Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ANE) (Sem.–6)

WIND TUNNEL TECHNIQUES

Subject Code : ANE-326

Paper ID : [A1232]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Q1 Define & explain the importance of following :

a) Reynolds' Number.

b) Froude Number.

e) Buoyancy correction.

d) Wake blockage.

e) Diffuser section of wind tunnel.

f) Energy ratio.

g) Force balance.

h) Test section flow quality.

i) List various flow visualization techniques.

j) Calibration of wind tunnel.

SECTION-B

Q2 Explain '*Laser-Doppler anemometry'*.

Q3 Write a note on '*Particle image velocimetry*'.

Q4 Define and explain the usage of hot-wire anemometer.

Q5 Explain briefly the optical methods of flow visualization.

Q6 Distinguish between supersonic and hypersonic wind tunnels.

SECTION-C

Q7 Distinguish between internal & external wind tunnel balances. Discuss the utility of three degree of freedom and six degree of freedom balances. (4,6)

Q8 Sketch a subsonic open circuit wind tunnel. What parameters are considered during the design of a subsonic open circuit wind tunnel? Explain the process for measurement of pressure and velocity in subsonic open circuit wind tunnel. (3,3,4)

Q9 Write notes on the following (**Any two**) : (2×5)

a) Dye injection special techniques

b) Transonic tunnels

c) Non-dimensional numbers & their importance