

Hazis Ali Shah

7530

Submitted to Sir Engr Adced

Dated 17/04/2020

## Question: 1 (Part: a)

### (a) Reservoir:

A reservoir is a man-made lake or large fresh body of water. Many people think of a reservoir as a lake and might even use the words interchangeably. However, the key difference is that reservoirs are artificial and lakes are naturally.

Mainly three types of reservoir;

- Valley dammed reservoir
- Bank-side reservoir
- Service reservoir

In above three types, service reservoir is most economical because it is entirely manmade. Its frame construction is easy as well as no need of any natural water body diversion. It also required small space.

## Question: 1 (Part: b)

There are types of embankments dam. Earth fill embankments and Rock fill embankments earth fill embankment are the one which consists of 50% or more soil while rock fill embankment are the one which consist of 50% or more rock. If we have to build an embankments in a hilly area, we should built rock fill embankments because rock fill embankments have more strength then earth fill embankments and in hilly area rocks will be easily available which will make our project economical and save.

## Question : 2

(a) List down different types of spillways also mention which type of spillway will be more efficient in a condition where freezing point of water is less than  $-10$  degree centigrade in winters and why?

Answer :-

Types of spillways:

Types of spillways are as follows;

1. Straight drop
2. Ogee spillway
3. Shaft
4. Chute
5. Side channel
6. Siphon
7. Cabyrinth

### Ogee shaped spillway:

An ogee shaped spillway is the most commonly used spillway.

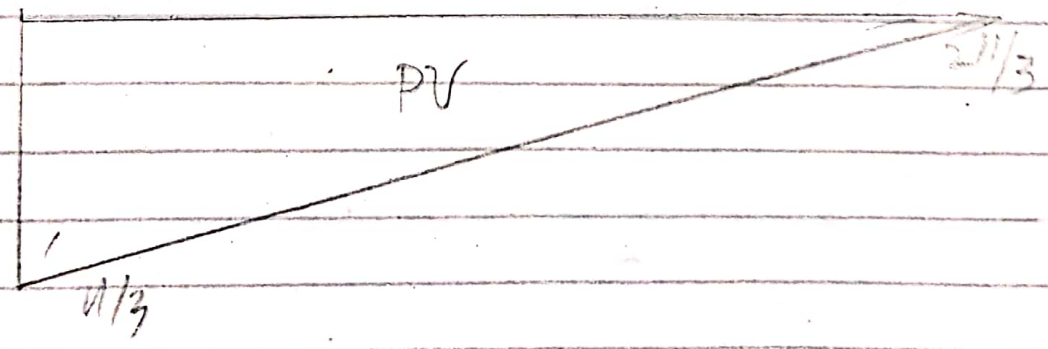
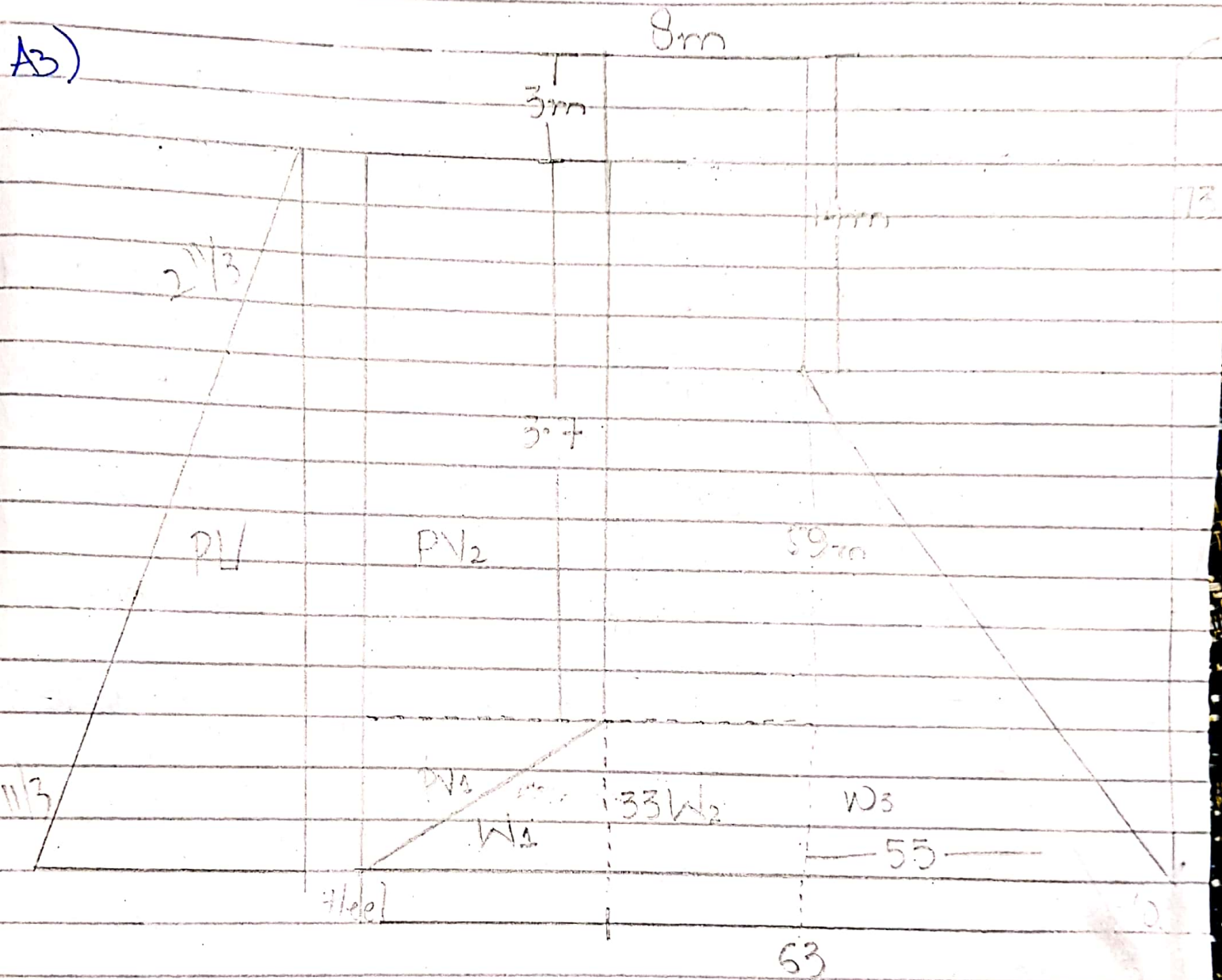
- It is widely used with gravity dam, Arch dams and buttress dams.
- Several rock fills and earth fill dams are also provided with this type of spillway as a superstructure.
- An ogee shaped spillway is took like English Letter 'S'
- The upper part of the spillway

surface matches closely to the  
lower nappe of a ventilated  
spillway.

In  $-10$  degree centrifugal area we  
will suggest ogee shaped spillway.

Q3) Design the --- pressure

A3)



Forces	Forces Calculation	FV	FH	L.A
W <sub>1</sub>	$\frac{1}{2} \times 6 \times 33 \times 24$	2376	0	$63 + \frac{6}{3} = 65$
W <sub>2</sub>	$8 \times 73 \times 24$	14016	0	$55 + \frac{8}{2} = 59$
W <sub>3</sub>	$\frac{1}{2} \times 55 \times 59 \times 24$	38940	0	$55 \times \frac{2}{3} = 36.67$
PV <sub>1</sub>	$\frac{1}{2} \times 6 \times 33 \times 10$	990	0	$63 + \frac{9 \times 6}{3} = 67$
PV <sub>2</sub>	$6 \times 37 \times 10$	2220	0	$63 + \frac{6}{2} = 66$
PU	$-\frac{1}{2} \times 69 \times 70 \times 10$	-24150	0	$69 \times \frac{2}{3} = 46$
PH	$-\frac{70^2 \times 10}{2}$		-24500	$70 \times \frac{1}{3} = 23.3$

$$\sum FV = 34392 \quad \sum FH = 24500$$

$$e = \frac{B}{2} - \bar{x}$$

$$\bar{x} = \frac{2622163.8 - 1681750.0}{34392}$$

$$\bar{x} = 27.34 \text{ m}$$

$$e = 69/2 - 27.34$$

$$e = 7.16 \text{ m}$$

Mr

Mo

154440

0

826944

0

1427929.8

0

66330

0

146520

0

1110900

570850

$\Sigma Mr = 2622163.8$   $1681750.0$



Condition:

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

$$e < \frac{69}{6}$$

$$7.16 < 11.5 \quad \text{OK safe}$$

$$\sigma_{heel} > 0$$

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

$$\sigma_{toe} = \frac{\sum FV}{B} \left( 1 + \frac{6e}{B} \right) \Rightarrow \frac{34392}{62} \left( 1 + \frac{6(7.16)}{69} \right)$$

$$\sigma_{toe} = 808.76 \text{ kN/m}^2$$

$$\sigma_{heel} = \frac{\sum FV}{B} \left( 1 - \frac{6e}{B} \right) \Rightarrow \frac{34392}{62} \left( 1 - \frac{6(7.16)}{69} \right)$$

$$\sigma_{heel} = 188.10 \text{ kN/m}^2$$

$$\sigma_{heel} > 0 \quad \text{OK safe}$$

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

$$\frac{\sum M_y}{\sum M_o}$$

$$= \frac{2622163 \cdot 8}{1681750 \cdot 0}$$

$$= 1.56 < 2 \quad \text{Not Safe}$$

$$= 1.56 < 2 \quad \text{Not Safe}$$

$$\sum M_r > \sum M_o$$

$$2622163.8 > 1681750.0 \text{ Safe}$$

$$\frac{U \sum F_v + B \times q}{\sum F_H} > 1$$

$$\frac{0.75 \times 34392 + 69 \times 1400}{24500}$$

$$4.99 > 1 \quad \text{OK safe}$$