Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh semester B.Tech examinations (S), September 2020

Course Code: ME461
Course Name: Aerospace Engineering

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks. Marks

1 a) Classify different regions of standard atmosphere based on the temperature variation. (6)

b) Explain why the temperature varies in different regions of atmosphere. (4)

2 Calculate the temperature, pressure and density of standard atmosphere at 6km, 11km and 18km altitudes. (10)

3 a) Explain lifting line theory. (7)

b) Explain the different types of drag encountered by aeroplanes. (3)

4 a) An aircraft having wing span 12m and wing area 18.5m^2 produces a lift of 80,000N when flying at 350km/h. Calculate the induced drag when flying at sea level, Assume span efficiency factor as 0.8. (7)

b) Write some methods to reduce the wing tip vortices. (3)

PART B

Answer any three full questions, each carries 10 marks.

5 a) Derive the general equations of motion of an aircraft. (7)

b) Deduce the equations of motion for a level unaccelerated flight from the general equations. (3)

6 Calculate the power required for an air craft of mass 232ton flies at 420km/h. The density altitude of the flight is 7km and the coefficient of parasite drag is 0.002. The Oswald efficiency factor for the flight is 0.85, span 65.4m, wing area 620m^2. (10)

7 a) With help of a schematic explain the variation of forces acting on an aircraft during take-off. (3)

b) Derive the expression to find out the length of ground roll required for landing. (7)

8	a)	Derive the equations to calculate the turn rate of flight undergoing pullup and pulldown maneuver.	(6)
	b)	What is rocket assisted take-off? Explain.	(4)

PART C

Answer any four full questions, each carries 10 marks.

9		With the help of neat sketch explain the working and functions of Gyro horizon.	(10)
10	a)	Explain the working of air speed indicator.	(7)
	b)	How true air speed is calculated?	(3)
11	a)	How rate of climb is measured in aircrafts? Explain.	(5)
	b)	Write brief notes on static and dynamic stability.	(5)
12	a)	With the help of neat sketches explain the working of turboprop engines	(7)
	b)	Compare Turbo fan and Turbo jet engines.	(3)
13	a)	How different parameters are measured using wind tunnels?	(6)
	b)	Explain the working of a closed circuit subsonic wind tunnel.	(4)
14	a)	Define orbital velocity. Derive the expression for it.	(6)
	b)	How a planet to planet travel is done? Explain.	(4)

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