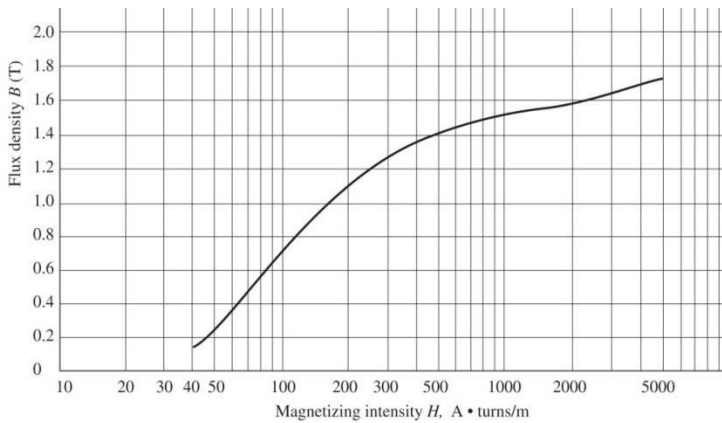


Q1(6 pts.) A square magnetic core has a mean path length of **50 cm** and a cross-sectional area of **100 cm²**. A **200** turn coil is wrapped around one leg of the core. The core has the magnetization curve shown below. $\mu_0 = 4\pi \times 10^{-7}$ H/m



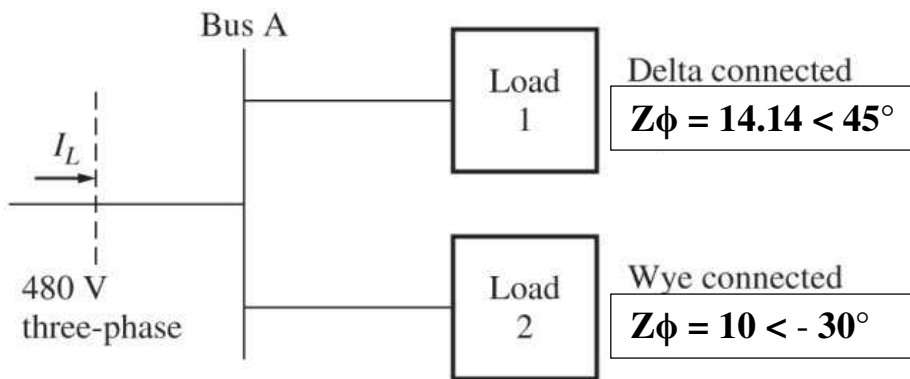
a) (2) Find the current (**i**) required to produce **0.012 wb** of flux in the core?

b)(2) What is the cores relative permeability (μ_r) at that current level.

c)(2) What is the cores maximum reluctance (R_{\max})?

a) $i = \underline{0.625 \text{ A}}$ b) $\mu_r = \underline{3820}$ c) $R_{\max} = \underline{147,059 \text{ AT/m}}$

Q2 (6 points) Find total real power (P) and power factor (pf) delivered by the three phase source.



a)(3) $P = \underline{54,529 \text{ W}}$

b)(3) $\text{Pf} = \underline{0.92 \text{ lag}}$

Q3 (8 points) A **10 kVA, 2200/220V** transformer is at full load delivering rated current and voltage at a **unity** pf. The transformer has the following equivalent circuit parameters referred to the primary: $R_{eq} = 40\Omega$, $X_{eq} = 40\Omega$, $R_c = 50k\Omega$, $X_m = 10 K\Omega$

- a) (3) Sketch the transformer equivalent circuit referred to the low voltage side.
Label all components and their value.
- b) (3) Find the **voltage regulation (VR)** for the transformer.
- c) (2) What is transformer efficiency (η)?

Equivalent circuit goes here.

$R_{eq} = 0.4\Omega$, $X_{eq} = 0.4\Omega$, $R_c = 500\Omega$, $X_m = 100\Omega$

b) **VR** = 8.6%

c) η = 91.4%

ELECT 316
Practice EXAM #1

NAME : _____

Question #	Points	Grade
1	6	
2	6	
3	8	
Total	20	

Notes:

1. All voltages and currents are rms values unless specifically noted.
2. All answers require correct units for full credit.
3. Please place answer in boxes where provided.