BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH **SEMESTER : II**
BRANCH: CIVIL **SESSION : SP/2025**

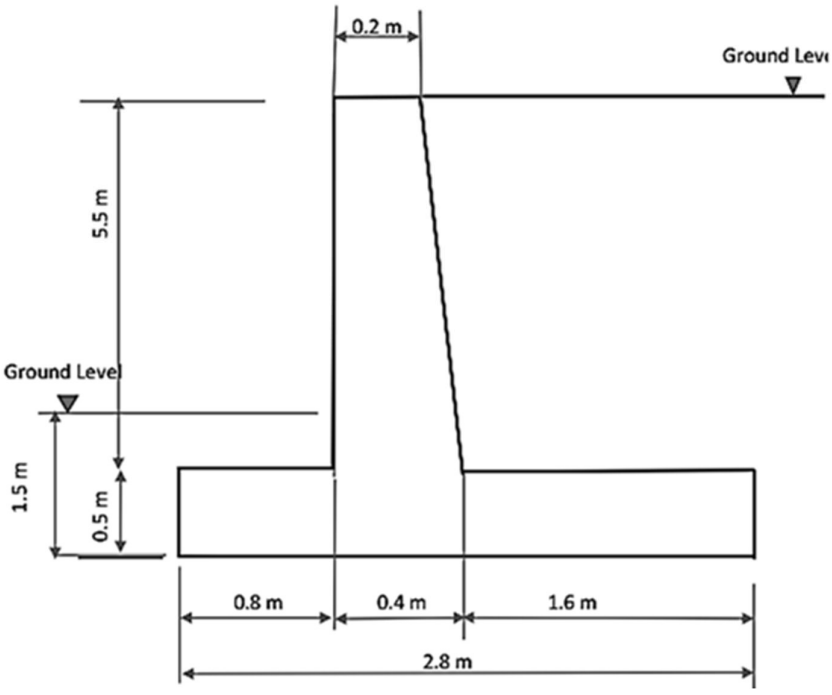
SUBJECT: CE549 STRUCTURAL DESIGN OF FOUNDATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
6. IS 456 is allowed in the examination hall.

			CO	BL
Q.1(a)	What are the objectives of surface exploration by Boreholes? Mention the types of boring.	[5]	1	K1
Q.1(b)	What are the advantages of SPT test?	[5]	1	K2
Q.2	Design a combined footing for two columns 400 mm x 400 mm each 5 m apart carrying a load of 1500 kN. Available width restriction is 2.5 m. The SBC of soil is 200 kN/m2 at 1.5 m below GL. Use M25 concrete and Fe415 steel.	[10]	2	K3
Q.3	A RCC cantilever retaining wall is having 5.5 m tall stem with base raft of width 2.8 m as shown in the following figure. The wall retains soil level with its top. Soil density is 16 kN/m^3 and has angle of repose = 30 degree. The safe bearing capacity of soil is 210 kN/m^2. Check the stability of the retaining wall against overturning, sliding and bearing pressure.	[10]	3	K3



Q.4(a)	A RCC column of size 500 mm x 500 mm is carrying a vertical load of 2500 kN, moment about X-axis of 500 kN and horizontal load of 25 kN at the bottom of column. Design the pile foundation for the column with 500 mm diameter piles of compression capacity of 1000 kN, tension capacity of 100 kN and horizontal load carrying capacity of 50 kN. Use M25 concrete and Fe415 steel.	[10]	4	K3
Q.5(a)	Mention types of machine foundations.	[5]	5	K1
Q.5(b)	Write the general requirements of Machine Foundation from the design point of view.	[5]	5	K2

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