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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (First Semester - Regular) Examinations, January 2026

25FYES11008 – Basic Aerodynamics

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. How does temperature affect air density & humidity?	CO1	K2
b. Give some importance of air viscosity.	CO1	K2
c. What is meant by lift coefficient?	CO3	K1
d. How does lift vary with angle of attack before stall?	CO5	K2
e. What is meant by interference drag?	CO4	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. Discuss the importance of having precise atmospheric information during flight planning. How do atmospheric conditions influence aircraft operation?	5	CO1	K2
b. Define aspect ratio and fineness ratio. How do these geometric parameters affect the aerodynamic efficiency of an aircraft?	5	CO3	K2
OR			
c. Explain the concepts of free-stream flow and relative airflow. Why are these concepts essential for understanding lift production?	5	CO3	K2
d. What is meant by aerodynamic drag? Define about induced drag, and give examples	5	CO3	K2
3.a. What is a polar curve? Explain how it is used to determine aircraft performance parameters?	5	CO4	K4
b. Describe the phenomenon of stall, its causes, symptoms, and recovery.	5	CO5	K2
OR			
c. Describe how the coefficient of lift (CL) and coefficient of drag (CD) vary with angle of attack for: • (i) a clean aerofoil • (ii) a contaminated aerofoil	5	CO5	K2
d. Explain how aerofoil contamination alters the boundary layer behaviour and flow separation?	5	CO5	K2
4.a. Define aircraft performance and discuss the major atmospheric factors that influence it.	5	CO6	K2
b. Establish the relationship between bank angle & load factor for an aircraft executing a level turn.	5	CO5	K2
OR			
c. Explain the aerodynamic purpose of various tabs and describe their importance.	5	CO5	K2

d.	Explain aircraft performance and describe the factors affecting performance.	5	CO6	K2
5.a.	Describe the role of horizontal stabilizers in maintaining longitudinal stability.	5	CO6	K2
b.	Describe the contribution of the vertical tail to directional stability.	5	CO6	K4
	OR			
c.	What is Dutch roll? Explain its causes, characteristics, and the methods used to damp this motion.	5	CO6	K2
d.	Explain spiral divergence and justify why it is classified as a weak form of instability.	5	CO6	K4
6.a.	Define camber, chord, and mean aerodynamic chord (MAC), and explain their aerodynamic importance	5	CO5	K2
b.	What are the primary & secondary control surfaces and what do they do and also give their location?	5	CO5	K2
	OR			
c.	Discuss how ice accretion on wings affects aircraft performance and safety?	5	CO5	K2
d.	Discuss the effects of ice formation on aircraft wings with respect to performance degradation and flight safety.	5	CO5	K2

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