Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2020

Course: Aircraft Design **Semester: VIII**
Program: B. Tech Aerospace Engineering **Time 03 hrs.**
Course Code: ASEG 461 **Max. Marks: 100**
Instructions: Use of Design DATA permitted. Assume *appropriate* value for missing DATA

SECTION A (15x2=30 Marks)

S. No.		Marks	CO
Q1	There are _____(5/**9**) number of phases in mission profile of agricultural aircraft.	**02**	**CO1**
Q2	There is one crew for _____ (**15**/30) passengers in executive class.	**02**	**CO1**
Q3	Tail arm of a Sailplane is _____percent of its fuselage length (40-50/50-55/about 60/**about 65**).	**02**	**CO2**
Q4	Main wheels carry upto _____(40/50/60/70/80/**90**)percent of the gross takeoff weight of Aircraft.	**02**	**CO2**
Q5	A high aspect ratio wing has a____(High/**Low**) Induced Drag.	**02**	**CO3**
Q6	A swept wing tends to stall first at the_____(root/**tip**) of the wing.	**02**	**CO3**
Q7	Medium lift Launch Vehicles can carry _____(0-2/**2-20**/20-50/50+) ton payload	**02**	**CO4**
Q8	Engine weight of spacecraft is included in_____ (payload/propellant/**structure**/equipment) weight category.	**02**	**CO4**
Q9	High taper ratio wing can make ailerons ineffective during flight (**True**/False).	**02**	**CO1**
Q10	The mission profile of Agricultural aircraft does not include cruise-back phase. (True/**False**)	**02**	**CO1**
Q11	Exposed wing planform area is higher than wing reference area(True/**False**)	**02**	**CO2**
Q12	Landing gear drag has additional 20 percent drag as Interference drag (**True**/False)	**02**	**CO3**

Q13	Top stage of Launch Vehicle has bigger diameter than lower stage (true/**false**).	**02**	**CO4**
Q14	Thrust gimballing helps in stability of Launch vehicles(**True**/False).	**02**	**CO4**
Q15	Staging helps in reduction in thrust requirements of Launch Vehicles (**True**/False).	**02**	**CO4**
	SECTION B (5x8=40 Marks)		
Q 16	Compare performance requirements *Civil* and *Military* aircrafts.	**08**	**CO1**
Q 17	Compare Wing, Wing-tip, and Tail and landing gear configurations for subsonic and supersonic Aircrafts.	**08**	**CO1**
Q 18	What is gross take-off weight of aircraft? Give final expression for its estimation. An airplane design has following features: *Payload weight=26000 N; Estimated fuel fraction=0.387; Empty Weight fraction=0.837.* Obtain gross weight of aircraft.	**08**	**CO2**
Q 19	Consider a private four-place aircraft with following characteristics: Cruise Mach No. 0.2; Cruise Altitude=10,000 ft; wing loading-20lb/ft^2; take-off weight=15,000 lbs. Design the main wing that would be suitable for this aircraft by estimating	**08**	**CO2**
Q 20	What parameters affect stability of space launch vehicle? Or Compare different mission profiles of launch vehicles, briefly.	**08**	**CO4**
	SECTION-C (1x30=30 Marks)		
Q 21	Design (layout sizing) an agricultural aircraft with following performance requirements: • stall speed 22 m/s • Loiter 30 minutes • Cruise range 300 km • cruising speed of 60 m/s • take off/landing distance 300 m Airplane should be powered by one conventional reciprocating engine	**30**	**CO3**