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Section : "B"

Semester : 6th

Paper : Irrigation Engineering

Date : 23-6-2020

Q NO 1

* Part A *

Explain anti water-Logging measures ?

Ans: Following are the anti water-Logging measures.

i: Reducing Intensity of Irrigation:

⇒ Small Portion of land should recieve canal water in a particular Season.

⇒ The remaining areas of land can recive water in next Season by crop rotation.

ii: Introduction OF crop rotation:

High water requring crop should be followed by One requiring less water & then by One requring almost no water.

Example:

Rice followed by wheat & then by cotton.

iii: Lining of canal & Water Courses:

⇒ Lining of canal make the water alingn through the Proper channel reducing major losses to greater extent.

⇒ And also reduce seepage of water.

iv: Improving natural Drainage of Area:

→ Water should not be allowed to stay at One area.

→ Natural Flow is Providing by bush & Jungle cutting.

v: Adaption of Sprinkler Method of Irrigation:

→ There should be no Percalation loses from water courses.

→ Only determined amount of water is supplied to land.

vi: Pumping of Tube Wells:

→ Lift Irrigation Should be introduction to used ground water.

→ Canal Irrigation may be substituted by tube well Irrigation.

vii: Optimum Use of Water:

→ Proper amount of water gives good result Less or more water effected the yield. cultivators should be educated so that there is Optimum Use of water.

⇒ Revenue Should be charged on the basis of quantity of water rather than area of land

Q No 1 x Part B x

Different b/w saline & alkain soil:

→ Salaine	Alkaline:
→ By Principal of Osmosis Pure water from roots flow outwards in a plant die due to lack of water. Such soil is unpreductive & is caused Saline Soil.	→ It is white in apparance as white patches appears over earth Surface.
→ Saline soil apparance is as a black crusty core over the surface of earth.	→ It is the salt efforgence continues for a longer period, a base exchange reaction with clay takes place thus Sediumizing the clay. making it impereable Illerated & highly Unproductive Such soil are called Alkaline Soil.

P.T.O

(1) Part C

How do you reclain salt affected land?

Ans: Following are the major aspects to regain salt affected land.

→ The Practice of crops reversal is necessary to reduce the establishment of salt or efflorescene.

→ An efficient drainage (surface & sub-surface) must be Provided to lower water take in Saline soil.

→ High salt resistant crops Like rice are grown on reached land for 1 or 2 reasons.

→ land should be flooded with water so that alkaline Salt will be dissolved in water.

xxx xxx xxx xxx xxx

Q No # 2.

Explain the Procedure of Designing of Irrigation canal by Kennedy's Theory :

Answer: Following are the steps required for the Procedure of Designing Irrigation canal use Kennedy's Theory.

step : 1

Assume the trail value of (D) & Put it in equation ($Q = AV$) → ① Eq determine

$Y_o = 0.546m$, $D = 0.64$

step : 2

As equation ① is $Q = AV$

Thus :

$$A = Q/V$$

$$A = BD = D^2/2$$

$$D = B + (5)^{1/2}$$

For assumed "D" Determine 'B' Find '$R = A/P$'

step : 3

Subtitule the value of (R) in Kutters & chazy's equation to Obtain (V) which will be the actual velocity for assumed dimension.

step : 4.

If the velocity worked out from Kutters & Chezy's equation agrees that of obtained with the Kennedys equation then the assumed depth is correct, Otherwise repeat the Procedure with changed value of (D).

xxx xxx xxx xxx

Q2. Part B

Problem!

Given data:

$D = 2.5\ m$

$Q = 30\ c/mec$

$C.V.R = M = 1$

$N = 0.0225$

$S = 1/5000 = 0.0002$

Solution

As we know that:

$\Rightarrow Q = AV$

Where:

$\Rightarrow A = Q/V = 30/V$ ——— (1)

→ using Darmular to calculate "V"

$\Rightarrow Y_o = 0.546\ m\ D\ 0.64$

$\Rightarrow Y_o = 0.546\ (1)(2.3)(0.64)$

$\Rightarrow \boxed{Y_o = 0.935\ m/s}$

⇒ Put the value in eq (1)

$A = 30/0.935$

$\Rightarrow \boxed{A = 32.01\ m^2}$

NOW!

$A = BD^2 + D^2/2$

Put value.

$32.01 = B(2.3)^2 + \frac{(2.3)^2}{2}$

$\Rightarrow \boxed{B = 12.77m}$

⇒ Put the value in below eq

⇒ $P = B + D\sqrt{5}$

$= 12.77 + 2.3\sqrt{5}$

⇒ $\boxed{P = 17.9m}$

Now,

⇒ $R = A/P$

$= \frac{32.01}{17.9}$

⇒ $\boxed{R = 1.76}$

⇒ Substituting the value of 'R' in Kutter's & chezys equation.

⇒ $V = C(RS)^{1/2}$ ——— (9)

⇒ $C = \frac{1/n + (23 + \frac{0.00155}{S})}{1 + (23 + \frac{0.00155}{0.0002})\, n/\sqrt{R}}$

⇒ $C = \frac{1/1 + (23 + \frac{0.00155}{0.0002})}{1 + (23 + \frac{0.00155}{0.0002})\, 1/\sqrt{1.76}}$

Putting value in eq (9)

$V = 49.526\,(1.76 \times 0.0002)^{1/2}$

$\boxed{V = 0.93\ m/s}$

⇒ This is equal to Vo thus no more trails required.

Q No # 3

x Part A x

Differential B/w initial regime & Final regime & according to Lacey's Theory:

Initial Regime	Final Regime
⇒ When only bed slope of channel changes but the cross Section remains same then their will be no silting & Scouring.	⇒ If all the Parameters depth & slope have equally free to vary & adjust according to discharging & silt grade is said to have final regime the cross.
⇒ Cross section or wetted Perameter remains the effected	⇒ In the final regime the cross Section assumes Semi ellipes shap.
⇒ It is a quicks process & occurs in short time of span.	

diagrm:

Q no # 3

Part B

Problm:

Given data:

$$Q = 30 \text{ cumec}, \quad d = 0.56 \text{ mm} = (M)$$

⇒ **Solution**

By formula:

⇒ silt factor $= f = 1.76 \times M^{0.5}$

⇒ $f = 1.76 \times (0.36)^{0.5}$

⇒ $\boxed{f = 1.3}$

⇒ $V_m = \left[\frac{Qf^2}{140}\right]^{1/6} = \left[\frac{30 \times (1.3)^2}{140}\right]^{1/6}$

⇒ $\boxed{V_m = 0.844 \text{ m/s}}$

⇒ $Q = AV \; ; \; A = Q/V = 30/0.844$

$$\boxed{A = 35.54 \text{ mm}^2}$$

where

⇒ $P = 4.75\sqrt{Q} = 4.75\sqrt{30}$

⇒ $\boxed{P = 26.01}$

⇒ $R = S/2 \times V^2/f \Rightarrow S/2 \times \frac{0.844^2}{1.3} \Rightarrow \boxed{R = 1.36 \text{ mm}}$

As we know;

⇒ $A = \frac{BD + D^2}{2}$

⇒ $35.5 = BD + D^2/2 \quad -(1)$

$\Rightarrow P = B + D\sqrt{5}$; $26.01 = B + 2.236D$ ——— (2)

Thus;

$\Rightarrow B = 26.01 - 2.236D$ ——— (3)

Put eq (3) in eq (1).

$\Rightarrow 35.54 = (26.01 - 2.236D)D + D^2/2$

$\Rightarrow 35.54 = (26.01 - 2.236D^2) + D^2/2$

$\Rightarrow 35.54 = 26.01D - 1.736D^2$

$\Rightarrow 1.736D^2 = 26.01D + 35.54 = 0$

Using quardatic Formula

$\Rightarrow -b + \sqrt{\frac{b^2 - 4ac}{2a}}$

Put value:

$\Rightarrow (-26.01) + \sqrt{\frac{26.01)^2 - (4)(1.73)}{2(1.73}}$

$\Rightarrow \boxed{D = 1.52}$

Put eq (3) we get:

$\Rightarrow \boxed{B = 22.611\,m}$

$\Rightarrow$ NOW!

$$S = \frac{P^{3/3}}{3340\,Q^{1/6}} \Rightarrow \frac{(1.3)^{5/3}}{(3349)(30)^{1/6}}$$

$\Rightarrow \boxed{S = 0.00027}$

Que # 4

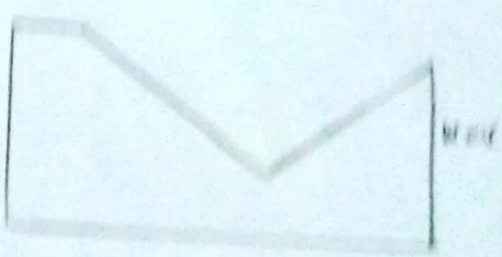
Explain the components of head works with neat diagram;

Ans: Following are the main components of head works:

- Weir or Barrage
- Under sluice sluices
- River sluices
- Fish ladder
- Canal head regulator
- Silt excluder / silt prevention devices
- River training works

→ **Weir or Barrage:**

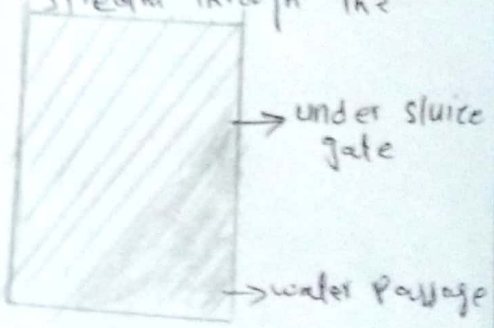
Normally the water level of any perennial river is such that it cannot be diverted to the irrigational canals. The bed level of the canal may be high than the existing water level on the up stream side of the weir is required to different levels different time, barrage is constructed.



⇒ Under sluice :

- It is also known as scouring sluice. The under sluice are the openins Provided at the base of the weir or barrage. These openings are Provided with adjustable gates.

⇒ When the silt deposition becomes appreciable the gates are opened and the deposited silt is loosened with an agitator mainting on a boat. The muddy water flow toward the down stream through the scouring sluice.



⇒ Divide wall :

- The divide water wall is a long wall constructed at right angle at weir or barrage. It may be constructected with upstream side. The wall is Extend Just to cover the channel head is exteted and the canal head regulator on the down stream side. It is extended up to the lowndry apron.

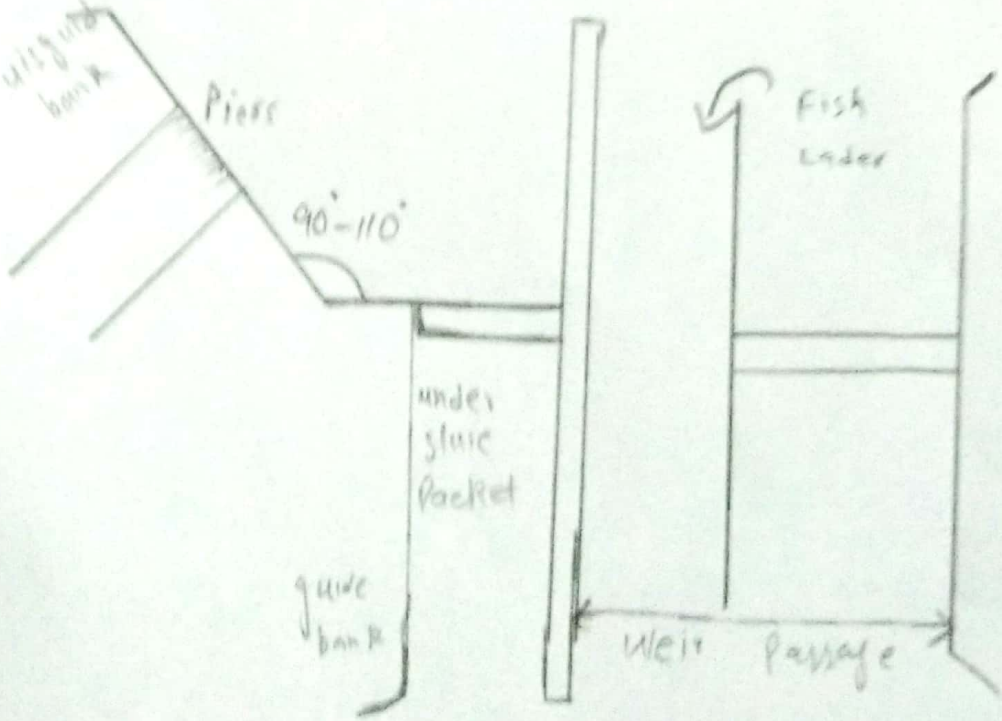
Fish Ladder:

- It is provided just by side of the divide wall or the free movement of fisher. Rivers are important sources of fisher. The tendency of fish is to move from upstream to down stream to upstream.

Fish ladder

Canal Head Regulator:

- A structure which is constructed at the head of the canal to regulator flow of water is knows as canal head regulators.



Q no # 4

Part B

What are the functions of the Head regulator:

Answer:

⇒ The major Function is to regulator the supply of water entering the canal. It controlls the entry of silt in the canal.

⇒ It Prevents the river floods from entering the canal.

⇒ It regulates / indicate the discharge passed into the canal from design discharge formula.

The End !!