Module 13: Assignment 2
Motors and Speed Control Methods

Problem Statement:

John is considering upgrading the motor of his electric vehicle (EV) and wants to select the most suitable motor from a range of options available in the market. To make an informed decision, he needs to calculate various parameters based on his vehicle's specifications and compare them with the specifications of the motors listed in the table below.

Specifications of John's Electric Vehicle:

- Rim radius = 0.4032 meters
- Height of tire = 0.2 meters
- Tractive force on a wheel = 8635 Newtons
- Gear ratio = 8:1
- Speed of vehicle = 65 km/h
- Velocity = 12.75 m/s

Motor Name	Motor Type	Peak Power (kW)	Motor Speed (RPM)	Peak Torque (Nm)	Mass (kg)
ABB - AMXE132S3GLX134186-BFA	Permanent Magnet Synchronous Motor	123	3000-5000	392	71
Brogen Motor – EC110-D2	Permanent Magnet Synchronous Motor	110	1660-4000	1000	135

Brogen - TZ 230 XS-60-02	Permanent Magnet Synchronous Motor	120	3000-8500	1200	-
LG Magna HP1015	Permanent Magnet Synchronous Motor	160	16000	300	<72
Canadian Electric Vehicles - HPEVS Dual AC-34 96-108 V Motor	Induction Motor	150	5000-10000	289	68

Tasks to be Performed:

- Calculate the wheel radius and circumference of John's electric vehicle based on the provided rim radius and height of the tire.
- Determine the RPM of the wheel using the speed of the vehicle and the calculated wheel circumference.
- Calculate the RPM of the motor by considering the gear ratio.
- Determine the power required at the wheel based on the tractive force on the wheel and the velocity of the vehicle.
- Compare the calculated parameters with the specifications of the motors listed in the table to identify the most suitable motor for John's electric vehicle.