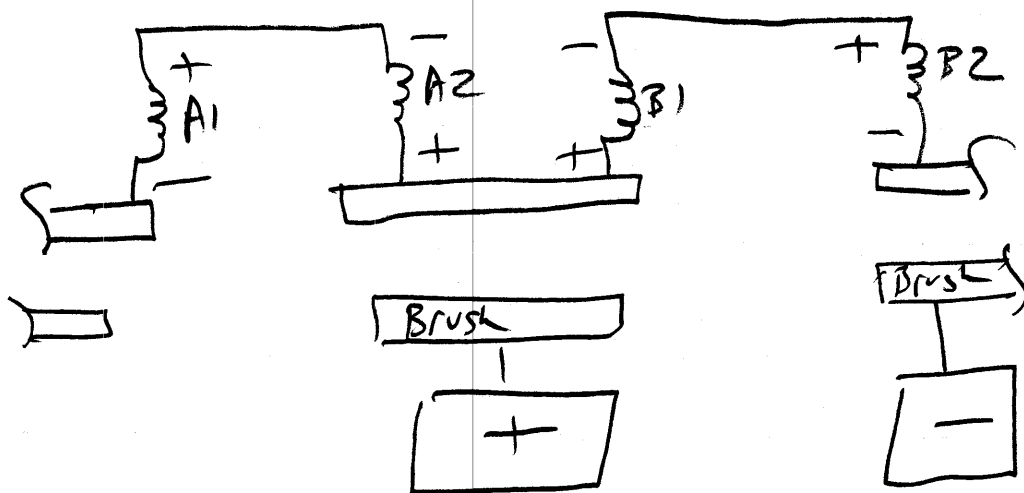
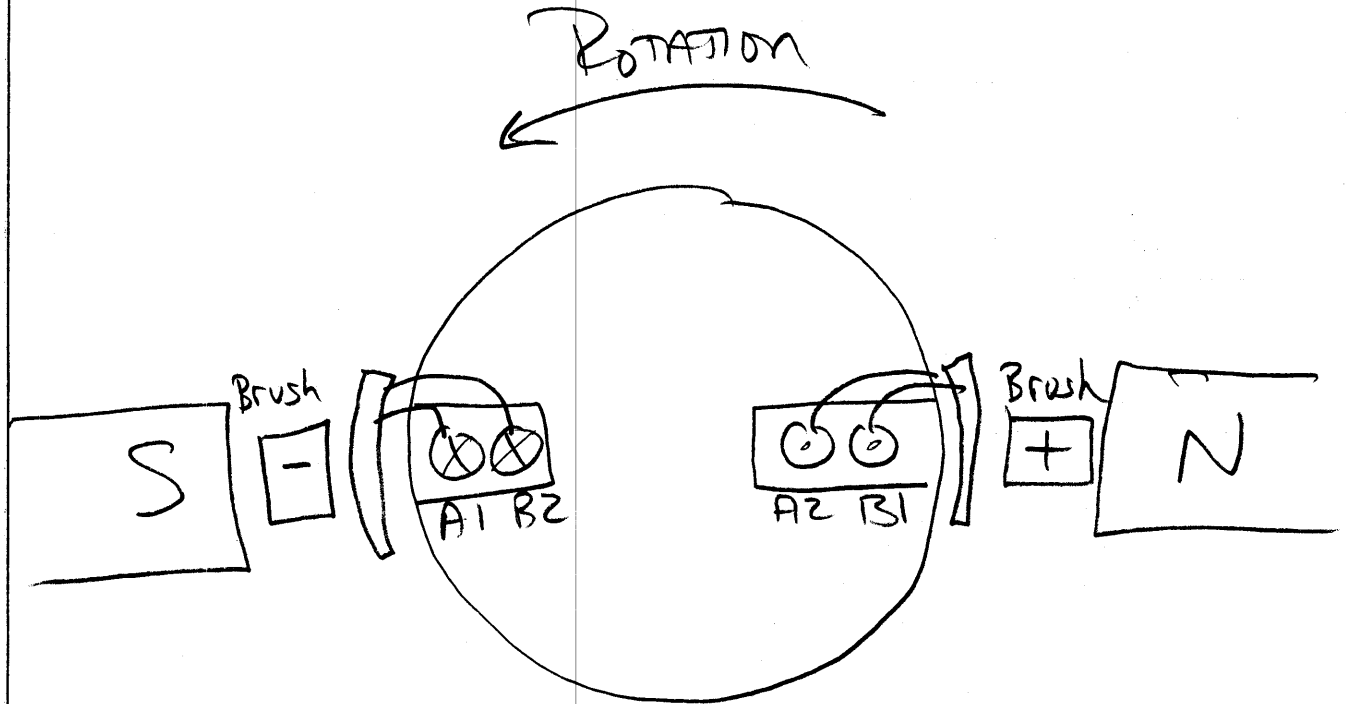


DC GENERATOR

2 Pole field - 2 Brush Sets - Pole Pitch (Coil Pnd) 180°
 2 Slots (One Coil Per Slot, one Conductor per coil)

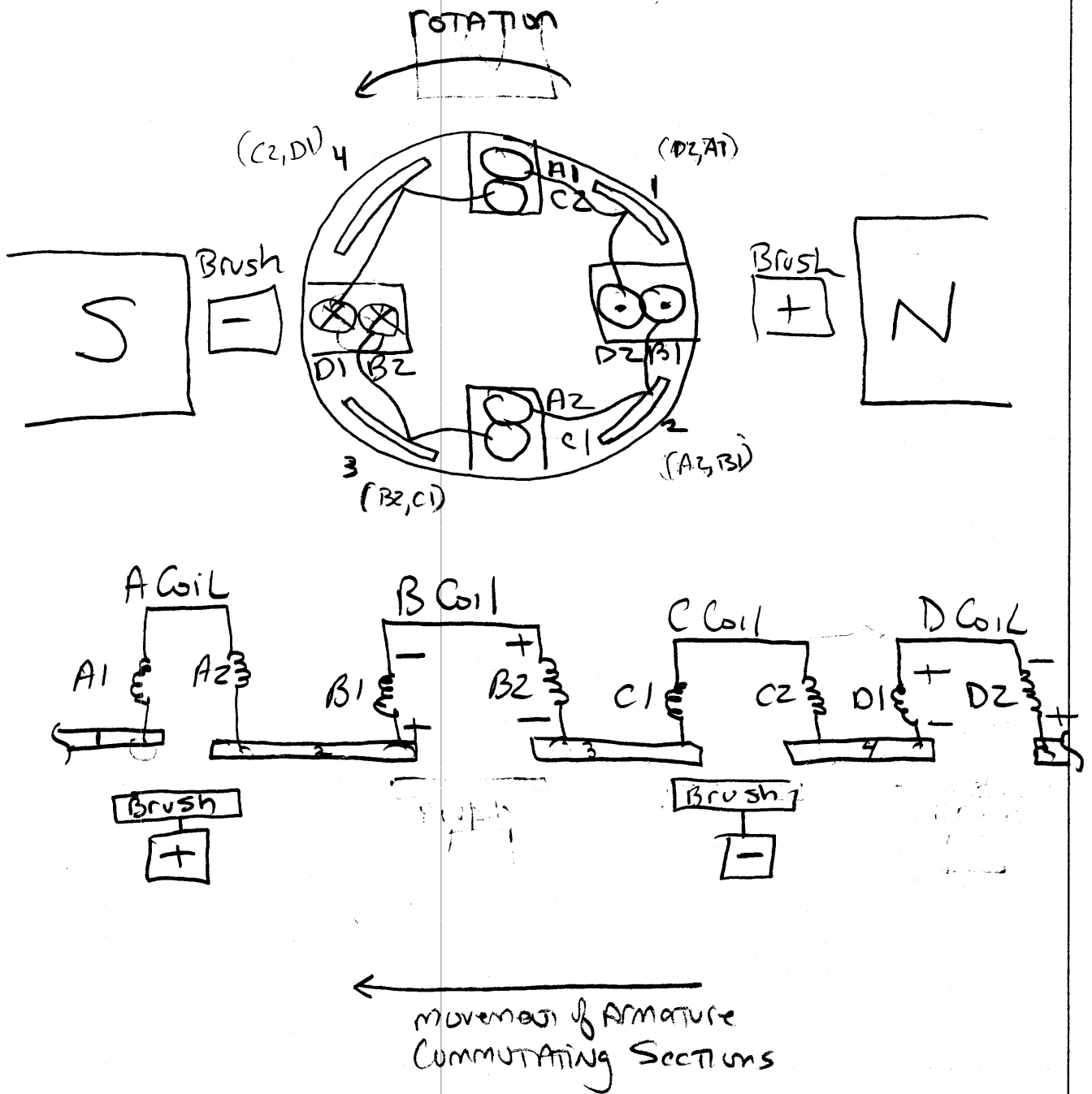


$$\# \frac{\text{Pulse}}{\text{Cycle}} = \frac{2 \text{ Slots}}{2 \text{ Poles}} \times 2 = 2 \text{ Pulse}$$

$$\text{Conduction degrees} = \frac{360^\circ}{2 \text{ Pulse}} = 180^\circ$$

DC GENERATOR

2 Pole field - 2 Brush sets - Pole Pitch (Coil Pitch) 180°
 4 slots (one coil per slot & one turn per coil)



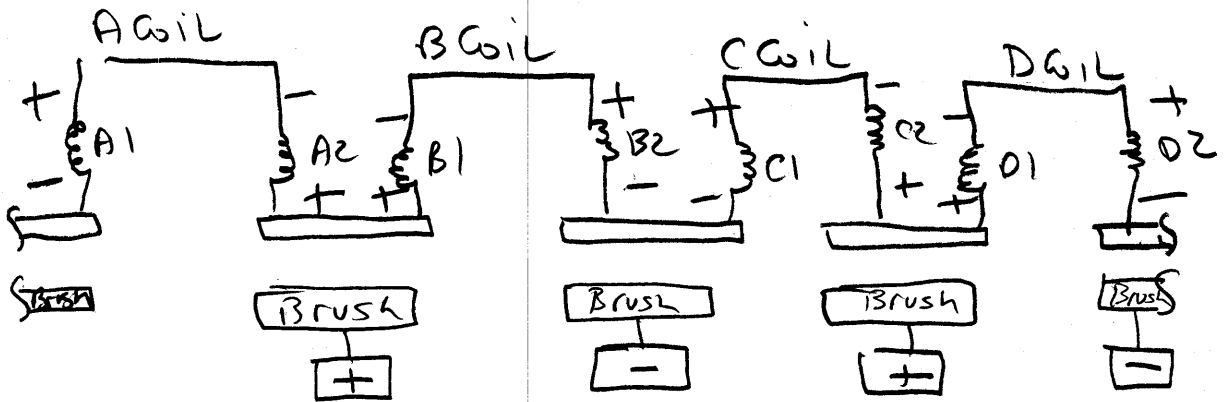
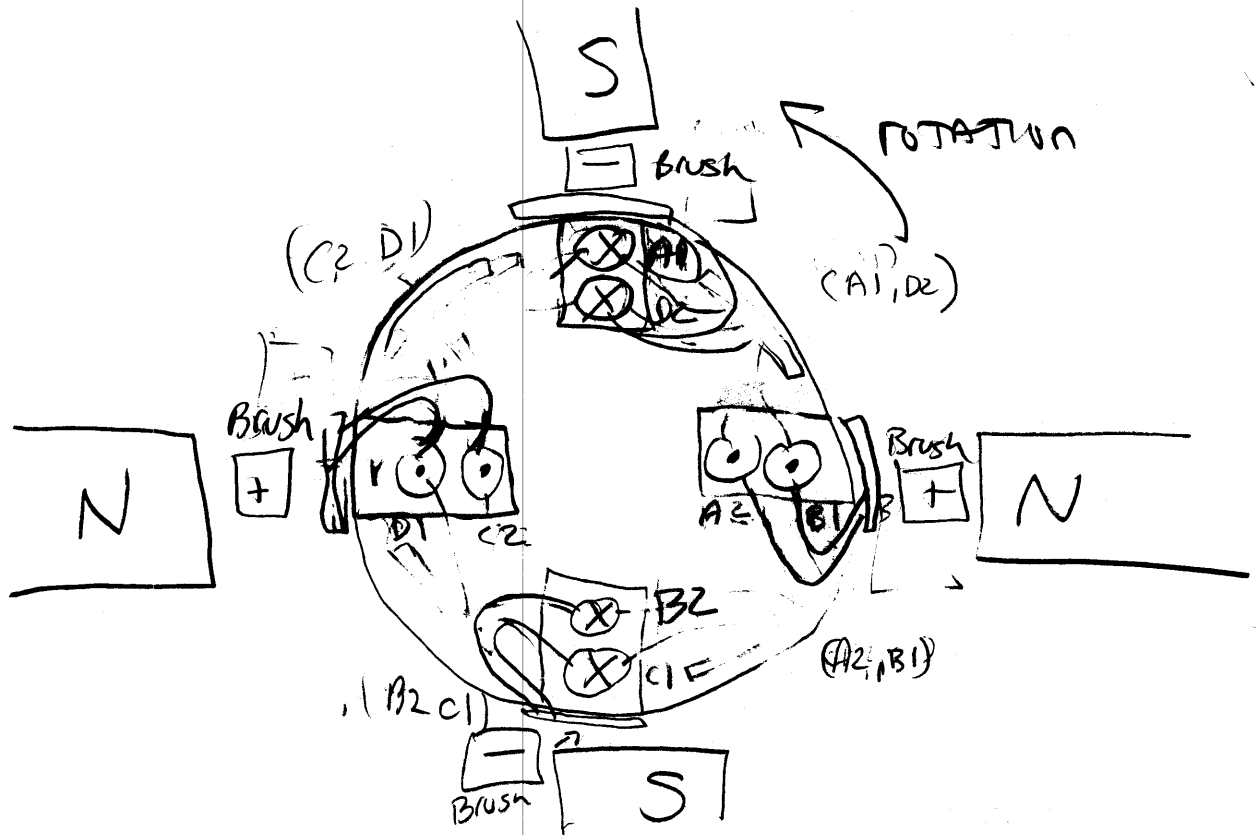
$$\# \frac{\text{Pulse}}{\text{cycle}} = \frac{4 \text{ Slots}}{2 \text{ Poles}} * 2 = 4 \text{ Pulse}$$

$$\text{Conduction degrees} = \frac{360}{4 \text{ Pulse}} = 90^\circ$$

DC GENERATOR

(3)

4 Pole - 4 Brush sets - Pole Pitch (coil Pitch) 90°
 4 Slots for coil per slot & one turn per coil

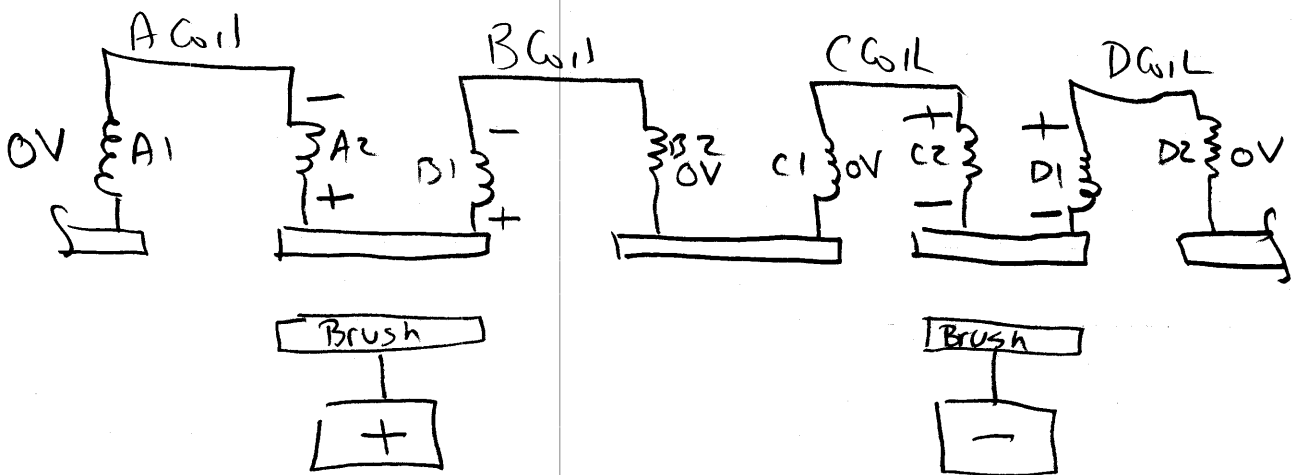
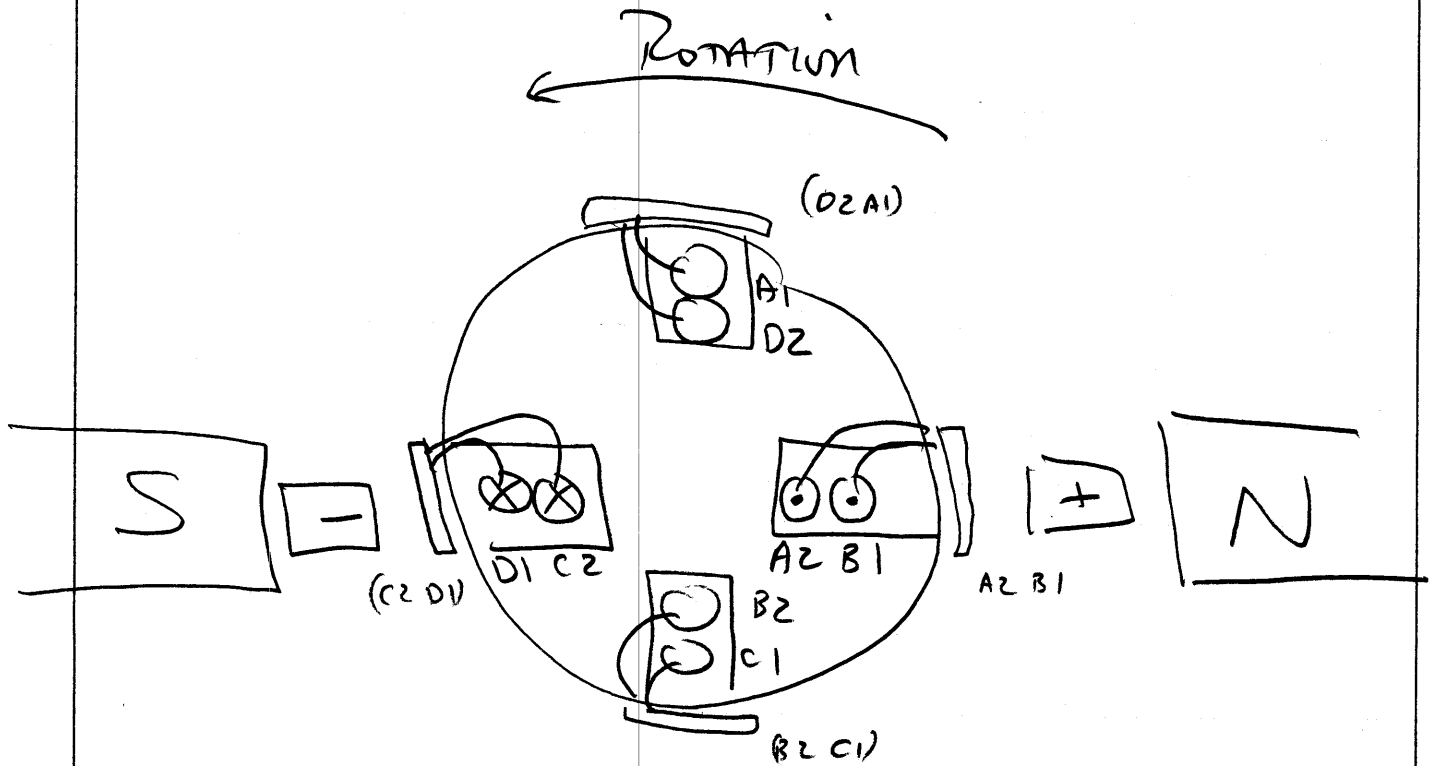


← COMMUTATING SECTIONS OF ARMATURE MOVEMENT

$$\# \frac{\text{Pulse}}{\text{Cycle}} = \frac{4 \text{ Slots}}{4 \text{ Poles}} \times 2 = 2 \text{ Pulse}$$

$$\text{Conduction degrees} = \frac{360}{2 \text{ pulse}} = 180^\circ$$

What if we use 2 Pole field w/ Armature w/ 90° Pole Pitch?



← movement of Armature
COMMUTATING SECTIONS

WORKS However → # 1 $E_0 <$ than if 4 Pole field used.
2 Arcing higher since COMMUTATING
Segments NOT exact at Neutral PT

Coil Pitch Always equal to (or slightly less than) Pole pitch.

Summary DC Generator/MTR

(5)

What effect on DC ripple does increasing the number of slots/pole achieve?

$$\# \text{ Pole} = \# \text{ Brushes}$$

$$\# \text{ Slots} = \# \text{ Coils (for our class)} = \# \text{ Commutating Sections}$$

$$\# \text{ Conductors } (Z) = (\# \text{ Slots}) \left(\frac{\# \text{ Coils}}{\text{Slot}} \right) \left(\frac{\# \text{ Turns}}{\text{Coil}} \right) \left(\frac{Z \text{ Conductor}}{\text{Turn}} \right)$$

$$(GEN) \quad E_o = \frac{Z \Phi n}{60} \quad \text{or} \quad n = \frac{60 E_o}{Z \Phi} \quad (\text{MOTOR})$$

$$\text{IF Flux CONSTANT} \rightarrow \frac{E_{o1}}{n_1} = \frac{E_{o2}}{n_2}$$

DC MOTOR

$$I_{\text{START}} = \frac{E_s}{R} \quad I_{\text{RUN}} = \frac{E_s - E_o}{R}$$

$$P_m = E_o I = \frac{T n}{9.55}$$

$$T = \frac{Z \Phi I}{6.28}$$

$$P_e = E_s I = P_m + P_{\text{LOSS}}$$

Reverse motor direction \rightarrow #1 Reverse Armature I_a
#2 Reverse field I_f

Reverse Generator Polarity \rightarrow #1 Reverse field I_f

#2 Reverse direction of rotation

$$T_o = \frac{J n^2}{131.5 P_i}$$

{ for DYN Brake - $T_o = \text{Time for } 1/2 \text{ speed}$
{ for Plugging $2T_o = \text{Time to stop}$.