# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING
## MID TERM EXAMINATION - NOV 2023

**Semester :** Semester V - 2021                    **Date :** 2-NOV-2023
**Course Code :** CIV3027                            **Time :** 2:00PM - 3:30PM
**Course Name :** Sem V - CIV3027 - Foundation Engineering    **Max Marks :** 50
**Program :** B. TECH                                **Weightage :** 25%

**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.*

## PART A

### ANSWER ALL THE QUESTIONS                    (2 X 5 = 10M)

1. Boussinesq gave the theoretical solutions for the stress distribution in an elastic medium subjected to a concentrated load on its surface. List the various assumptions made in Boussinesq's theory for point load.

(CO1) [Knowledge]

2. List the various factor of safety with respect to slopes and also write the expression for each of them.

(CO1) [Knowledge]

## PART B

### ANSWER ALL THE QUESTIONS                    (2 X 10 = 20M)

3. 6 A). Determine the Factor of safety of a site in Western Ghats with respect to cohesion of a clay stratum laid at 1 in 2 to a height of 10m, if the angle of internal friction $\varphi=100$ ; $c=25kN/m2$, Taylor's stability number (Sn) =0.064 and $\gamma=19kN/m3$. Also determine the critical height of the slope in the soil? B) A line load of 120 kN/m is acting on the ground surface of a construction site near Malleshwaram. Determine the vertical stress at a point P which has x and z coordinates as 2 m and 3.5 m respectively.

(CO1) [Comprehension]

4. A state of active pressure occurs when the soil mass yields in such a way that it tends to stretch horizontally. It is a state of plastic equilibrium as the entire soil mass is on the verge of failure. Derive the expression for active earth pressure by Rankine's theory with a neat sketch.

(CO2) [Comprehension]

**ANSWER ALL THE QUESTIONS**                                              **(1 X 20 = 20M)**

5. A) Three parallel strip footings 4 m wide each and 5 m center to center transmit contact pressures of 200, 150 and 100 kN/m2 respectively. Calculate the vertical stress due to the combined loads beneath the centers of each footing at a depth of 3 m below the base. Assume the footings are placed at a depth of 2 m below the base.  Use Boussinesq's method for line loads.

   B) A 5 meter deep canal has side slopes of 1:1. The properties of soil are c=17 kN/m2, φ=10̊, e=0.6 and G=2.67. 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) [Application]