Assignment - 1

1) Explain the journey of Automotive with the help of flow chart from the begening of 18th century to 21st century & give brief description on the following milestone in the Automotive

a) invention of Electric motor

b) Golden era of EV

c) Domination of Electric vehicle by Gasoline cars

d) Coming of New era in EV

e) introduction to HEV

Q-2- Explain and draw the layout of following HEV with their two Advantages, Disadvantages & industrial Application in automotive segment

a) Series HEV

b) parallel HEV

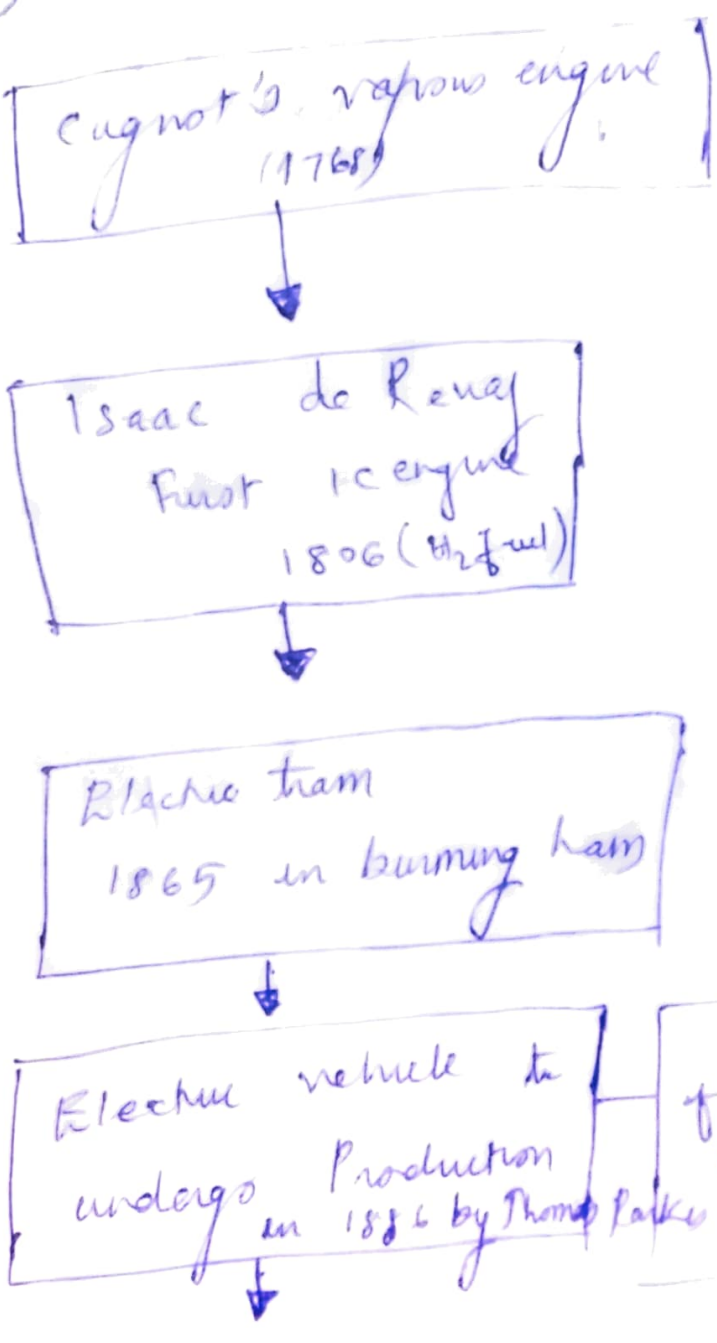
c) Series Parallel hybrid vehicle

d) Plug in hybrid electric vehicle

e) Fuel cell EV

Q-3) Explain with Diagram the Construction & working Principle of BLDC?

1-A) Very first steam vehicle by Nicolaus Cugnot namely Cugnot's vapour engine vehicle (1768)



1890 Morrison carriage
william morrison (USA)

a) In 1826 Anyos Jedlik (Austria) has
* invented Indigenous Electric motor got the patent.

* Have the patent in several prototype in 1906

Golden era of EV
Range 100 mile top speed
45-50 kmph

a) In 1826 Anyos Zedlik (Austria) has invented Indigenous Electric motor & got the patent Several prototypes

b) EV gained popularity by
* No emmm
* Efficient
* Low cost
* easy start

c) * Henry ford started Assembly line production
* In 1912 chevrolet & introduced Self start mechanism en IC engine
* world war time became of Range and charging time are en trouble
* oil Lobby has the power on the economy en the Gasoline vehicles are more popular

d) EV Sales have risen rapidly in 2010 higher rate of Battery electric vehicle & plug in hybrid electric vehicle

78% pollution has comes with in Automo

CARB – California Air resources board in formed in 1970, they have emission regulation

they were able to reduce of the pollution 1970 – in 2000 is 80%

e) Introduction to HEV

Hybrid Electric vehicle are the type of Electric vehicle it is have sub division of

Degree of hybridyation

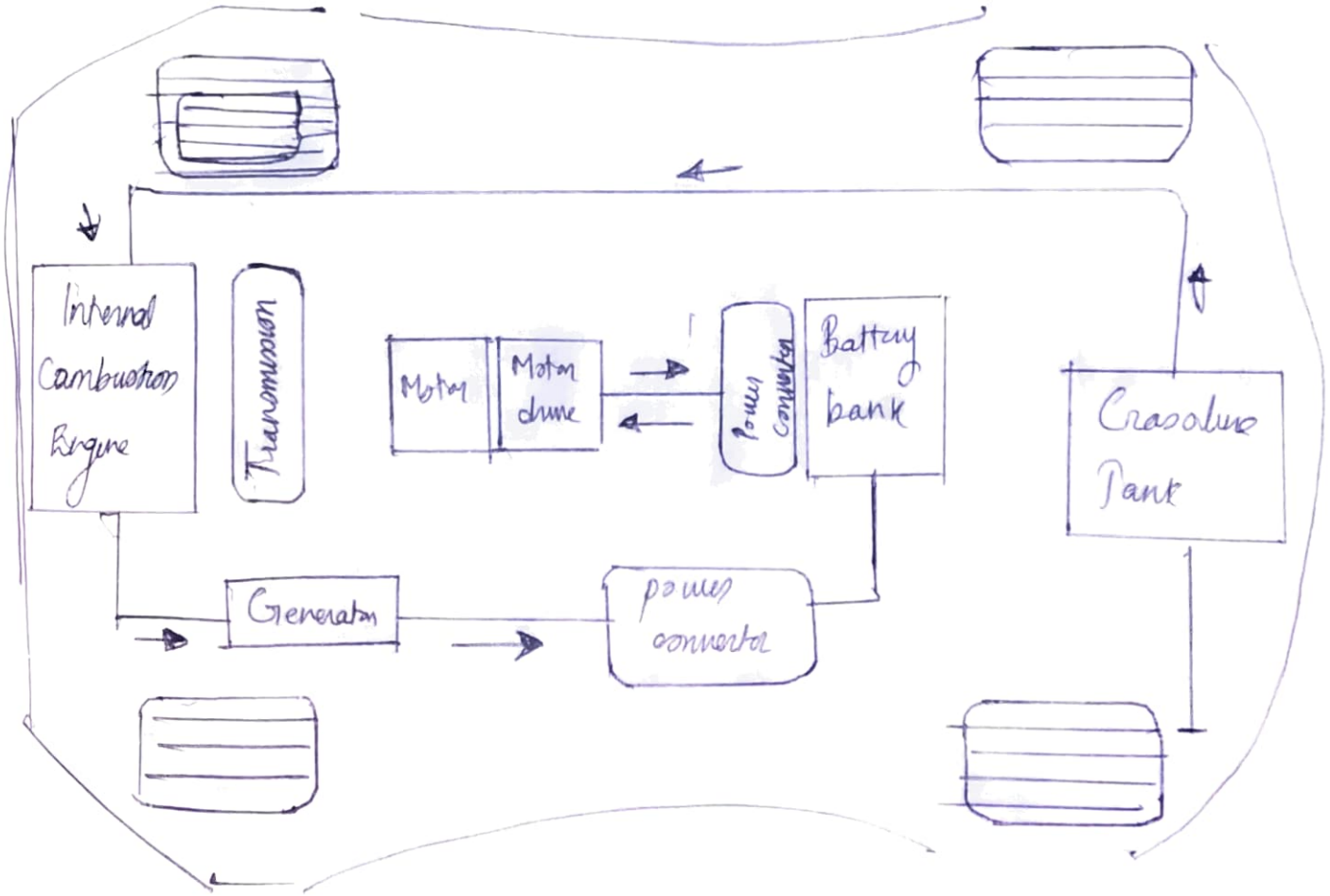
- Micro
- Mild
- full

Hybrid Architecture

- Series
- Parallel
- Series/parallel

* It is uses internal combustion engine & battery powered motor to enhance vehicle efficiency

2-A) Series HEV

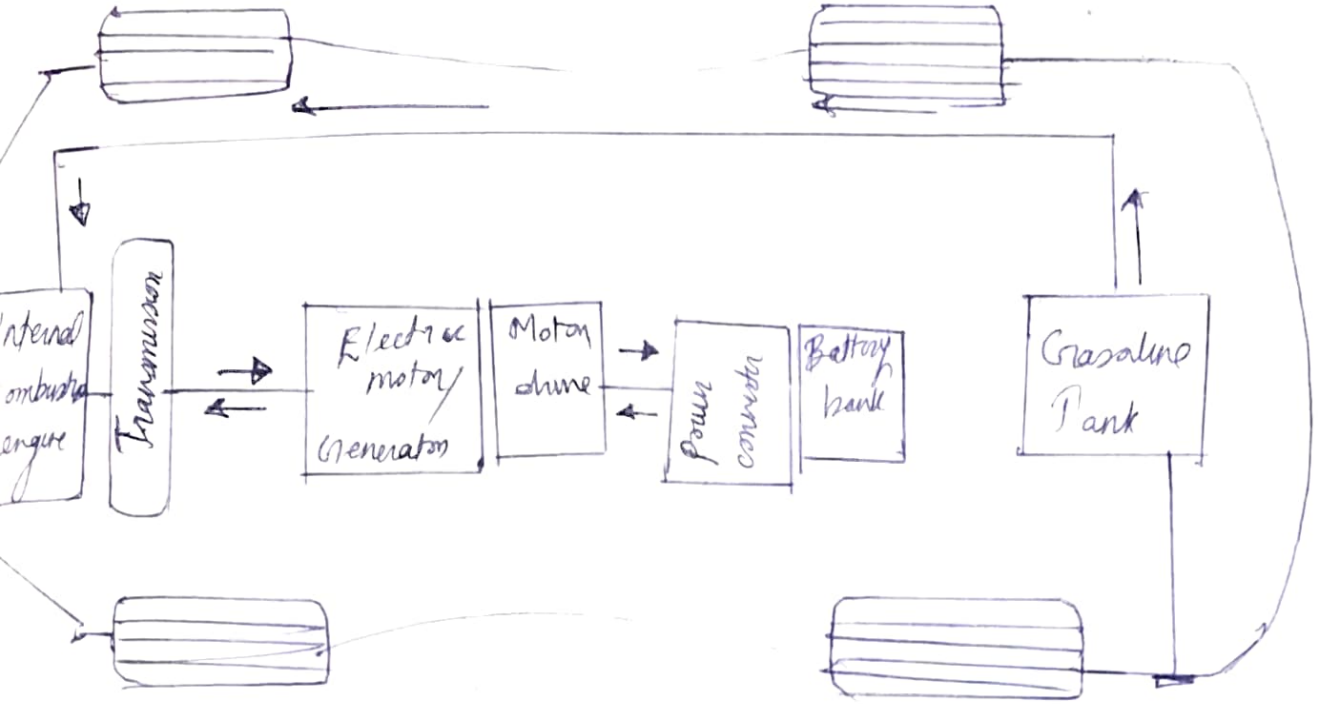


* Motor is primary source & IC engine is secondary source of power
* Electric vehicle fitted with IC engine to recharge battery pack.
* eg: BMW i3
* 2L 3 cylinder engine
* ~~Red~~ Advantages:
* It really reduces the emission
* motor is the primary source

Pros advantages

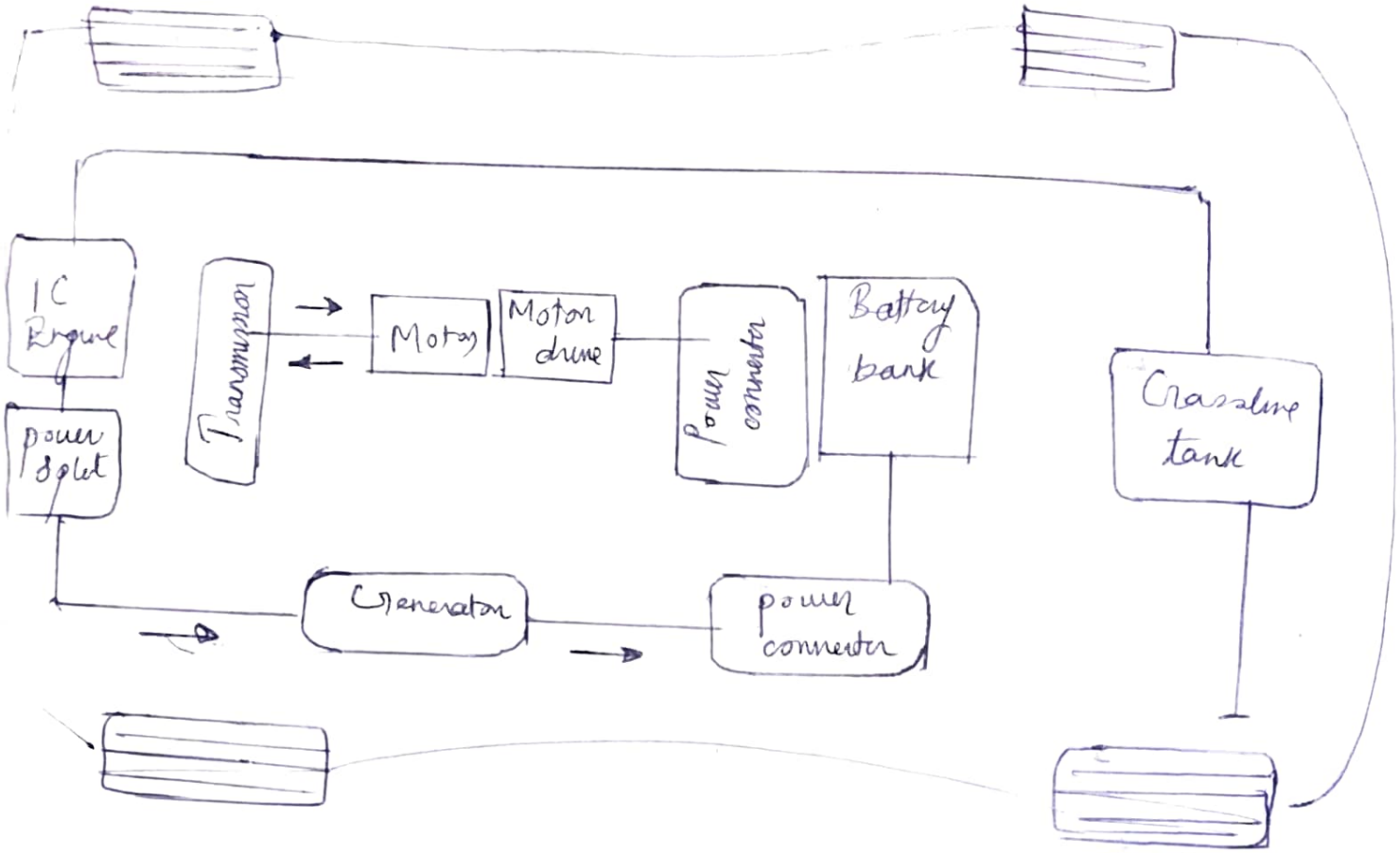
* Rare model
* high cost

b) Parallel HEV



* IC engine vehicle fitted with a powerful electric motor to assist the engine
* Batter pack is smaller in size
* eg: BMW i8
* IC engine is primary machine

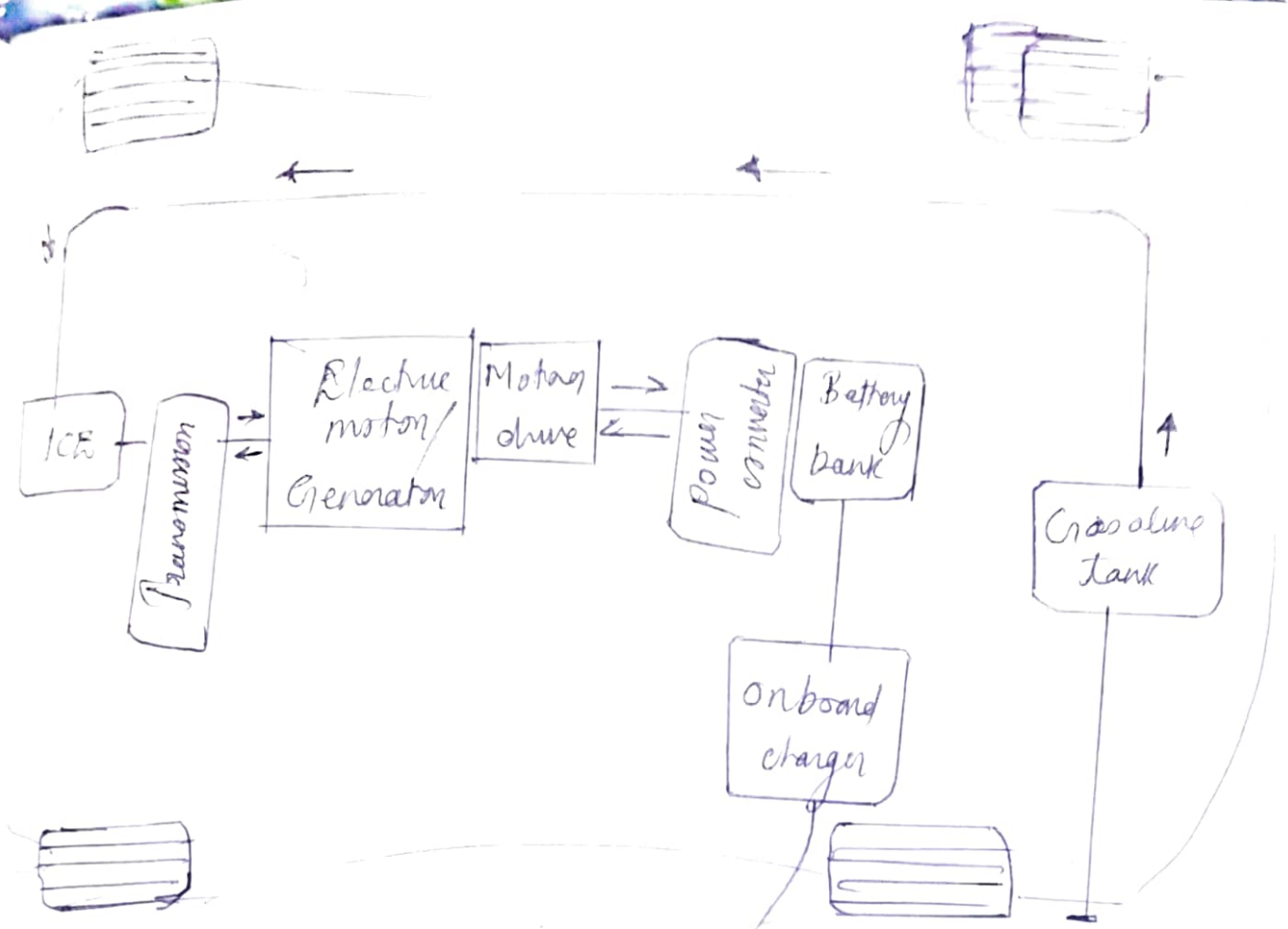
Series-Parallel HEV



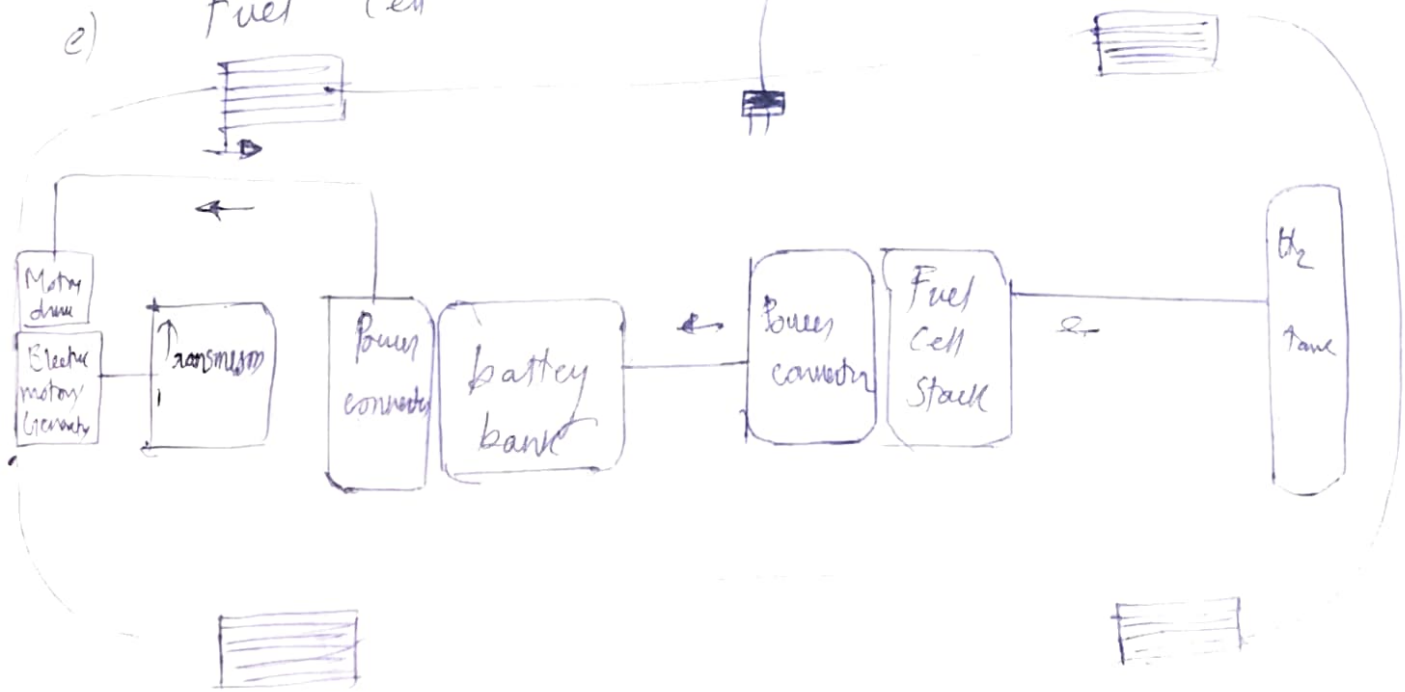
eg: Toyota prius - 1995

d) plug in hybrid - EV

* Battery Powered by AC supply



e) Fuel cell EV



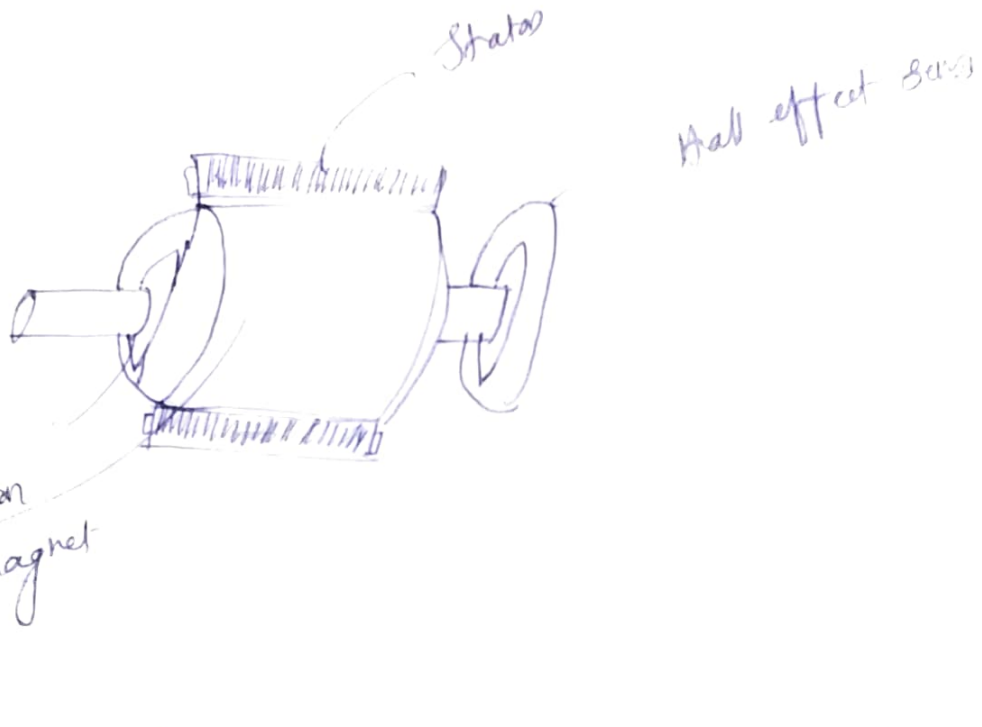
* Fuel cell genereates electricity instead of the battery pack & then battery pack

power the motor

eg :- i10 Hyundai

3A) BLDC Motor

* It has max efficiency of 99%
* And Minimum efficiency of 35%



* In this motor, the permant magnet attach to the rotor. The current carrying conductors or armature windings are located on the Stator. They use electrical commutation to convert electrical energy into mechanical energy.