

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**  
**(MID SEMESTER EXAMINATION MO/2023)**

**CLASS: BTECH**  
**BRANCH: ALL**

**SEMESTER : V**  
**SESSION : MO/2023**

**SUBJECT: SR510 FUNDAMENTALS OF AEROSPACE ENGINEERING**  
**TIME: 02 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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Q.1(a)	List the different characteristics of flow with which the flow types could be derived for any fluid flow problem.	[2]	CO CO1	BL L2
Q.1(b)	Write down the differential form of the inviscid momentum equation and tag each part/portion of the equation with a suitable explanation of its existence in the equation and its formation.	[3]	CO1	L2
Q.2(a)	What is the difference between an air breathing and a non-air breathing propulsion system.	[2]	CO3, CO4	L2
Q.2(b)	Explain with the help of a suitable sketch, how an airframe and the propulsion system are linked to each other.	[3]	CO3, CO4	L3
Q.3(a)	What are the main drawbacks of the piston engine which makes it less preferred engine for the practical use?	[2]	CO3	L2
Q.3(b)	Write the thrust equation of an air breathing engine and explain the importance of each term.	[3]	CO3, CO4	L3
Q.4(a)	Show with suitable figure the variations of the temperature and pressure along the length of the turbojet engine.	[2]	CO3	L2
Q.4(b)	What do you mean by bypass ratio of a turbofan engine? Also explain why a turbofan engine used in the military applications have lower bypass ratio compared to that used in the civilian aircraft.	[3]	CO3	L3
Q.5(a)	Show with the suitable sketches the different types of inlet used in the ramjet engine. Also mention about the intake preferred for the practical use.	[2]	CO3	L2
Q.5(b)	What are the main challenges associated with the development of the scramjet engine? Explain in brief about the each point clearly.	[3]	CO3	L3

:::29/09/2023 M:::