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Total Number of Pages: 02

B.Tech
PCAE1205

3rd Semester Back Examination 2017-18

Elements of Aeronautics

BRANCH: AERO

Time: 3 Hours

Max Marks: 70

Q.CODE: B1172

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)**
- a) What is meant by ornithopter?
 - b) Difference between Biplane and Mono plane
 - c) Define drag with suitable sketches.
 - d) Define Mach No.
 - e) Enumerate the components of an airplane.
 - f) Name any three basic instruments for flying .
 - g) What are the types of airplane structures?
 - h) What are the components of a modern airplane for which aluminum alloy is used?
 - i) What are the limitations of piston engines for aircraft propulsion?
 - j) What are the forces acting on an airplane during level flight?
- Q2 a) Explain how the modern developments in aerodynamics and aerospace materials influenced aircraft design. (5)**
- b) Explain how the airplane propulsion has developed over the years (5)**
- Q3 a) Discuss the classification of flight vehicle, with respect to principle of operation and configuration (5)**
- b) define International Standard Atmosphere. Describe briefly how the pressure, temperature and density vary with altitude (5)**
- Q4 a) Sketch a typical airfoil and explain how lift, drag and moment are generated, when facing a pre stream. (5)**
- b) What is the effect of angle of attack on the pressure distribution on the surface of the airfoil? (5)**
- Q5 a) Explain the working of jet engine with neat sketch and discuss the merits and demerits. (5)**
- b) Explain with neat sketches the constructional details and working of a bypass engine and what are its merits and demerits in comparison with turbojet engine? (5)**

- Q6 a) Write short notes on the following : (5)**
(1) Monocoque construction and
(2) Geodesic construction of airplane structures
- b) What is the role of composite materials in the modern airplane construction? What are the prime components of the modern airplane? (5)**
- Q7 a) Explain the brief history of rocket development. Classify the various type of rocket. (5)**
- b) Explain with neat sketches the construction and working of solid propellant rocket engine system. (5)**
- Q8 Write short answer on any TWO: (5 x 2)**
- a) Functions of flaps, winglets and slats.**
 - b) Drag polar and significance.**
 - c) Distinguish between turbo-jet and turbo-prop engines.**
 - d) Methods of thrust augmentation.**