CBCS SCHEME

15AE752

Seventh Semester B.E. Degree Examination, Jan./Feb.2021
Wind Tunnel Techniques

Time: 3 hrs.

Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 Obtain the expression for the following non-dimensionless numbers:
   a. Reynold's number
   b. Weber's number.
   c. Froude's number
   d. Mach's number.
   e. Euler's number.

(16 Marks)

OR

2 Using Buckingham's π-theorem, show that the discharge Q consumed by an oil ring is given by,

$$\alpha = Nd^3 \phi \left[\frac{\mu}{\rho Nd^2}, \frac{\sigma}{\rho N^2 d^3}, \frac{\omega}{\rho N^2 d} \right]$$

where d is the internal diameter of the ring, N is rotational speed, ρ is density, μ is viscosity, σ is surface tension and ω is the specific weight of oil. (16 Marks)

Module-2

3 Explain the following:
   a. High Reynolds number tunnels.
   b. Automobile wind tunnels.
   c. Aeroacoustic wind tunnels.
   d. General-purpose wind tunnels.
   e. Environmental wind tunnels.

(16 Marks)

OR

4 With a neat sketch explain the following:
   a. Blow down wind tunnel (open circuit)
   b. Blow down wind tunnel (closed circuit).
   Also explain the advantages and disadvantages.

(16 Marks)

Module-3

5 Explain the following:
   a. Calibration of subsonic low speed wind tunnel.
   b. Calibration of supersonic wind tunnels.

(16 Marks)

OR

6 With a neat sketch, explain the following:
   a. Turbulence sphere.
   b. Pressure sphere.
   c. Hot-wire anemometer.

(16 Marks)

Module-4

7 With a neat sketch explain the following:
a. A wire balance.
b. Strut-type balance.
c. Platform-type balance. **(16 Marks)**

OR

8 With a neat sketch explain the wood smoke generator and kerosene smoke generator.
(16 Marks)

Module-5

9 With a neat sketch explain the Guidelines for wind tunnel experiments. **(16 Marks)**

OR

10 Discuss the store carriage and separation tests. **(16 Marks)**

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