Final Assignment /QUIZ

NAME : Sheraz-uddin

ID NO : 7695

SUBJECT : Hydraulic structures

SECTION : B

SUBMITTED TO : Engr. Adeed

QNO1:-

part (a):-

CULVERT	CAUSEWAY
①: A small bridge having total length of span 6m or less than it b/w the faces of abutment.	①: A bridge having its floor flush or little above the bed of the stream which allows flood water to pass over its floor.
②: Culvert may be made from concrete, pipe or other materials.	②: Cause way made from earth, masonry, wood or concrete.
③: it is constructed under a road.	③: It is constructed above a road.
④: A culvert is the bridge which is under on road to cross the water.	④: A causway is the track or road on the upper side of an embankment across a water.
⑤: It normally uses for natural flow of water for controlling it.	⑤: It is notmally uses for to supports a roadway between piers.

Part (b): Q No 1:

Ans:-

CROSS DRAINAGE WORK:-

Cross drainage work is a structure it is constructed when there is two happens, which is crossing of canal and natural drain.

→ And it is due to prevent the drain water from mixing into canal water.

WHY IT IS NECESSARY:-

Cross drainage work is required to dispose of the drainage water so that the canal supply water remains uninterrupted.

→ Cross drainage work is necessary to construct some suitable structure to let forward the canal safely.

→ It is necessary to maintain natural direction of flow.

TYPES:-

Following are the some types of cross drainage work;

⇒

(i) Adequate.
(ii) Super passage.
(iii) Level crossing.
(iv) Inlet and outlet.

(i): **Adequate:** It carries irrigation canal over a drain.

(ii): **Super passage:** It carries a drain over an irrigation canal.

(iii): **Level crossing:** This structure makes it possible to dispose off drain water supply at some level as that of a canal.

(iv): **Inlet & outlet:** When possible drain water is taken in the canal to be discharged afterwards into a drain at suitable location.

Q No: 2 :-

part (a):

WEIR	BARRAGE
→ Low cost.	→ High cost.
→ Low control on flow of water.	→ Relatively high control on flow of water levels by operation of gates.
→ No provision for trans-port communication across river.	→ Usually a road or rail bridge can be added conviniently.
→ Chances of silting on the upstream is most.	→ Silting may be controlled by judicial operation of gates.

Part (b):

Reynolds Number :-

The product of density times length divided by viscosity coefficient.

→ This is proportional to the ratio of internal forces and viscous forces in a fluid flow.

★: Laminar:

When the velocity of the fluid is constant at any point of fluid, it is called laminar flow.

→ And if the reynold number is less than 2000 it means it is laminar flow.

★ Turbulant:

It is opposite of laminar flow.

→ The velocity of the fluid is not constant at any point of fluid.

→ if reynold's number > 2000 Then
↳ Turbulent

⇒ Neither laminar nor turbulent flow;

When the Reynolds number is between 2000 and 2800, the flow is neither laminar nor turbulent.

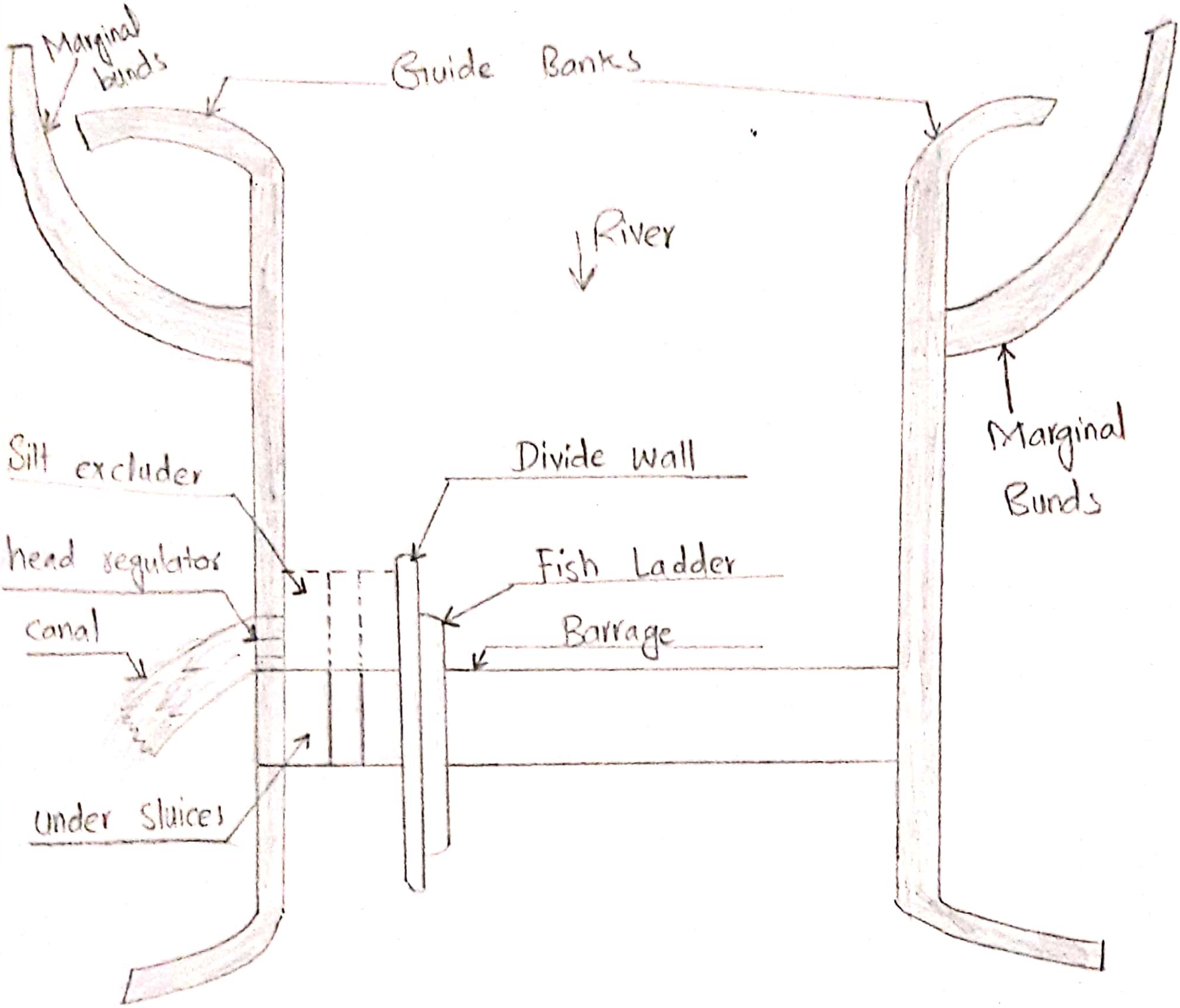
Lower Critical velocity :-

The velocity at which flow changes from laminar to transition is called lower critical velocity.

Higher Critical velocity :-

The velocity at which flow changes from transition to turbulant as called Higher critical velocity.

Q NO. 3 :~ Part (a):



⇒ Barrage And its Components

Part (b):-

Ans :-

Several formulae based on experimental results have been proposed to predict the 'maximum' or 'equillibrium' scour depth (y_s, below general bed level) around bridge piers, In general, these assume the relationship

$$Y_x/b' = \phi(y_o/b', F_r, d/b')$$

Where b' is the pier width, y_o is the upstream flow depth, d is the sediment size, and F_r is the flow froude Number.

→ Laursen's (1962) experimental results underestimate the scour depth, compared to many indian experiment (Inghis, 1949) which suggest the formula (approach flow is normal to the bridge piers).

$$Y_s/b' = 4.2\,(Y_o/b')^{0.78}\,F_r^{0.52}.$$

→ The indian field data also suggest that the scour depth should be taken as twice the regime scour depth.

In case of live beds (a stream with bedload transport) the formula:

$$Y_x/Y_o = (B/b')^{5/7} - 1.$$

predicts the maximum equillibrium scour depth.

In a relatively deep flow a first-order estimate of (clear) local scour (around pier) may be obtained by:

$$Y_s = 2.3 K_\alpha b'$$

Where K_α = angularity co-efficient which is a function of the pier alignment i.e angle of attack of approach flow.

Q NO4:-

GIVEN DATA:-

L.L = 1500 lb/ft²
D.L = 300 lb/ft²
Section = 15' x 15'
Thickness = 3 ft
Unit of soil = 100 lb/ft³
θ = 30°
Unit wt. of Concrete = 156 lb/ft³

f_y = 60 ksi

Solution:-

Self wt. of Slab = Thickness x Unit wt of RCC concrete

= 3 x 156 = 468 lb/ft²

Total load = (L.L + D.L + Self.wt)

= (1500 + 300 + 468)
= 2268 lb/ft²

Co-efficient of earth pressure;

$$\frac{1 - \sin\theta}{1 + \sin\theta} = \frac{1 - \sin(30^\circ)}{1 + \sin(30^\circ)} = 0.33$$

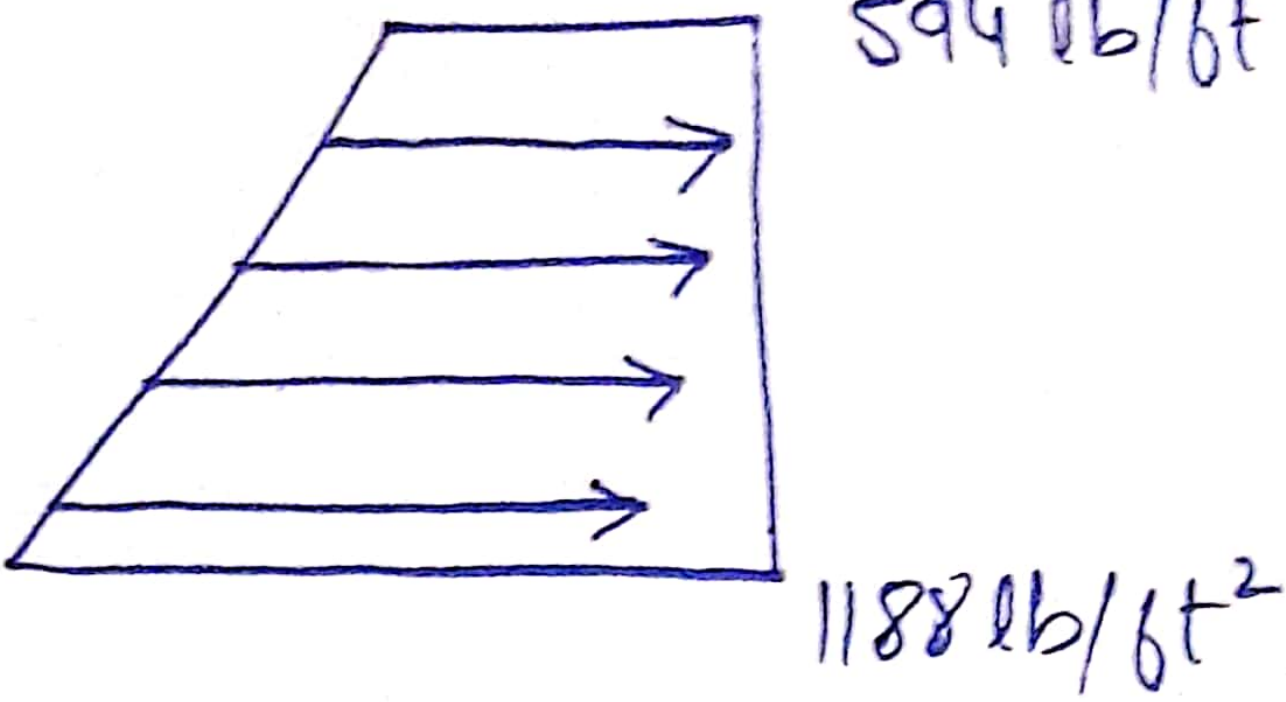
→ Laterial pressure;

* Vertical pressure at top;
  (L.L + D.L) Ka
  (1500 + 300) 0.33
  = 594 lb/ft²

* Pressure of soil;
  ⇒ Ka × h × unit wt. of Soil
  ⇒ 0.33 × (15′ + 3′) × 100
  ⇒ 0.33 × 18 × 100
  ⇒ 594 lb/ft²

→ Lateral pressure at top = 594 lb/ft²

* Pressure at bottom;
  = top + pressure of Soil
  = 594 + 594
  = 1188 lb/ft²


594 lb/ft
1188 lb/ft²