PRN:		Course Code:	PAS302

Second Year **M. Tech** End Semester Examination Winter 2024

Launch Vehicle Aerodynamics 000472

Day and Date: Mon 25 NOV 2024 Max Marks: **100**

Time: 02:00PM To 05:00PM Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	From the second law of thermodynamics, derive and show $S_2 - S_1 = C_v \ln T_2/T_1 + R \ln V_2/V_1$	08	2	1
	b)	Derive the normal shock governing equations.	08	2	1
		OR			
	b)	Derive the isentropic relation from Second law of thermodynamics	08	3	1
Q.2		**Attempt the following**			
	a)	Explain on the heat transfer effect on launch vehicles.	08	2	1
	b)	Derive the expression for Momentum and Displacement thickness of Boundary layer.	08	3	2
		OR			
	b)	Write short note on Shock Shear layer interaction.	08	3	2
Q.3		**Attempt any two from the following**			
	a)	Write short note on the various configurations and components of missiles.	08	1	2
	b)	Explain the classification of rockets in detail	08	3	3
	c)	Explain the type of rocket and missiles.	08	3	3

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Q.4	**Attempt any two from the following**			
	a)	What is meant by unsteady flow characteristics of launch vehicles?	08	3	3
	b)	Write note on slender and blunt bodies.	08	3	4
	c)	Explain on Axisymmetric flow separation and vortex shedding of launch vehicles.	08	2	4
Q.5	**Attempt any Two of the following**			
	a)	Write note on booster separation.	09	3	4
	b)	Explain on the specific considerations in missile launching.	09	2	4
	c)	Determine the aero elastic effects of launch vehicle.	09	3	5
Q.6	**Attempt any Two of the following**			
	a)	Explain Static and dynamic stability in detail.	09	2	5
	b)	Write in detail about optical flow visualization techniques.	09	3	5
	c)	Write note on stability characteristics of Launch vehicle configuration.	09	3	5

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