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Paper Hydrulic Structure

SECTion A

(A)

Question No # 1

(A) Define reserviour also explain which type of reserviour will be more encomical and why ?

Answer :-

Reserviour :-

Reserviour is a man-made lake or large freshwater body of water.
Many people think of a reservior as a lake and might even use the word interchangeably.
However the key difference is that reserviour are artifical and lakes are naturally.

Mainly there are three type of Reserviour.

(2)

→ Valley damed Reserviour

→ Bank-Side Reserviour

→ Service Reserviour

In the above three type, service reserviour is most economical because it is entirely man made.
His Frame construction is easily as well as no need of any natural water body of diverstion.
it also require small space.

(3)

(b)
Which type of embankment dam you will suggest in a hilly area and why?

Answer:-

There are two type of embankment dam. Earth Fill embankment and Rock Fill embankment dam. Earth Fill embankment are the one which consist of 50% of more Soil. while rock Fill embankment are the one which consist of 50% or more rock. if we have to build an embankment in hilly area we should built rock Fill embankment. because rock Fill embankment have more strength than earth Fill embankment and in hilly area rock will be easily available which make our Project economical and

(4)

Question # 2

Ans:- Different type of Spillways.

(1) Strength drop Spillway
(2) ogee spillway
(3) Shaft spillway
(4) Crute Spillway
(5) Side channel spillway
(6) Siphon spillway
(7) Labyrinth spillway

* ogee spillway is generally more efficent in a condition where breezing point of water. is less than -10 degree centigrade because the downstream Profile of the spillway is made to coincide with the sp shape of the lower nappe of the free falling jet from the sharp crested ~~wire~~. weir.

P.T.O

(3)

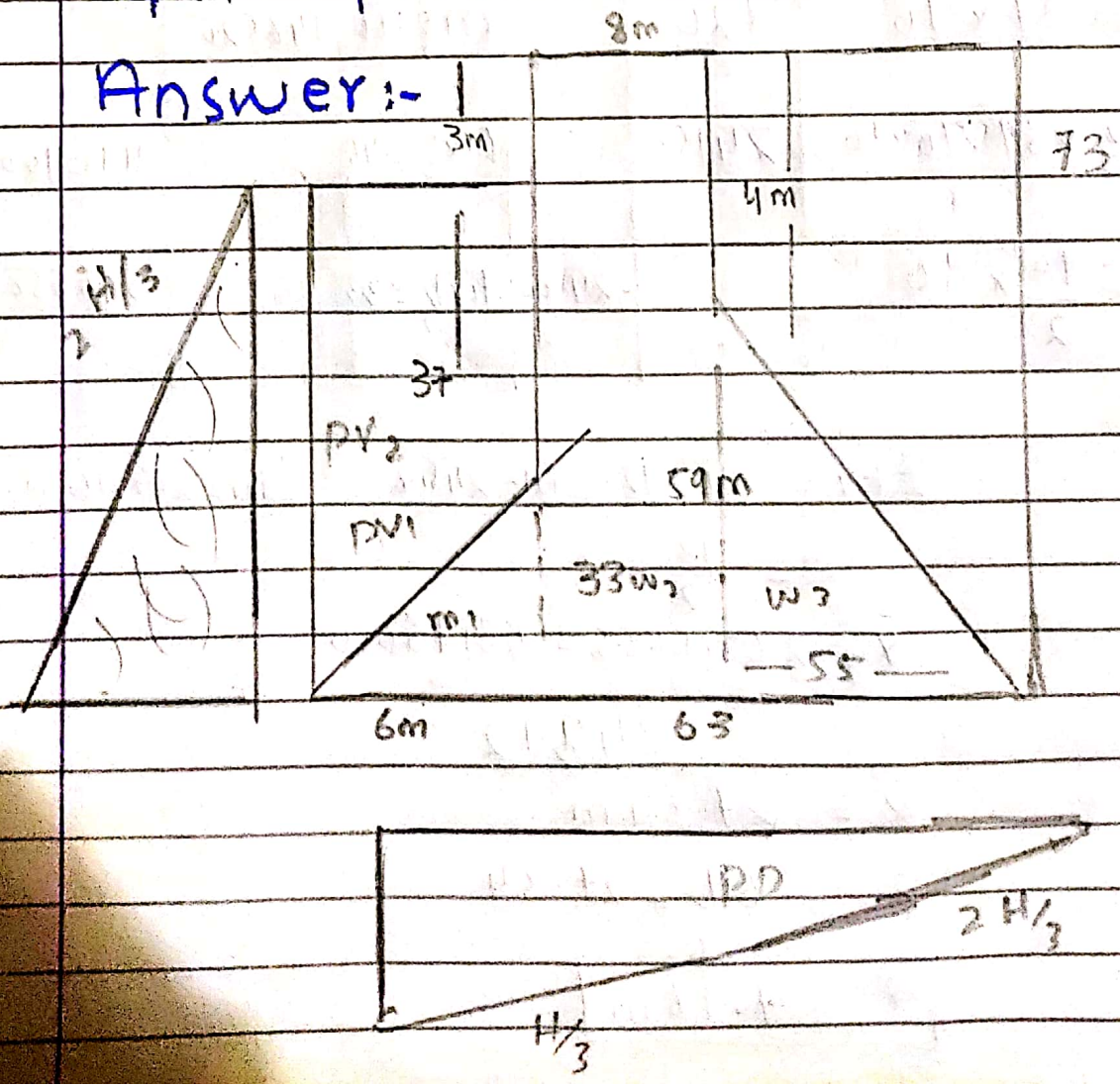
In this shape the lower nappe is similer to a projectile and hence the downstream surface of the ogee spillway will Fellow the parbolic path. where "O" is the origin of parabola.

ogee spillway is also best for this condition because In this condition temperature the head is maximum and when the spillway run with maximum head The overflowing water just Fellow the curve profile of the spillway and there is no gap blw the water and spillway surface So discharge is maximum.

Question No # 3

Desgin the gravity dam by assuming the dam dimension Find all the Stability check at least three of them must be in safe condition and economical. In the Reservioux Full ~~condition~~ Considering wisut of dam, water pressure and uplft pressure.

Answer:-



	Force calculation	FV	FH	L.A	Mr	Mo
W_1	$\frac{1}{2} \times 6 \times 33 \times 24$	2376		$63+6/3=65$	15440	
W_2	$8 \times 73 \times 24$	14016		$55+8/2=59$	826944	
W_3	$\frac{1}{2} \times 55 \times 59 \times 24$	38940		$55 \times 2/3 = 36.67$	142792.3	
P_{V_1}	$\frac{1}{2} \times 6 \times 33 \times 10$	990		$63 \times \frac{2 \times 6}{3} = 67$	66330	
P_{V_2}	$6 \times 37 \times 10$	220		$63+\frac{6}{2}=66$	146520	
P_H	$-\frac{70^2}{2} \times 10$		-24500	$70 \times 1/2 = 233$		570850
P_H	$\frac{1}{2} \times 69 \times 70 \times 10$	24150		$69 \times \frac{2}{3} = 46$		1110900

$\Sigma FV = 34392$ $\Sigma FH = 24500$ $\Sigma mr = 2622163.88168$

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

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

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

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

$$\boxed{\bar{e} = 7.16\ m}$$

(8)

Condition:-

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

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

$7.16 < 11.5$ ok Safe

$\gamma_{heel} > 0$

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

$$\gamma_{toe} = \frac{\Sigma Fv}{B}\left(1 + \frac{6e}{B}\right) \Rightarrow \frac{34392}{69}\left(1 + \frac{6(7.16)}{69}\right)$$

$\gamma_{toe} = 808.76$ KN/m²

$$\gamma_{heel} = \frac{\Sigma fv}{B}\left(1 - \frac{6e}{B}\right) \Rightarrow \frac{34392}{69}\left(1 - \frac{6(7.16)}{69}\right)$$

$\gamma_{heal} = 188.10$ KN/m²

$\gamma_{head} > 0$ or Safe

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

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

$= 1.56 \not> 2$ not Safe

P.T.O

$\Sigma M_r > \Sigma M_o$

$2622163.8 > 1681750.0$ safe

$$\frac{\mu \Sigma fv + B \times q}{\Sigma fx}$$

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

$4.99 > 1$ ok safe.