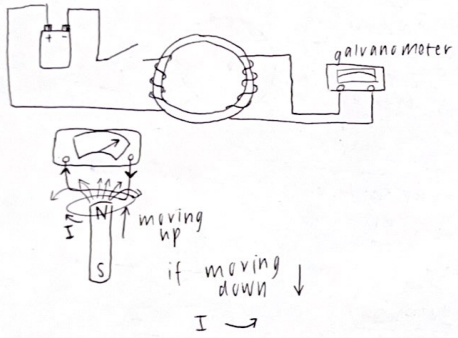
ELECTROMAG. INDUCTION

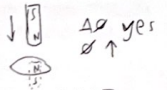
using mag. fields → produce voltage (EMF)
→ current (in complete circuit) (Faraday's law)



LENZ'S LAW

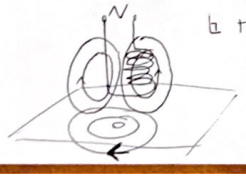
current is produced by induced EMF

& mover in direction to have B that opposes the original ΔØ



$-\Delta\Phi = +\mathcal{E}MF$

EDDY CURRENTS



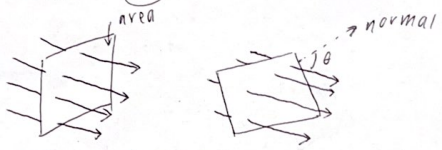
back EMF

EMF opposes change by motor's self-generated EMF (back EMF)

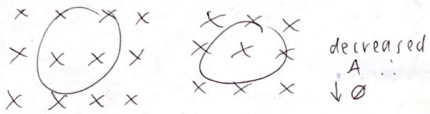
↓reduces I

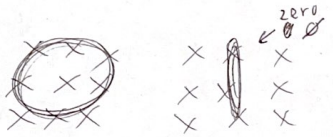
Ø FLUX

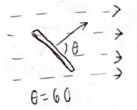
$\Phi = BA_{\perp}$ = (Wb) unit



ΔØ caused by ΔB, ΔA, ΔθΔ





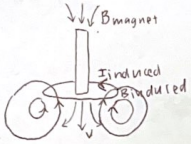


$\Phi = BA\cos(60)$
$= 3(0.004)(0.5)$

FARADAY'S LAW OF INDUCTION

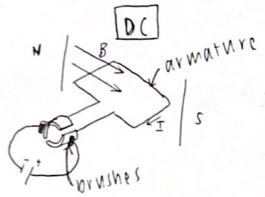
$$\mathcal{E} = -N\frac{\Delta\Phi}{\Delta t}$$

$$= -N\frac{\Delta(BA\cos\theta)}{\Delta t}$$

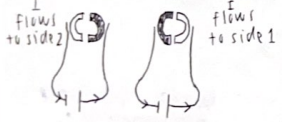


motor effect

electrical motor - electrical → mechanical (rotational kinetic)

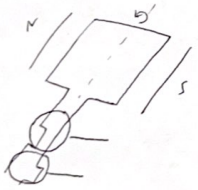


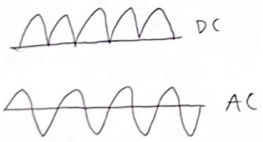
brushes on split ring



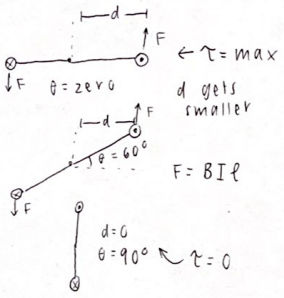
reverses the magnetic dipole

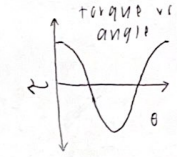
angular momentum

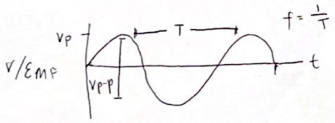




how motor effect works



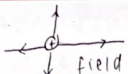




Split ring → DC
slip rings → AC

RDC
SAC

N (+) → S (-)

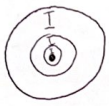


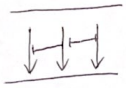
⊙ out of page

⊗ into page

RHR

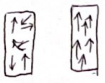
thumb = current
fingers (curled) = magnetic field





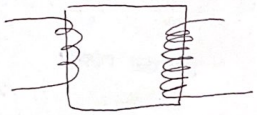
thumb = v
fingers = B
palm = F

DOMAINS



$$\varepsilon_{rms} = \frac{1}{\sqrt{2}}\varepsilon_{max}$$

TRANSFORMERS

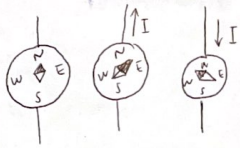


$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

P = P

VI = VI

$$\frac{I_s}{I_p} = \frac{N_p}{N_s}$$



coils w/ more than one loop

$F = NIB_{\perp}\ell$

$P = I^2R$