

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

**CLASS: BTECH / BARCH  
BRANCH: ALL / ARCH**

**SEMESTER: V  
SESSION: MO/2022**

**SUBJECT: SR510 FUNDAMENTALS OF AEROSPACE ENGINEERING**

**TIME: 2 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

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Q1 (a)	Define an aerodynamics? Explain with an example how aerodynamic studies are applied in practical application?	[2]	CO CO1, CO2	BL L3
Q1 (b)	Differentiate between an internal and external aerodynamics? Give an example of each of them.	[3]	CO1, CO2	L3
Q2 (a)	Define a streamline? What is its usefulness from the aerodynamic point of view?	[2]	CO1, CO2	L2
Q2 (b)	Derive an equation for shear stress that acts in a moving fluid.	[3]	CO1	L4
Q3 (a)	Derive an equation of total normal and axial force acting over a unit span of the wing.	[5]	CO1, CO2	L4
Q4 (a)	Explain how a flow similarity studies is linked with the wind tunnel?	[2]	CO1, CO2	L2
Q4 (b)	Derive stalling velocity of an airplane with respect to the lift coefficient for the steady level flight.	[3]	CO1	L3
Q5 (a)	How drag of an aircraft is linked with flight velocity and the angle of attack? Explain it with suitable sketches.	[5]	CO1, CO2	L4

**:::::: 30/09/2022 :::::M**