B.E.(Aeronautical Engineering) Semester Third (C.B.S.)
# Elements of Aeronautics
Paper - V

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Notes :   1.   All questions carry marks as indicated.
         2.   Solve Question 1 OR Questions No. 2.
         3.   Solve Question 3 OR Questions No. 4.
         4.   Solve Question 5 OR Questions No. 6.
         5.   Solve Question 7 OR Questions No. 8.
         6.   Solve Question 9 OR Questions No. 10.
         7.   Solve Question 11 OR Questions No. 12.
         8.   Due credit will be given to neatness and adequate dimensions.
         9.   Assume suitable data wherever necessary.
         10. Illustrate your answers wherever necessary with the help of neat sketches.
         11. Use of non programmable calculator is permitted.

1. a) Write about very early developments   **7**
            i)   Samuel Pierpont Langley
            ii) Daedalus and Icarus

       b) Write about wright brothers [Wilbur Wright & Orville Wright].   **7**

OR

2. a) Write about aeronautical triangle.   **7**
            [Langley, The Wrights and Glenn Curtiss]

       b) Define following terms :   **7**
            i)   Biplane
            ii)   Monoplane
            iii) Biplane Interference
            iv)   Ornithopter
            v)   Triplane
            vi)   Whirling arm apparatus
            vii) Glider

3. a) Illustrate the developments in Aerodynamics over the years.   **7**

       b) Illustrate the developments in propulsion over the years.   **7**

OR

4. a) Illustrate the developments in structure over the years.   **7**

       b) Illustrate the developments in materials over the years.   **7**

5. a) Write down component of an airplane and their functions.   **8**

       b) Give classification of different types of flight vehicles.   **5**

OR

6.	a)	Calculate the standard atmosphere values of 'T', 'P' and 'e' at a Geopotential Altitude of 11 km.	7
	b)	What is Drag? Explain different types of Drags.	6
7.	a)	Derive hydrostatic equation.	8
	b)	Derive an expression for Geopotential and Geometric altitude.	5

OR

8.	a)	What is NACA airfoil series. Write down its significance?	7

      i) 4 Digit Series [NACA 2412]
      ii) 5 Digit Series [NACA 23012]
      iii) 6 Series [NACA 65 - 218]

	b)	Define following terms.	6

      i) Centre of pressure
      ii) Mach number
      iii) Reynolds number
      iv) Lift
      v) Drag
      vi) Side force

9.	a)	Write short notes on :	4

      i) Monocoque construction

      ii) Semi Monocoque construction

	b)	Write short notes on following terms.	9

      i) High wing
      ii) Mid wing
      iii) Low wing

OR

10.	a)	Give Physical properties of metals and non - metals.	8
	b)	Define following terms	5

      i) Brittle   ii) Ductile
      iii) Malleable   iv) Luster
      v) Corrosion

11.	a)	Give the difference between turbojet Engine and ramjet Engine.	5
	b)	Derive the Thrust Equation for rocket Engine.	8

OR

12.	a)	Derive Equation for burnout velocity of Rocket Equation.	7
	b)	Consider a turbojet powered airplane flying at a standard altitude of 9144 m at a velocity of 804.67 kmph. The turbojet Engine itself has inlet and exit areas of 0.65 and $0.42\,m^2$ respectively. The Velocity and Pressure of the Exhaust gas at the exist are $487.68\,m/s$ and 0.3064 bar, respectively. Calculate the thrust of the Turbojet.	6

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