MID-TERM PAPER.

ID # 7744.

SECTION: C.

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Q2 a, Define resesvious also explain which type of resesvious will be more economical & why?

Ans:-

RESERVIOUR:-

It is been defined as. "a lasge natusal or asbifical lake used as a sousce of wates supply".

=> The more wates we use, the more land has to be flooded.

* EXPLANATION:-

Basically as we know A resesvious is an asbifical lake where wates is stored.

=> Mostly resesvioss ase formed by constructing dams acsoss rivers.

=> A reservious can also be formed from a natural lake whose outlet has been dammed to control the wates level.

=> Basically the dam controls the amount of wates that flows out of the reservious.

* Types of Reservious:-

Some of its main types are given below:-

1, Dammed valleys.

2, Coastal reservious.

3, Bank-side reservious.

4, Service resious.

In the above types, the reservious which is more economical is service reservious beacuse it is entirely man made reservious. It's frame construction is easy

as well as no need of any natural water body diversion. It also required small space.

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

Ans:- As we know Embankment dams are mainly made from natural materials.

=> These are two types of embankments dam. Earth fill embankmet & Rock fill embankment.

=> Earth fill embankments are made up of mostly compacted earth.

=> Earth fill embakments are the one which consists of 50% or more soil in its properties.

=> While rock fill embankments are the one which consists of 50% or more rock.

* SUGGESTION:-

If we have to build an embankment in a hilly area we should build rock fill embankment because rock fill embankment has more strength then earth fill embankment & in hilly areas rock fill embankments are easily available which will help our projects economically & it will be more safe.

Question:2. 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 then -10 degree centigrade in winters & why?

ANSWER:- SPILLWAY:-

A spillway is a structure used to provide the controlled release of flows from a dam or levee into a down-stream area, typically the given bed of the dammed given itself.

=> It is a hydraulic structure built at a dam site for diverting the surplus water from a reservious after it has been filled to its maximum capacity.

* DIFFERENT TYPES OF SPILLWAY

Some of its types are given below:-

(i) Straight drop spillway.
(ii) overflow spillway or ogee spillway.
(iii) chute spillway
(iv) Side channel spillway.
(v) Shaft spillway.
(vi) Syphon spillway.
(vii) Labyrinth spillway.

* CONDITION :-

The types of spillways which will be more efficient in a condition where freezing point of wates is less than -10 degrees are as follows :-

(1) Straight Drop spillway.

(2) Shaft spillway.

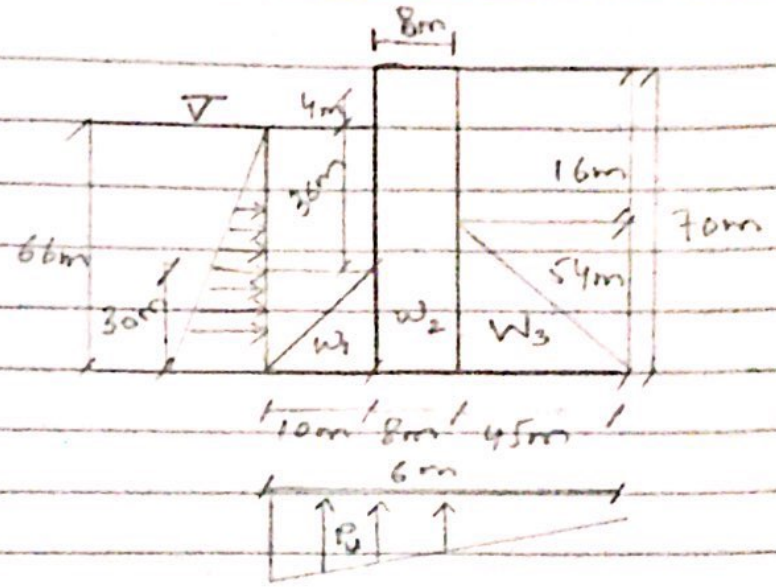
(3) Side channel spillway.

(4) Labyrith spillway.

=> usually shaft spillway used the most in coldes regions.

QUESTION : 3

ANSWER :-



=> Assume Unit wt for concrete = 24 KN/m³

=> Assume Unit wt for water = 10 KN/m³.

Now force & moment calculation.

forces	forced formula	FV (KN)	FH (KN)	Lever Arm (m)	Mr	Mo
W_1	½ x L x w x rc	3600	0	56.33	202800	0
W_2	L x w x rc	13440	0	49.00	658560	0
W_3	½ x L x w x rc	29160	0	30.00	874800	0
P_{V1}	½ x L x w x rw	1500	0	59.67	89500	0
P_{V2}	L x w x rw	3600	0	58.00	208800	0
P_V	(-½) x L x w x rw	-2079	0	42.00	0	873180
P_H	(-½ x L x w x rw	0	-2178	22.00	0	479160
				Σ	2034460	1352340

$\gamma_{toe} = (\Sigma Fv/B)(1 + 6e/B)$

$\gamma_{Toe} = 905.97128\ KN/m^3$

&

$\gamma_{Heel} = (\Sigma Fv/B)(1 - \frac{6e}{B})$

$= \left(\frac{30510}{63}\right)\left(1 - \frac{6 \times 9.14}{63}\right)$

$\boxed{\gamma_{Heel} = 62.72\ KN/m^3}$

Condition → Safe in Stress → OK.

⇒ For factor of Safety Against overs turning condition → $(\Sigma Mr/\Sigma Mo) > 2$

$\Rightarrow \frac{2034460}{1352340} \Rightarrow 1.50 \not> 2$

Condition → No of Safe in overs turning → No of OK.

$\Rightarrow$ Condition $\Sigma M_r > \Sigma M_o$

$\Sigma M_r = 2034460$

$\Sigma M_o = 1352340$

Condition $\Rightarrow$ safe $\Rightarrow$ ok.

$\Rightarrow$ for factor of safety Against Tension

condition $\Rightarrow e < B/6 \rightarrow B/6 = 10.50\ m$

eccentricity of the Resultant force

$\Rightarrow e = B/2 - \bar{x} \rightarrow (i)$

$\bar{x}$ = location of Resultant force from toe.

$\Rightarrow \bar{x} = \dfrac{\Sigma M_r - \Sigma M_o}{\Sigma f_v} = \dfrac{2034460 - 1352340}{30510}$

$\Rightarrow \bar{x} = 22.36.$

Putting value we get;

So $e = \dfrac{63}{2} - 22.36$

$\boxed{e = 9.14\ m}$

Condition → Safe in tension → OK.

⇒ for factor of safety against stress.

⇒ Condition → $r_{Heel} > 0$

Now: $r = (\Sigma fv/B)(1 \pm 6e/B) \rightarrow (A)$

Now from eq (A) we get;

⇒ for factor of safety Against sliding

Condition → $\frac{(\mu \Sigma fv + Bq)}{\Sigma fH} \geq 1$

1. $q = 1400$

$\mu = 0.7$

Putting value we get

$= \frac{0.7 \times 30510 + 63 \times 1400}{21780}$

$= 5.03 > 1$

⇒ Condition Safe in sliding.