

CE-020 Design of Earth Retaining Structures

B.E. Final YEAR (CIVIL) END SEMESTER EXAMINATION

Time: 3HRS.

Max. Marks: 40

Note: Q.No.1 is compulsory.

Attempt five questions in all.

Assume missing data suitably.

All parts of a question should be attempted at one place.

Q1(i) To avoid large lateral thrust, proper provision for drainage must be made behind retaining wall.

(ii) The grip length of a well is its depth below the normal depth of scour.

(iii) The bottom plug of the well helps in transmit load to the subsoil.

(vi) Cohesive soil is the best soil for reinforcement.

(4*2=8)

Q2(a) Describe the methods of obtaining swell pressure. (4)

(b) Give the characteristics of expansive soils. Describe the procedure for their identification. (4)

Q3(a) How stability of retaining wall is checked. Describe stepwise procedure. (3)

(b) Check the external stability of a reinforced earth abutment for retaining a 7m high backfill as shown in Fig1. The vertical and horizontal bridge seat loads are 150kN/m (V_1) and 25kN/m (H_1) respectively. The allowable pressure is 250kN/m² and the safe design strength of geogrid reinforcement is 17.5kN/m. Assume μ and α as 0.55 and 1.0 respectively. (5)

Q4(a) Describe the salient features of under reamed piles. How are the capacities are obtained in clay. (4)

(b) Determine the capacity of a 7m long single under reamed pile of stem diameter 45cm, the stratum is deep deposit of medium dense sand having $\gamma=15\text{KN/m}^3$, $\phi=31^\circ$ (4)

Q5(a) Explain Terzahi's analysis for rigid bulkhead applied to well foundations. (3)

(b) A bridge pier in a sand deposit with external diameter $d=8.5\text{m}$ and the depth of well below scour level $D=15\text{m}$ is subjected to the following loads.

$W=14000\text{kN}$, $H=2000\text{kN}$, moment about base level = 42000kN. The value of ϕ of the sand = 30° , wall friction $\delta=20^\circ$, allowable bearing pressure 60t/m², and $k_h/k_v=m=1$. Check the stability of the well under the above forces according to IRC method. Assume the weight of soil is 20kN/m³. (5)

Q6(a) What are the different types of breakwater. Describe with neat sketch a composite breakwater. (4)

(b) What are the different forces, which are considered for the design of water front structures? (4)

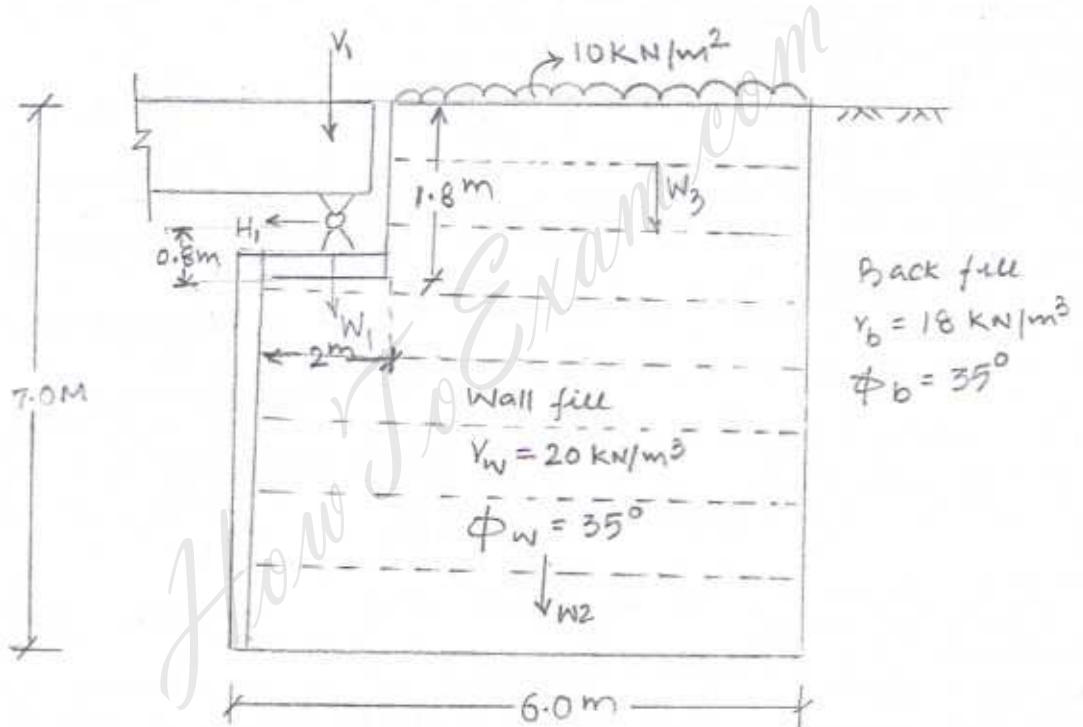


Fig 1