Code No: RR312102   RR   SET-1

B. Tech III Year I Semester Examinations, December-2011
AIRCRAFT PERFORMANCE
(AERONAUTICAL ENGINEERING)

Time: 3 hours   Max. Marks: 80

Answer any five questions
All questions carry equal marks
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1. Consider an airfoil at $\alpha = 0^o$. Compare skin friction drag and normal pressure drag on airfoil. Make use of flow patterns to illustrate your answer. [16]

2. Describe a maneuver of airplane in which you encounter a pull-up maneuver, a pull-down maneuver, a vertically upward flight and a vertical dive. Make a plot of V-n diagram and locate these maneuvers in flight envelope. Hence discuss the significance of the V-n diagram. [16]

3. Write a detail note on various types of drag acting on different parts of the airplane. [16]

4. What are the fundamental parameters of aircraft performance? Derive expressions for the same. [16]

5. Obtain the expressions for thrust available and maximum velocity of
   a) Propeller-driven aircraft
   b) Jet-propelled aircraft. [8+8]

6. A glider weighing 5500 N with a wing loading of 650 N/sq.m has its air brakes extended during the drive, which gives the drag polar as $C_D = 0.7 + 0.022\ C_L^2$. Estimate the gliding angle and the rate of descent when driving with air brakes extended as 30 m/s. [16]

7. Define Endurance. Obtain the expression of endurance for
   a) Propeller-driven airplanes
   b) Jet-propelled airplanes. [8+8]

8. Define true airspeed, equivalent air speed and indicated airspeeds. Which one of these is used for plotting V-n diagram? Explain the diagram in full for a highly maneuverable airplane. [16]

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Code No: RR312102

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SET-2

B. Tech III Year I Semester Examinations, December-2011
AIRCRAFT PERFORMANCE
(AERONAUTICAL ENGINEERING)
Time: 3 hours   Max. Marks: 80
Answer any five questions
All questions carry equal marks
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1.   Write a detail note on various types of drag acting on different parts of the airplane.   [16]

2.   What are the fundamental parameters of aircraft performance? Derive expressions for the same.   [16]

3.   Obtain the expressions for thrust available and maximum velocity of
        a) Propeller-driven aircraft
        b) Jet-propelled aircraft.   [8+8]

4.   A glider weighing 5500 N with a wing loading of 650 N/sq.m has its air brakes extended during the drive, which gives the drag polar as $C_D = 0.7 + 0.022\ C_L^2$. Estimate the gliding angle and the rate of descent when driving with air brakes extended as 30 m/s.   [16]

5.   Define Endurance. Obtain the expression of endurance for
        a) Propeller-driven airplanes
        b) Jet-propelled airplanes.   [8+8]

6.   Define true airspeed, equivalent air speed and indicated airspeeds. Which one of these is used for plotting V-n diagram? Explain the diagram in full for a highly maneuverable airplane.   [16]

7.   Consider an airfoil at $\alpha = 0^o$. Compare skin friction drag and normal pressure drag on airfoil. Make use of flow patterns to illustrate your answer.   [16]

8.   Describe a maneuver of airplane in which you encounter a pull-up maneuver, a pull-down maneuver, a vertically upward flight and a vertical dive. Make a plot of V-n diagram and locate these maneuvers in flight envelope. Hence discuss the significance of the V-n diagram.   [16]

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B. Tech III Year I Semester Examinations, December-2011
AIRCRAFT PERFORMANCE
(AERONAUTICAL ENGINEERING)
Time: 3 hours　　　　　　　　　　　　　　　　　Max. Marks: 80
Answer any five questions
All questions carry equal marks
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1. Obtain the expressions for thrust available and maximum velocity of
   a) Propeller-driven aircraft
   b) Jet-propelled aircraft. [8+8]

2. A glider weighing 5500 N with a wing loading of 650 N/sq.m has its air brakes extended during the drive, which gives the drag polar as $C_D = 0.7 + 0.022\ C_L^2$. Estimate the gliding angle and the rate of descent when driving with air brakes extended as 30 m/s. [16]

3. Define Endurance. Obtain the expression of endurance for
   a) Propeller-driven airplanes
   b) Jet-propelled airplanes. [8+8]

4. Define true airspeed, equivalent air speed and indicated airspeeds. Which one of these is used for plotting V-n diagram? Explain the diagram in full for a highly maneuverable airplane. [16]

5. Consider an airfoil at $\alpha = 0^o$. Compare skin friction drag and normal pressure drag on airfoil. Make use of flow patterns to illustrate your answer. [16]

6. Describe a maneuver of airplane in which you encounter a pull-up maneuver, a pull-down maneuver, a vertically upward flight and a vertical dive. Make a plot of V-n diagram and locate these maneuvers in flight envelope. Hence discuss the significance of the V-n diagram. [16]

7. Write a detail note on various types of drag acting on different parts of the airplane. [16]

8. What are the fundamental parameters of aircraft performance? Derive expressions for the same. [16]

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Code No: RR312102 | RR | SET-4

B. Tech III Year I Semester Examinations, December-2011
AIRCRAFT PERFORMANCE
(AERONAUTICAL ENGINEERING)

Time: 3 hours   Max. Marks: 80
Answer any five questions
All questions carry equal marks
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1.   Define Endurance. Obtain the expression of endurance for
       a) Propeller-driven airplanes
       b) Jet-propelled airplanes.   [8+8]

2.   Define true airspeed, equivalent air speed and indicated airspeeds. Which one of
       these is used for plotting V-n diagram? Explain the diagram in full for a highly
       maneuverable airplane.   [16]

3.   Consider an airfoil at $\alpha = 0^o$. Compare skin friction drag and normal pressure drag
       on airfoil. Make use of flow patterns to illustrate your answer.   [16]

4.   Describe a maneuver of airplane in which you encounter a pull-up maneuver, a
       pull-down maneuver, a vertically upward flight and a vertical dive. Make a plot of
       V-n diagram and locate these maneuvers in flight envelope. Hence discuss the
       significance of the V-n diagram.   [16]

5.   Write a detail note on various types of drag acting on different parts of the
       airplane.   [16]

6.   What are the fundamental parameters of aircraft performance? Derive expressions
       for the same.   [16]

7.   Obtain the expressions for thrust available and maximum velocity of
       a) Propeller-driven aircraft
       b) Jet-propelled aircraft.   [8+8]

8.   A glider weighing 5500 N with a wing loading of 650 N/sq.m has its air brakes
       extended during the drive, which gives the drag polar as $C_D= 0.7+0.022\ C_L^2$.
       Estimate the gliding angle and the rate of descent when driving with air brakes
       extended as 30 m/s.   [16]

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