

University of Asia Pacific
Department of Civil Engineering
Mid-Semester Examination, Fall 2018
Program: B.Sc. in Civil Engineering
Year 1st Semester 1st

Course Title: English Language I (●ral and Written English) Course Code: HSS101 Credit: 3.00

Time: 1.00 Hour

Full Marks: 20

Instructions:

*Marks are indicated in the right margin.

*Answer all the questions

1. Choose the correct homophone from the options below: 5x1=5

- a) We bought ___ (to, too, two) packets of chips and entered the hall.
- b) My all-time favourite meal is _____ (stake, steak) and lobster.
- c) Many people suffer from _____ (flu, flew, flue) during autumn and winter.
- d) Let's grab a _____ (bite, byte) to eat in town after work!
- e) The Garabit Viaduct was constructed _____ (bi, by, bye) Gustave Eiffel between 1882 and 1884.

2. Complete the following passage by inserting the missing *a*, *an*, *the* or *x* (for no article) where necessary: 0.5x10 = 5

Civil Engineers design, build, and maintain (a) ___ foundation for our modern society -- our roads and bridges, drinking water and energy (b) ___ systems, sea ports and airports, and the infrastructure for (c) ___ cleaner environment, to name just (d) ___ few.

Civil Engineering touches us throughout our day. Think of (e) ___ civil engineer when you turn on your tap to take a shower or drink clean water, flick on your lights and open your refrigerator, drive to work on roads and bridges through synchronized traffic lights, take mass transit or take a flight for a vacation and toss your empty (f) ___ coffee cup in the recycling bin. Civil Engineers often specialize in one of (g) _____ number of technical areas, such as, Transportation, Coastal Engineering, Construction, Structural, Environmental and so on. (h) ___ creativity and innovative spirit of Civil Engineers are showcased in the projects they have created throughout (i) ___ world.

Some time-honored civil engineering projects are, the Golden Gate Bridge, the Eiffel Tower and (j) Hoover Dam.

3. Read the following sentences and change the tenses as directed.

5 x 1 = 5

- a) She earns a six figure salary. (Present Continues)
- b) A Geotechnical Engineer determines what exactly lies beneath a proposed construction site. (Future Indefinite)
- c) They do not know anything. (Present Perfect)
- d) Hewants a dark chocolate bar tomorrow. (Simple Past)
- e) I have heard about Isambard Kingdom Brunel. (Past Perfect)

4. Suppose, you are a Construction Site Engineer at MAX Infrastructure Ltd.

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Three days ago, you bought ten bitumen compactors from Petrola Trading Corporation Ltd (Address: 20, Dilkusha C/A, Dhaka 1000) for your company but when you came back, you discovered that five compactors did not work properly. You called the company to report the problem but you have not received any help yet.

Now, write a complaint letter to the Manager of Petrola Trading Corporation Ltd explaining the problems you faced and state what action you would like from the company.

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

Course Title: Mathematics-I
Time: 1.00 Hour.

Course Code: MTH 101
Full Marks: 60

There are **Four** questions. Answer any **Three**. All questions are of equal values, indicated in the right margin.

1. Define differentiability of a function. Discuss continuity and differentiability of $f(x)$ at $x=0$, 20
where $f(x) = \begin{cases} 3 + 2x, & -3/2 < x \leq 0 \\ 3 - 2x, & 0 < x < 3/2 \end{cases}$

2. (a) State Leibnitz's Theorem. If $y = e^{2\sin^{-1} x}$, then show that 12
$$(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - (n^2 + 4)y_n = 0.$$

(b) Discuss the applicability of the Rolle's theorem for the function 8
$$f(x) = x^3 - 3x^2 + 2x$$
 over $(0, 2)$.

3. (a) For $y = \sec x$, show that $y_2 = y(2y^2 - 1)$. 10
(b) For parametric equation $x = a(2\cos t + \cos 2t)$, $y = a(2\sin t - \sin 2t)$ using 10
chain rule find $\frac{dy}{dx}$.

4. State Maclaurin's theorem. Expand $\sin x$ in power of x with remainders R_n in 20
Lagrange's and Cauchy's form.

University of Asia Pacific
Department of Basic Sciences and Humanities
Mid-Semester Examination Fall – 2018
Program: B. Sc Engineering (CE)

Course Title: Physics
Time: 1.00 Hour

Course Code: PHY-I01

Credit: 3.00
Full Mark: 60

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

1. (a) Prove that work done per unit volume, $w = \frac{1}{2}$ x stress x strain for volume strain energy. [10]
- (b) Calculate the work done in stretching a uniform metal wire of area of cross section 10^{-6} m^2 and length 1.5 m through $4 \times 10^{-3} \text{ m}$. Given $Y = 2 \times 10^{11} \text{ N/m}^2$. [10]
2. (a) What is called Cantilever? Prove that depression $y = \frac{Wl^3}{3YI_g}$ at the free end of the cantilever, where the terms have their usual meanings. [10]
- (b) A uniform rod of length 1 m is clamped horizontally at one end. A weight of 0.1 kg is attached at the free end. Calculate the depression at the midpoint of the rod. The diameter of the rod is 0.02 m. ($Y = 10^{10} \text{ n/m}^2$) [10]
3. Define elastic fatigue. State and explain stress-strain diagram of a metallic wire. [20]
4. (a) State and explain the Bernoulli's theorem and prove that $\frac{v^2}{2} + gh + \frac{p}{\rho} = \text{Constant}$, where the terms have their meanings. [10]
- (b) Two equal drops of water (surface tension T), each of radius r, are falling through air (viscosity η) with a steady velocity v. If the two drops coalesce to form a bigger drop, (i) compute the energy released and (ii) find the new velocity of fall. [10]

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

Course No: CE 107
Full Marks: 60

Course Title: Introduction to Civil & Env. Engg.
Time: 1 hour

PART I

Answer all the questions.

1. Define "Environment" according to P. Gisbert. From which word is it derived? Discuss its classifications also. [3+2+5]
2. What is the importance of i) Environmental Engineer and ii) Environmental Education? [5+5]
3. Differentiate between i) Green Engineering and Traditional Engineering Processes ii) Biotic component and Abiotic component of environment. [5+5]

PART II

Answer all the questions.

4. Mention few simple points (at least three for each) related to the understanding of science, engineering and technology. [10]
5. (a) Define civil engineering according to ASCE. [4]
(b) Mention six major roles of civil engineers in infrastructure development. [6]
6. (a) Calculate (showing unit detail) the weight of a brick (W_b) in lb and kg, if its size is about 24.13 cm x 4.5 in x 69.85 mm. Consider unit weight of brick material, $\gamma_{bm} = 125 \text{ lb/ft}^3$. [5]
(b) For the brick as mentioned above (in question no. 6(a)), calculate the pressures on the surface in psi (lb/in^2) for the following two cases. [5]

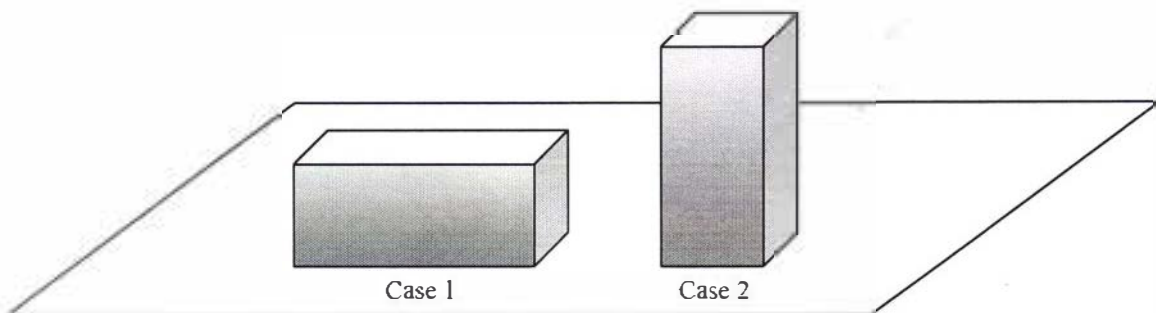


Figure: Brick resting on a plane surface

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

Course Title: Engineering Mechanics 1
 Time: 1 hour

Credit Hour: 3.0

Course Code: CE 101
 Full Marks: 4 x 10

ANSWER ALL QUESTIONS. The figures are not drawn to scale. Any missing data can be assumed reasonably.

1. **Fig.1** shows a system of forces acting on a structure. Calculate the magnitude, direction and location of resultant of the forces.

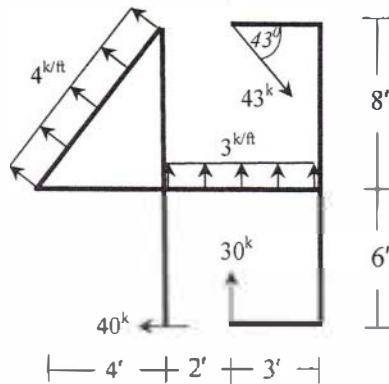


Fig.1

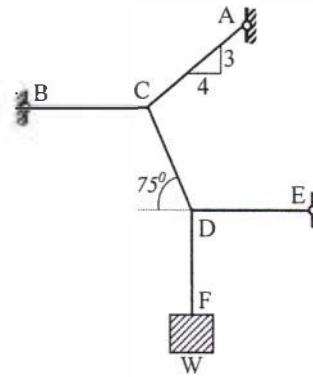


Fig.2

2. **Fig.2** shows a cable system where a weight W is suspended by the cable DF . Which cable will experience maximum tension among BC , AC , CD , DE and DF and calculate the value of maximum tension [Given: $W = 10$ kips].
3. In the truss loaded as shown in **Fig.3**, (i) identify zero force members, (ii) Calculate reactions at supports E and F and (iii) forces in member CD , CH and DH

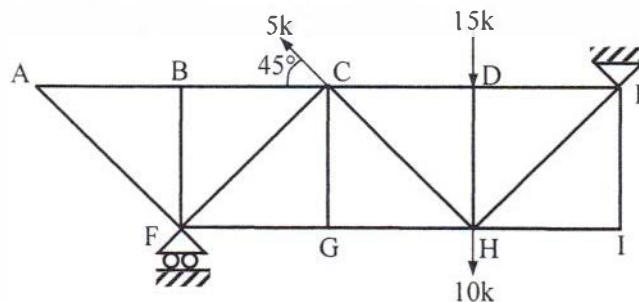


Fig. 3

4. In the **Fig.4** below, calculate (i) the reaction at support B and F and (ii) the bending moment and shear force at C

