

**University of Asia Pacific**  
**Department of English**  
**Mid-Semester Examination (Spring 2022)**  
**Program: B.Sc in Civil Engineering**  
**Year: 1<sup>st</sup> Semester: 1<sup>st</sup>**

Course Code: HSS 101

Course Title: English I

Credit Hr: 3.00

Time: 1 hour

Full Marks: 20

---

**Instructions:**

*\*Marks are indicated in the right margin.*

*\* Answer all the questions.*

1. Fill in the blank using the correct form of the verb.

10 x .5= 5

The police a) \_\_\_\_\_ (apprehend) nineteen people, but later they had to be released on public demand.

b) \_\_\_\_\_ (there / be) no transportation available because c) \_\_\_\_\_ (there / be) a drivers' strike last week.

d) \_\_\_\_\_ (I / find) out that e) \_\_\_\_\_ (I / be) on the wrong side of the block after f) \_\_\_\_\_ (walk) for 15 minutes

g) \_\_\_\_\_ (I / leave) now so I've come to bid my goodbyes.

Would you reckon h) \_\_\_\_\_ (you / still / reside) in the same building in seven years' time?

i) \_\_\_\_\_ (you / not / recognise) Ananta if j) \_\_\_\_\_ (you / meet) him again, he's had a total transformation.

2. Identify the mistakes in the passage given below and rewrite it with the correct answer. Underline the mistakes you're rectifying.

10 x .5= 5

Someone have realized that tomorrow was our principals birthday. These woman was one of a kindest person to ever exist. So it was no surprise she was popular on the pupils. Every single one of us want to get her something. After class, I scouring the whole afternoon shopping in a gift. After a excruciating search, I finally found something that catches my eyes. The next day I has suprised her with a bouquet of beautiful roses and she was absolutely delighted.

3. You are Iffad Zaman/ Iffat Jaman, a customer service officer from Amazon. Recently you received a complaint from a disgruntled customer about a stationary set (order#8402) that never arrived.

Write an **apology letter** to the customer on behalf of the company regarding this matter. 10 x 1= 10

**University of Asia Pacific**  
**Department of Basic Sciences and Humanities**  
**Mid-Term Examination Spring - 2022**  
**Program: B. Sc Engineering (Civil)**

Course Title: Physics  
 Time: 1.00 Hour

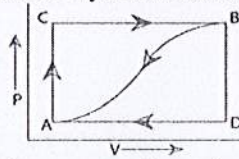
Course Code: PHY-101

Credit: 3.00  
 Full Mark: 60

**N.B-** There are four (04) questions. Answer three (03) including Q. no. 1.

1. (a) Derive the differential equation of a progressive wave. [12]
- (b) Show that for a particle executing simple harmonic motion, its velocity at any instant is  $\frac{dy}{dt} = \omega\sqrt{a^2 - y^2}$ , where the symbols have their usual meanings. [08]

2. (a) State and explain the laws: Zeroth law of thermodynamics, First law of thermodynamics. [12]
- (b) When a system is taken from the state A to state B along the path ACB, 80 joules of heat flows into the system and the system does 30 joules of work (fig. below). [08]



- (i) How much heat flows into the system along the path ADB, if the work done is 10 joules?
- (ii) The system is returned from the state B to the state A along the curved path. The work done on the system is 20 joules. Does the system absorb or liberate heat and how much?
- (iii) If  $U_A = 0$  and  $U_D = 40$  joules, find the heat absorbed in the process AD and DB.
3. (a) What is adiabatic process? Prove that the work done during an adiabatic process is  $w = \frac{1}{1-\gamma}(RT_2 - RT_1)$ , where the symbols have their usual meanings. [12]
- (b) A quantity of dry air at  $27^\circ\text{C}$  is compressed suddenly to  $1/3$  of its volume. Find the change in temperature.  $\gamma$  is 1.4. [08]
4. (a) Derive the efficiency of the Carnot's heat engine in terms of temperature. [12]
- (b) A Carnot engine whose low temperature reservoir is at  $7^\circ\text{C}$  has an efficiency of 50%. It is desired to increase the efficiency to 70%. By how many degrees should the temperature of the reservoir be increased? [08]



**University of Asia Pacific**  
**Department of Basic Sciences & Humanities**  
**Mid Semester Examination, Spring-2022**  
**Program: B.Sc. in Civil Engineering**

Course Title: Mathematics I  
Time: 1.00 Hour

Course Code: MTH 101

Credit: 3.00  
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 domain and range of the functions 10

(i)  $f(x) = \sqrt{9 - x^2}$

(ii)  $f(x) = \frac{x-2}{2x-1}$ .

b) Differentiate the following functions 10

(i)  $\cot(\ln(\sin a^x))$

(ii)  $(x^2 + 1)\cos^{-1}x + e^{\sqrt{1-x}}$ .

2. a) Find the maximum and minimum value of the following function 10

$$f(x) = x^4 + 2x^3 - 3x^2 - 4x + 4.$$

b) Find the equation of the Tangent and the Normal to the following curve 10

$$f(x) = x^2 + x - 6 \text{ at } x = 2.$$

3. a) Investigate the differentiability of the following function at  $x = \frac{3}{2}$ . Also comment on the continuity of the function at that point 10

$$\text{where, } f(x) = \begin{cases} 3 + 2x & \text{when } -\frac{3}{2} \leq x < 0 \\ 3 - 2x & \text{when } 0 \leq x < \frac{3}{2} \\ -3 - 2x & \text{when } x \geq \frac{3}{2}. \end{cases}$$

b) Find the first six Maclaurin's polynomial of  $\ln(1 - x)$ . 10

**OR**

4. a) Investigate the continuity of the function at  $x = 2$  10

$$\text{where, } f(x) = \begin{cases} 5x - 4 & \text{when } 0 < x \leq 1 \\ 4x^2 - 3x & \text{when } 1 < x < 2 \\ 3x + 4 & \text{when } x \geq 2. \end{cases}$$

b) Find the first eight Taylor polynomial of  $e^{mx}$  at  $x = 0$ . 10

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Midterm Examination Spring 2022**  
**Program: B. Sc. Engineering (Civil)**

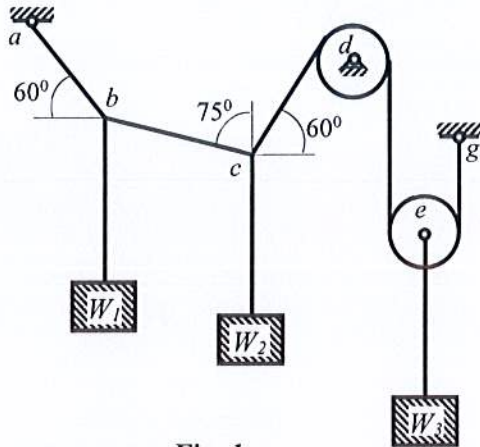
Course Title: Engineering Mechanics I  
 Time: 1 hour

Credit Hours: 3.0

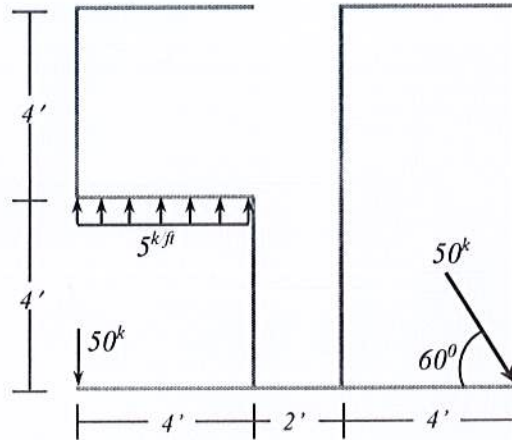
Course Code: CE 101  
 Full Marks: 40 (= 4 × 10)

**ANSWER ALL THE QUESTIONS**

1. **Fig. 1** shows that two weights  $W_1$  and  $W_2$  are suspended from cable  $abcdeg$  at points  $b$  and  $c$  respectively, while another weight  $W_3$  is suspended from pulley  $e$ . Calculate the weights of  $W_1$  and  $W_2$ , if  $W_3 = 200$  lbs [assuming Pulley  $d$  and  $e$  are smooth].



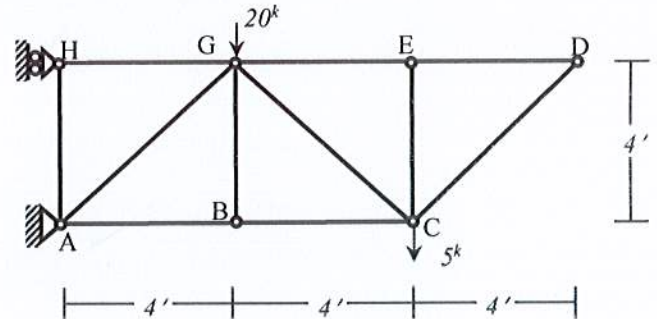
**Fig. 1**



**Fig. 2**

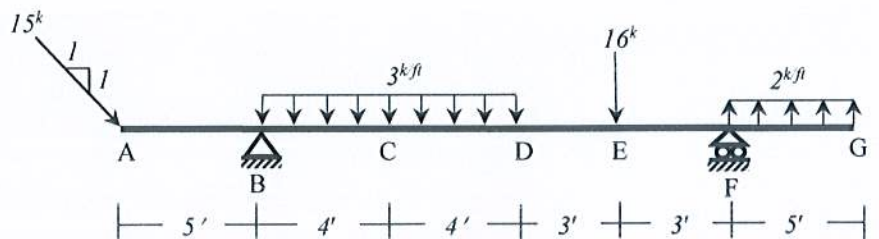
2. **Fig. 2** shows a system of forces acting on a structure. Calculate the magnitude, direction, and location of the resultant force.

3. For the truss system loaded as shown in **Fig. 3**,
- (i) Identify zero force members,
  - (ii) Calculate the reactions at supports A and H,
  - (iii) Calculate forces in members AB, AG and GH.



**Fig. 3**

4. In the beam loaded as shown in **Fig. 4**, calculate the
- (i) Reactions at supports B and F
  - (ii) Shear Force (SF) and Bending Moment (BM) at point C.



**Fig. 4**

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Midterm Examination Spring 2022**  
**Program: B.Sc. Engineering (Civil)**

Course Title: Introduction civil & env. engg.  
Time: 1 hour

Credit Hour: 2.0

Course Code: CE 107  
Full Marks: 40

---

**(Answer all the questions. All questions are of equal value. Figures  
in the right margin indicate marks)**

1. Explain the following: [10]
  - i) Environment
  - ii) Environmental science
  - iii) Environmental engineering
  - iv) Environmental ethics
  - v) Environmental pollution
  
2. a) What is 3R principle? [2]  
b) Discuss how 3R principle can minimize waste production? [3]  
c) Describe greenhouse effect. [5]
  
3. a) Differentiate between biotic and abiotic environments with examples. [2.5]  
b) Differentiate between micro and macro environment. [2.5]
  
4. a) Point out the major components of a building and discuss them in brief. [10]  
b) Calculate the weight of a brick in lb and kg, if its size is about 9.5 in × 11.43 cm × 63.5 mm. Consider unit weight of brick material is 120 lb/ft<sup>3</sup>. 1 kg = 2.20 lb. [5]