Task-2 (Report)

Date : _____

Basic electronics of a drone

1) Flight controller:
- acts as the CPU of the drone
- Has components like microcontroller, IMU and sometimes a magnetometer and barometer
- Keeps drone stable by running control algorithms

2) Electronic speed controllers:
- Converts DC battery voltage to 3 phase AC ~~voltage~~ signals for brushless DC motors
- Controlled by PWM, oneshot or Dshot signals from FC
- Ensures precise control of motor RPM for stable flight

3) Brushless DC Motors:
- Provide thrust by rotating propellers
- Preffered over brushed motors due to higher efficiency, torque to weight ratio and durability
- Typically rated in KV (RPM per volt)

4) Propellers:
- Generate lift and thrust by rotating
- Propeller size, pitch and material affect flight efficiency, thrust and maneuverability

Date : _____

5) Battery (usually Li-Po) :
- High energy density Lithium-Polymer batteries to supply power.
- Ratings are in S (eg 3S, 4S, 6S), voltage ≈ 3.7V per cell, capacity (mAh), and discharge rate (C-Rating)
- Provides both high current for motors and stable voltage for electronics

6) Power Distribution board (PDB) / Power management System :
- Distributes power from batteries to ESCs, flight controller and auxillary systems
- Usually integrated into FC stack

7) Radio transmitter and reciever :
- The transmitter (Tx) sends pilot inputs to the reciever (Rx) on the drone. Reciever then decodes the signal and sends it to the FC.
- Communication protocols include PWM, PPM, SBUS or crossfire (for long range)

8) GPS and Nairgation modules :
- Provide position, velocity and timing data.
- Used for autonomous missions, waypoint navigation and "Return to home" functions.