Date / /20

Name# M= IKRAM

ID# 7874

Sec# B

Sub: Geo tech

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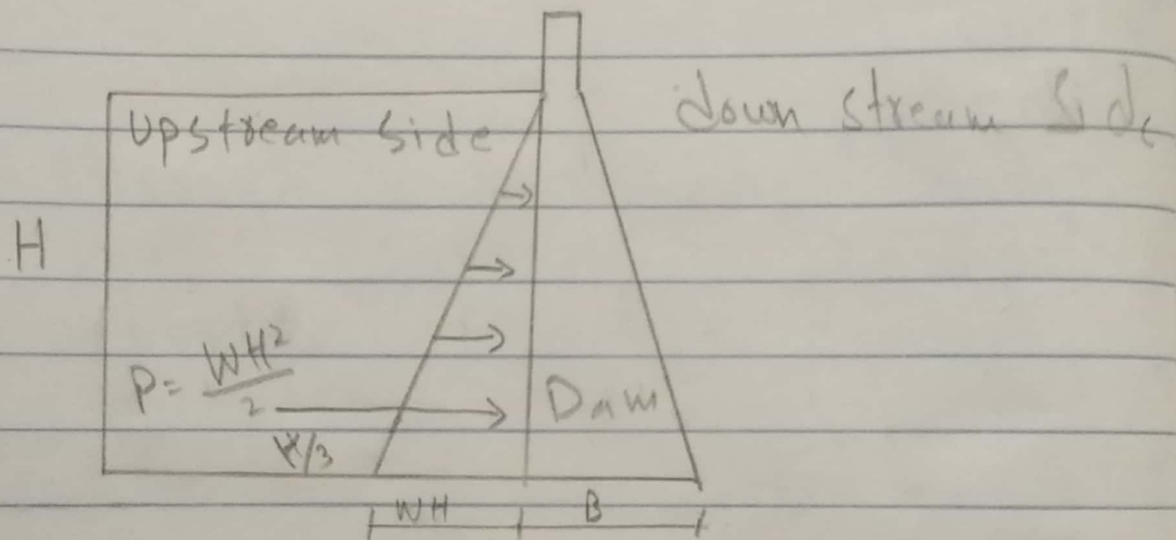
Q: 1:- (A)

Forces acting on dam:-

1. Water Pressure:-

it is the Pressure of water that acts Perpendicular on the upstream face of the dam.



2. Uplift Pressure or Seepage load:

when water is Stored on the upstream Side of a dam

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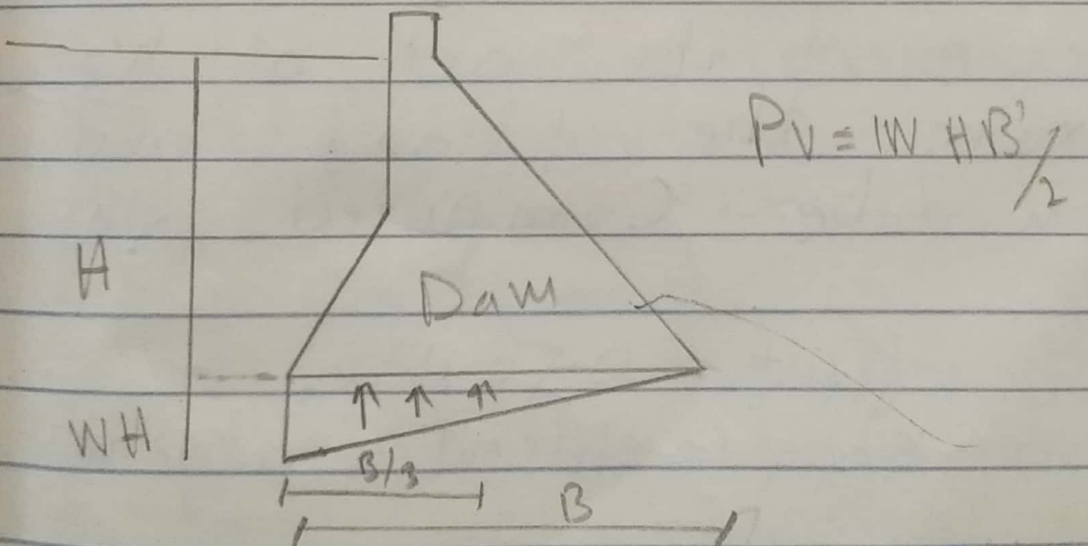
there exists a head of water equal to the height up to which the water is stored.

it is essential to study the nature of uplift and also some methods will have to be reduced the uplift pressure value.



③ Self weight of Dam :-

The weight of dam and it's foundation a major resisting

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force it Can be Computed using the eq

$W = \gamma_m$ Volume

γ_m = unit weight of dam material

④ Silt Pressure:

~~the weight~~

The weight of dam and it's foundation a major resisting force it's act at h/3 from the base and Can be Computed using eq

$P_{silt} = 0.50\, s h^2 K_a$

K_a = Co-efficient of active earth

⑤ Wave Pressure:

Wave is generated on the Surface of the reservoirs by the blowing wind which exert a pressure on the upper part of the dam above the water level this pressure is calculated using $p_w = 2.4 \gamma_w h_w$

(6) Ice Pressure:-

The Ice ~~Pressure~~ which may be formed on the water surface of the reservoir in cold countries may be some melt and expand.

The dam face has then to resist the thrust exerted by the expanding ice. this force act linearly along the length of dam & at reservoir level. Magnitude of this force varies 250 to 1500 KN/m^2 depend upon temp

Date: / /20 Q:-1 :- part (B)

① liquification of Soil:-

Effective Stresses are the Stresses which keep the Soil particles in Contact with each other if the effective Stress decrease the Soil loose it's Strength. when the effective Stresses become zero then Soil will Change to liquified state.

* liquification of Soil Can Prevented by

① Densification
② Stabilization of soil.
③ Drainage from the soil.
④ Prevent lateral flow by Providing baffle wall
⑤ lowering the ground water table

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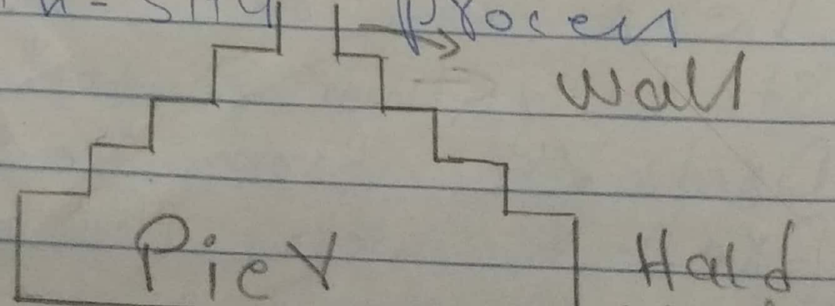
(2) Infinite Slope:-

The Slope which infinite area and finite depth such a Slope is Called as Infinite Slope

example:
National Slope
i.e Hills mountain desert etc.

(3) Pier foundation:-

The Vertical members which have larger dia as Compared to pile and transmit the load of structure to the underground soil.
They are Contruited by Cast in-situ process



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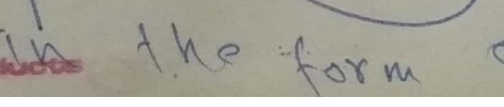
(4) Dynamic load:-

Is a method to assess a pile's bearing capacity by applying a dynamic load to the pile head (a falling mass) while recording acceleration and strain on the pile head, ~~regardless of their~~ it may be performed on all piles, regardless of their installation method.

OR:.

A dynamic load is any force that changes with time, such as car tyres, people walking & wind gusts. usually in structural engineering we treat these as static load in order to simplify calculation.

~~Dynamic~~



load is in the form of

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(5) Butren Dam:-

A butren dam is a dam with a solid, water tight upstream side that is supported at intervals on the downstream side by a series of supports. The Dam can be straight or curved. They are made of reinforce concrete.

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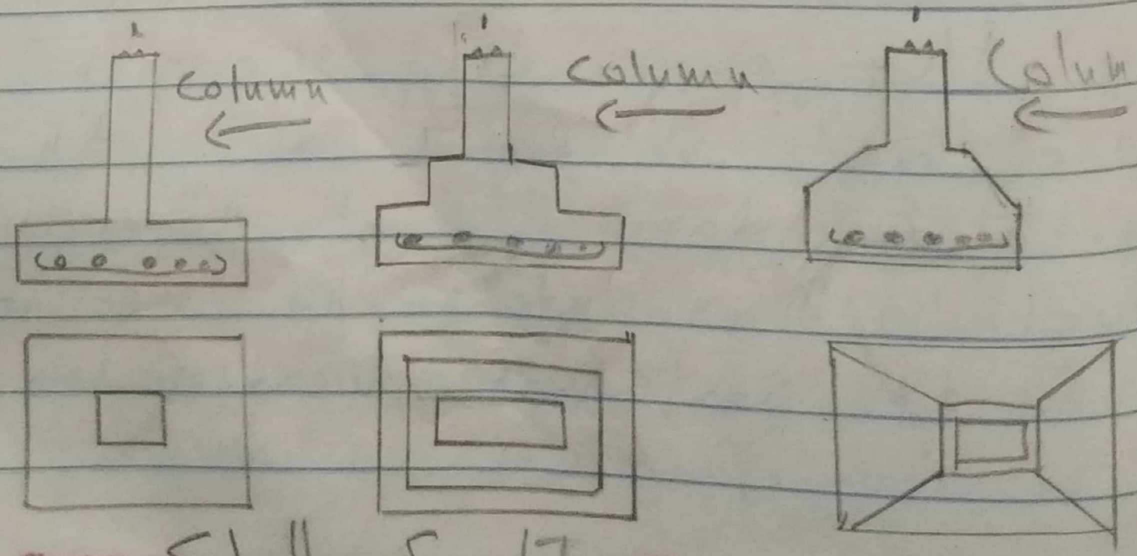
Ans:

Shallow Foundation:

A Shallow foundation is a type of building foundation that transfer load to the earth very near to the surface. Rather than to a subsurface layer or a range of depths as does a deep foundation.



Shallow Foundation

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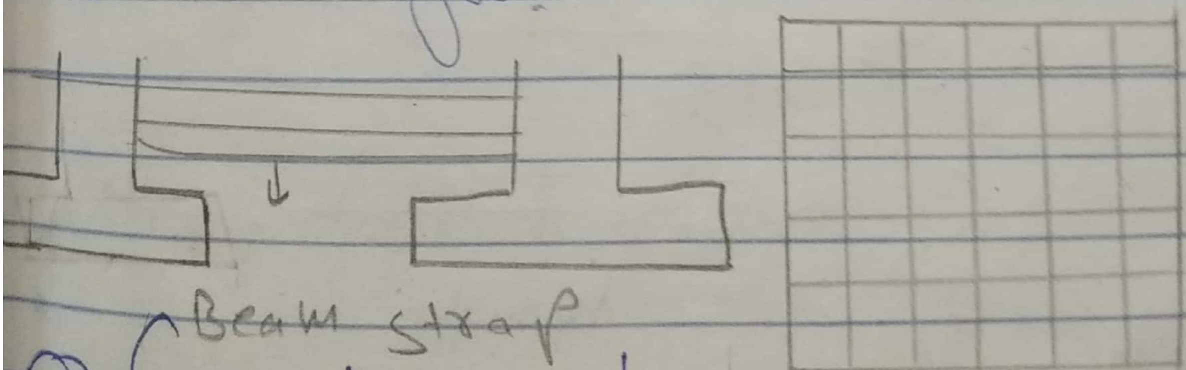
Types of Shallow foundation:

(1) Raft foundation or Mat

A raft foundation is essentially a Continuos Slab resting on the Soil that extends over the entire foot print of the building thereby Supporting the building and transferring it's weight to the ground.

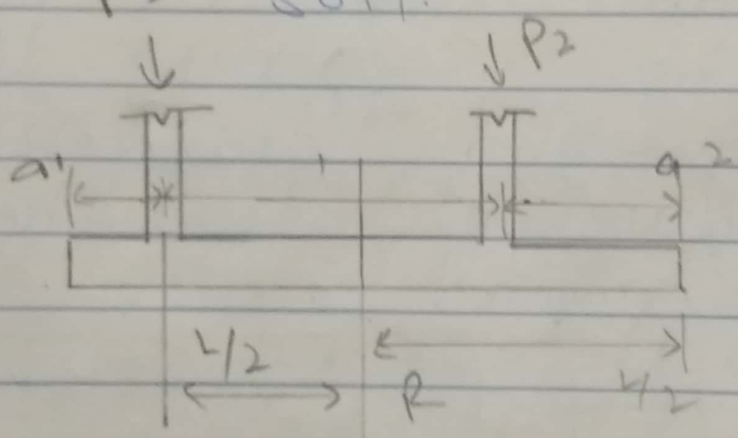


(2) Combined foundation:-

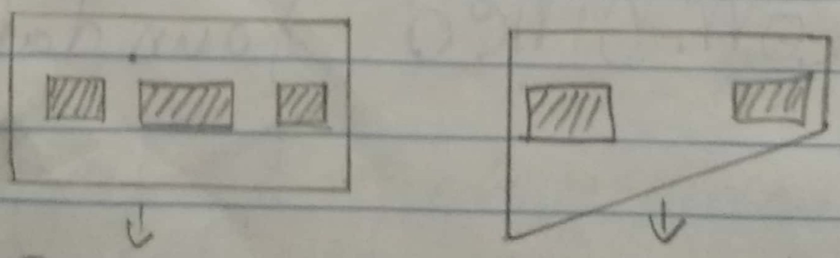
Combined footings are Constructed for

two or more Columns when they are Close to each other and their foundation overlap.

The function of a footing or foundation is to transmit the load form the Structure to the underlying Soil.



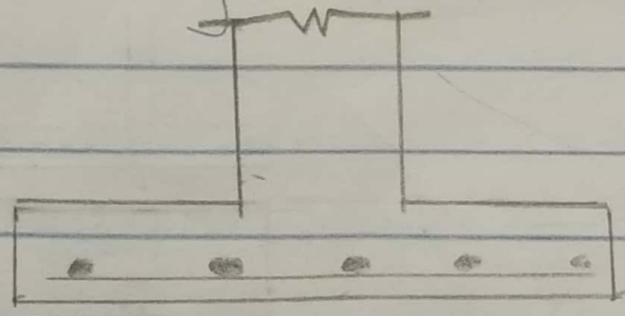
Combined footing with loads



Rectangular Trapezoidal

(3) Strip foundation:-

Strip foundation are a type of shallow foundation that are used to provide a continuous, level (or sometimes stepped) strip of support to a linear structure such as wall or closely-spaced rows of columns built centrally above them.



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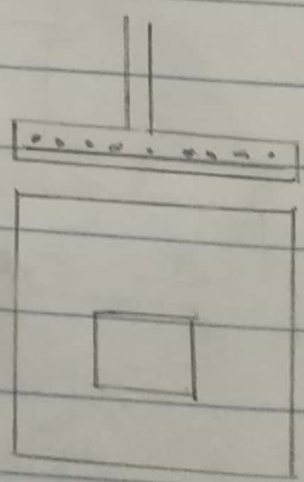
④ Spread foundation:-

is Common in residential buildings. has a wider bottom portion than the load-bearing foundation walls it support. The wider part spreads the weight of the structure over more area for greater stability.



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Ground Improvement Techniques:-

Ground Improvement tehniques are the techniques which are use to enhance the engineering property of Soil in order to bear heavy structural load. The main properties are Shear Strength, permeability, bearing Capacity and Stiffness etc.

Need of Ground Improvement techniques:

The Soil in which Volumetric Changes take Place due to Shrinkage and Swelling Such Soil needs ground Improvement techniques.

* The Soil which is Organic in nature.
* The Soft Soil also required ground Improvement techniques.
* The Soil which is Sandy and gravely.

The foundation in Sanatory dump places also required ground Improvement techniques.

Method of Ground ImProvement techniques:

① Removal and RePlacement of Soil:-

This is an oldest and simple method

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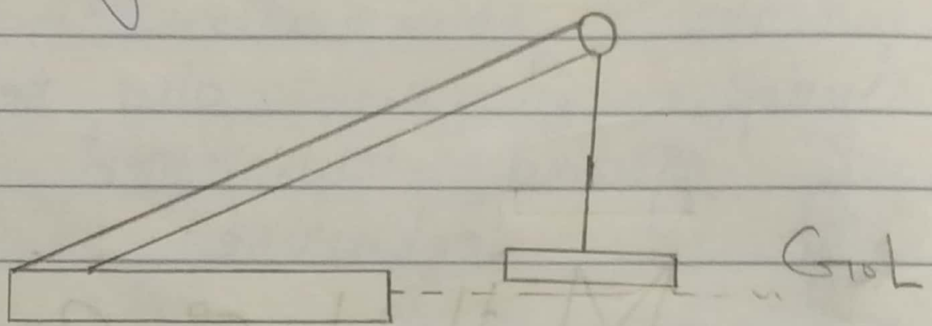
This method is Performed on loose Soil.
in this method the unsuitable Soil is replaced with Compaction and better engineering properties.
This method is applicable above the ground water table.



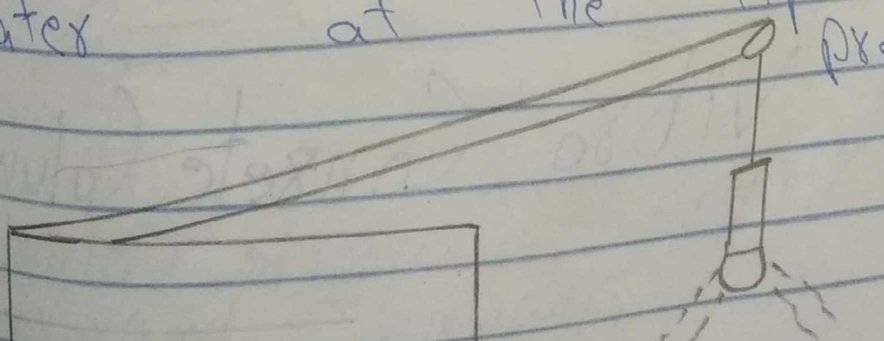
② Dynamic Compaction:-

This method is used to Increase the bearing Capacity of Soil. This also Increase the Consolidation

Rate. This method also Increase the density of Soil. in this actually densification of Soil take place.

③ Vibro Compaction:-

It is also Called Vibro densification in this method the Compaction take place at a Certain depth in granulal Soil through Vibratory probe. This vibratory probe is run by on electric motor. The Penetration of Probe is entance by ejecting water at the tip of probe.



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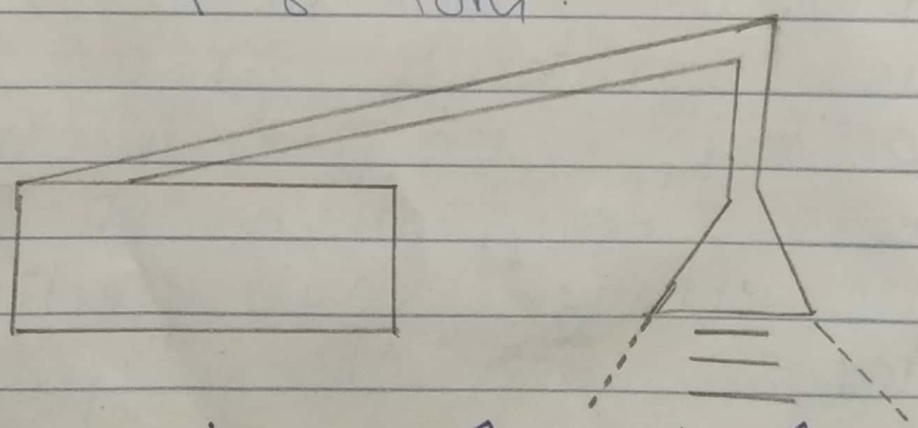
(4) Rapid Impact Compaction:-

Impact energy is applied to surface of ground as a result of which densification of soil take place upto a depth of 15 feet. This impact energy is actually applied through hydraulic ramp. The hydraulic ramp weight value from 4-8 ton.



(5) Vibro Conrete Column:-

Vibro Conrete Columns is a ground Improvement

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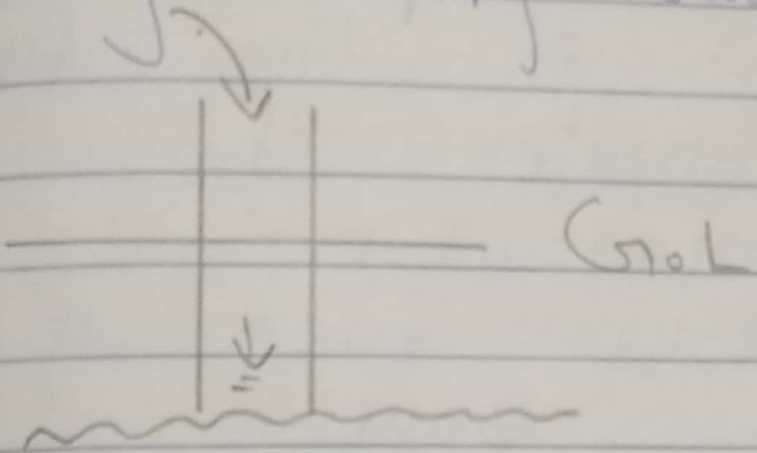
technique which transfer the load from weak strata to hard strata by using strength concrete.



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Q:- 3

Given data:

$C = 25\ KN/m^2$

$\phi = 16°$

$G = 2.73$

$e = 0.50$

To find:

F_c (f.os) when Soil is dry.

F_c (f.os) when there is seepage in soil.

Sol:-

$$F_c = \frac{C}{\gamma d \times H \times \sin s + \cos} + \frac{\tan \phi}{\tan s}$$

$$\gamma d = \frac{G \times \gamma w}{1+e} = \frac{2.72 \times 9.8}{1+0.5}$$

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$$\gamma d = 17.8\,KN/m^3$$

$$F_c = \frac{25}{17.8 \times 6 \times \sin(26) \times \cos(26)} + \frac{\tan(16)}{\tan(26)}$$

$$F_c = 1.18$$

When there is Seepage of water:

$$F_c = \frac{c}{\gamma \times H \times \sin i \times \cos i} + \frac{\gamma'}{\gamma} \times \frac{\tan\phi}{\tan i}$$

$$\gamma' = \gamma - \gamma w$$

$$= \frac{2.72 + 0.5}{1 + 0.5} \times 9.8$$

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$\gamma = 21.04 \ kN/m^2$

$\gamma' = \gamma - \gamma_w \Rightarrow 21.04 - 9.8$

$= 11.24 \ kN/m^3$

$$F_c = \frac{25}{21.04 \times 6 \times \sin(26^\circ)\cos(26^\circ)} + \frac{11.24}{21.04} \cdot \frac{\tan(16)}{\tan(26^\circ)}$$

$F_c = 0.816$

Fc when Soil is dry = 1.18

Fc when there is Seepage = 0.816

Date: / /20 Q:-4 (a)

Ans:

Given data:-

H = 10m
C = 18.8 KN/m²
γ = 17 KN/m²
Φ = 20°
F.os = 1.5
Fd = 1.0

Required:

Inclination = ?

Sol:-

$$SN = \frac{c}{F.os \times \gamma \times H}$$

$$SN = \frac{18.8}{(1.5)(17)(10)}$$

$$SN = 0.073$$

using taylor chart for

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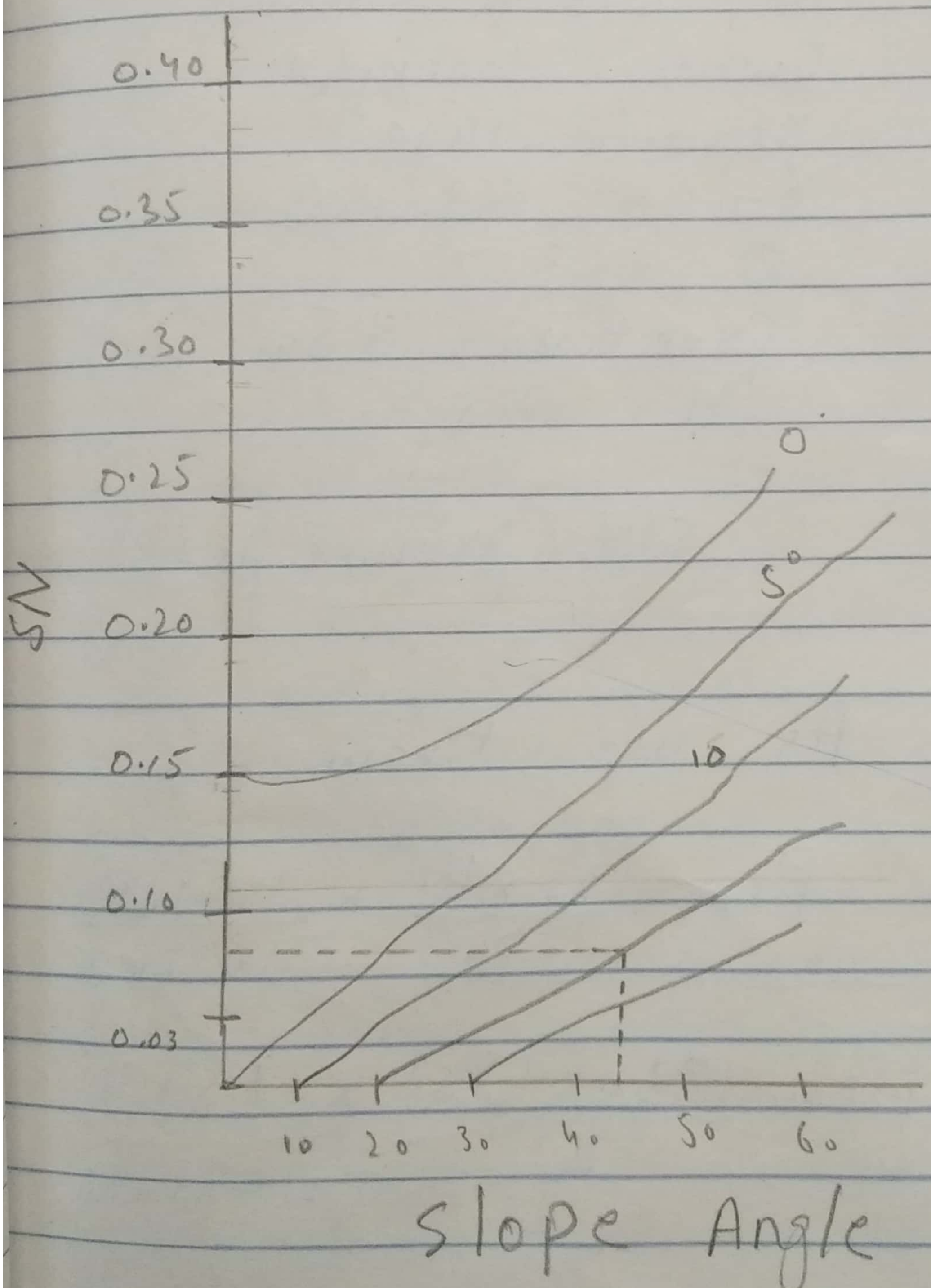
→ $\phi = 20^\circ$

→ SN = 0.073

→ $i = 44^\circ$ (from taylor chart)



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Q:- 4:- (b)

Ans:

Given data:-

Heigh of water on upstream side = 15m

Bottom width = 12m

Top width = 6m

γ water = 1000kg/m²

γ concrete = 1450

γ_{silt} = 1330 kg/m²

ϕ = 35°

free board = 3.5m

H = 2.5

Silt, pressure P_s = ?

As we Know

$$P_s = \frac{\gamma_s \times H_s^2}{2} \times \frac{1-\sin\phi}{1+\sin\phi}$$

$$P_s = \frac{1330 \times (2.5)^2}{2} \times \frac{1-\sin 35°}{1+\sin 35°}$$

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$$\rho s = 1126.30 \, kg/m$$