CBCS SCHEME

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BAE302

Third Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Elements of Aeronautics

Time: 3 hrs. Max. Marks: 100

Note: 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.	Write the basic components of an airplane with a neat diagram and explain functions of each.	10	L2	CO1
	b.	Write a note on aircraft axis system with neat sketch and also explain aircraft motions.	10	L2	CO1
		OR			
Q.2	a.	Draw the fuselage and wing structure of an aircraft and explain its components.	10	L2	CO2
	b.	Explain with the application of metallic and non-metallic materials used in aircrafts.	10	L2	CO2
		Module – 2			
Q.3	a.	Define Bernoulli's theorem and explain its significance for generating lift and measuring airspeed.	8	L2	CO2
	b.	Discuss airfoil nomenclature with neat sketch.	6	L2	CO2
	c.	Describe the properties of atmosphere with different altitude terms.	6	L2	CO2
		OR			
Q.4	a.	Define Mach number. Briefly explain different mach number regimes.	8	L2	CO2
	b.	Explain the different types of drag with suitable expressions and also draw the drag curve.	8	L2	CO2
	c.	Write short note on: i) Centre of pressure ii) Aspect ratio.	4	L2	CO2
		Module – 3			
Q.5	a.	Describe the construction, principle of operation of Turboprop engine with suitable diagram.	10	L2	CO3
	b.	Briefly explain the brayton cycle and its applications to gas turbine engines.	10	L2	CO3

		OR			
Q.6	**a.**	With suitable diagram, explain the construction, the principle of operation of Ramjet engine.	**10**	**L2**	**CO3**
	b.	What are the general classification of internal combustion engines used in aircraft? Describe various cylinder arrangements used in internal combustion powered aircraft.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Discuss about static and dynamic stability.	**6**	**L2**	**CO3**
	b.	Define degrees of freedom for an aircraft and explain the forces act on an aircraft in flight.	**6**	**L2**	**CO3**
	c.	With neat sketch explain the function of different types of control tabs.	**8**	**L3**	**CO3**
		OR			
Q.8	**a.**	Briefly explain about the twinning flight conditions with suitable sketch and relevant expressions.	**8**	**L3**	**CO3**
	b.	Discuss the effect of changes in engine power and altitude on aircrafts performance.	**6**	**L3**	**CO3**
	c.	Derive equation of motion for a level and unaccelerated flight.	**6**	**L3**	**CO3**
		Module – 5			
Q.9	**a.**	Describe the typical hydraulic system and its components with suitable diagram.	**10**	**L2**	**CO2**
	b.	What is the purpose of aircraft fuel system? Describe commonly used fuel systems used in piston engine with simple sketch.	**10**	**L2**	**CO2**
		OR			
Q.10	**a.**	Write a note on following aircraft instruments: i) Altimeter ii) Airspeed indicator iii) Mach meter iv) Vertical speed indicator.	**12**	**L2**	**CO3**
	b.	With suitable diagram, explain aircraft communication system and navigation system in detail.	**8**	**L2**	**CO3**

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