JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Tech-I Semester (CE-Structural Engineering)

COURSE CODE (CREDITS): 25M11CE111 (3) MAX. MARKS: 25

COURSE NAME: DESIGN OF REINFORCED CONCRETE STRUCTURES

COURSE INSTRUCTORS: Dr. KAUSHAL KUMAR MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

(c) Calculator is allowed.

Q.No	Question	CO	Marks
Q1	Discuss the causes and types of sulphate attacks (external and internal), including the role of delayed ettringite formation (DEF). Explore preventive strategies like using sulphate-resistant cement, optimizing mix design, controlling temperature during curing, and the role of mineral admixtures in enhancing resistance.	1	3
Q2	Explain the yield line theory for slabs. What are the properties of yield lines?	2	3
Q3	Derive an expression for the Ultimate load carrying capacity at the yield line in an isotropically reinforced square slab simply supported on all the edges subjected to uniformly distributed load over entire area. Use both methods	2	6
Q4	Explain the behavior of various parts of a counterfort retaining wall	3	3
Q5	Check for the stability of a cantilever retaining wall for retaining an earthfill of 4.5 m height above the ground. The safe bearing capacity of soil is 130 kN/m^2 and unit weight of earth fill is 18kN/m^3. The angle of friction is 30° and coefficient of friction between soil and concrete is 0.45. Use M20 concrete and Fe415 steel. Preliminary design is given in the figure. (next page)	3	10

All dimensions are in 'm'.

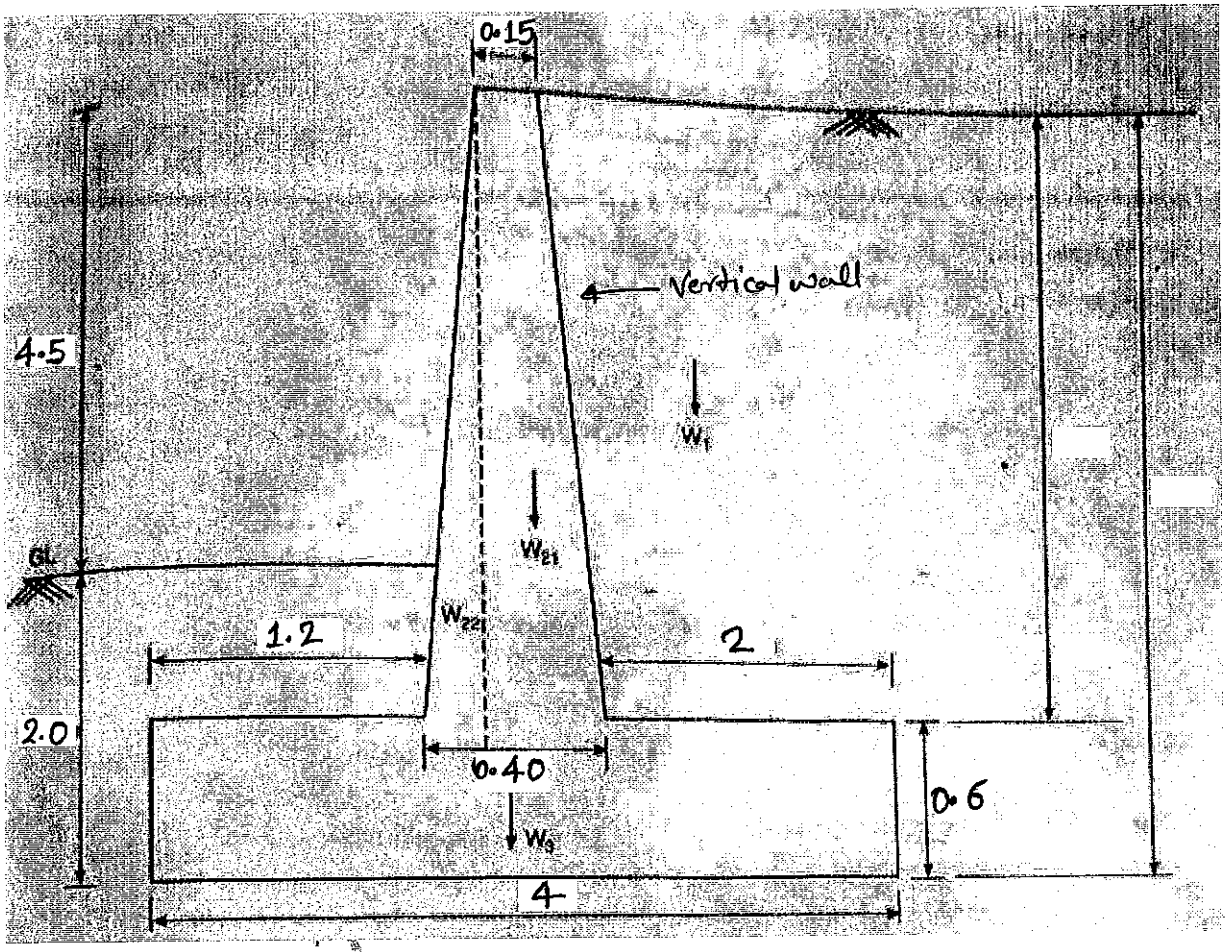

Figure: Preliminary Design of Cantilever R.W.

End of Paper