Code No: RR212102 **Set No.1**

II B.Tech. I Semester Supplementary Examinations, May -2005
FUNDAMENTALS OF AERONAUTICAL ENGINEERING
(Aeronautical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the concept of 'Ornihopters'.
   (b) How sweep of the wing affects the aerodynamic performance of high speed aircrafts.
2. (a) Explain briefly Nose wheel and Bicycle type undercarriages with the help of sketches. Write down the merits and demerits of each type.
   (b) Explain the functions of Horizontal stabilizer and Vertical stabilizer.
3. Describe with a neat sketch, Principal details and functioning of a radio altimeter. Does it have some limitations? Discuss.
4. Discuss the characteristics of stratosphere. How does the temperature vary in this layer of atmosphere? How can you obtain temperatures in this regime?
5. What is airfoil? Describe the various airfoil shapes with the help of neat sketches.
6. How the loads are transferred in a geodesic construction, explain the characteristics of the components used in the construction.
7. Compare and contrast the differences between the following types of engines used in airplanes.
   (a) Piston type
   (b) Turboprop type
   (c) Jet type.
8. What are the different types of rockets? Discuss their relative merits and applications.

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Code No: RR212102 **Set No.2**

II B.Tech. I Semester Supplementary Examinations, May -2005
FUNDAMENTALS OF AERONAUTICAL ENGINEERING
(Aeronautical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the various modern techniques used on an aircraft for
   i. Reduction of induced drag and
   ii. Reduction of profile drag.
   (b) Describe the contribution of Sir George Cayley in the field of aeronautics.
2. (a) Distinguish between a fixed wing aircraft, helicopter and tilt rotor aircraft. Give example of each.
   (b) What are the various types of undercarriages used for a helicopter ? Explain.
3. Describe the functioning of a Mach-meter with a neat sketch. Explain that it combines an altimeter and airspeed indicator in itself in its simplest form.
4. Explain the outer atmospheric layers known as ionosphere and exosphere. How are these different from stratosphere and troposphere? How do these layers affect the atmosphere on earth? Discuss.
5. Define the terms associated with airfoil and describe the effect of each on the lift and drag coefficient of the airfoil.
6. In which case the monocoque construction is used in the airplane? What are the limitations for monocoque construction? Discuss the causes of the failure in monocoque construction.
7. What are the various components of turboprop engine? Describe them briefly. Discuss the different types of turboprop engines.
8. Explain the principle of jet thrust and propeller thrust. Enumerate the differences between propeller thrust and jet thrust in airplanes.

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Code No: RR212102 **Set No.3**

II B.Tech. I Semester Supplementary Examinations, May -2005
FUNDAMENTALS OF AERONAUTICAL ENGINEERING
(Aeronautical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the design features of a Turboprop Engine.
   (b) Who worked on the concept of Sir George Cayley and how do you assess the success of the development of his concept ?
2. (a) How do the primary controls of a Helicopter differ from that of a fixed wing aircraft ?
   (b) Define dorsal and explain its function.
3. Describe a rate of climb indicating instrument. How is it similar to or different from an Air speed indicator? Make use of sketches.
4. Flight-testing is normally carried out in early hours of the day. What are the reasons for the same? Why it should not be carried out during the noon period of the day? Explain how one can make a preliminary guess of the stability of atmosphere?
5. Explain the nomenclature of NACA 4 digit series, NACA 5 digit series. Draw and explain the $C_L - \alpha$ curve for an airfoil.
6. Compare making labeled sketches the monocoque, semi-monocoque and geodesic construction for airplane wing.
7. What are the various components of turbo jet engine? Describe them briefly. Discuss the different types of turbo jet engines.
8. Explain the principle and working of rocket. Describe the different components of a rocket.

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Code No: RR212102 **Set No.4**

II B.Tech. I Semester Supplementary Examinations, May -2005
FUNDAMENTALS OF AERONAUTICAL ENGINEERING
(Aeronautical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the various engine-starting systems.
   (b) Discuss the contribution of Otto Lilienthal in the field of aeronautics. Who made the further contributions in the work field of Otto Lilienthal? Explain.
2. (a) Distinguish between Leading Edge and Trailing Edge flaps with the help of sketches. Explain their function.
   (b) Explain the following:
      i. Need to have retractable undercarriage for high speed aircrafts.
      ii. Functions of primary control surfaces of an aircraft.
3. Make use of neat sketches to elaborate various control surfaces on an airplane. How do these controls function? Explain different maneuvers performed with these control surfaces.
4. Explain the usefulness of atmosphere in generating lift drag and moments on a lifting body with sketches and principles of physics. What if atmosphere were not around?
5. Draw the lift coefficient versus angle of attack curves for cambered and symmetrical airfoils and discuss the different points on them. Explain the characteristics of a supersonic airfoil.
6. Make labeled sketches of the monocoque, semi-monocoque and geodesic construction for airplane fuselage and compare them.
7. What are the various components of piston engine? Describe them briefly. Discuss the different types of piston engines.
8. Elaborate the principle and working of a jet engine and rocket engine. Enumerate the differences between jet engine and rocket engine.

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