MRCET CAMPUS

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS INSTITUTION – UGC, GOVT. OF INDIA)

Department of AERONAUTICAL ENGINEERING

AIRCRAFT PERFORMANCE

QUESTION BANK

Prepared by:

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R20

Code No: R20A2109

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Supplementary Examinations, January 2024

Aircraft Performance

(AE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

			Marks
1	***A***	Based on the mission profile performance of an aircraft varies. Justify.	**[7M]**
	B	Calculate the dynamic viscosity, pressure, and altitude at a height of 23 km with reference to the ISA.	**[7M]**
		OR	
2	***A***	What is meant by an operational safety? How can one improve operational safety of aircrafts.	**[7M]**
	B	Explain the variation of thrust, propulsive power and specific fuel consumption with flight speed.	**[7M]**

SECTION-II

3		Derive the endurance formula for Jet-propelled Airplanes, make suitable assumptions and list them.	**[14M]**
		OR	
4		Explain the effect of altitude and temperature on cruise performance.	**[14M]**

SECTION-III

5		Given an airplane mass of 60000 kg, Lift/Drag ratio 12, thrust per engine 60,000N, assume g=10 m/s^2. For a straight, steady, wings level climb of a twin-engine airplane. Calculate the rate of climb.	**[14M]**
		OR	
6		Explain in detail, with relevant formulae Climb rate, climb gradient, Thrust producing engines and Minimum fuel climbs.	**[14M]**

SECTION-IV

7		An airplane weighing 1,00,000 N is powered by an engine producing 20,000 N of thrust under sea-level standard conditions. If the wing area be 25 m^2, calculate i. Stalling speeds at sea level and at 10 km altitude(ρ at 10 km = 0.413 kg/m^3) ii. $(C_D/C_L)_{min}$, $\left(C_D/C_L^{3/2}\right)_{min}$, T_{rmin}, P_{rmin}, V_{md}, V_{mp} under sea-level conditions. Assume $C_D = 0.016 + 0.064\ C_L^2$, $C_{Lmax} = 1.5$	**[14M]**
		OR	
8		Define Maneuver and Turning performance. And compare the Maneuver performance of military aircraft and transport aircraft.	**[14M]**

SECTION-V

9	***A***	Define Take off distance and derive a suitable formula for estimating the same.	**[7M]**
	B	A passenger plane landed at Delhi's IGI Airport with a tail strike. Explain this case's complexities.	**[7M]**
		OR	
10	***A***	Describe about conventional take-off and landing. Write all approaches while doing landing and take-off.	**[7M]**
	B	Discuss about the abandon landing. What are the circumstances when abandon landing is performed?	**[7M]**

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