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SUBJECT : "Irrigation Enginearing"

SUBMITED TO : "SIR JIBRAN."

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Q1 (a) ANSWER.

*WATER LOGGING:-

Water logging occurs when there is too much water in a plant's root zone, which decreases the oxygen available to roots. water logging can be a major constraint to plant growth & production &, under certain conditions will cause plant death.

*CAUSE:-

=> Inadequate Surface Drainge.
=> Seepage from canal system.
=> over irigation of fields.
=> obstruction of natural drainge
=> Impermeable clay layers below the soil.

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Question 2 Part (B).

* EFFLORENCE:-

Efflorence means "flowes out"
The migration of a salt to the surface of a porous material, where it forms a coating. The essential process involves the dissolving of an intesnally held salt in wates, or occassionally in anothes solvent.

=> Efflorence can occus in natusal & bilt encironments on porus construction matsials it may present a cosmetic outs.

* LEACHING PROCESS:-

"The process whereby suspended or dissolved solids pasticles are transported to anothes location in the soil."

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Question 2 Part (A)

Ans:- PROCEDURE By KENNEDY THEORY -

When an irrigation channel is to be designed by the Kennedy theory it is essential to know FSD (Q), coefficient of rugosity (N) CVR (m) & longitudinal slope of channel (S) beforehand. Then making use of the following three equations section can be designed by trials:,

$V = 0.546 m$ .1) $Q = A.V$; & $V = CRS$

The procedure of designing may be outlined in the following steps:-

(i) Assume the reasonable full supply depth 1).

(ii) using equation (1) find out value of V.

(iii) with this value of V, using equation (2) find out A.

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⇒ Assuming side slopes & from the knowledge of A & D find out bed width B.

⇒ Calculate R which is ratio of area & wetted perimeter.

⇒ using equation (3) find out value of actual velocity v.

when the assumed value of D is correct the value of v in step (4) will be same as v calculated in step (3). If not assume another suitable value of D & repeat the procedure till both values of velocity come out to be the same.

* The procedure of designing may be outlined in the following steps:-

(i) using equation (1) express v in terms of D only.

(ii) from given B/D ratio & side slopes are not given take 4/1 as side slopes for alluvial soil).

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Question 2 Part (B)

INITAL REGIME :-

When a channel is first put into service, then the channel tries to attain its "initial regime" condition. When the channel is excavated with small width & flatter slope, then the bed slope gets increased due to deposition of sediment in order to develop incred flow velocity. The increased flow velocity enables the discharge to pass through the channel having small width.

=> Here with the increased bed slope the depth of the channel also varies, however the width of the channel does not vary & remains constant. So keeping constant discharge, constant width constant silt charge & constant silt grade & only by varying bed slope & depth of channel.

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* FINAL REGIME:-

This is the ultimate regime condition attained by the channel when in addition to varying bed slope & depth of the channel the width of the channel is also allowed to vary.

=) what happen exactly is that with the passage of time, the resistance offered by the sides of the channel against erosion comes to an end due to continous action of water, so the channel adjusts its bed slope, depth & width in order to attain stability. such a condition is known as final regime condition.

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Question 3 Part(A).

Ans. STORAGE HEAD WORK:-

The storage headwork is generally used to store the waters. The works which are constructed at the head of the canal, in order to divert the rives waters forwards the canal, so as to ensure a regulated continous supply of silt free water with a certain minimum head into the canal are known as Diversion head works.

=> It stores water during the period of excess supplies in the rivers & releases it when demand overstakes the available supplies.

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=> It regulates the intake of water into the canal.

=> A headwork raises the water level in the rivers.

=> A headwok can reduce fluctuations in the level of rives supply.

* 1) DIVERSION HEAD WORKS:-

A weir or a barrage is constructed across a rives to raise water level and to divert water to a canal is known as diversion head work:-

=> They raises the water level in the rives so that the commanded area is increased.

=> They regulates the supply of water into the canal.

=> It controls the entry of silts into the canel.

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Q3 Part (B)

OBjectives of DIVERSION HEAD WORKS:-

=> To form a storge by constructing Aykes (embankments) on both the banks of the rives so that water is available through out the years.

=> To control the fluctuation of water level in the rives dusing diffesent seasons.

=> It raises the wates level on upstream side.

=> It controls the entry of silts into the canals.

=> It provides some pondage creating small ponds.

=> It help in controlling the vagaries of the rives.

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* SITE CHOICE -

=) Rocky Stage :- Rives steep slope with high velocity.

=) Sub mountanions or boulders Stage :- boulders or gravel.

=) Alluvial plans :- Bed slope small with gentle velocity.

A headwork site selection should satisfy the following rules :-

=) The rives should have high well defined erodile & non submesible banks so that the cost of rives traing work is minimum.

=) The site should be such that the headwork can be aligned at right angles to the direction of flow in the rives.

=) The rives section at the site should be narrow & well defined.

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Question 14

a) CANAL HEAD REGULATOR:-

Any structure constructed to regulate the discharge, full supply level or velocity in a canal is known as a regulator work. This is necessary for the efficient working & safety of an irrigation channel. Structure at the head of canal taking off from a reservoirs may consists of number of spans separated by the piers & operated by gates.

The functions of canal head regulator are :-

=> To admit water into the off taking canal

=> To regulate the supply into the canal.

=> To control the silt entry into the canal.

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(B) SILT EXCLUDERS :-

Silt excludes are those works which are constructed on the bed of the river, upstream of the head regulator. The cleaser water entss the head regulator & silted water entss the ~~head~~ ~~regulator~~ silt excludes. In this type of works, the silt is therefore, removed from the water before in entss the canal.

=> A silt excludes is a structure in the Undes sluices pocket to pass the silt laden wates to the down stream so, that only clear wates entess into the canal through head regulator.

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(C) UNDER SLUICES:-

The Under Sluices are the openings which are fully controlled by gates, provided in weir wall with their crest at a low level. They are located on the same side as the off-taking canal.

=> Under sluices are also called scouring sluices because they help in removing the silt near the head regulators.

* FUNCTIONS:-

(i) Preserve a clear & defined tive channel approaching the regulator.

(ii) control the silt entry into the canal.

(iii) Pass the low floods without dropping the shutter of the main weir.

(iv) Provide greater water-way for floods thus lowering the flood level.

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(1) BALANCING DEPTH:-

If for a channel section the depth of cutting is such that the quantity of excavation or cutting is equal to the earth filling required for making the banks, then depth of cutting is known as balancing depth or most economical depth of cutting.

=> Balancing canal depth comes when the canal is in partially embankment & partially in cutting. It is the depth of the canal (H) which gives equal amount of filling. (ie earth required for formation of Banks) & cutting (ie earth from digging).

for balancing depth;

Area in cutting = Area in embankment.

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