Stepper motor

It has two parts [thin motor is rotate by stepwise]
1) Stator
2) Rotor   এর ঐ motor গুলার speed কম থাকে
   ↳ Here, permanent   কিন্তু torque অনেক বেশি থাকে,
    magnet is used.
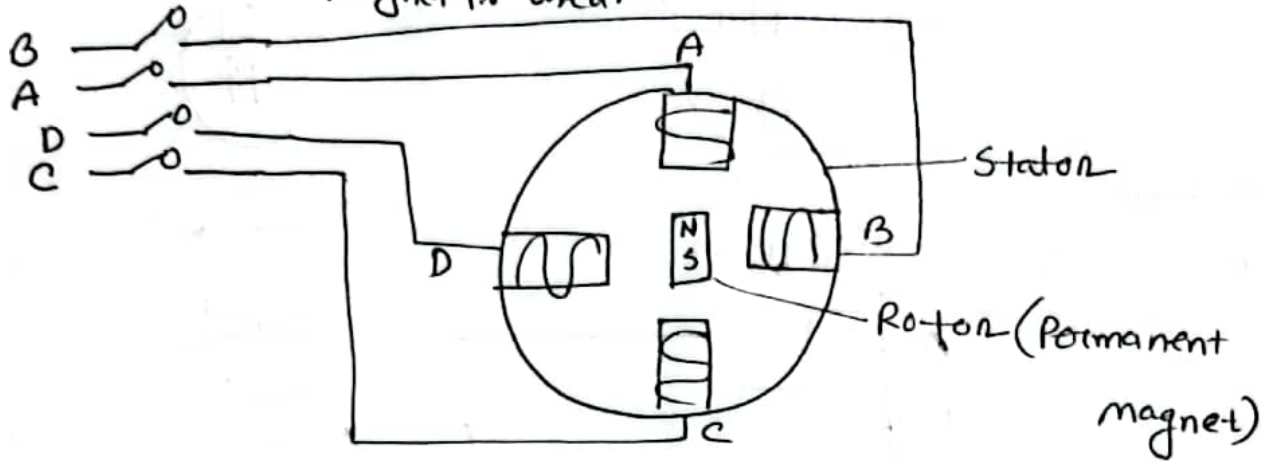
প্রধানে সব গুলো pole ক্রমানয়ে energited করা হয়,
এর কারনে সহজে step গুলা control করা যায়,
একটি stepper motor সাধারণত পুরো একটা
cycle complete করতে ২০০ steps পর্যন্ত ঘুরতে
পারে, এবং প্রতি step এ $\frac{360°}{২০০} = 1.8°$ step angle
হবে, stepper motor max^m ৯০° পর্যন্ত step
angle পর্যন্ত cover করতে পারে,
minimum step angle is 0.72°. max^m ৯০°.
তবে 1.8°, 3.5°, 7.5° 15° এই step angle
গুলা বেশি use হয়।

Definition→ A Stepper motor, also known as Step motor
or stepping motors, is an electrical motor that
rotates in a series of small angular steps instead
of continuously.

N.B: A stepper motors are Controlled by a driver, which sends
the pulses into the motor causing it to turn.

Stepper motor Driving modes / Techniques:-
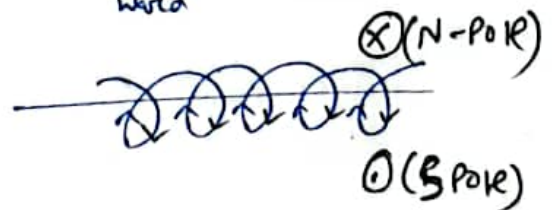
1) Wave mode / single coil excitation mode →

इन्दुलाजन्म
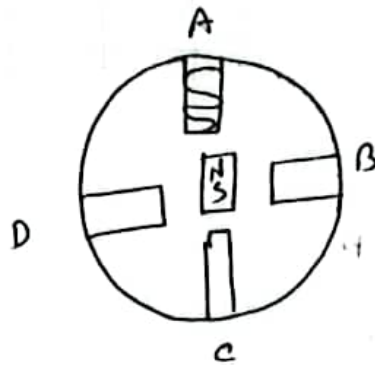
Upward ↑ North pole create.

downward ↓ South pole ".

⊗ (N-pole)

⊙ (S pole)

Here, only one Phase is energized
at a time.

EX→ If Coil ₳ A (pole) is energized, then North pole (N) and
South pole (S) is created here. As a result, the
motor (Permanent magnet) is aligned with the
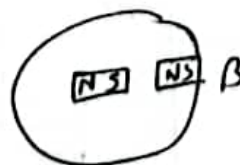magnetic field generated by the coil.

If is same for Coil (pole) B, C, D.

& there, the rotor spins 90° clockwise with the magnetic field generated by the coil (pole).
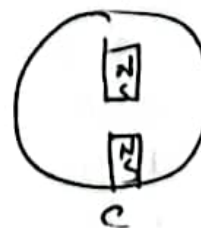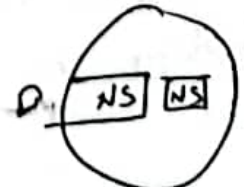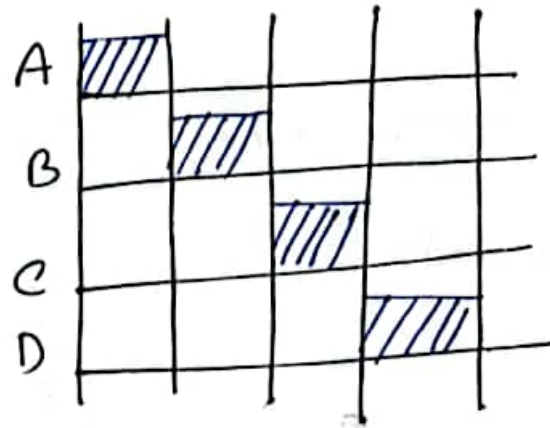
Condition-1	Condition-2	Condition-3	Condition-4

Truth table →

Logic Diagram

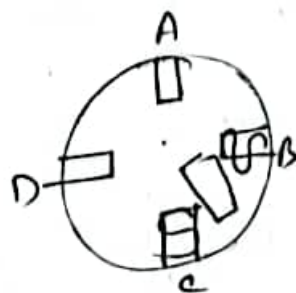| Condition	A	B	C	D
1	1	0	0	0
2	0	1	0	0
3	0	0	1	0
4	0	0	0	1

2) Full Step Mode → (Here, step angle is also 9θ) Here, two phases are always energited at the same time. The steps are similar to the wave mode ones. N.B → The motor is able to produce a higher torque since more current is flowing in the motor and a stronger magnetic field is generated.
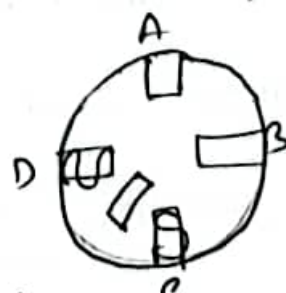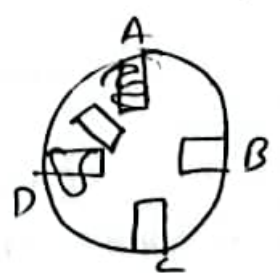

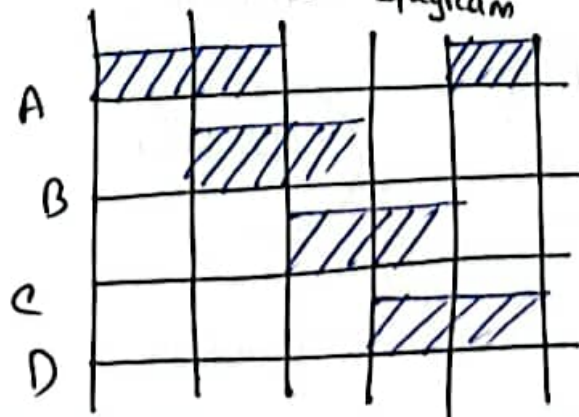Condition-1   Condition-2   Condition-3   Condition-4

logic diagram

Truth table

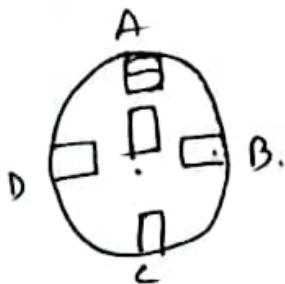| Condition	A	B	C	D
1	1	1	0	0
2	0	1	1	0
3	0	0	1	0
4	1	0	0	1

9) Half Step mode :-
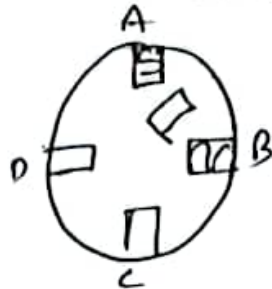
It is the Combination of wave and full step modes.
The step size is to be reduced by half (in this
case 45° instead of 90).

It is higher (torque) when both phases are energised
and weaker when only one phase in energised.
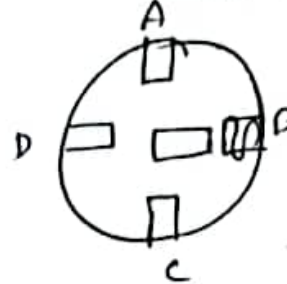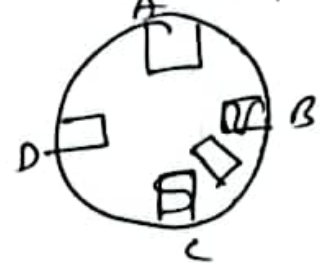The torque produce the motor is not Constant.
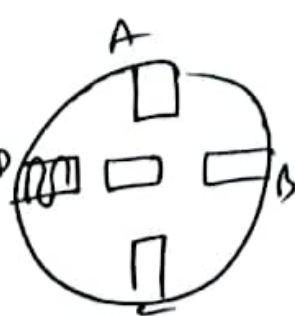
Condition-1
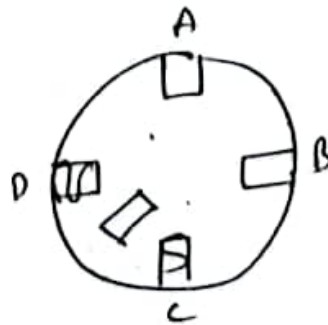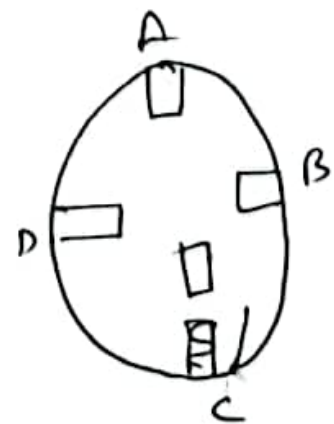

Condition-2

Condition-3

Condition-4
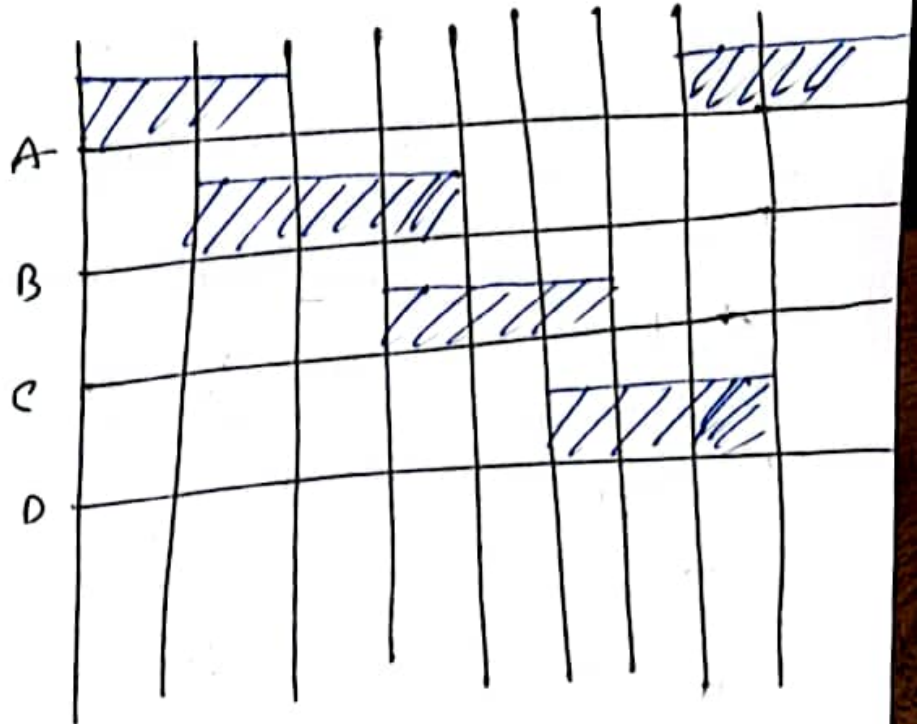

Condition-8

Condition-7

Condition-6

Condition-5

Truth table :-

Conditions	A	B	C	D
1	1	0	0	0
2	1	1	0	0
3	0	1	0	0
4	0	1	1	0
5	0	0	1	0
6	0	0	1	1
7	0	0	0	1
8	1	0	0	1

logic diagram