CBCS SCHEME

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BAE302

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
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.	List the classification of aircraft. Draw an aircraft and label the parts.	10	L1	CO2
	b.	With help of a neat sketch, explain the working of a helicopter.	10	L1	CO2
		OR			
Q.2	a.	Illustrate the general construction types of wing and fuselages. Explain its components.	12	L1	CO2
	b.	Discuss the metallic and non-metallic materials used in aircraft applications with suitable examples.	8	L1	CO2
		Module – 2			
Q.3	a.	Derive an expression for speed of sound and discuss its significance.	10	L2	CO2
	b.	With the help of neat sketches, explain the following : i) Pressure distribution over a wing section ii) Air foil nomenclature.	10	L2	CO2
		OR			
Q.4	a.	Discuss the generation of Lift and Drag over an airfoil and write the equations for lift and drag components.	8	L1	CO2
	b.	Define the following : i) Aerodynamic center ii) Aspect ratio iii) Center of pressure iv) Zero – lift condition.	8	L1	CO2
	c.	A model wing air craft at a 4° angle of attacks with the normal and axial force 700 kN and 500 kN respectively. Calculate the lift and drag development in that aircraft flying at a velocity of 50m/s.	4	L3	CO2
		Module – 3			
Q.5	a.	List the classifications of aircraft power plants in detail.	8	L1	CO2
	b.	With the help of P-V and T-S diagram, explain the working of a Ramjet engine. List the advantages and disadvantages.	12	L2	CO2
		OR			
Q.6	a.	Illustrate a turbo fan engine and explain its working principle with the help of the P-V and T-S diagram.	10	L2	CO2
	b.	Discuss the different methods of thrust augmentation in detail.	10	L2	CO2
		Module – 4			
Q.7	a.	With the help of proper sketches, explain the basic aircraft axis systems, motions and control systems responsible for the same.	10	L2	CO3
	b.	Describe the following : i) Turning flight ii) Gliding flight.	10	L2	CO3

		OR			
Q.8	**a.**	Discuss the effect of altitude on power required and power available for both propeller driven and jet propelled aircraft and illustrate its performance curves.	**10**	**L3**	**CO3**
	b.	Write short notes on : i) Correct and In-correct bank angle ii) Inverted maneuvers.	**10**	**L2**	**CO3**
		Module – 5			
Q.9	**a.**	Elaborate the importance of environment control system in an aircraft.	**10**	**L2**	**CO3**
	b.	Explain the pneumatic systems and its applications in airplanes.	**10**	**L2**	**CO3**
		OR			
Q.10	**a.**	With a neat sketch, explain the flight control system of an aircraft.	**10**	**L2**	**CO3**
	b.	Describe the Inertial Navigation system with the appropriate sketches.	**10**	**L2**	**CO3**

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