PRN:		Course Code :	AER4704B

Final Year **B. Tech** End Semester Examination Winter 2023

Wind Tunnel Techniques

Day and Date: Tuesday, 05/12/2023 Max Marks: **100**

Time : 2.00 to 5.00 PM Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Find an expression for drag force on smooth sphere of diameter D, moving with uniform velocity V in a fluid of density ρ and dynamic viscosity μ using Rayleigh's Method.	08	2	1
	b)	What are similarities and explain the type of similarities.	08	2	1
		OR		2	
	b)	What is Froude Model law and Show that $V_p/V_m = (Lr)^{1/2}$.Also find the scale ratio of Force using Froude model law.	08	3	
Q.2		**Attempt the following**			
	a)	What are the components of Low speed wind tunnel. Explain in detail with neat sketch.	08	2	2
	b)	Explain the Layout and working of Induction type wind tunnel and write down the advantages and Disadvantages.	08	2	2
		OR			
	b)	What is Angularity and Explain the procedure to measure Angularity in Low speed Wind tunnel	08	2	2
Q.3		**Attempt any two from the following**			
	a)	Explain the working of Hypersonic wind tunnel and draw the layout of Hypersonic wind tunnel.	08	2	3
	b)	Write in detail about Plasma arc Tunnel.	08	2	3
	c)	What is Shock Tunnel? Explain the functioning of Shock tunnel.	08	2	3
Q.4		**Attempt any two from the following**			
	a)	What are wind tunnel Balances and write in detail about Wire balances.	08	2	4
	b)	Write in detail about calibration of supersonic wind tunnel.	08	2	4
	c)	Write note on Strut type wind tunnel balances.	08	2	4
Q.5		**Attempt any Two of the following**			
	a)	What are the different Flow Visualization Techniques?	09	2	5
	b)	Write in detail about Smoke tunnel visualization Technique. Also with neat sketch explain the working of Kerosene Smoke generator.	09	2	5
	c)	What are the different optical visualization techniques and Explain Schlieren System visualization Technique in detail?	09	2	5
Q.6		**Attempt any Two of the following**			
	a)	Explain Hot wire Anemometry and write on the classification of Hot wire Anemometer.	09	2	5
	b)	Explain Constant Temperature Anemometer in detail.	09	2	5
	c)	Derive Kings Relation also explain Kings law Plot.	09	3	5

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