Name:	
Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Special End Sem 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 (5x6=30 Marks)

S. No.		Marks	CO
Q1	List 7 pivot points of conceptual design of aircraft.	05	CO1
Q2	Write crew and passenger weight estimation criteria for different aircraft.	05	CO2
Q3	Which of the following type of mass constitute structural mass of launch vehicle? (engine, equipment mass, current stage fuel tank, payload, next stage fuel tank, payload casing)	05	CO4
Q4	List mission profile phases of agricultural aircraft (in sequential order)	05	CO3
Q5	List of trajectory phases of a typical Launch vehicle (in sequential order).	05	CO4
Q6	Consider launch vehicle with 1200 m^3 required volume . Neglecting end caps, estimate its length, if stage diameter is 9 m.	05	CO4

SECTION B (5x08=40 Marks)

Q 7	Describe different steps involved in aircraft conceptual design.	08	CO1
Q 8	Compare merits and demerits of different landing gear and seating arraignments of Aircrafts.	08	CO1
Q 9	Derive expression of gross take-off weight (W_0)of aircraft? An airplane design has following features: *Payload weight=10000 lb; Estimated fuel fraction=0.387; Empty Weight fraction=$0.93W_0^{-0.07}$*. Obtain gross weight of aircraft.	08	CO2

Q 10	Consider a agricultural aircraft with following characteristics: Cruise velocity 60 m/s wing loading-10 lb/ft^2; take-off weight=2000 lbs. Design the main wing that would be suitable for this aircraft by estimating.	08	CO3
Q 11	Derive expression to estimate stability criterion of space launch vehicle. Or Explain Tossback boost trajectory of launch vehicle along with spacecraft applications.	08	CO4
SECTION-C (1x30=30 Marks)			
Q 12	Design (layout sizing) an jet passenger aircraft with following performance requirements: Gross still air range = 4,000 km No. of passengers = 150 Cruise Mach no. = 0.80 Altitude = 11,000 m Airplane should be powered by jet engine.	30	CO3

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