Submitted By : M. Zubair Khan

Submitted TO : Dr M. Jahangir durrani

Subject : Irrigation Engg.

Department : Civil Engg.

ID : 7677

Assignment : Final

Iqra National University peshawar

Date : 23/June/2020

Q1 Part a Explain anti water-logging measure.

Ans 1) Lining of canal & water course:
It reduce seepage of water

2) Reducing intensity of irrigation
- only small portion of land should recive canal water in one particular season.
- Remaining areas can recive water in next season by rotation

3) By introducing crop rotation
- High water requiring crop should be followed by one requiring less water, and Then by one requiring almost no water.
Example: Rice Followed by wheat and they by cotton

4) Optimum use of water
- Certain amount of water gives the best result less or more water reduce the yield.
Cultivators should be educated so that not to use more water

5 Improving natural drainage of area
- water should not be allowed to stay in one area.
- Natural Flow is provided by bush and jungle Cutting.

6 Pumping / Tubewells or vertical Drainage
7 Economical use of water according to need
8 Adoption of sprinkler method of irrigation

Q1 Part b Difference b/w saline and alkalin soil

Ans · The key difference b/w saline and alkaline soil is that saline soil have a pH less than 8.5 and an exchangeable sodium percentage less than 15, while alkaline soil have pH greater than 8.5 and an exchangeable sodium percentage higher than 15.
Mean while, neutral soils have pH 7.

- ~~Flocculated soils therefore soil, aeration and permeability~~
- ~~floc~~

Saline soil	Alkalin soil
• Flocculated soils therefore soil aeration & permeability is normal	• Dispersed & compact soil, aeration and permeability is low
• Easy to manage because physical condition of soil is good	• Such soil can be managed because physical condition is not so good.
• In rainy season, some natural vegetation is grown	• No any natural vegetation except some grasses

Q01 Part c How do you reclaim salt affected lands.

Ans
- By maintaining the water table sufficiently below the roots
- Hence all the measure which were suggested for preventing water logging hold good for preventing salinity of lands.
- An efficient drainage (surface & subsurface) must be provided to lower the water table in saline soils

X ——— X

Q02 Part a Explain the procedure of designing of an irrigation Canal by Kennedy Theory.

Ans1 step 1 Assume the trial value of D and put in eq (1) & determine.

$$V_o = 0.546 m D^{0.64}$$

step 2: In Eq (1) $Q = AV$

$$A = Q/V$$

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

$$P = B + D\,5^{1/2}$$

For assumed D determin B.

Find $R = A/P$

step 3: Substitute the vale of R in eq (2) (Kuttlers & chazys Eq). to obtained V which will be the actual velocity For assumed dimensions

step 4: If the velocity worked out From Eq (2) agree with that of obtained with Eq (3) (Kennedeys Eq). Then the assumed depth is correct. Otherwise repeat the procedure with changed value of D.

Q02 Part B

Given Data

$Q = 30 m^3/sec$

C.V.R = $m = 1$

$N = 0.0225$

$S = 1/500$

Assume $d = 2.3 m$

Sol

$$V_0 = 0.55 m D^{0.64}$$

$$V_0 = 0.55 \times 1 \times (2.3)^{0.64}$$

$$\boxed{V_0 = 0.937 m/sec}$$

$$Q = AV$$

$$A = Q/V$$

$$A = 30/0.937$$

$$\boxed{A = 32.017 m^2}$$

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

$$32.017 = B \times 2.3 + \frac{(2.3)^2}{2}$$

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

(6)

$$P = B + D\sqrt{5}$$

$$P = 12.77 + 2.3\sqrt{5}$$

$$\boxed{P = 17.913\ m}$$

$$R = \frac{A}{P}$$

$$R = \frac{32.017}{17.913}$$

$$\boxed{R = 1.82}$$

$$V = C\left(\sqrt{RS}\right)$$

$$C = \frac{1}{0.0225} + \frac{\left(23 + \frac{0.00155}{0.0002}\right)}{1 + \left(23 + \frac{0.00155}{0.0002}\right) \times \left(\frac{0.00255}{\sqrt{1.82}}\right)}$$

$$C = \frac{75.194}{1.518}$$

$$\boxed{C = 49.535}$$

~~$$\boxed{C = 49.703}$$~~

(7)

$$V = C(\sqrt{RS})$$

$$V = 49.535 \times \sqrt{1.787 \times 0.0002}$$

$$\boxed{V = 0.93 \text{ m/sec}}$$

which equal to the V_0

Q3 Part A Differentiate b/w Initial regime & Final regime, According to Lacey's Theory

Ans

Initial Regime

. when only bed slope of channel changes but the cross section remains same then also so silting or scouring take place. But this is rare.

Final Regime

If All the parameters (perimeter depth & slope) have equally free to vary and adjust according to discharge & silt grades then the channel is said to have Final regime.

Q3 Part B

Given Data

$Q = 30\ m^3/sec$

$M = 0.56mm$

Sol

Silt Factor $= f = 1.76 \times M^{0.5}$

$f = 1.76 \times (0.56)^{0.5}$

$$\boxed{f = 1.3}$$

$$V_m = \left[\frac{Qf^2}{140}\right]^{1/6}$$

$$= \left(\frac{30 \times (1.3)^2}{140}\right)^{1/6}$$

$$\boxed{V_m = 0.844}$$

$Q = AV$ $\quad A = Q/V = \frac{30}{0.844}$

$$\boxed{A = 35.54}$$

$P = 4.75\sqrt{Q}$

$P = 4.75\sqrt{30}$

$$\boxed{P = 26.01}$$

$$R = \frac{5}{2} \times \frac{V^2}{f} = \frac{5}{2} \times \frac{(0.844)^2}{1.3}$$

$$\boxed{R = 1.36}$$

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

$$35.54 = BD + \frac{D^2}{2} \quad \text{—— (1)}$$

$$P = B + D\sqrt{5}$$

$$26.01 = B + 2.236D$$

$$B = 26.01 - 2.236D \quad \text{—— (2)}$$

Put eq (2) in eq (1)

$$35.54 = (26.01 - 2.236D)D + \frac{D^2}{2}$$

$$35.54 = 26.01D - 2.236D^2 + \frac{D^2}{2}$$

$$35.54 = 26.01D - 2.236D^2 + 0.5D^2$$

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

$$\underbrace{-1.736D^2}_{a} + \underbrace{26.01D}_{b} \underbrace{-35.54}_{c} = 0$$

$a = -1.736 \quad b = 26.01 \quad C = -35.54$

By Quardatic eq

$$D = \frac{-(26.01) + \sqrt{(26.01)^2 - 4(-1.736)(-35.54}}{2(-1.736)}$$

$$\boxed{D = 1.52}$$

Put in Eq (2)

$$B = 26.01 - 2.236(1.52)$$

$$\boxed{B = 22.611}$$

$$S = \frac{f^{(5/3)}}{3340\, Q^{1/6}}$$

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

$$\boxed{S = 0.00026}$$

Q4 Part A

Explain the Component of Head Works with neat diagram

Ans

1) Weir: Normally the water level of any perennial river is such that it cannot be diverted to their irrigation canal. The Bed level of the cannal may be higher than the existing water level of the river. In such case weir is constructed accross the river to rise the level of water.

2) Barrage: when the water level on the up stream side of the weir is required to be raised to different level at different time, barrage is constructed

3) Under sluices: The under sluices are the opening provided at the base of the weir or barrage. These opening are provided with adjustable gate.

4) Divide wall: The divide wall is a long wall constructed at right angles in the weir or barrage, it may be constructed with stone masonary or cement Concrete.
on the upstream side wall is extended to canal head regulator & down stream side wall

is extended up to launching apron

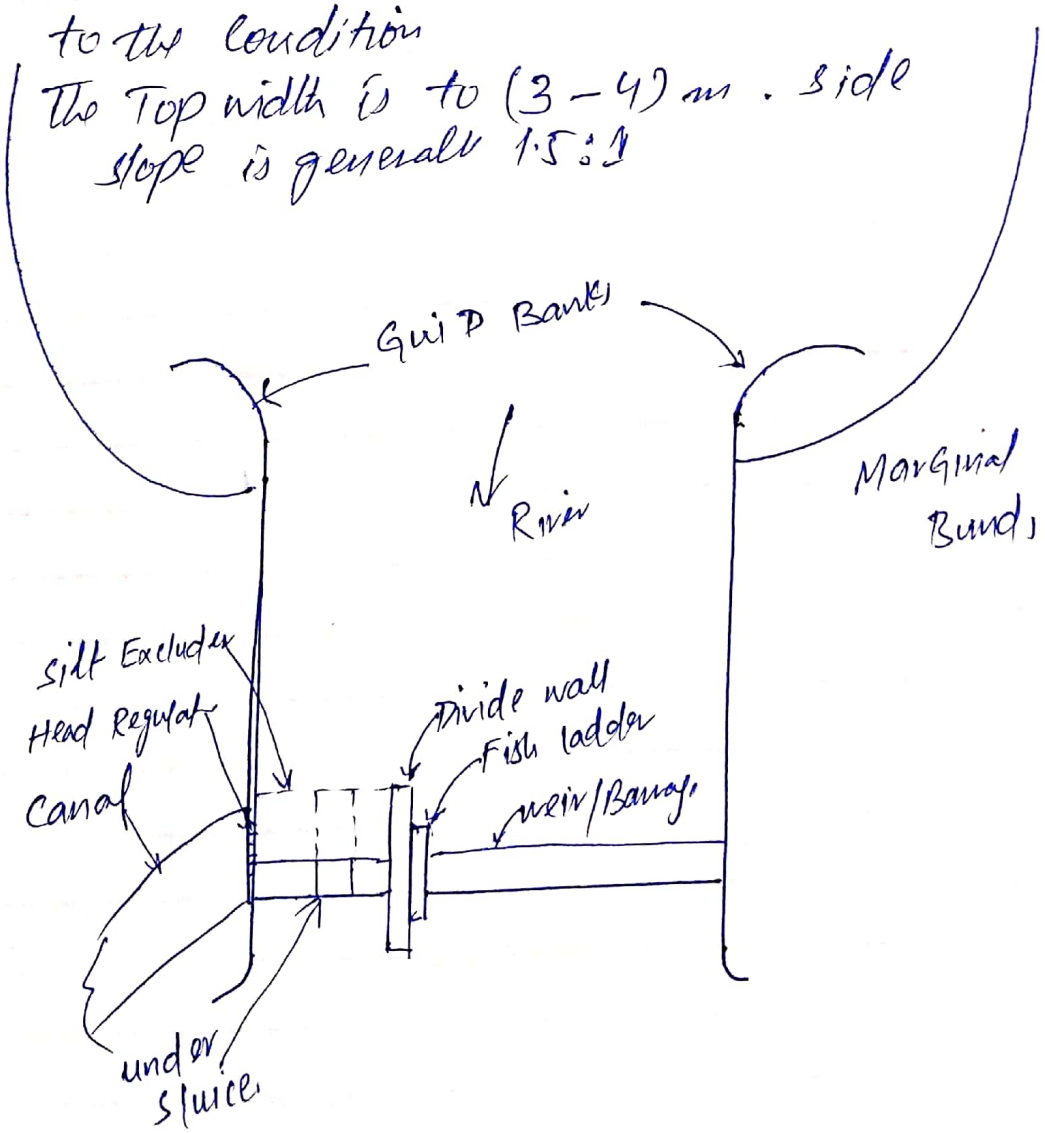
Function of divide wall: . To form a still water pocket in front of the canal head so that the suspended silt can be settled down which than later be cleaned through the scouring sluice
. it provides a straight approach in front of the canal head

5) Fish ladder: The Fish ladder is provided just by the side of the divide wall for the free movement of Fishes. Rivers is the important source of Fishes
The Tendency of Fish is to move from upstreams to downstream in winter & from downstreams to upstream in monsoons, this movement is essentials for their survival.

6) Cannal Head regulator: A structure which is constructed at the head of the canal to regulate the flow of water is know is canal head regulator.
Function of canal Head regulator: it regulate the supply of water entering the canal. It control the entry of silt in the canal
it prevents the river-floods from entering the canal.

7) Silt regulation works: The entry of silt into a canal, which takes off from a head works, can be reduced by constructed certain special works called silt control works
(a) silt Excluder (b) silt Ejectors

8) Marginal Bunds: The marginal Bunds are earthen embankments which are constructed parallel to the river bank on one or both the bank accordig to the condition
The Top width is to (3 – 4) m. side slope is generally 1.5 : 1



Q 4 Part B

what are the Function of Head Regulators?

- To admit water into the off taking Canal
- To regulate the supplies into the canal
- To indicate the discharge passed into the canal from design discharge Formula by observed Head of water on the crest
- To control the silt entry into the canal During heavy floods, it should be closed otherwise high silt quantity will leave to the canal.

End paper