KASHIF KHAN.

ID # 7846

Section # "B"

instructor # Liaqat Ali Sir

Subject # Geo tech.

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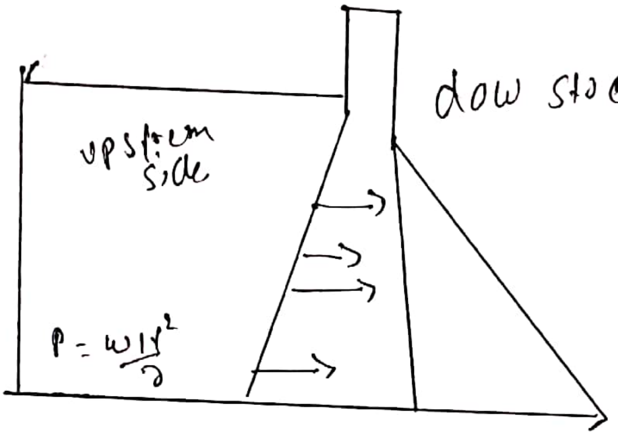
Ans (1) Water pressure :-

It is the pressure of water that acts perpendicular on the upstream face of the dam.



(2) Uplift Pressure: or seepage loads:

Uplift pressure when the water is stored on the upstream side of a dam 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 its Foundatio a major resisting Force it can be computed using the following eq.

$W = \gamma_m$ volume

γ_m = unit weight of dam material.

4) Selt pressure :->

~~Soil~~ The weight of dam and its Foundation a major resisting Force it act at h/3 from the base and can be compited using equation of active earth.

5) Wave pressure :->

Wave is generated on the surface of reservior by the blowing wids which exert a pressure on the upper part of the dam above the water level this pressure is calculated using $P_w = 2.4 \gamma h_w$

B)

⇒ Soil lique faction:

(1) Soil liquefaction occurs when saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, such as shaking during an earthquake or other sudden chang in stress condition. In which a material that is ordinarily a solid behaves like a liquid. In soil mechanics the term "liquefied" was ist by allen Hazen. in refrence to the 1918 failure of the Calaveras Dam in California. He described the mechanism of flow liquefaction of the embankment dam as.

2) Buttress dam :-

A budress dam or hollow dam is a dam with a solid, water-tight upstream side that is supported at intervals on the downstream side by a series of buttress or supports.

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3 Infinit slopes:

The type of slope extending infinitly or up to an extend whose boundries are not well defined.

4) Pier foundation :-

A pier foundation is a collection of large diameter cylindrical columns to support the supper structure and transfer large super-imposed load to the firm strata below.

5) Dynamic load :-

is any force that change with time such as car ~~tyres~~ tyres people working. and went gusts. usually in structure engineering we treat these as stratic load.

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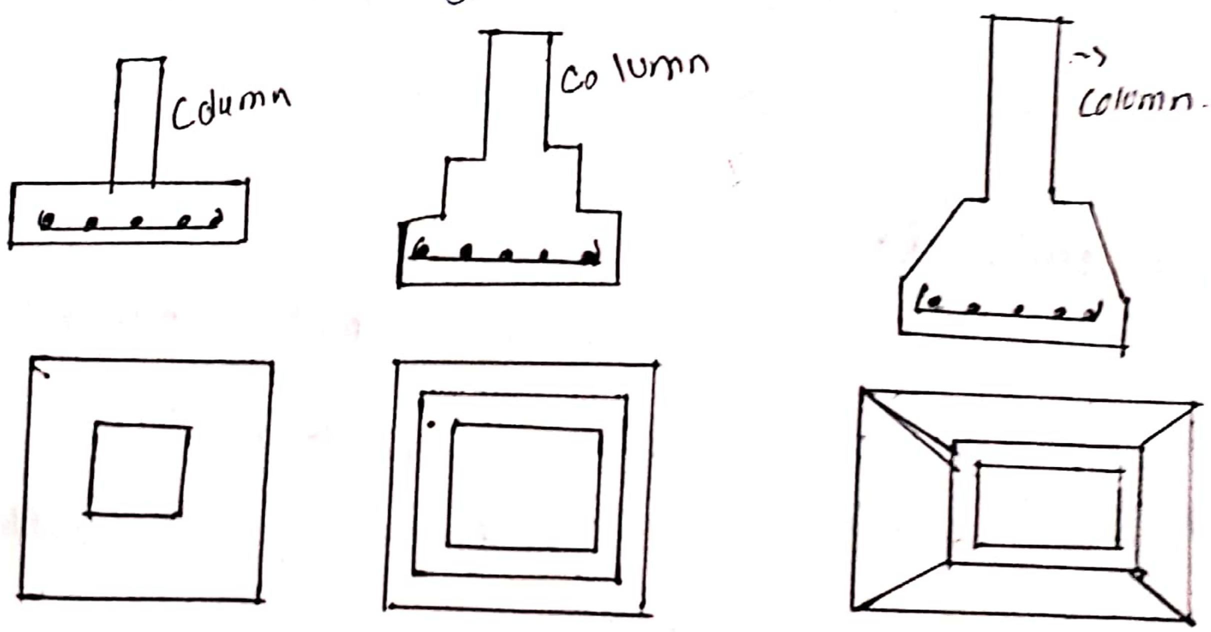
Q NO :02 (5)

Define shallow foundation.

Explain types of shallow foundation in details.

Ans A Shallow foundation is a type of building foundation that tranfer building loads to the earth very near to the surface rather than to a the surface layer or a range of depths as does a deep foundation



Shallow Foundation:

Different types of shallow Foundation are:

⇒ Skrip Foundation :->
are the types of foundation that are used to provide continous level (or some time stepped) strip of support to a linear structure such as wall or closely spaced rows of columns buits centrally above them.

⇒ Rapt Foundation :->
It is also called mat foundation is essentially a continous slab resting on the soil that extends over the entire foot print of the building and transferring its weight to the ground.

⇒ Spread Footing :
It is defined as the structural members used to support the column and wall as well

and distribute the load coming on the structure to the soil beneath it.

=> Combined Footings :-> are constructed for two or more columns when they are close to each other and their foundation is to transmit the ~~foundation~~ load from the structure to the underlying soil.

Q No:2
B
Ans

GROUND IMPROVEMENT TECHNIQUES :-

Ground improvement techniques are are the techniques which are used to enhance the engineering property of soil beal heavy structural load. The main properties are shear strength, permeability, bealing capacity etc.

⇒ Methods of Ground Improvement Techniques :→

1) Removal and Replacement of Soil :→

This is an oldest and simple method. This method is performed on Loose Soil.

In this method the unsuitable soil is replaced with Compacted fill. In this method the same soil is used to refill the higher Compaction and better engineering properties this methode 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 to this method actually densification of soil take place.

⇒ VIBRO Compaction :->

It is also called vibro densification. In this method the compaction take place at a certain depth in gradual soil through vibratory probe. This vibratory probe is run by an electric enhance by ejecting water at the tip of probe

⇒ 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 valles from 4-8 TONS.

5) WETSOIL MAXINGS:

In this method of ground improvement technique a past of cement is prepared & inseated in the soil. This Method is used to improve the characteristics of using cementation binder slurry.

Q: No# 3

Given Data.

$C = 25\ KN/m^2$

$\phi = 16°$

$G = 2.73$

$Q = 0.50$.

Required:→

F-o-S when soil is dry = ?

F-o-S when there is a seepage = ?

SOLUTION :→

$$Fc = \frac{c}{\gamma d \times H \times \sin i \times \cos i} + \frac{\tan Q}{\tan i}$$

By Relation:→

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

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

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

$$F_c = 1.18$$

When there is seepage of water

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

$$\gamma' = \gamma - \gamma_w$$

$$= \frac{2.72 + 0.5}{1 + 0.5} \times 9.5$$

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

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

$$= 11.24 \ KN/m^3$$

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

$$F_c' = 0.816$$

Result :->

Fc when soil is dry. = 1.18

Fc when There is Seepage = 0.816

Q=04
(a) Given :->

Height = 10 m

C = 18.8 kN/m²

γ = 17 kN/m³

ϕ = 20°

F.O.S = 1.5

F_ϕ = 1.0.

Required :

Inclination , i = ?

Solution : ->

$$SN = \frac{C}{F.O.S \times \gamma \times H}$$

$$= \frac{18.8}{1.5 \times 17 \times 10}$$

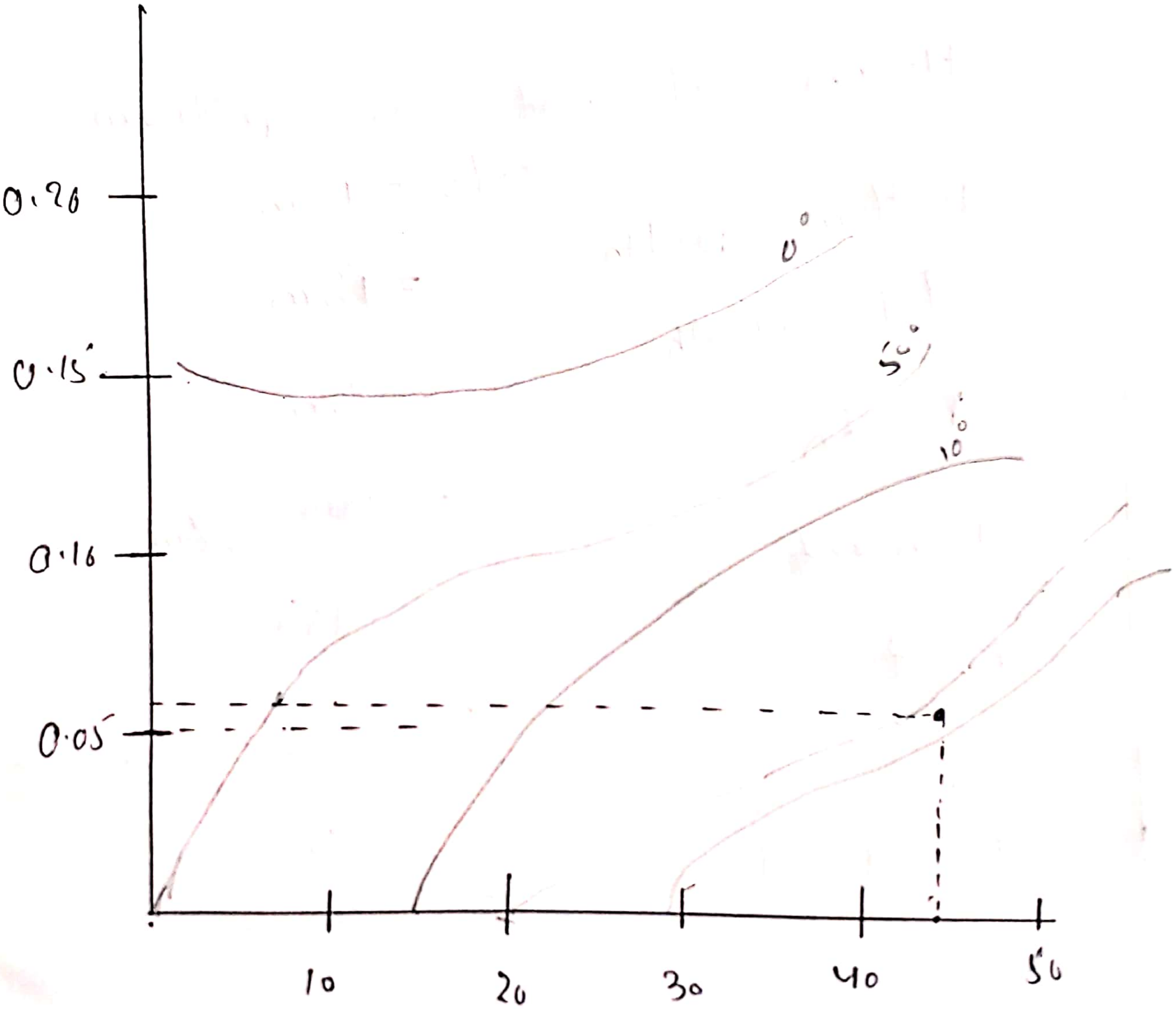
SN = 0.073

Using taylor chart for:

-> ϕ = 20°

-> SN = ~~40°~~ 0.073

=> **i = 44°**



Slope Angle.

Q:40 (B)

Given :->

Heigher of water on upstream side = 15m

Bottom, width = 12m

Top width = 6m

γ_{water} = 1000 kg/m²

$\gamma_{concrete}$ = 1450

γ_{silt} = 1330 kg/m³

ϕ = 35°

Free Bord = 3.5 m

H = 2.5 m.

Req:

Silt pressure P_s = ?

Solution:

As we know

$$P_s = \frac{\gamma_w \times H^2}{2} \times \frac{1 - \sin\phi}{1 + \sin\phi}$$

$$P_s = \frac{1330 \times 2.5^2}{2} \times \frac{1 - \sin 35^\circ}{1 + \sin 30^\circ}$$

$$= \frac{1330 \times 2.5^2}{2} \times 0.27$$

$$\Rightarrow 4156.25 \times 0.27$$

$$\Rightarrow 1122.18 \, kg/m^2$$

Result:

Silt pressure $P_s = 1122.18 \, kg/m^2$