

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

**CLASS:** B.Tech  
**BRANCH:** CHEMICAL/ECE/MECH/PIE

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

**SUBJECT: SR510 FUNDAMENTALS OF AEROSPACE ENGINEERING**

**TIME:** 3 Hours

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.

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		CO	BL
Q.1(a)	Summarize the differences between an ideal and a real flow over an aerofoil.	[5] CO1	L2
Q.1(b)	Illustrate the common feature of Orifice Meter, Venturi Meter and a Pitot Tube. Describe the process of extracting velocities from all these devices.	[5] CO1	L2
Q.2(a)	Demonstrate the Zone of silence and action for a sonic and a supersonic moving source.	[5] CO2	L2
Q.2(b)	Describe the different uses of convergent - divergent nozzles and diffusers with proper examples.	[5] CO2	L2
Q.3(a)	What do you mean by Propulsion? Explain with an example.	[2] CO3	L2
Q.3(b)	Why turboprop engine cannot be operated beyond 0.7 Mach number? What methods adopted to overcome this?	[3] CO3	L3
Q.3(c)	Explain in brief about the working principles of a ramjet engine? Also write its major drawbacks associated with it.	[5] CO3	L4
Q.4(a)	Draw the TS diagram of a turbojet engine?	[2] CO4	L2
Q.4(b)	What is the function of a plasticizer? Give an example of the plasticizer used in solid rocket propellant preparation.	[3] CO4	L3
Q.4(b)	Explain clearly with suitable sketches about the progressive, regressive and neutral burning. Give an examples of the grain used for each of them.	[5] CO4	L4
Q.5(a)	Write about the law of ellipses?	[2] CO5	L2
Q.5(b)	Explain in brief about the Universal Law of Gravitational Force.	[3] CO5	L3
Q.5(c)	Derive an equation to obtain the Orbital velocity ( $V_o$ ) that is needed to keep the object in its orbit.	[5] CO5	L4

:::30/11/2023 M:::