Code: 9A21604

R09

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

FLIGHT VEHICLE DESIGN

(Aeronautical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 Explain in detail, the initial analyses that are carried out during the conceptual design phase. What are data of the aircraft design that are available at the end of the process?

2 (a) Draw the conceptual drawing of a supersonic stealth bomber.
(b) What can you do to reduce the probability of Radar detectability?
(c) Briefly explain how the conceptual design of this aircraft is carried out.

3 (a) Describe the pressure distribution over an airfoil, and the effect on C_l and C_d.
(b) Define critical mach number and drag divergence mach number.

4 Compare the cross sections of the fuselages of passenger aircraft, bomber and fighter–at the nose, in the middle and at the tail.

5 How are the different elements of an aircraft distributed in the configuration to achieve weight balance? Start with explaining what weight balance is and how the weights of the different parts of an aircraft are known at the conceptual design stage.

6 (a) What are the factors that influence the cruise speed?
(b) Explain the advantages of a canard over a conventional horizontal stabilizer.

7 Explain the aerodynamic load over an aircraft.

8 Explain the process of verification of the performance of a passenger aircraft after the conceptual design is available, but before the preliminary design starts.

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