ourdiu.com | Shared by MD. AMIRUL ABEDIN TUSER

Daffodil International University

B. Sc. in Civil Engineering

Final Examination, Spring - 2025

Course Code: CSE 202 | Course Title: Computer Programming Lab

Section: BN21 | Level-Term: 2-1 | Teacher's Initial: SNA

Full Marks: 40 | Date: May 28, 2025 | Time: 2.0 Hours

Right margin indicates full marks. Answer all the questions in google colab notebook.

1. a). *Assign* the following data in a DataFrame using a dictionary *[CO1, C2]* [02]

Names: Alice, Bob, Charlie, David
Marks: 85, 90, 95, 88

b). *Add* a new column called "Grade" based on the following: *[CO1, C2]* [05]

If Marks $\geq 90 \rightarrow$ 'A'

$80 \leq$ Marks $< 90 \rightarrow$ 'B'

Else $\rightarrow$ 'C'

c). *Display* only the students who got an A. *[CO1, C2]* [03]

2. A fixed beam of length L= 6 + 0.5*sin(last_two_digit_of_student_id) m is subjected to a uniformly distributed load w =10 kN/m along its entire length. The beam has a constant flexural rigidity EI = 2 x 10^7 kN/m^2

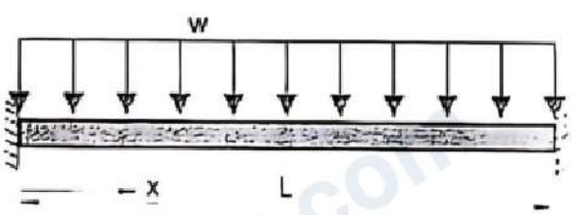


Figure 1

The deflection curve of the beam under this loading can be given by the formula:

$$y(x) = -\frac{w}{24EI}(x^4 - 2Lx^3 + L^2x^2)$$

where:

- y(x) is the vertical deflection at distance xxx from the left support (in meters),
- EI is the flexural rigidity (in kN·m^2),
- w is the uniformly distributed load (in kN/m),
- L is the span length (in meters).

Demonstrate a plot in python that shows deflection of the beam. *[CO3, C2]* [10]

ourdiu.com | Shared by MD. AMIRUL ABEDIN TUSER

3. The following data defines the sea-level concentration of dissolved oxygen for fresh water as a function of temperature:

T (°C)	0	8	16	24	32	40
DO (mg/L)	14.621	11.843	9.870	8.418	7.305	6.413

a). *Demonstrate* a linear regression model to predict DO level based on temperature. [05] *[CO3, C2]*

b). *Show* the model in a plot along with the given data points in scatter plot. *[CO3, C2]* [05]

c). *Determine* dissolved oxygen for fresh water for 18 degree Celsius temperature. *[CO3, C2]* [03]

4. *Apply* a for loop to calculate the sum of given series. *[CO2, C3]* [07]

$S = 1*2*3*4 + 5*6*7*8 + \ldots\ldots\ldots + 21*22*23*24$

