SECTION-A

Q.1. (i) A small metal ball of mass m is dropped in a liquid contained in a vessel, attains a terminal velocity V. If a metal ball of the same material but of mass 8m is dropped in the same liquid then the terminal velocity will be
(a) V (b) 2V (c) 4V (d) 8V

(ii) Water is flowing through a tube of non-uniform cross section. Ratio of the radius at entry and exit end of the pipe is 3:2. Then the ratio of velocities at entry and exit of liquid is.
(a) 8:27 (b) 4:9 (c) 1:1 (d) 9:4

(iii) In Bernoulli’s theorem, which of the following is conserved?
(a) linear momentum (b) angular momentum (c) mass (d) energy

(iv) The venturimeter measures the pressure difference by measuring
(a) height difference (b) temperature difference (c) velocity difference (d) volume difference

Q.2. (i) State Bernoulli’s Equation.

(ii) A cylinder of height 20m is completely filled with water. The velocity in ms\(^{-1}\) of efflux of water through a small hole on the side of cylinder near bottom is?

(iii) Explain lifting up of an aeroplane according to Bernoulli’s equation.

SECTION-B

Q.3. Explain working of atomizer.

Q.4. State and write equation of continuity.

Q.5. Terminal velocity of a steel ball of diameter 0.2 cm when falls through a tube filled with glycerine is?
g=9.8 m/s\(^2\) density of steel = 800 kg/m\(^3\)
density of glycerine= 1330 kg/m\(^3\)
\(\eta=8.33\) poise.

Q.6. A wind with speed 40 m/s blows parallel to the roof of a house. The area of the roof is 250 m\(^2\). Assuming that the pressure inside the house is atmospheric pressure the force exerted by the wind on the roof and the direction of the force will be?
\(\rho\) air = 1.2 kg/m\(^3\)
SECTION-C

Q.7. Derive an expression for speed of efflux. (3)

Q.8. With what velocity does water flow out of an orifice in a tank with gauge pressure $4 \times 10^5 \text{N/m}^2$ before the flow starts? Density of water $= 1000 \text{kg/m}^3$. (3)

SECTION-D

Q.9. Derive an expression for terminal velocity. (4)