

NAME: Maqsood Khan

SECTION: B

Id: 7718

SUBJECT: Hydraulic Structures

SUBMITTED TO: Engr. Adeed Khan

SEMESTER = 8th

DEPT: CIVIL

Q1(a)

①

Ans: RESERVOIR:

A natural or artificial place where water is collected and stored for use, especially water for supplying a community, irrigation lands, power etc.

- Service Reservoir will be more economical as compared to other type of reservoir. It is also known as "Distribution Reservoir." These are the storage reservoir, which store treated water.
- Service reservoirs store fully treated potable water close to the point of distribution, so need less cost and energy for distribution of water.
- Large service reservoir can also be managed to reduce the cost of pumping, by refilling the reservoir at times of day when energy costs are low.

(2)

Economical Reservoir:

Service reservoir is

economical because its entirely man-made.

Its frame easily constructed as well as

no need of any water body direction.

Less space is required for service reservoir.

Q 1
(b)

Ans:

I will suggest Rock Fill embankment because the earth fill embankment consist of 50% or more soil and the rock fill embankment consist of 50% or more rocks. Therefore we have to choose rock fill embankment for hilly area because in hilly areas rocks are easily available it would have more strength and due to easily availability of material our project will be economical and safe.

Q2:

Ans: DIFFERENT TYPES OF SPILLWAYS:

- ① Straight Drop spillway
- ② Ogee spillway
- ③ Shaft spillway
- ④ Chutte spillway
- ⑤ Side channel spillway
- ⑥ Siphon spillway
- ⑦ Labyrinth spillway

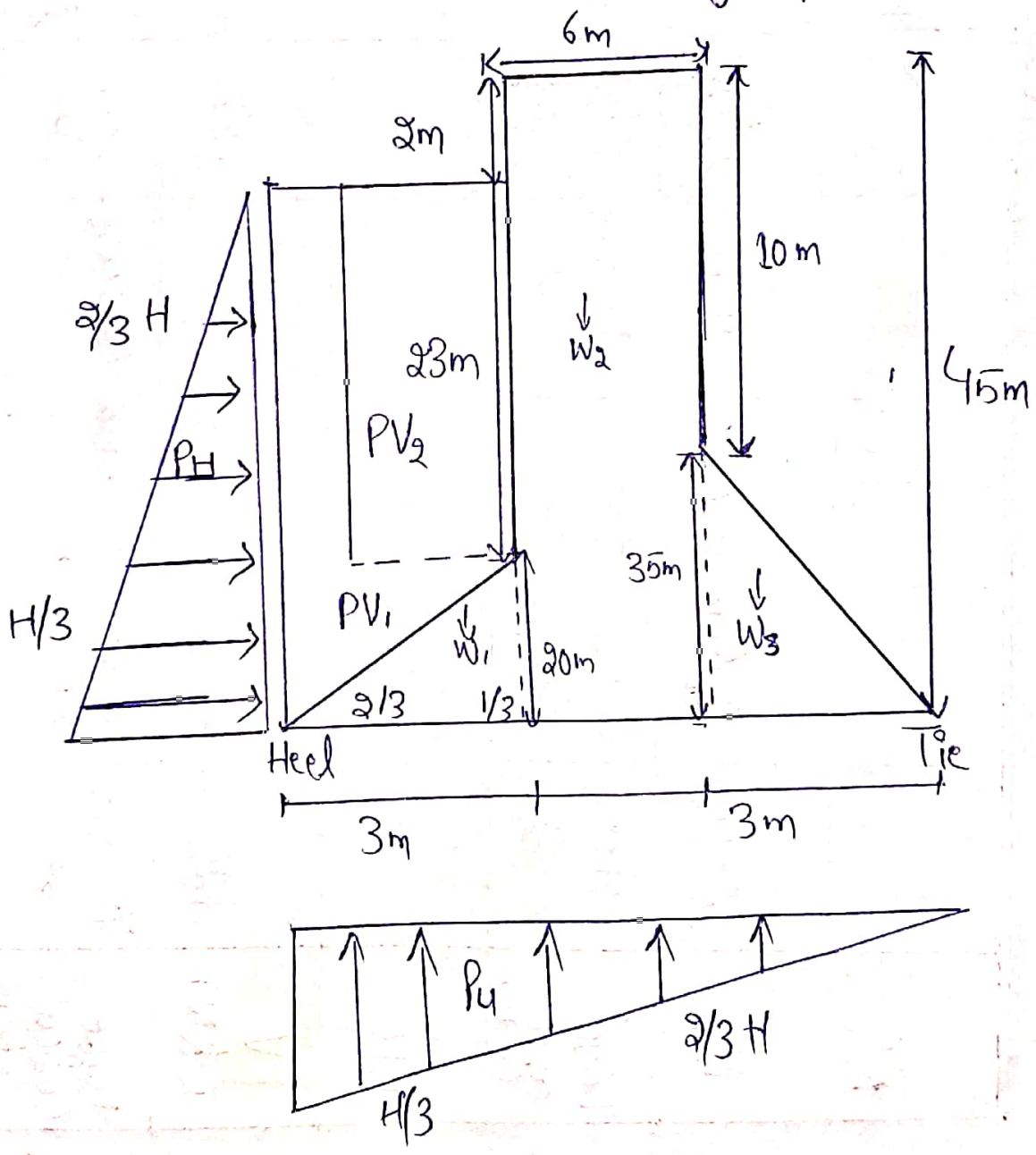
→ I will suggest Siphon Spillway

Reason: Because when the air in the bend has been exhausted, siphonic action starts and continuous flow is maintained until air enters the bend. The inlet end of the conduit is placed well below the normal reservoir water level to prevent ice and drift from entering the conduit.

Q3 (a)

Sol: Gravity Dam.

for the gravity Dam as shown in figure, we will check the stability. In reservoir full condition considering weight of dam, water pressure and weight pressure.



Eccentricity Given as,

$$e = \frac{B}{Z} - \bar{x} \rightarrow (A)$$

$$\bar{x} = \frac{\sum Mx - \sum Mo}{\sum Fv} = \frac{157305 - 289560.85}{11550}$$

$$\bar{x} = 14.52$$

By putting values "A"

$$e = \frac{34}{2} - 14.52 = 17 - 14.52$$

$$e = 2.48$$

(1)

Factor of safety for Tension

$$e < \frac{B}{6}$$

$$2.48 < \frac{34}{6}$$

$$2.48 < 5.67 \quad \underline{\underline{OK}}$$

④ ⑦ ⑧

Stress:

$$Y_{heel} > 0$$

$$Y = \frac{\sum f_v}{B} \left(1 \pm \frac{6e}{B} \right)$$

$$Y_{Toe} = \frac{\sum f_v}{B} \left(1 + \frac{6e}{B} \right)$$

$$Y_{Toe} = \frac{11550}{34} \left(1 + \frac{6(2.48)}{34} \right)$$

$$Y_{Toe} = (339.71)(1+0.48)$$

$$Y_{Toe} = (339.71)(1.48)$$

$$Y_{Toe} = 502.778$$

$$Y_{heel} = \frac{\sum f_v}{B} \left(1 - \frac{6e}{B} \right)$$

$$= \frac{11550}{34} \left(1 - \frac{6(2.48)}{34} \right)$$

$$= 339.71(1-0.44)$$

$$Y_{heel} = 290.24 > 0 \quad \frac{0.14}{1.1}$$

Factor of Safety Against

"Overturning"

Given as

$$\frac{\sum M_r}{\sum M_o} > 2$$

$$(\sum M_r) > 2(\sum M_o)$$

$$\frac{4157305}{289560.85} > 2$$

$$1.58 > 2$$

Not safe

$$4157305 > 2(289560.85)$$

safe

FOS Against Sliding

$$\frac{\sum F_v + Bq}{\sum F_H} > 1$$

Given

$$u = 0.7$$

$$q = 1400$$

$$= 0.65 - 0.75$$

$$\frac{(0.7)(11550) + (34)(1400)}{9245} > 1$$

$$\frac{8085 + 47600}{9245} > 1$$

$$6.02 > 1$$

OK

"Therefore our design is safe"