15AE752

enth Semester B.E. Degree Examination, July/August 2021 **Wind Tunnel Techniques**

Max. Marks: 80

Note: Answer any FIVE full questions. 1 a. Define Buckingham theorem. b. Show that the lift FL on airfoil can be expressed as F _L = ρν² d² φ (ρνd μ, α). (12 Marks) 2 a. Define following dimensionless number: i) Reynolds number ii) Froude's number (06 Marks) b. In an aeroplane model of size 1/10 of its prototype the pressure drop is 7.5 kN/m². The model is tested in water. Find the corresponding pressure drop in the prototype. (10 Marks) 3 a. Explain with neat sketch, open circuit low speed wind tunnel. (08 Marks) b. Describe irregularities of flow in low speed tunnel. (08 Marks) b. Explain with neat sketch, Indraft type Supersonic wind tunnel. (08 Marks) b. Explain with neat sketch, Pressure driven hypersonic wind tunnel. (08 Marks) b. Describe the techniques used for turbulence measurement in a wind tunnel. (08 Marks) b. Write a short note on pressure and temperature measurement in wind tunnel. (08 Marks) b. Discuss with neat sketch, Wire type balance. (08 Marks) b. Discuss with neat sketch, optical flow visualization technique for supersonic flow wind tunnel. (08 Marks) b. Explain briefly Flow visualization by Shadow Graph method. (08 Marks) b. Explain with a neat sketch the basic principle of barometer. (08 Marks) c) Marks) 6 a. With neat sketch, explain Water flow channel. (08 Marks) b. Explain with a neat sketch, Flat plate boundary layer measurement. (08 Marks) c) Marks) 6 a. Explain with example, Taylor – Proudman theorem. (08 Marks) Write a short note on Unsteady pressure measure technique in wind tunnel. (08 Marks)				
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Important Note: 1. On completing your answers, compulsorily draw dis