someone more interested in posting a perfectly staged selfie at the latest trendy travel destination. His or her focus is on grabbing an image of himself or herself in front of a trending landmark to either show off to those left at home or just to show that they were there. Their choice of destination may not have been on their bucket list; rather, it is a status symbol destination. Posting photos at a trending location is likely to result in an abundance of likes, loves, shares and comments from friends and followers. In some cases the caption claims may even be exaggerated; "checking in" when they are not staying at a media-touted hotel or "Best Lunch Ever!!" when they did not eat at the restaurant but they photographed themselves outside.

In the past, holiday destinations would become popular after being featured in travel books, magazines or on TV. On their return, travelers would wait excitedly for their photos, slides or films to come back from the processors. After sorting through them all, to remove the blurry photos, friends and family would be invited round to watch a slide show or a cine film of the holiday. Travel was influenced by the media, word of mouth and great personal holiday photos. Certainly, photos of friends, colleagues and families somewhere exotic encouraged others to travel themselves and to capture the same or similar images on film.

Thanks to the advances in technology. People today can upload photos instantly into a publicly or privately available online photo album (Facebook/Instagram etc.). They visit the places they've seen photographed or talked about, on social media in order to wow their friends, be on-trend or secure a similar "must have" photo. It also leads to some people intentionally seeking out a new location, site or destination in order to be the first to feature it online. (493 words)

A) Write whether the following statements are TRUE or FALSE: **1 X 5 = 5**

i. Selfie takers are mostly narcissistic in nature.
ii. Selfie tourists post more photos of awesome landscapes and images with lots of information.
iii. A travel photographer uses hyperbolic captions with the photos of tourist spots.
iv. A selfie tourist gives authentic information about a travel destination.
v. Travellers can sort out their most favourite destinations from the online photo albums.

B) Write a synonym/word meaning in English for each of the following words and make sentences of your own with them *(any FIVE)*: **2 X 5 = 10**

i) snobbery ii) trendy iii) exaggerated iv) blurry v) exotic vi) feature

C) Answer the following questions in your own words based on the above passage: **2 X 3 = 6**

i. Write a suitable title for the above passage with logical reasons.
ii. Comment on your preferred job – a travel photographer or a selfie tourist? Why?
iii. What does the phrase "bucket list" in the text refer to? What may be your bucket list?

D) Fill in the blanks with suitable words from the text: **0.5 X 8 = 4**

Technological advancement has made (i) ____ possible without anyone's help. With the passage of time, two trends have developed in the field of (ii) ____: travel photography and selfie tourism. A travel photographer (iii) ____ takes snaps of fabulous images and landscapes of a tourist spot from unique angles. However, a selfie tourist (iv) ____ photos of himself or herself in front of a famous (v) ____ in order to show off mostly. The former posts photos in online albums with (vi) ____ of information about the location whereas the latter uploads photos with (vii) ____ captions. In either case, people get recent updates about the tour-worthy (viii) ____.

2. Make sentences with the following idiomatic expressions (any 6): **1 X 6 = 6**

i. a bird's eye view
ii. blue blood
iii. by and large
iv. in a nutshell
v. nip in the bud
vi. red handed
vii. silver spoon
viii. ups and downs

3. **Combine the following sentences into one (any 2):** **2 X 2 = 4**

i) Shipbuilding has already proved its worth home and abroad. It can contribute greatly to the procurement of ships domestically and throughout the world. If the industry can expand its capacity to meet the demands on both fronts, it may change the industrial landscape of Bangladesh.

ii) Someone has stolen a car from outside the school. Some children saw the thief. The police are searching for the car now. But first of all, they have to find some clues of theft.

iii) During summer, load shedding makes it quite impossible for people to concentrate on their work. This is an unbearable situation. People want uninterrupted power supply. Otherwise, they may get impatient and be violent.

4. **Write a 5-paragraph** *(follow the instructions below)* **essay on the following topic.** **15**

Your Life in Dhaka City

No. of Paragraphs	Contents of paragraphs
1. Introduction	Write about the place where you stay. Describe the place in brief. Write about the time you pass in your university. Mention in your thesis statement that you are going to write about some facilities, problems and suggestions.
2. Facilities	Write about the advantages with appropriate examples.
3. Problems	Highlight the problems with suitable examples.
4. Suggestions	Point out a number of measures to overcome the problems in Dhaka city.
5. Conclusion	Conclude with hopes of better living in Dhaka.

University of Asia Pacific

Department of Basic Sciences and Humanities

Semester Final Examination, Fall-2021

Program: B.Sc. in Civil Engineering (1st Year/ 2nd Semester)

Course Title: Chemistry Course No.: CHEM 111 Credit: 3.00

Time: 3.00 Hours. Full Marks: 150

There are **eight** questions. Answer any **six** questions.

1. a. Define air pollutants. What are the sources of air pollutants? How can the air pollution be controlled? **2+5+5 =12**

b. Define photochemical smog. Write down some effects of photochemical smog. Illustrate the mechanism of smog-forming reaction flow charts. **2+5+6 =13**

2. a. Define corrosion. Compare between dry and wet corrosion. Explain the mechanism of wet corrosion. **2+3+10 =15**

b. How can the corrosion be prevented? Discuss the prevention of corrosion by barrier protection and cathodic protection. **2+8=10**

3. a. Write short notes on the following: **5×3=15**

i. DO
ii. BOD
iii. COD

b. Define hardness of water. How many types of hardness of water are found and how they can be prevented? **2+8=10**

4. a. Define paint. What are the major constituents of paint?-Explain. **2+10=12**

b. Define pigments. What is the function of pigments? Write down some requirements of a good pigment. **2+5+6 =13**

5. a. What are the requirements of a good varnish. Discuss about some major ingredients of varnish. **5+10=15**

b. 1.250 g of naphthalene was dissolved in 60 cm^3 of benzene and freezing point of the solution was found to be 277.515 K, while that of benzene 278.495 K. Density of benzene =0.880 g cm^{-3}, K_f=5.1 K per 1000 g benzene. Calculate the molecular mass of naphthalene. **10**

6. a. Define hybridization. Show the formation of ammonia (NH_3) and water (H_2O) molecule according to hybridization theory **2+12=14**

b. Hydrogen can form H_2 but He_2 cannot exist on the basis of MO theory. why? **11**

7. a. Write brief notes on the following: **3×5=15**

   i. Diagonal relationship
   ii. Pauli exclusion principle
   iii. Transition elements

   b. Calculate the value of l, m and number of electrons of the orbitals when n= 1, 2, 3. **10**

8. a. Derive the general equation for the radius of hydrogen atom. **15**
   b. The partial pressure of CO_2 in the reaction $CaCO_3(s) \leftrightharpoons CaO(s) + CO_2(g)$ is 0.773 mm at 500°C. Calculate K_p at 600°C for the above reaction. ΔH of the reaction is 43.2 kcal per mole and does not change in the given range of temperatures. **10**

University of Asia Pacific
Department of Basic Sciences & Humanities
Final Examination, Fall-2021
Program: B.Sc. in Civil Engineering

Course Title: Co-ordinate Geometry and Vector Analysis	Credit Hour: 3 Time: 3 hours	Course Code: MTH 103 Full Marks: 150

There are **Eight** Questions. Answer any **Six**. All questions are equal value. Part marks are shown in the margin.

1. **(a)** Find the distance between $P(-3,-3,-8)$ and the origin **05**

   (b) Find the ratio in which the xz plane divides the line joining $(1,1,2)$ and $(2,-3,2)$. Also find the coordinates of that point. **10**

   (c) If P and Q are $(-2, 4, 1)$ and $(3, -2, -5)$ respectively and O be the origin, then find the direction cosines of OP and PQ. Also find the angle between OP and PQ. **10**

2. **(a)** Find the direction cosine of the line which is equally inclined to the axes. **10**

   (b) If P and Q are (2, 3, 4) and (1, 1,-1) respectively and O be the origin, then find the direction cosines of OP, OQ and PQ. **15**

3. **(a)** Find the equation of plane which is passing through (2,3,1),(1,1,3),(2,2,3). Also find the perpendicular distance from the point (5, 6, 7) to this plane. **10**

   (b) Show that the four points (0,-1,-1),(4,5,1),(3,9,4),(-4,4,4) are coplanar. **10**

   (c) Find the angle between two planes 2x-2y-z+3=0 and 5x-4y+3z-15=0. **05**

4. **(a)** Find the equation of plane which is passing through (4,0,1) and parallel to 4x+3y-12z+6=0 **05**

   (b) Find the equation of plane which is passing through (1, 2, 3) and the intersection of two planes x+2y+3z+4=0, 4x+3y+2z+1=0. **10**

   (c) Find the equation of plane which is passing through (-1,3,2)and perpendicular to two planes x+2y+2z-5=0,
   3x+3y+2z-8=0. **10**

5. **(a)** Find the constant k so that the planes x-2y+kz=0 and 2x+5y-z=0 are at right angles. **05**

   (b) Find the equation of plane which is parallel to the plane 4x-4y+7z-3=0 and a distance 4 unit from the point (4,1,-2). **10**

   (c) Find the equation of plane which is passing through (2,-1,-4)and perpendicular to two planes 3x+4y-5z+6=0, and x-2y+2z+1=0. **10**

6. (a) Find the equation of plane which is passing through the intersection of planes $4x+3y-10z+16=0$, $3x-7y+5z+4=0$ and is parallel to $2x+17y-20z+15=0$. **10**

(b) Find the equation of plane which is passing through the intersection of planes $x-2y+3z+4=0$, $2x-3y+4z-1=0$ and is perpendicular to $3x-y+2z-1=0$. **10**

(c) Find whether the two points (2, 0, 1) and (3,-3, 2) lie on the same side or opposite side of the plane $x-2y+z-6=0$. **05**

7. (a) Find the two tangent planes to the sphere $x^2 + y^2 + z^2 - 4x + 2y - 4 = 0$ which are parallel to the plane $2x - y + 2z - 1 = 0$ **15**

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

8. (a) Find the equation of sphere whose center is (-2, 2, 3) and radius is 5. **05**

(b) Find the radius and center of the sphere $x^2 + y^2 + z^2 + 2x - 4y - 6z + 5 = 0$ **05**

(c) Show that, the equation $3x^2 + 4y^2 + z^2 - 12x - 16y + 4z - 4 = 0$ represents ellipsoid and also find the center and length of semi major axis. **15**

University of Asia Pacific
Department of Civil Engineering
Final Examination Fall 2021
Program: B.Sc. Engineering (Civil)

Course Title: Engineering Mechanics II | Credit Hours: 3.0 | Course Code: CE 103
Time: 3 hours | Full Marks: 100

ANSWER ALL THE QUESTIONS

1. In ***Figure 1***, the coefficients of friction between block A and the wedge B is $\mu_1 = 0.25$ and between the wedge B and block C is $\mu_2 = 0.3$. Assuming wedge B to be weightless calculate the force Q required to raise block A by pushing the wedge B to the right. Given, $W_A = 500$ lb. | *10*

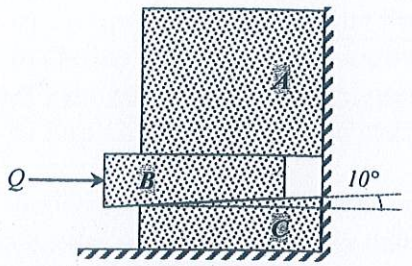


Figure 1

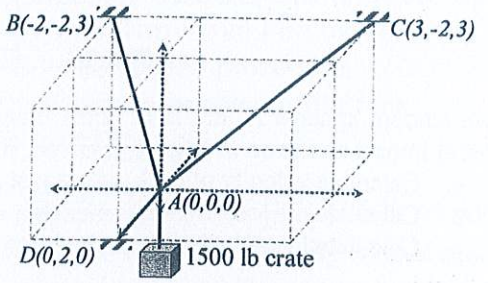


Figure 2

2. Calculate the force in cord AB, AC and AD used to support the 1500 lb crate shown in ***Figure 2***. | *10*

3. Calculate and locate the resultant of the noncoplanar parallel force system shown in ***Figure 3***. Each small square on the grid represents *(2'×2')* area. | *10*

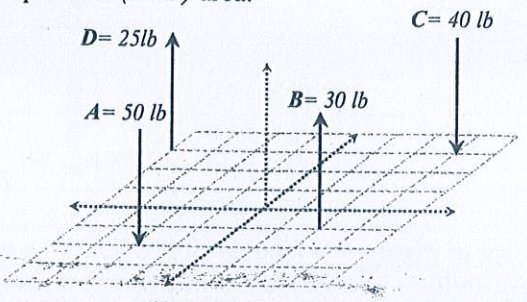


Figure 3

4. A jet of steam issued from a nozzle with a velocity of 600 fps and the absolute rate of w lb per sec. It enters a moving blade with a velocity v_B fps. The blade is shaped as shown in ***Figure 4*** and has a negligible frictional loss. | *10*
If the resultant force on the blade is $R_x = 15$ lb and $R_y = 10$ lb, calculate v_B and w.

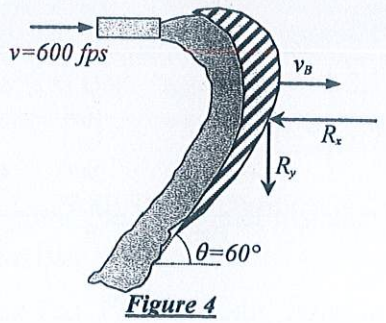


Figure 4

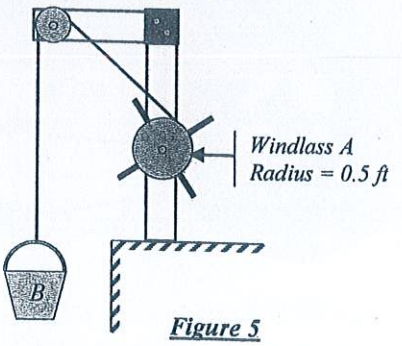


Figure 5

5. A 50 lb bucket B is connected to a Windlass A as shown in ***Figure 5***. The Windlass A, weighing 35 lb, has a radius of gyration of 0.30 ft.
If B is released from rest, calculate the following after it has fallen a distance of 10 ft.
   a. Velocity of Bucket B and angular velocity of A | *6*
   b. Normal acceleration and tangential acceleration of A | *4*

6. Block A, weighing 3 lb, rests upon a 15° ramp where $\mu = 0.2$. As shown in ***Figure 6,*** A is in contact with a spring which has been compressed 10 in and whose scale is K= 40lb/in. The lower end of spring is attached to a fixed wall and at the instant the spring reaches its free length, it acts upon the block.
   a. Calculate the speed of the body at the end of the10′ ramp. *10*
   b. Calculate distance 's' along the horizontal where A hits the ground. *8*

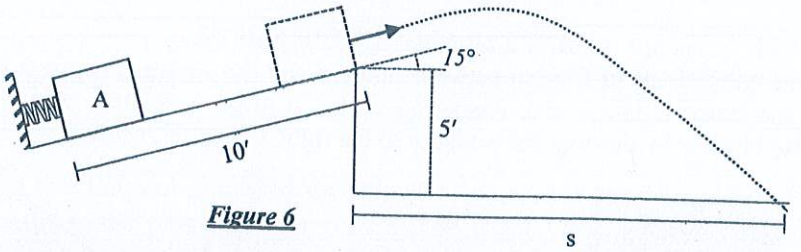


Figure 6

7. Two smooth spheres A and B of equal diameter and on a horizontal plane, collide with oblique central impact as shown in ***Figure 7***. Given: weight of A= 15 N, weight of B = 12 N.
   a. Calculate velocity of each sphere just after impact. *7*
   b. Calculate the loss of kinetic energy. *2*
   c. Calculate impulse during deformation and restitution. *5*

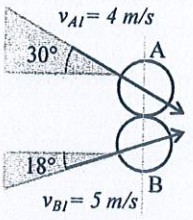


Figure 7

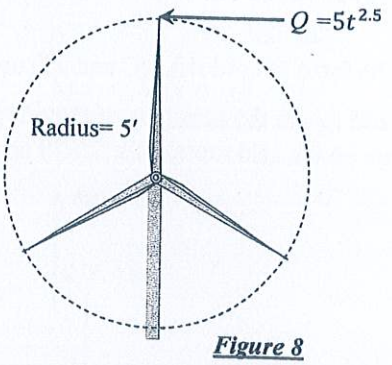
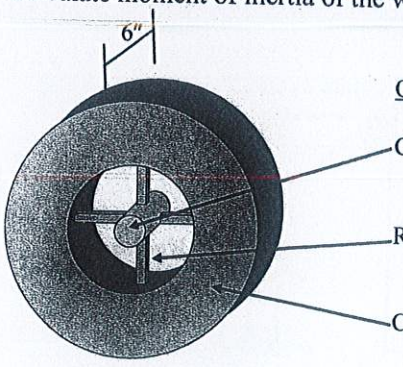


Figure 8

8. A 500 *lb* wind turbine shown in ***Figure 8*** is rotating clockwise with a velocity $\omega = 50\ rads^{-1}$. It is acted upon by a time-dependent force $Q = 5t^{2.5}$lb (t is in seconds) towards left. If radius of gyration of the turbine is 3.5 ft, calculate its angular velocity after 20 seconds. *8*

9. Calculate moment of inertia of the wheel shown in ***Figure 9*** with respect to its instantaneous center. *10*



Object	Dimension		Unit wt
Central cylindrical hub	Radius	1.5″	490 lb/ft^3
	Length	6″	
Rectangular prism	X-section	1″ × 1″	45 lb/ft^3
	Height	10″	
Cylindrical tube	Outer radius	24″	45 lb/ft^3
	Inner radius	11.5″	
	Height	6″	

Figure 9

University of Asia Pacific
Department of Civil Engineering
Final Examination – Fall 2021
Program: B.Sc. Engineering (Civil)

Course Title: Surveying | Course Code: CE 105
Time: 3 hours | Credit Hour: 4 | Full Marks: 150

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1. Answer all of the following five questions. (5*6=30)
   a) Differentiate between any two methods commonly used in plane table surveying.
   b) Compare between 'Aerial Photogrammetry' and 'Terrestrial Photogrammetry'.
   c) Define closing error in a traverse. Discuss its correction procedure.
   d) Compare GIS and remote sensing including their respective limitations.
   e) Explain the necessity of transition curves in roads.

2. A survey area located in a hilly terrain has a dimension of roughly 10000'x10000'. Discuss the main problems that can be encountered during surveying in that area. If accuracy is of great importance for the project for which the surveying is being conducted and you have sufficient budget, illustrate which method of surveying you would choose and why. (15)

3. The following are bearings taken on a closed compass traverse: (20)

Line	FB	BB
AB	271°50'	351°50'
BC	332°10'	49°30'
CD	320°20'	135°15'
DE	70°10'	255°0'
EA	121°48'	301°50'

Compute the interior angles and correct them for observational error.

4. A tacheometer was set up at a station P and the following readings were obtained on a staff vertically held – (15)

Inst Station	Staff Station	Vertical angle	Hair readings	RL of BM
P	BM	-7°30'	2.15, 2.04, 3.74	607m +x
P	D	15°45'	1.75, 3.45, 6.27	x= (Last two digits of ID /2.5)

Determine the horizontal distance between BM and D and determine the elevation of mid hair at D.

5. A line AB 1775 m long, lying at an elevation of 350 m measures 5.32 cm on a vertical photograph for which focal length is 18 cm. Determine the scale of the photograph in an area, the average elevation of which is about 567 m. (10)

6. A plot ABCD forms the plane of a pit excavated for road work. The total plot is subdivided into several rectangle shown in figure 1. Estimate the volume of the excavation in cubic meters. The digits in the corner of the box represents the depth of cutting in meter. (10)

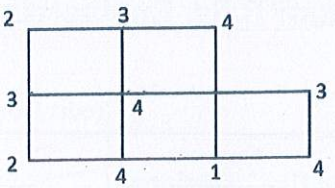

Figure 1

7. An excavation is to be made for a reservoir 25 m long and 15 m wide at the bottom, having the side of the excavation slope at 2 horizontal to 1 vertical. Calculate the volume of excavation if the depth is 5 meters. The ground surface is level before excavation. (5)

8. The following table gives the values of the offsets in feet taken from a chain line to an irregular boundary: (15)

Distance (ft)	0	10	20	35	50	70	90
Offset (ft)	10.6	15.4	20.2	18.7	16.4	20.8	22.4

Calculate the area in square feet included between the chain line, the irregular boundary and the first and the last offset by - i) Simpson's Rule and ii) Trapezoidal Rule.

9. Two tangents intersect at chainage 75+40, the deflection angle being 31°. The radius of the circular curve connected with the tangents is 20 chains. The circular curve is set out by taking offset from the chords considering peg interval equal to 150 links with length of the chord being 30 meters. Calculate the chainage of Point of Curve (PC) and Point of Tangency (PT). (10)

10. A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities. (15)

Side	Length (m)	Azimuth
AB	500	98°30'
BC	620	30°20'
CD	468	298°30'
DE	?	230°0'
DA	?	150°10'

11. Draw tentative contour lines for "98+last digit of student id" m and "100+last digit of student id" m in the following grid (calculation not required). (5)