

## Electric Machines & Drives

### Homework Answers #1: Safety, Chapter 2, Chapter 3

**Due:** 08/29/11

#### Electrical Safety

#1. Please list at least 5 safety concerns when working with electric machines and drives;

Source matched to machine.

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Load matched to machine.

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Case grounded.

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PPE needed

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Mechanical / electrical guards in place.

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#### Chapter 2 of text book - Answers.

2-4: 20V

2-5: 1.8V

2-9: A. 960N, B. 906N, C. No, force on pole equal in magnitude but opposite in direction to force on conductor.

2-12: A. 12A, B. 169.7V, C. 1440W, D. 2880W

2-13: 23Hz

2-15: A.  $I_1$  lags behind  $I_3$  by  $60^\circ$ , B.  $I_3$  lags behind  $I_2$  by  $90^\circ$ , C. E lags behind  $I_1$  by  $150^\circ$

2-23 (a only):  $-10-5I_1=0$ ,  $5I_1+2I_2=0$ ,  $I_1+I_3=I_2$

2-26 (a only):  $E_{21}+20I_1=0$ ,  $E_{21}=-100/_0^\circ$ ,  $I_3=I_1+I_2$ ,  $E_{21}+I_2(50j)=0$

#### Chapter 3 of text book - Answers.

3-5: 251kw or 336hp

3-7: a. 100kw or 134hp, b. 83.3%, c. 68256 Btu/hr

3-9: a. 1096J, b. 3288J, c. 242kJ

3-10: conduction, convection, radiation

3-11: a. clockwise, b. 50Nm

3-14: 209W

3-17: a. 13.1Nm, b. 88.8kJ, c. 2195W, d. 2400W

3-22: 1568 N\*m, 239RPM