

线圈在转动时可以通过滑环和电刷保持与外电路的连接。

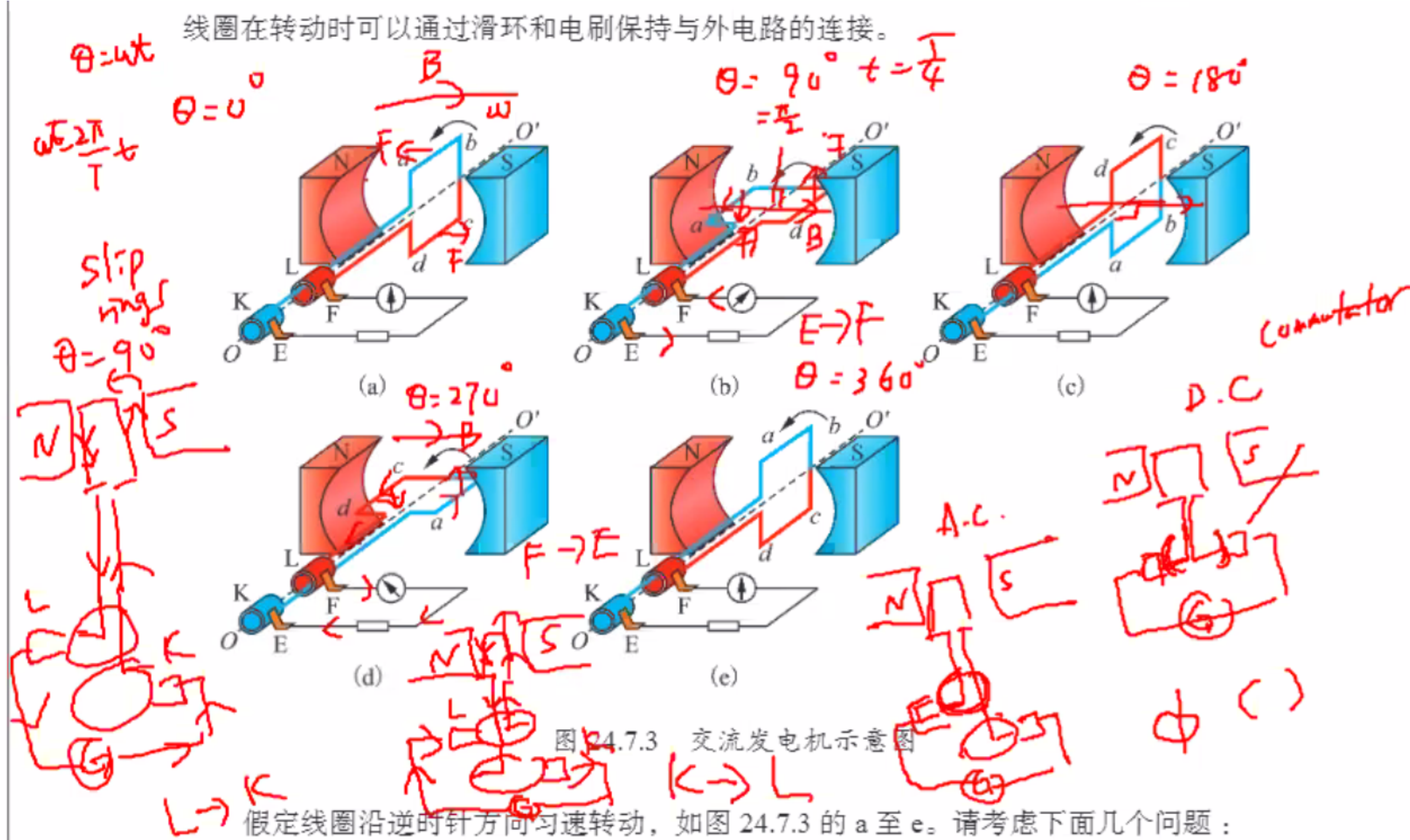


图 24.7.3 交流发电机示意图

假定线圈沿逆时针方向匀速转动，如图 24.7.3 的 a 至 e。请考虑下面几个问题：

Faraday's Law
Current is induced when a conductor meets a changing magnetic flux
$I_i = \frac{\mathcal{E}_i}{R}$

Lenz's Law
Direction of induced emf is opposed to the change causing it
Direction of induced current opposes the change producing it

Electromagnetic Induction

Electromagnetism

Magnetic Field

Electromagnet
Straight conductor
Narrow coil
Solenoid

Magnetic Field Strength	
A vector, S.I. unit: Tesla (T)	Narrow coil
$B = \frac{F_m}{Il}$	$B = \frac{\mu_0 NI}{2r}$
Straight Conductor	Solenoid
$B = \frac{\mu_0 I}{2\pi r}$	$B = \mu_0 nI$

Magnetic Forces
Ampere Force
$F_m = BIl \sin \theta$
Direction: $I \times B$
Lorentz Force
$F_m = q(\hat{v} \times \hat{B}) = Bqv \sin \theta$
$r = \frac{mv}{Bq}$
$T = \frac{2\pi m}{Bq}$ is independent of v
For helix: $R = \frac{mv \sin \theta}{Bq}$

Applications
Mass Spectrometer
Cyclotron

Magnetic flux
$\phi = \hat{B} \cdot \hat{A}$