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SUBJECT : HYDRAULIC STRUCTION.

"FINAL PAPER SUBMISSION."

Question 2 (a)

ANSWER:-

* DIFFERENTIATE B/W CULVERT & CAUSEWAY-

CULVERT	CAUSEWAY:
=> It is an opening through an embankment for the conveyance of water by mean of pipe or an enclosed channel	As we know a causeway is a track, road or railway on the upper point of embankment across.
=> A culvert may act as a bridge for traffic to pass on it.	=> It should also be named as "a low or wet place."
	=> It can be constructed of earth masonary, wood or concrete.

Question 2 (B)

ANSWER:-

* CROSS DRIANAGE WORK:-

As we know cross drainage work is a structure constructed when there is crossing of canal & natural drain, to prevent the drain wates from mining into canal wates

=> By mining two or three streams into one & only one cross drainage work to be constructed, making the structure economical.

* NECESSITY:-

Sometimes a cross drainage work is required when one canal crosses anothes canal. The cross drainage

Work is also required to dispose out the drainge water so that the cannal supply remains Uninterrupted.

=> It is also called drainge crossing.

* TYPES of CROSS DRAINAGE WORK :-

* TYPE-2 Irrigation canal passes oves the Drainge :-

This condition Involved the Construction of the following ;-

* AQUEDUCT :-

=> It is an hydraulic structure in which the irrigation ~~canal~~ canal is taken oves the drainge such as rives stream etc. is known as aqueduct.

⇒ This structure is suitable when bed level of canal is above the peak flood level of drainage.

* SIPHON AQUEDUCT-

⇒ It is a hydraulic structure where the canal is taken over the drainge, but the drainage waters cannot pass cleasly below the canal. So it is called Siphon Aqueduct.

⇒ This structure is suitable when the bed level of canal is below the highest flood level.

*TYPE II Drainge passes oves the Irrigation canal:-

* SUPER PASSAGE:-

The hydraulic structure in which the drainge is taken oves the irrigation canal is known as super passage.

=> This structure is suitable when the bed level of drainge is above the full supply level of the canal.

* SIPHON SUPER PASSAGE:-

The hydraulic structure in which the draineye is taken oves the irrigation canal, but the canal wales passes

below the drainge under siphonic action is know as siphon super passage.

=> suitable when the bed level of drainage is below the full supply level of the canal.

* TYPE III Drainge & canal intersect each other at the same level:-

* LEVEL CROSSING :-

When the bed level of canal & the stream are approximately the same & quality of wates in canal & stream is not much diffesent, then the cross drainge work constructed is called level

Crossing & wales of canal & stream is allowed to min.

=> It consits of forllowing components.

(i) Crest wall.

(ii) Stream regulator.

(iii) Canal regulator.

* INLET & OUTLET :-

=> When bothe the irrigation canal & stream or drain meets at same level then drain is allowed to entes the canal as an inlet.

=> At some distance from this inlet point a part of watey is allowed to drain as outlet which meets the stream.

Q: 2(a) ANSWER :-

WEIR

=> weirs are commonly used to control the flow rates of rives during pesiods of high dischasge.

=> Sluice gates are wed to Encrees or decrease the val of wates going out.

BARRAGE.

=> It is used to convest tidal enegyy into electricity by forcing wates throyh tusbines by activating a gesnetor.

Q2(B) ANSWER:-

* REYNOLD'S NUMBER:-

The product of density time, length divided by viscosity coefficent.

=> This is proportional to the ratio of Inertial forces & viscous forces in a fluid flow.

* LAMINAR:-

The flow in a pipe is laminal if the reynold's ~~m~~ numbes is less than 210.

* TURBULENT:-

If the reynold's numbes is greates than 400 than it is turbulent flow.

* NEITHER LAMINAR NOR TURBULENT BLOW :-

when the reynold's numbes is B/w 2000 & 2800, then the blow is neithes laminah nor tusbulent.

* LOWER CRITICAL VELOCITY :-

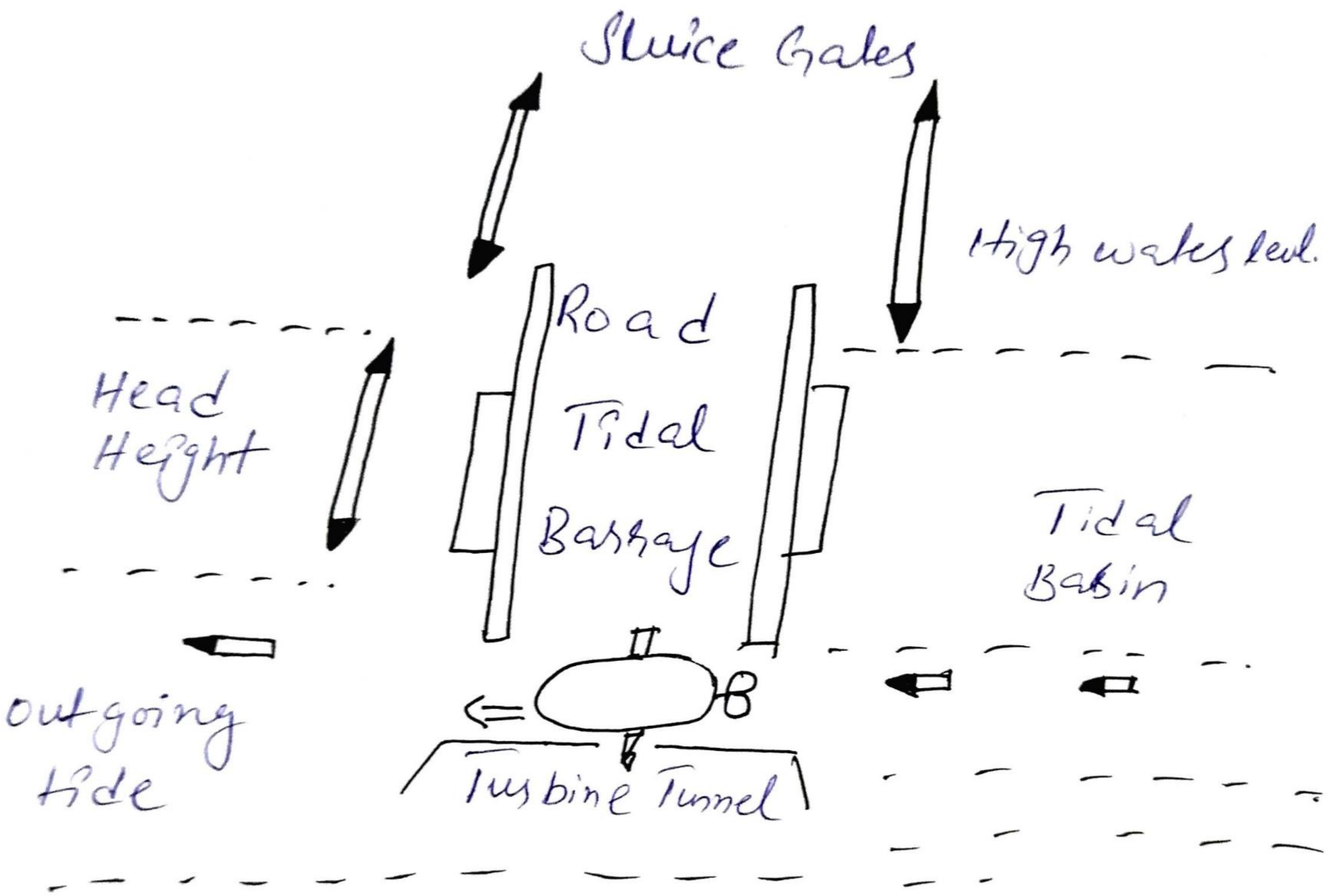
The velocity at which Blow changes from laminas to transition is called lowes Critical velocity.

* HIGHER CRITICAL VELOCITY :-

The velocity at which blow changes from transition to tusbulent is called highes critical velocity.

Q 3(a) ANSWER:-

"SKETCH OF BARRAGE"-



Q 3 (B) ANSWER:-

* SCOUR DEPTH UNDER THE BRIDGE:-

If the contracted width (i.e the bridge length L) is less than the regime width, W, the normal scour depth, D_N, under the bridge is given by.

$$D_N = R_s (W/L)^{0.61} \quad \Rightarrow (10.18)$$

where R_s is the regime scour depth.

=> The maximum scour depth in a single span bridge no (piers) with a straigth approach (case 1) is about 25% more than the normal scour given by eq(10.18) whereas in the case of multispan structure with a curved approach reach (case 2) it is 100% more than the normal scour. If the constriction is ~~predo~~ predominant, the maximum

Scour depth is the maximum of case 1 or case 2, or the value given by

$$D_{max} = R_5 (W/L)^{1.56}$$

Q.NO:-4.

Given:-

$L.L = 1.5\ kip/ft^2 = 1500\ lb/ft^2$

$D.L = 300\ lb/ft^2$

$\theta = 30°$

unit weight of Soil = $100\ lb/ft^3$

Dimension = 15' x 15'

f_y = 60 ksi Steel.

Concrete = 1:2:4 = M15

→ Solution:-

① Load calculation:-

Total Load carry on top slab :-

$$= S.wt + L.L + D.L$$

S.wt of slab $= 3 \times 150$

$= 450 \ lb/ft^2$

$$w = 450 + 1500 + 300 = 2250 \ lb/ft^2$$

② Coefficient of earth pressure :-

$$Ka = \frac{1 - \sin\theta}{1 + \sin\theta}$$

$$Ka = \frac{1 - \sin(30)}{1 + \sin(30)}$$

$$Ka = 0.33$$

③ Lateral Pressure due to (D.L + L.L)

= Total vertical Load (L.L + D.L) x Ka

$= (1500 + 300) \times 0.33$

$= 594 \text{ lb/ft}^2$

④ Lateral Pressure due to soil :-

$= Ka \times \gamma h$

$= 0.33 \times 100 \times 18$

$= 594 \text{ lb/ft}^2$

⑤ Lateral Pressure :-

Top :-

= Lateral Pressure due to (D·L + L·L)

$= 594 \text{ lb/ft}^2$

Bottom :-

= Lateral Pressure due to (D·L+L·L)
+ Lateral pressure due to soil.

$= 594 + 594$

$= 1188 \text{ lb/ft}^2$