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**Induction Motor Project**

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EEE3091F: Energy Conversion

University of Cape Town

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**Part A – MATLAB Code**

**Question 1**

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**Question 2**

A graph of a speed and speed

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**Question 3**

A graph of a motor current

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A screenshot of a computer

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**Question 4**

A graph of a speed and speed

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A screenshot of a computer program

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**A graph of different colored lines

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A screenshot of a computer

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**Question 6**

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**Question 7**

A graph of a speed and speed

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A screenshot of a computer

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INDUCTION MOTOR PROJECT THEORY QUESTION ANSWERS

**Question 1:**

a) Larger motors generally have lower internal resistances hence suffer lower copper losses compared to smaller motors making them more efficient. This is because the windings of the stator and rotor in larger machines have more cross-sectional area hence lower resistance.

b) The load the machine operates in directly affects the machines efficiency. A lower load (under 50% load) will lower the running conditions of the machine hence there will be low Torque output. This means for the same power input a lower load results in lower output power () hence the losses are increased, and the efficiency is lowered.

**Question 2:**

a) For standard motors:

For the 3 kW:

For the 7.5 kW:

For the 15 kW:

For the 55 kW:

Total daily power input = 37,668 + 12,093.84 +11,406.12 +6593.4 = 67,761.36 kWh per day

Total Monthly input Power = 67,761.36 x 28 = 1,897,318.08 kWh per month

Electricity bill = 1,897,318.08 \* 28.288 = 536,713.34 R

b) For energy efficient motors:

For the 3 kW:

For the 7.5 kW:

For the 15 kW:

For the 55 kW:

Total daily power input =37,269.2 + 11,802.96 + 11,086.68 + 6172.2 = 66,331.04 kWh per day

Total Monthly input Power = 66,331.04 x 28 = 1,857,269.12 kWh per month

Electricity bill = 1,857,269.12 \* 28.288 = 525,384.29 R

c) Monthly savings = Monthly cost standard – monthly cost energy efficient

= 536,713.34 – 525,384.29 = 11,329.05 R

**Question 3:**

For standard motor:

For energy efficient motor:

Daily Profit

The number of days required for the machine to make back the R4000 is: