



Science

STUDY AND ANALYSIS OF PERMANENT MAGNET DC MOTORS WITH VARIOUS PARAMETERS

Dr. S. K. Mahobia^{*1}

^{*1} Assistant Professor, Department of Physics, Rewa Engineering College, Rewa (M.P.). India

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Abstract

The permanent magnet type DC motors are used in various applications as heater, wiper. DC motors are any of a class of electrical machines that converts direct current electrical power into mechanical power. The DC motor has important role in moving machine because of mostly use in the industry appliances. The speed control of DC motor is increasingly getting sophisticated and precise. The Speed of the DC motor is controlled by with the help of controlling the stator winding voltage. There are various methods of speed control of DC drives namely field control.

Keywords: Rectifier; Permanent Magnet; DC Motor; Stator.

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1. Introduction

DC motors are the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles or in drives for steel rolling mills.

2. Permanent Magnet Stators

PM fields (stators) are convenient in miniature motors to eliminate the power consumption of the field winding. Most larger DC motors are of the "dynamo" type, which have stator windings. Historically, PMs could not be made to retain high flux if they were disassembled; field windings were more practical to obtain the needed amount of flux. However, large PMs are costly, as well as dangerous and difficult to assemble; this favors wound fields for large machines.

3. Single-Phase Rectifiers

3.1. Half-Wave Rectification

Half-wave rectification requires a single diode in a single-phase supply, or three in a three-phase supply. Rectifiers yield a unidirectional but pulsating direct current; half-wave rectifiers produce far more ripple than full-wave rectifiers, and much more filtering is needed to eliminate harmonics of the AC frequency from the output.

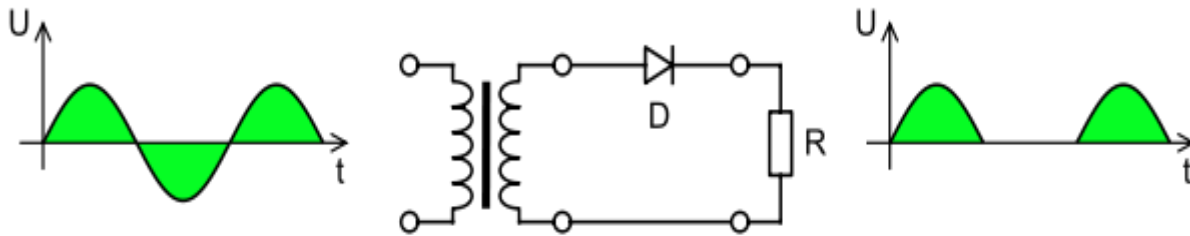


Figure 1: Half-wave rectifier

3.2. Full-Wave Rectification

Single semiconductor diodes, double diodes with common cathode or common anode, and four-diode bridges, are manufactured as single components.

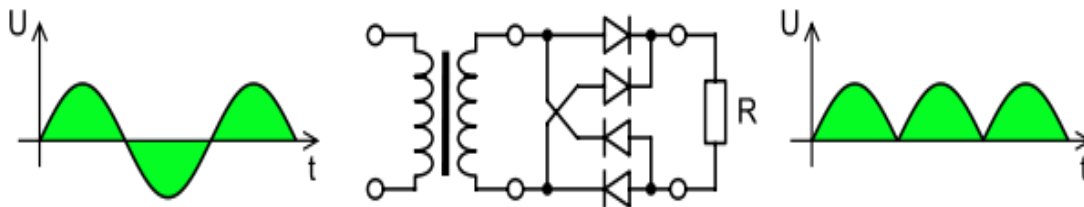


Figure 2: Full-wave rectifier using 4 diodes

For single-phase AC, if the transformer is center-tapped, then two diodes back-to-back (cathode-to-cathode or anode-to-anode, depending upon output polarity required) can form a full-wave rectifier. Twice as many turns are required on the transformer secondary to obtain the same output voltage than for a bridge rectifier, but the power rating is unchanged.

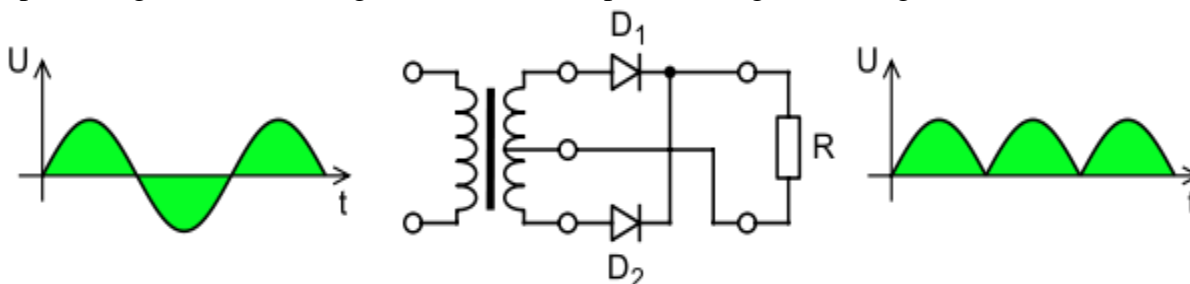


Figure 3: Full-wave rectifier using a center tap transformer and 2 diodes

4. Results and Discussion

Table 1: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 1 ampere

Sr. No.	Apply the Voltages in D.C.	R.P.M. measured by Tachometer
1	12	1200
2	9	1000
3	6	800
4	3	600

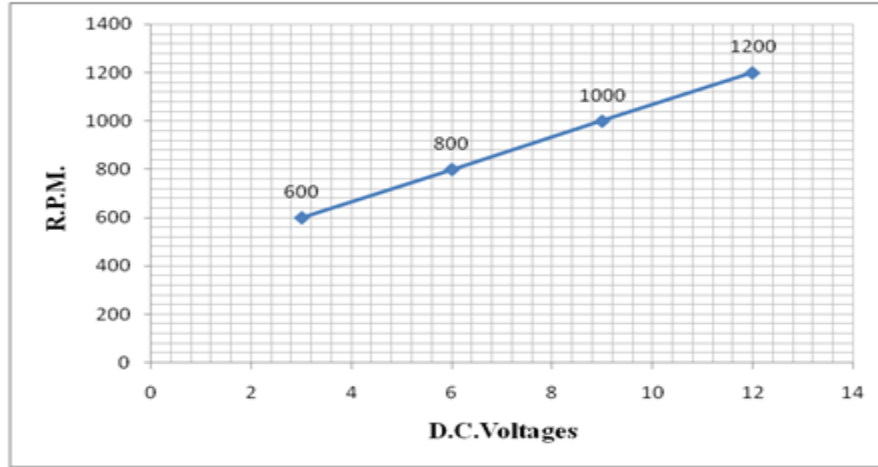


Figure 4: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 1 ampere

Table 2: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 2 ampere

Sr. No.	Apply the Voltages in D.C.	R.P.M. measured by Tachometer
1	12	1600
2	9	1400
3	6	1200
4	3	1000

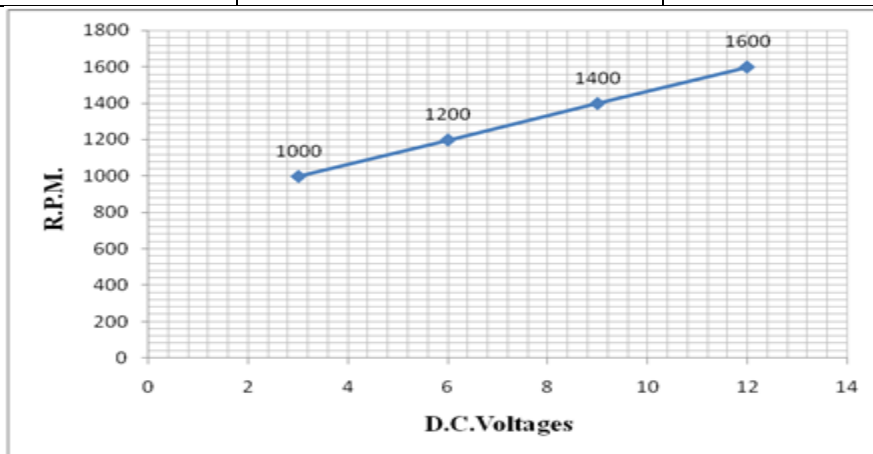


Figure 5: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 2 ampere

Table 3: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 3 amperes

Sr. No.	Apply the Voltages in D.C.	R.P.M. measured by Tachometer
1	12	1800
2	9	1600
3	6	1400
4	3	1200

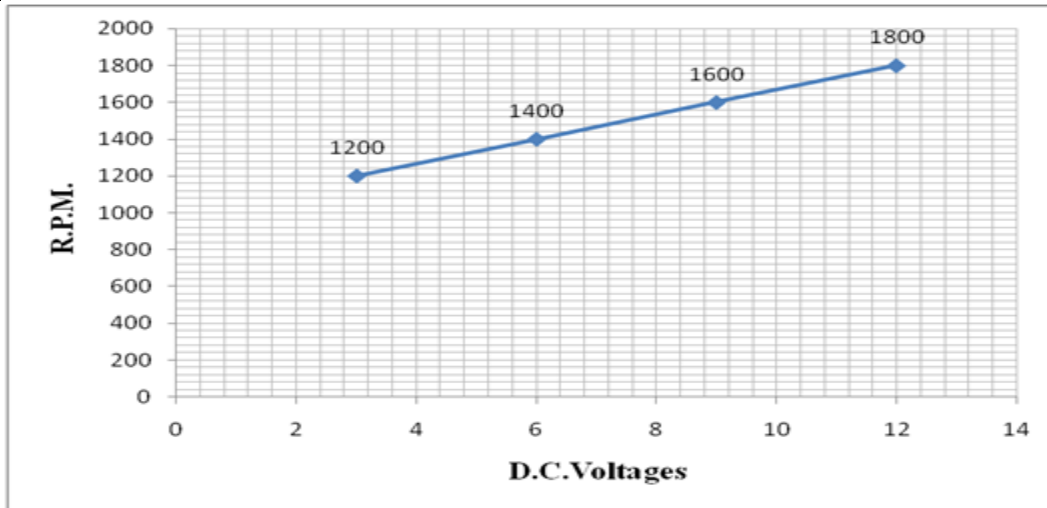


Figure 6: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 3 ampere

Table 4: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 5 ampere

Sr. No.	Apply the Voltages in D.C.	R.P.M. measured by Tachometer
1	12	2200
2	9	2000
3	6	1800
4	3	1600

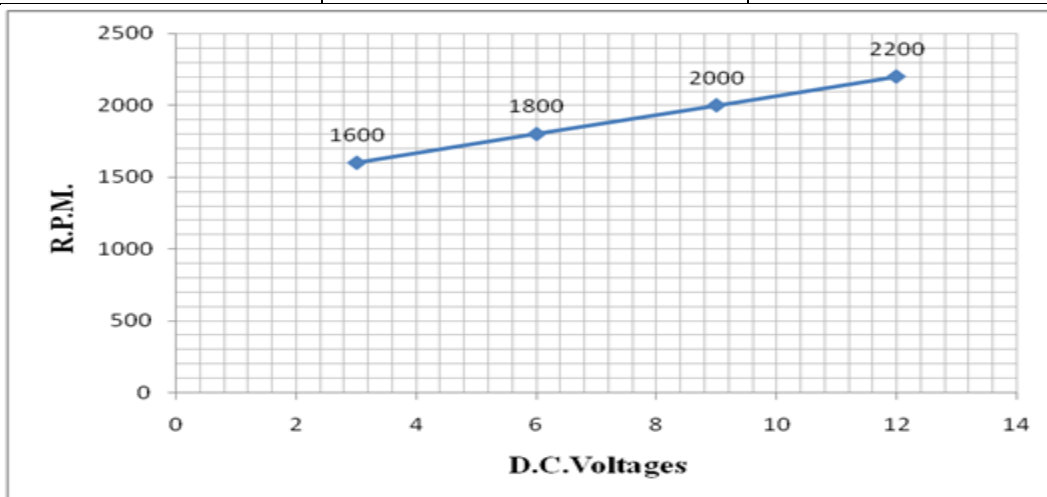


Figure 7: Voltage and R.P.M. using of Permanent magnet type D.C. Motor with 5 amperes

5. Conclusions

During these this study, we are finding out the various R.P.M. using of speed control. Which is varies the voltage. We are obtaining the Maximum 2200 R.P.M. By Permanent magnet type D.C. Motor by using of Apply the Voltages are 12 D.C. with 5 amperes.

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