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**UNIVERSITY OF PETROLEUM
AND ENERGY STUDIES**



End Semester Examination – April, 2017

Program/course: B.Tech ASE

Subject: Design of Aerospace Vehicle

Code : ASEG 462

No. of page/s: 2

Semester – VIII

Max. Marks : 100

Duration : 3 Hrs

NOTE: Make use of *sketches/plots* to elaborate your answer. Brief and to the point answers are expected.

Section A (4X5M=20M)

- Q1. What are the factors affecting the aircraft design configuration.
- Q2. What are the primary Stages included in preliminary design. Discuss?
- Q3. Briefly discuss the fuselage sizing and its features.
- Q4. What are the Special considerations in configuration lay out.

Section B (4X10M=40M)

- Q5. Explain the various Guidelines for values of CL_{max} of wings with various high lift devices.
- Q6. Discuss the Selection of wing loading based on prescribed flight speed (V_p).
- Q7. Explain how to analyze the Weight fractions for various segments of mission
- Q8. In the context of wing design , briefly discuss the various aspects that needed to be considered.

Or

Elaborate the answer in detail with neat sketch –The Aerodynamic characteristics of an airfoil

Section C (40 Marks)

Q9. Design a commercial Aircraft which satisfies the following requirements. Also draw the preliminary three views of the Aircraft.

- i) Engine Type : Bypass Turbofan
- ii) Number of Passengers 100
- iii) Altitude 10KM
- iv) cruise Mach Number =0.7
- v) Range =5000KM

With the above data substantiate the following

- a) Substantiate the constrains for Budget and time
- b) Obtain Airworthiness requirements
- c) Estimate Preliminary weight estimation
- d) Optimization of wing loading and thrust loading
- e) Wing parameters
- f) Empennage design
- g) Control Surfaces design
- h) Fuselage design
- i) Engine
- j) Preliminary layout

Use the Attached data for your Design Calculation – Reference.