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Section : A

Module : 8th Semester

Subject : Hydraulic Structure

Submitted to :

Engg. A deed

Assignment no. 1

Qno1

(a)

• Reservoir:

A reservoir is a man made lake or large fresh water 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 natural.

• Mainly three type of reservoirs.

Valley dammed reservoir

Bank side reservoir

Service reservoir

In the above three types, service reservoir is most economical because it is entirely man made, its frame construction is easily as well as no need of any natural water body diversion it also required small space.

Q101

(b)

- There are two type of embankment dam
 - 1) Earth fill embankment
 - 2) Rock fill embankment.

Earth fill embankment are the one which consist of 50% or more soil while rock fill embankment are the one which consist of 50% or more rock. if we have to build in embankment in a hilly area we should build rock fill embankment because rock fill embankment have more strength then earth fill embankment and in hilly area rock will be easily available which will make our project economical and safe.

Q No 2

Ans Different type of spillways.

- 1) Strength drop spillway
- 2) Ogee spillway
- 3) Shaft spillway
- 4) chute spillway
- 5) Side channel spillway
- 6) Siphon spillway.
- 7) Labyrinth spillway.

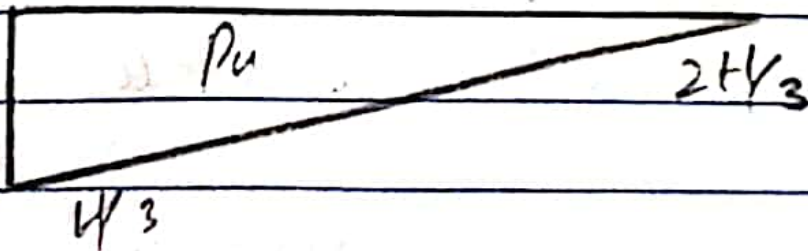
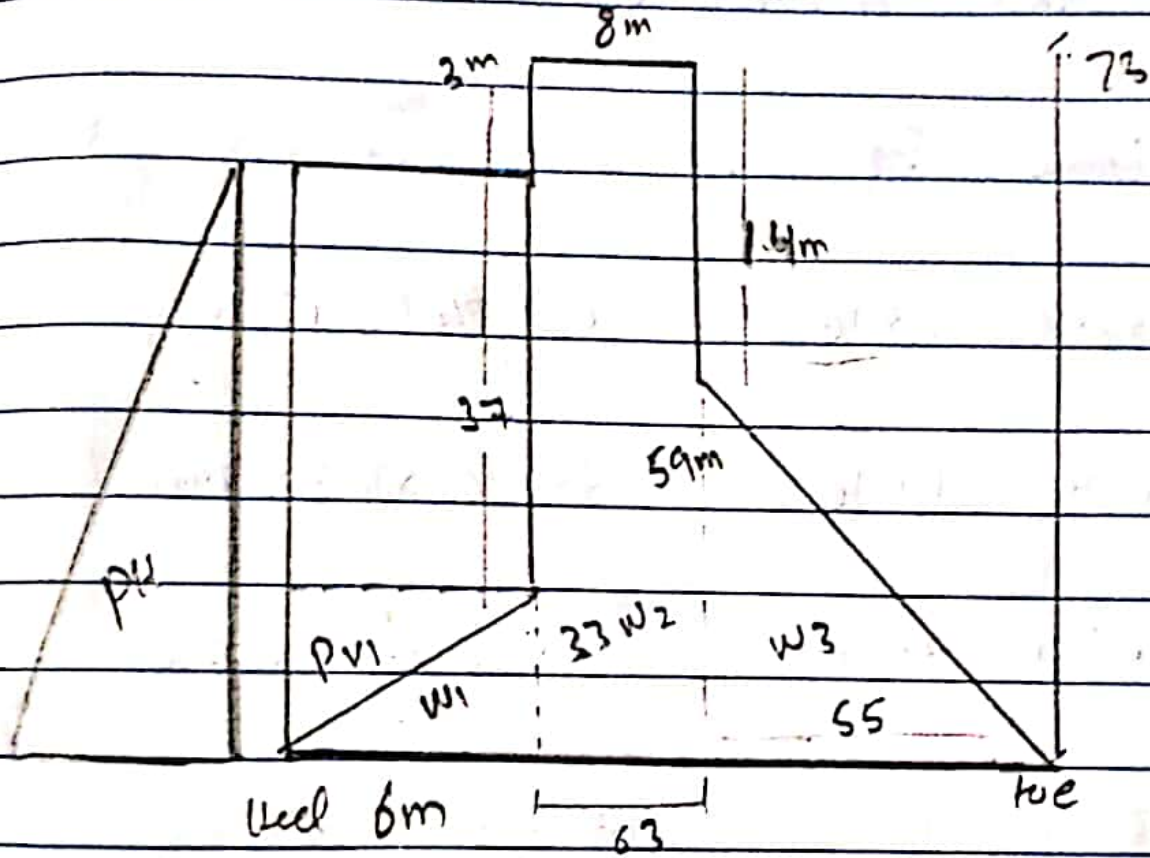
* Ogee spillway is generally more efficient in a condition where freezing point of water is less than -10 degree Centigrade because the down stream profile of the spillway is coincide with the shape of the lower nappe of the free falling jet from the sharp crested weir. In this shape the lower nappe is similar to a projectile and hence down stream surface of the ogee spillway will follow parabolic path where "O" is the origin of parabola.

* Ogee spillway is also best for this condition

Because in this temperature the head is minimum and when spillway runs with maximum head, the overflowing water just follow the curve profile of the spillway and there is no gap between the water spillway surface so discharge is maximum.



Q No 3



Forced and moment Calculation

QNO 3

Forces	Force formula	F _y	F _x	level Area ^(ms)	M _x	M _o
W ₁	$\frac{1}{2} \times 6 \times 33 \times 24$	2376		$63 + \frac{6}{3} = 65$	15440	
W ₂	$8 \times 73 \times 24$	14016		$55 + \frac{8}{2} = 59$	826944	
W ₃	$\frac{1}{2} \times 55 \times 59 \times 21$	38940		$55 \times \frac{2}{3} = 36.67$	14279298	
P _{v1}	$\frac{1}{2} \times 6 \times 33 \times 10$	990		$63 + \frac{2 \times 6}{3} = 67$	66330	
P _{v2}	$6 \times 37 \times 10$	2220		$63 + \frac{6}{2} = 66$	146520	
P _u	$-\frac{1}{2} \times 69 \times 70 \times 10$	-24150		$69 \times \frac{2}{3} = 46$		1110900
P _H	$-\frac{70^2}{2} \times 10$		-24500	$70 \times \frac{1}{3} = 23.3$		570850

ΣF_H =

ΣM_x =

ΣF_v = 34392

24500

2622163.8

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

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

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

$$e = \frac{69}{2} - 27.34$$

$$e = 7.16m$$

Condition:

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

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

$$7.16 < 11.5 \quad \text{ok} \quad \text{Safe}$$

$$\gamma_{\text{need}} > 0$$

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

$$\gamma_{to\ e} = \frac{\sum F_v}{B} \left(1 + \frac{6e}{B} \right)$$

$$= \frac{34392}{69} \left(1 + \frac{6(7.16)}{69} \right)$$

$$\gamma_{to\ e} = 308.76 \text{ kN/m}^2$$

$$\gamma_{\text{need}} = \frac{\sum F_v}{B} \left(1 - \frac{6e}{B} \right)$$

$$= \frac{34392}{69} \left(1 - \frac{6(7.16)}{69} \right)$$

$$\gamma_{\text{need}} = 133.10 \text{ kN/m}^2$$

$$\gamma_{\text{need}} > 0 \quad \text{ok}$$

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

$$\sum M_o$$

$$= \frac{2622163.8}{1681750.0}$$

$$= 1.56 \neq 2 \quad \text{Not safe}$$

$$\sum M_y > \sum M_o$$

$$2622163.8 > 1681750.0 \quad \text{safe.}$$

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

$$\frac{0.75 \times 34392 + 69 \times 1400}{29500}$$

$$4.99 > 1 \quad \text{ok safe.}$$

THE END