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**PRESIDENCY UNIVERSITY
BENGALURU**

SET B

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024**

Semester : Semester V - 2021

Course Code : CIV3027

Course Name : Foundation Engineering

Program : B.Tech.

Date : 09-JAN-2024

Time : 9:30AM - 12:30 PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
 - (ii) Question paper consists of 3 parts.
 - (iii) Scientific and non-programmable calculator are permitted.
 - (iv) Do not write any information on the question paper other than Roll Number.
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PART A

ANSWER ALL THE QUESTIONS

4 X 5M = 20M

1. An earth slope is an unsupported, inclined surface of a soil mass. Earth slopes are formed for railway formations, highway embankments, earth dams, canal banks, levees, and at many other locations. Explain the various types of slopes with a neat sketch.
(CO1) [Knowledge]
2. Explain active and passive earth pressure with a neat sketch.
(CO1) [Knowledge]
3. List the various assumptions made in Rankine's Earth Pressure Theory.
(CO3) [Knowledge]
4. Explain ultimate bearing capacity, net ultimate bearing capacity, safe bearing capacity, net safe bearing capacity and allowable bearing capacity of soil.
(CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

5 X 10M = 50M

5. A concentrated load of 50 kN acts on the surface of the soil. Determine the vertical stress variation at points directly beneath the load up to a depth of 10 m and draw a plot. Use Boussinesq's theory for point loads.
(CO1) [Comprehension]

6. A canal is constructed for supplying water from Bhadra dam. The depth of canal is 5 meter deep. It has side slopes of 1:1. The properties of soil are $c=20\text{kN/m}^2$, $\phi=10$ degree, $e=0.8$ and $G=2.8$. If Taylor's stability number is 0.108, determine the factor of safety with respect to cohesion, when canal runs full. Also determine the factor of safety with respect to cohesion, for sudden drawdown condition with Taylor's stability number is 0.137.

(CO1) [Comprehension]

7. Rankine's earth pressure theories are useful for determining earth pressure exerted by soil on retaining walls, Derive the expression for earth pressure for cohesive soil.

(CO2) [Comprehension]

8. Structures are damaged when the bearing capacity of the soil is inadequate. Explain the various types of bearing capacity failures of soil with neat sketches.

(CO2) [Comprehension]

9. A 30 cm diameter concrete pile is driven into a homogeneous consolidated clay deposit with cohesion 40 kN/m^2 , with adhesion factor $\alpha=0.7$. If the embedded length is 10 m, Estimate safe load of the pile with Factor of safety=2.5.

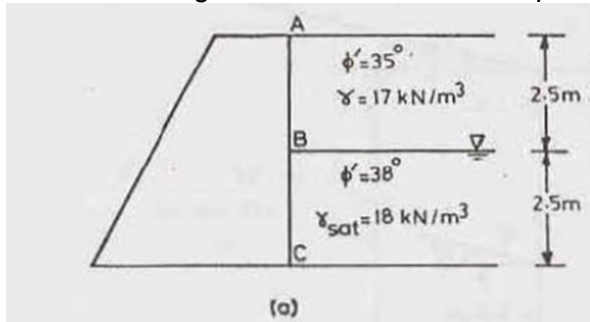
(CO3) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

2 X 15M = 30M

10. A retaining wall is constructed at Presidency University campus. Determine the active earth pressure for the retaining wall shown below. Take $\gamma_w=10\text{ kN/m}^3$.



(CO2) [Application]

11. A Pile foundation is a kind of deep foundation, can be defined as a slender column or long cylinder which are used to support the structure and transfer the load at desired depth either by end bearing or skin friction. Explain the classification according to mode of transfer of loads and material used for pile foundations.

(CO3) [Application]