UNIT - 1

1. Explain Buckingham PI theorem with example.
2. Define any five non dimensionless members.
3. An aircraft is to fly at a height of 9Km where temperature & pressure are $-45°C$ & 30.2Kpa at 400m/s. A 1/20th scale model is tested in a pressurized wind tunnel in which the air at $15°C$ for completes dynamic similarity. What would be P & V should be used in WT. For air $\mu \alpha$ T3/2 / (T + 117), Es = γp, P = ρRT where T is in Kelvin & γ is the ratio of specific heats.
4. A 7.2m height & 15m long spillway discharges 94m3/s discharge under a head of 2.0m. If 1:9 scale model of this spillway is to be constructed, determine model dimensions, head over spillway model & the model discharge. If model experience a force of 7500N. Determine force on the prototype.

UNIT - 2

5. Explain about losses in subsonic wind tunnel.
6. Give the Classification of wind tunnel & explain about hypersonic wind tunnel.
7. With a neat sketch explain about types of supersonic wind tunnel.
8. Explain about losses in supersonic wind tunnel.
9. Explain about high speed wind tunnel with neat sketch.

UNIT – 3

10. Derive the expression for test section speed.
11. With a neat sketch explain about calibrations of supersonic wind tunnel.
12. Explain about flow angularity measurements & its types.
13. With a neat sketch explain about turbulence measurements.

UNIT – 4

14. Explain about any one types of wind tunnel balances with neat example.
15. With a neat sketch explain about velocity measurements using LDA.
16. With a neat sketch brief about pressure measurements by using transducers.
17. With a neat sketch explain about force measurements in wind tunnel.

UNIT – 5

18. Explain about optical method of flow visualization.
19. Explain flow visualization method by using smoke & tuft grid techniques.
20. With a neat sketch explain about dye injection techniques.