ENERGY DISSIPATORS

9.1 Water depth and Froude number at the entrance of the stilling basin are 0.5 m and 6, respectively. Determine the length of the hydraulic jump and calculate the energy dissipated in the hydraulic jump with the analytical and graphical solution.

9.2 Unit discharge (q) is given 6 m^3/m.s in an energy dissipator. Water depth on upstream of hydraulic jump and downstream normal water depth is 0.6 m and 2.5 m, respectively. Determine the type of energy dissipator comparing water depth on downstream of hydraulic jump and downstream normal water depth.

9.3 Maximum, minimum and average discharges in an energy dissipator are given as 1300 m^3/s, 40 m^3/s, 135 m^3/s, respectively. Water depths on downstream of the hydraulic jump and downstream normal water depths are shown in Table 1 for each discharge. Determine the type of energy dissipator by using rating curves for each discharge.

Table 1 Water depths on downstream of hydraulic jump and downstream water depths

	Maximum discharge (m^3/s)	**Maximum discharge (m^3/s)**	**Average discharge (m^3/s)**
Water depth on downstream of the hydraulic jump (m)	2.5	0.9	1.8
Downstream normal water depth (m)	3.5	0.5	1.5

9.4 Determine the dimensions of the stilling basin if water depth on downstream of the hydraulic jump and downstream normal water depth are 2.8 m and 1.6 m, respectively.

9.5 Difference between crest elevation and the bottom of downstream is 10.5 m and the average velocity over a diversion weir is 0.4 m/s. Unit discharge (q) is 4 m^3/m.s if the spillway water depth is 1,5 m. Find water depth and velocity on the toe of the diversion weir (Neglect the spillway losses).

9.6 The length of a diversion weir and the fall height of the weir are 150 m and 25 m, respectively. Unit discharge (q) is given as 4.5 m^3/m.s if water nappe can be 2 m, find water depth on the toe of the weir.

9.7 Crest length of a diversion weir and elevation difference between crest and stilling basin are 42 m and 12 m, respectively. Discharge is given 147 m^3/s. Find critical water height over the weir and water depth at the toe of the weir.

9.8 Velocity on the upstream of the hydraulic jump and Froude number are given for 2 cases in Table 2. Determine the dimensions and type of stilling basin for each case.

Table 2 Velocities and Froude numbers for Question 9.8

	Velocity (m/s)	**Froude Number**
Case 1	3	1.4
Case 2	5	2.0

9.9 Determine the dimensions of the stilling basin if velocity on the upstream of the hydraulic jump is 7 m/s (Fr=4.0).