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MID – SEMESTER EXAMINATION
SIXTH SEMESTER

Roll no
MARCH 2019
B.TECH

CE 304: Geotechnical Engineering

Time Allowed: 01 hr 30 min.

Max Marks: 30

NOTE: Attempt All questions. Marks carried by a question are indicated against it. You may assume any missing data suitably. Write only to the point answers.

- 1. A retaining wall with a smooth vertical back is 8 m high and retains a two-layer sand backfill with the following properties.

Depth: 0 – 5 m	$c' = 0$	$\phi' = 30^\circ$	$\gamma = 17 \text{ kN/m}^3$
Depth: 5 m and below	$c' = 0$	$\phi' = 35^\circ$	$\gamma = 18 \text{ kN/m}^3$

Draw a neat sketch showing active earth pressure distribution and determine the total active thrust and its point of application. Assume that the water table is well below the base of the wall. (6)

- 2. Describe the equipment, work procedure, presentation of results, and limitations of the following in – situ tests:
 - (i) The “Standard Penetration Test”.
 - (ii) The “Plate Load Test”.

(8)

- 3. An inclined rough retaining wall with a positive batter angle of 15° (from vertical) is 7 m high. It retains a soil backfill which is sloping upwards at 10° to the horizontal from the top of the wall. The properties of the soil backfill are: $c' = 0$, $\phi' = 36^\circ$, $\gamma = 18 \text{ kN/m}^3$. Determine the total active thrust by Culmann’s graphical method. (6)

- 4. A braced cut 7.5 m deep is made in a cohesionless deposit ($c' = 0$, $\phi' = 32^\circ$, $\gamma = 16 \text{ kN/m}^3$), the top row of struts is at a depth of 1.0 m from top, the bottom row of struts is located at a height of 1.5 m from the bottom of the cut, the middle row of struts is located at mid – way between the top and bottom row of struts. The spacing of struts in the horizontal direction is 3 m. Draw Pack’s earth pressure envelope and determine force in struts at each level. (5)

- 5. Using the free – earth support method, calculate the depth of embedment of the sheet pile and the pull in the anchor rod for the anchored bulk head system shown in the figure given below. (5)

