

Code No: RR312104

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SET-1

B. Tech III Year I Semester Examinations, December-2011
WIND TUNNEL TECHNIQUES
(AERONAUTICAL ENGINEERING)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Write any three Non dimensional numbers used for Aerodynamics and their importance.
- b) Write the types of Similarities and explain each in detail with examples. [8+8]
- 2.a) Explain and derive Buckingham theorem.
- b) What is Scale effect and how it is related to the Similarities? [8+8]
- 3.a) Write down the principle of low speed subsonic wind tunnel and draw the neat diagram.
- b) Explain with neat sketches the function of supersonic wind tunnel. [8+8]
- 4.a) Explain the losses of subsonic wind tunnel.
- b) Explain layouts, sizing and design parameters of hypersonic wind tunnel. [8+8]
- 5.a) Name the two equipments and their working principles to calibrate the flow angularity in low speed subsonic wind tunnel.
- b) How the supersonic wind tunnel is calibrated? Explain with diagrams. [8+8]
- 6.a) What is the purpose of calibration of wind tunnel? How the wind tunnel test section speed and horizontal buoyancy is calibrated?
- b) Write short notes on following:
 - i) Calibration of wind tunnel.
 - ii) Turbulence measurement.
 - iii) Test section speed calibration. [8+8]
- 7.a) Describe the types of wind tunnel balances and explain one with diagram.
- b) With diagram show how the lift, drag, pitching moment and rolling moment is measured by the wind tunnel balances. [8+8]
- 8.a) Name the three pressure measuring equipments and explain one with diagram.
- b) What are the fix components measured by the wind tunnel balances? Explain how these are measured. [8+8]

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Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Write down the principle of low speed subsonic wind tunnel and draw the neat diagram.
- b) Explain with neat sketches the function of supersonic wind tunnel. [8+8]
- 2.a) Explain the losses of subsonic wind tunnel.
- b) Explain layouts, sizing and design parameters of hypersonic wind tunnel. [8+8]
- 3.a) Name the two equipments and their working principles to calibrate the flow angularity in low speed subsonic wind tunnel.
- b) How the supersonic wind tunnel is calibrated? Explain with diagrams. [8+8]
- 4.a) What is the purpose of calibration of wind tunnel? How the wind tunnel test section speed and horizontal buoyancy is calibrated?
- b) Write short notes on following:
 - i) Calibration of wind tunnel.
 - ii) Turbulence measurement.
 - iii) Test section speed calibration. [8+8]
- 5.a) Describe the types of wind tunnel balances and explain one with diagram.
- b) With diagram show how the lift, drag, pitching moment and rolling moment is measured by the wind tunnel balances. [8+8]
- 6.a) Name the three pressure measuring equipments and explain one with diagram.
- b) What are the fix components measured by the wind tunnel balances? Explain how these are measured. [8+8]
- 7.a) Write any three Non dimensional numbers used for Aerodynamics and their importance.
- b) Write the types of Similarities and explain each in detail with examples. [8+8]
- 8.a) Explain and derive Buckingham theorem.
- b) What is Scale effect and how it is related to the Similarities? [8+8]

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SET-3

B. Tech III Year I Semester Examinations, December-2011
WIND TUNNEL TECHNIQUES
(AERONAUTICAL ENGINEERING)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Name the two equipments and their working principles to calibrate the flow angularity in low speed subsonic wind tunnel.
- b) How the supersonic wind tunnel is calibrated? Explain with diagrams. [8+8]
- 2.a) What is the purpose of calibration of wind tunnel? How the wind tunnel test section speed and horizontal buoyancy is calibrated?
- b) Write short notes on following:
 - i) Calibration of wind tunnel.
 - ii) Turbulence measurement.
 - iii) Test section speed calibration. [8+8]
- 3.a) Describe the types of wind tunnel balances and explain one with diagram.
- b) With diagram show how the lift, drag, pitching moment and rolling moment is measured by the wind tunnel balances. [8+8]
- 4.a) Name the three pressure measuring equipments and explain one with diagram.
- b) What are the fix components measured by the wind tunnel balances? Explain how these are measured. [8+8]
- 5.a) Write any three Non dimensional numbers used for Aerodynamics and their importance.
- b) Write the types of Similarities and explain each in detail with examples. [8+8]
- 6.a) Explain and derive Buckingham theorem.
- b) What is Scale effect and how it is related to the Similarities? [8+8]
- 7.a) Write down the principle of low speed subsonic wind tunnel and draw the neat diagram.
- b) Explain with neat sketches the function of supersonic wind tunnel. [8+8]
- 8.a) Explain the losses of subsonic wind tunnel.
- b) Explain layouts, sizing and design parameters of hypersonic wind tunnel. [8+8]

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SET-4

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

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Describe the types of wind tunnel balances and explain one with diagram.
- b) With diagram show how the lift, drag, pitching moment and rolling moment is measured by the wind tunnel balances. [8+8]
- 2.a) Name the three pressure measuring equipments and explain one with diagram.
- b) What are the fix components measured by the wind tunnel balances? Explain how these are measured. [8+8]
- 3.a) Write any three Non dimensional numbers used for Aerodynamics and their importance.
- b) Write the types of Similarities and explain each in detail with examples. [8+8]
- 4.a) Explain and derive Buckingham theorem.
- b) What is Scale effect and how it is related to the Similarities? [8+8]
- 5.a) Write down the principle of low speed subsonic wind tunnel and draw the neat diagram.
- b) Explain with neat sketches the function of supersonic wind tunnel. [8+8]
- 6.a) Explain the losses of subsonic wind tunnel.
- b) Explain layouts, sizing and design parameters of hypersonic wind tunnel. [8+8]
- 7.a) Name the two equipments and their working principles to calibrate the flow angularity in low speed subsonic wind tunnel.
- b) How the supersonic wind tunnel is calibrated? Explain with diagrams. [8+8]
- 8.a) What is the purpose of calibration of wind tunnel? How the wind tunnel test section speed and horizontal buoyancy is calibrated?
- b) Write short notes on following:
 - i) Calibration of wind tunnel.
 - ii) Turbulence measurement.
 - iii) Test section speed calibration. [8+8]

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