UNIVERSITY OF ALASKA FAIRBANKS

COLLEGE OF ENGINEERING AND MINES
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

COURSE CODE	EE F102 F01 (CRN: 32862)
COURSE NAME	INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING
SEMESTER	SPRING
YEAR	2023
TYPE AND NUMBER OF SUBMISSION	HOMEWORK 4
METHOD OF SUBMISSION	ONLINE VIA CANVAS
DATE OF ASSIGNMENT	WEDNESDAY 01 MAR 2023

DUE DATE OF SUBMISSION	FRIDAY 10 MAR 2023	**DUE TIME OF SUBMISSION**	23:59

STUDENT NAME	Jewel Maldonado

MAKE THIS FORM A "COVER PAGE" FOR YOUR HOMEWORK SUBMISSION.

FOR THE TA USE ONLY

REMARKS:

FOR THE TA USE ONLY		
PROBLEM NUMBER	**MAXIMUM POINTS POSSIBLE**	**POINTS EARNED**
PROBLEM 1	50	
PROBLEM 2	100	
TOTAL	150	

Problem HW-4-1 Points Distribution
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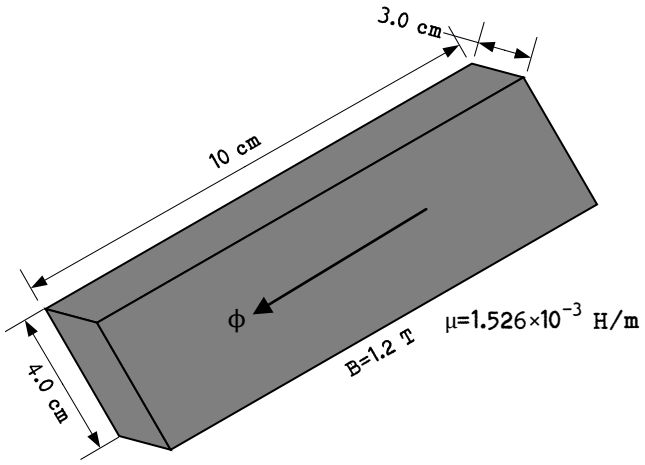
A flux (ϕ) passes through a piece of a ferromagnetic material with its dimensions and specifications as shown in the figure. The flux creates a flux density (B) of 1.2 T inside the material. The permeability (μ) is 1.526×10^{-3} H/m.



(a) Determine the value of flux (ϕ), in Wb. (20)

(b) Determine the magnetic field intensity (H), in A/m. (20)

(c) If the cross-sectional area perpendicular to the flux direction is reduced by 30%. Determine the new magnetic flux density (B), in Tesla. (10)

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Problem HW-4-2 Points Distribution
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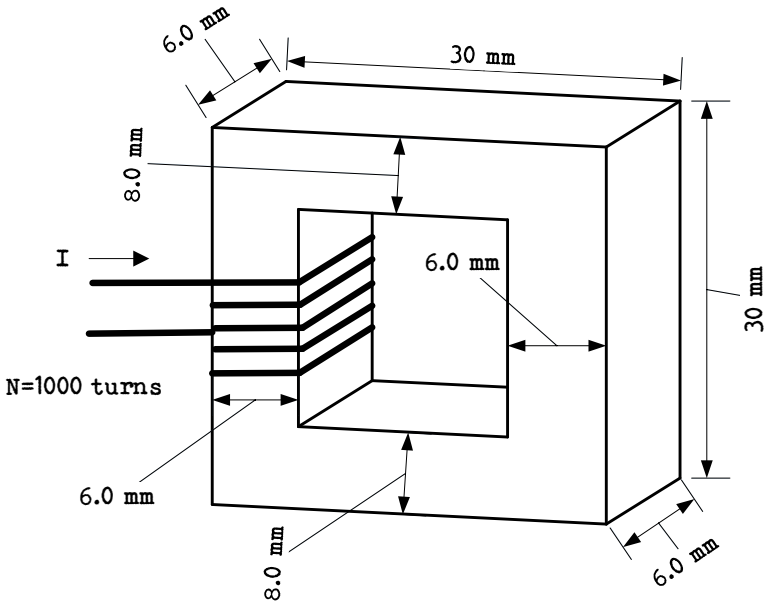
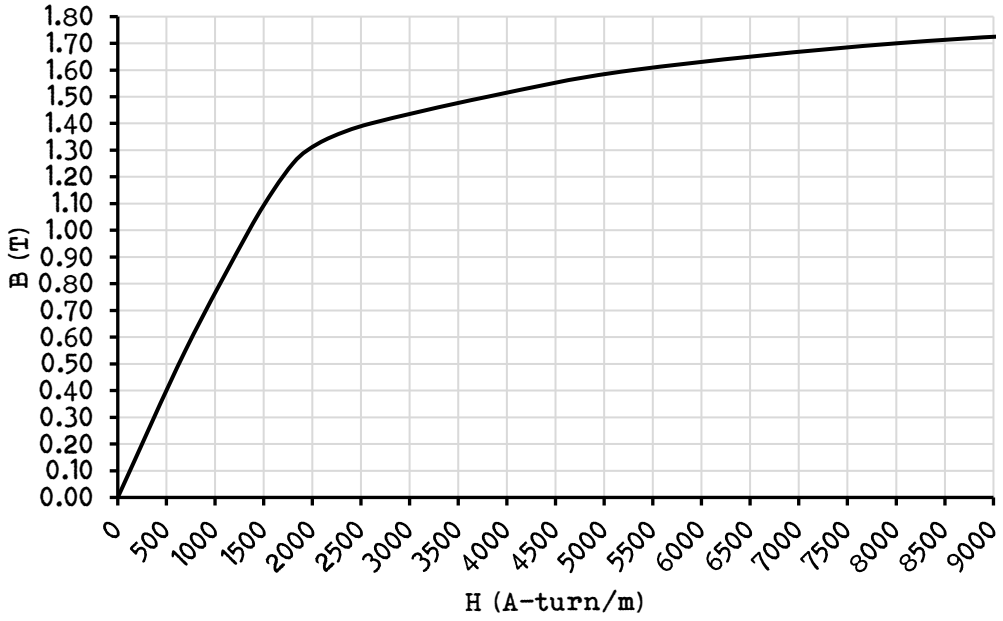
For the magnetic circuit with the core B-H curve shown, the magnetic flux density at the left bar of the circuit (B_{left}) is 0.9 T.





(a) Determine the magnetic flux, ϕ, in Wb. (10)

(b) Determine the magnetic drop at the left bar, $H_{left}l_{left}$, in A.turn. (10)

(c) Determine the magnetic drop at the right bar, $H_{right}l_{right}$, in A.turn. (10)

(d) Determine the magnetic drop at the upper bar, $H_{upper}l_{upper}$, in A.turn. (10)

(e) Determine the magnetic drop at the lower bar, $H_{lower}l_{lower}$, in A.turn. (10)

(f) Determine the input current, I, in A. (10)

(g) Determine the reluctance of the left bar, R_{left}, in A.turn/Wb. (10)

(h) Determine the reluctance of the right bar, R_{right}, in A.turn/Wb. (10)

(i) Determine the reluctance of the upper bar, R_{upper}, in A.turn/Wb. (10)

(j) Determine the reluctance of the lower bar, R_{lower}, in A.turn/Wb. (10)

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