

**R09**

Code No: 56071

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech III Year II Semester Examinations, December - 2018**

**CONCEPTUAL DESIGN OF FLIGHT VEHICLES**

**(Aeronautical Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any five questions  
All questions carry equal marks**

---

- 1.a) What do you understand by 'Integrated Product Development'? What are the steps involved in this activity?  
b) How is the empty weight of an aircraft estimated in the initial phase of design?  
c) Explain 'mission segment weight fractions'. [5+5+5]
- 2.a) Explain airfoil section, thickness ratio, thrust to weight ratio in the context of preliminary design of an aircraft.  
b) Write on thrust matching during the initial phase of design of an aircraft.  
c) Explain wing loading and its significance in design of the airplane. [5+5+5]
- 3.a) What is isobar tailoring?  
b) What are the factors that affect the design of a fuselage?  
c) Write on radio detectability of an aircraft and the design features that may be incorporated in military aircraft to reduce this. [5+5+5]
- 4.a) Describe the feature of integrating the nozzle of an aircraft into its design.  
b) Explain capture area and boundary layer diverters for the engines.  
c) Describe the landing gear of a modern aircraft. [5+5+5]
- 5.a) State the different materials used in the production of an aircraft and the factors deciding the selection of the materials for the manufacture of the aircraft.  
b) What is centre of gravity excursion and why and how is it controlled?  
c) Explain V-n diagram. [5+5+5]
- 6.a) State and explain the stability derivatives.  
b) What are the dynamical characteristics of an aircraft?  
c) What is balanced field length? [5+5+5]
- 7.a) What is life cycle cost?  
b) Describe the sizing matrix for an aircraft.  
c) Distinguish between design trades and requirement trades. [5+5+5]
- 8.a) Describe the factors to be considered in the design of a VTOL aircraft.  
b) Describe a F-16 aircraft. [6+9]

---ooOoo---