

(1.) Payload Mass $\rightarrow 5 \text{ Kg}$

4 Rotors $\rightarrow 30 \text{ cm Dia}$
(2 kg)

$$T \Rightarrow \frac{(2+5)}{4} \Rightarrow (1.75 \times 10) \\ \Rightarrow 17.5 \text{ N}$$

$$P = \sqrt{\frac{T^3}{28A}} ; A = \frac{\pi (0.3)^2}{4} \\ \Rightarrow 0.0706$$

$$\Rightarrow (194.822 \text{ W}) \times 4 \text{ rotors} \\ \Rightarrow \underline{779.29 \text{ W}}$$

Same Capacity Batter.

$$t_f \propto \frac{C}{\text{Power}}$$

$$\therefore \frac{t_{f4}}{t_{f1}} \Rightarrow \frac{\text{Power}_1}{\text{Power}_4}$$

$$\Rightarrow \underline{1.0858}$$

6 Rotors $\rightarrow 25 \text{ cm Dia}$
(2.5 kg)

$$\frac{1 \text{ kg}}{2.5^2}$$

$$\left(\frac{1 \text{ kg}}{2.5^2} \right) \times \left(\frac{2.5}{1} \right)^2 \\ = 1 \text{ kg}$$

$$T \Rightarrow \frac{(2.5+5)}{6} \Rightarrow (1.25 \times 10) \\ \Rightarrow \underline{12.5 \text{ N}}$$

$$P \Rightarrow \sqrt{\frac{T^3}{28A}} ; A = \frac{\pi (0.25)^2}{4}$$

$$P \Rightarrow (141.0293 \text{ W}) \times 6 \Rightarrow \underline{0.0491}$$

$$\Rightarrow \underline{846.17 \text{ W}}$$

$$*(3) \quad b = 10 \text{ m}$$

$$S = 20 \text{ m}^2$$

$$\% \text{ red}^n \text{ in } D_i \quad | \quad g = 3 \text{ m}$$

$$g/b \Rightarrow \underline{0.3} \quad \Rightarrow \quad \sigma \Rightarrow 0.38$$

$$\text{Biplane} \rightarrow C_{Di} \Rightarrow (1.38) \left(\frac{C_L^2}{\pi A_{\text{Biplane}}} \right) \Rightarrow \left(\frac{1.38}{2} \right) \frac{C_L^2}{\pi A_{\text{mono}}}$$

$$\text{Mono plane} \rightarrow C_{Di} \Rightarrow \left(\frac{C_L^2}{\pi A_{\text{mono}}} \right)$$

$$\therefore \% \text{ Red}^n \approx$$

$$\frac{(C_{Di})_{\text{mono}} - (C_{Di})_{Bi}}{(C_{Di})_{\text{mono}}} \times 100$$

$$\Rightarrow \frac{(1 - 0.69)}{1} \times 100$$

$$\Rightarrow \underline{\underline{31\% \text{ red}^n}}$$

(4.) (a) ~~Relaxed Longitudinal Stability is a~~ major and Drag reduction are main reasons for choosing longitudinal

(b) (i) ~~Relaxed Longitudinal Stability & Control~~ Relaxed Longitudinal Stability & Control

(b) Drag Redⁿ, stall proofness & High Maneuverability

(c) High Maneuverability & Drag Reduction

(d) More Weight Capacity, & Reliability

(e) Better Maneuverability & far more stability.