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Q NO#01 Part "a"

Ans 2

"RESERVOIR"

A french word.
Reservior means a 'Tank'
A reservoir is, most commonly, an elarged natural or artificial lake, pond or impoundment creceted using a down or lock to store water

"OR"

A natural or artificial place where water is collected and stored for use, espicially water for supplying a community, irrigating land, 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 reservoirs which are the storage reservoir.

Reason:

1) Service reservoirs store fully treated putable water close to the point of distibution, so need less cost and energy for distribution of water.

(ii) Service reservoir perform several functions
- Ensuring sufficient head of water in the water distribution system
- Providing water capacity to even out peak demand from consumers.

(iii) Large service reservoirs can also be managed to reduce the cost of pumping, by refilling the reservoirs at those times of day when energy costs are low

"b" # "Rockfill Embankment Dam"

Rockfill embankment dams are best and economical in hilly areas.
- Because Rockfill dams are appropriate for construction at locations where suitable rock can be quarried at or near the dam site and where the foundations will not be subjected to loading or to erosion from any seepage through or under the dam.
- One of the most important aspects of a rockfill dam is that it can be very cheap and economical since materials can be sourced from near the dam's location.

- This type of dam can also be suitable in areas that don't present the best conditi for deep foundations.
- The section of compacted granular soil helps to slow the flow of water while the impervious zone provides strength and stabilit during heavy rainfall and flood.
- Another key benefits is that it can stand not without cold conditions, hot and humid climates, as well.

Q NO# 02

Ans:-2

Spillways:

Types:-

Different types of spillways are as follows

i Straight drop spillway
ii Ogee spillway
iii Shaft spillway
iv ~~Chute~~ Spillway
v Side Channel spillway
vi Siphon spillway
vii Labyrinth Spillway

⇒ In a Condition where freezing point of water is less than —0

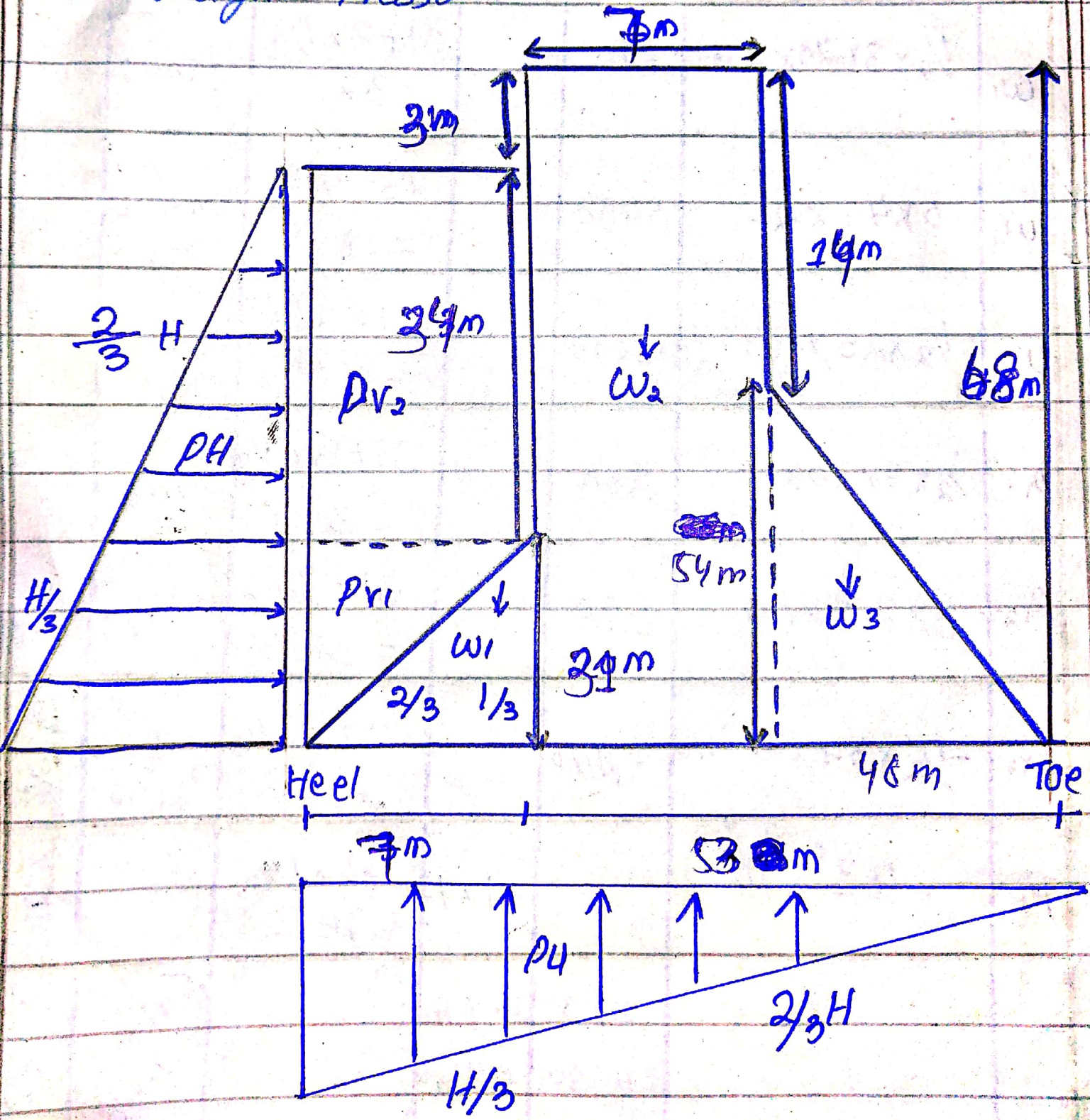
degree Centigrade in winters the most efficient Spillway is Chute Spillway Because Chute Spillway disposed water from upstream in the downstream through a Steepy Sloped open Channel so that the flow will be very fast cy the flow water pressure will be high cy will be in Supercritical Condition, So the energy will be dissipated from falling water due to kinetic energy because of the water in motion, energy dissipaton cy also provided in this types of Spillway thus the temperature of water will go high cy it will not allow water to freeze cy Stop so water is moving freely in the Cold area.

Q NO# 03:-

Ans No 3 **Graph Dam;**

For the graph Dam as shown in figure, we will check the stability. In reseorvoir full condition

considering weight of dam, water pressure, and weight pressure.



Assume; unit weight of Concrete section

$\gamma_d = 24\ KN/m^3$;

unit wt of water, $\gamma_w = 10\ KN/m^3$;

$\mu = 0.65 - 0.75$ & $q = 1400$.

Moment Calculation:-

Forces	Forces Calculation	vertical Forces F_V (KN)	Horizontal Forces (F_H)	Lever Arm L.A	Resisting Moment MR ($F_V \times LA$)	over Turning Moment MO
W_1	$\frac{1}{2}\times 7\times 31\times 24$	2604		$53+7/3 = 55.33$	144079.3	
W_2	$7\times 68\times 24$	29808		$46+7/2 = 49.5$	866488	
W_3	$\frac{1}{2}\times 46\times 54\times 24$	29808		$46\times 2/3 = 30.67$	9142136	
P_{V1}	$\frac{1}{2}\times 7\times 31\times 10$	1085		$53+\frac{2\times 7}{3} = 57.67$	62571.95	
P_{V2}	$34\times 7\times 10$	2380		$53+7/2 = 56.5$	134470	
P_U	$-\frac{1}{2}\times 60\times 65\times 10$	−19500		$60\times 2/3 = 40$		780000
P_H	$-65^2/2\times 10$		−21125	$65\times 1/3 = 21.67$		457778.75
		$\Sigma F_V = 2780/$	$\Sigma F_H = 21125$		$\Sigma M_R = 182082/0.61$	1237778.75

Eccentially of resultant force

$$e = \frac{B}{2} - \bar{x} = (1)$$

Where; $\bar{x}$ = location of resultant force from toe.

$$\bar{x} = \frac{\Sigma M_r - \Sigma M_o}{\Sigma FV}$$

$$\bar{x} = \frac{1820820.81 - 1237778.75}{27801.}$$

$$\bar{x} = 20.97 m.$$

So; eq(1)

$$e = \frac{BO}{2} - 20.97$$

$$e = 9.03 m$$

Factor of Safety against ~~Cond~~ Tension.

Condition:- $e < B/6$

$e < 60/6.$

$9.03 < 10$ ok safe.

Stress;

$\gamma heel > 0$

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

$$\gamma_{toe} = \frac{\Sigma FV}{B}\left(1 + \frac{6e}{B}\right)$$

$$\gamma_{toe} = \frac{27801}{60}\left(1 + \frac{6(9.03)}{60}\right)$$

$$\gamma_{toe} = 881.76 \text{ KN/m}^2.$$

$$\gamma_{heel} = \frac{\Sigma F_V}{B}\left(1 - \frac{6e}{B}\right)$$

$$\gamma_{heel} = \frac{27801}{60}\left(1 - \frac{6(9.03)}{60}\right)$$

$$\gamma_{heel} = 44.94 \text{ KN/m}^2.$$

$\gamma_{heel} > 0$ o/k safe.

Factor of safety against overturning :-

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

$$= \frac{1820820.61}{1237778.75}$$

$$= 1.47 \not> 2 \text{ Not safe.}$$

So; $\Sigma M_r > \Sigma M_o$

$1820820.61 > 1237708.33$

ok safe.

FOS against sliding :

$$\frac{\mu \times \Sigma F_V + B \times q}{\Sigma F_H} > 1$$

$$= \frac{0.75 \times 27801 + 80 \times 1400}{21125}$$

$$= 4.96 > 1 \quad \text{O/K Safe.}$$