

CBCS SCHEME

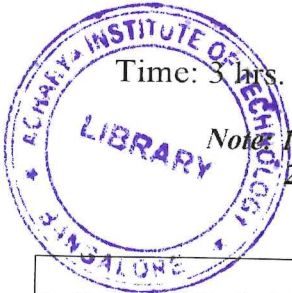
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BAE602

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026

Aircraft Performance and Stability



Time: 3 hrs.

Max. Marks: 100

- Notes:* 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1

			M	L	C
Q.1	a.	Describe the conditions for unaccelerated cruise performance of an aircraft. Obtain equation of motions for the same.	8	L2	CO2
	b.	Explain service ceilings and absolute ceilings with relevant sketch.	6	L2	CO1
	c.	Write short note on thrust required curve of an airplane with relevant graph and explain its significance.	6	L2	CO1

OR

Q.2		For a steady climb flight, derive the expression for maximum rate of climb and maximum climb angle Q_{max} in terms of fundamental parameters and explain the climb performance with aid of hodograph diagram.	20	L2	CO2
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Module – 2

Q.3		With necessary aerodynamic relation, derive an expression to show $V_{(C_L^{3/2}/C_D)_{max}} < V_{(C_L/C_D)_{max}} < V_{(C_L^{1/2}/C_D)_{max}}$	20	L4	CO1
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OR

Q.4	a.	Define range and describe the different types of weight.	5	L1	CO1
	b.	Derive Breguet range expression for a propeller driven airplane. List the condition for obtaining maximum range.	15	L2	CO1

Module – 3

Q.5	a.	Derive the expression for minimum turn radius and maximum turn rate.	16	L2	CO2
	b.	Write short note on balanced field length.	4	L2	CO2

OR

Q.6	a.	Explain about intermediate segments of ground roll with neat sketch.	6	L2	CO2
	b.	Describe the various phases of landing flight and derive expressions for estimating approach distance and flare distance.	14	L2	CO2

Module – 4

Q.7	a.	Prove that elevator angle required to vary lift coefficient varies inversely with elevator power.	10	L2	CO3
	b.	Briefly explain stick fixed neutral point and using suitable graph. Derive the expression for the same.	10	L2	CO3

OR

Q.8	a.	Explain elevator required for landing and elevator power.	10	L2	CO3
	b.	Explain the contribution of fuselage wing, tail and airframe on static longitudinal stability.	10	L2	CO3

Module – 5

Q.9		With neat sketch, briefly explain about rudder lock and Dorsal fin.	20	L2	CO4
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OR

Q.10	a.	Define trim. With proper graph and diagram, derive how trim tabs are support for longitudinal static stability.	10	L2	CO4
	b.	Briefly explain about one engine in operative condition, Weather cocking effect of an airplane with neat sketch.	10	L2	CO4
