

Name:	
Enrolment No:	

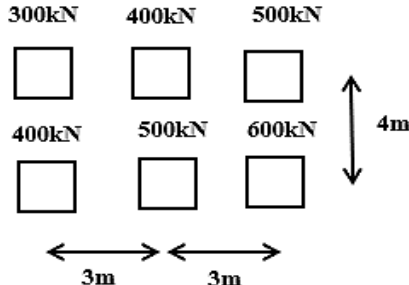
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
END SEMESTER, MAY 2023

Course: Foundation of Structures Program: M. Tech (Structures) Course Code: CIVL 7030 Instructions: Attempt all the questions	Semester: II Time: 3Hrs Max. Marks: 100 PAPER - I
--	--

SECTION A

S. No.		Marks	CO
Q.1	Under what circumstances combined footings are preferred?	4	CO1
Q.2	Briefly explain the various considerations for the design of building foundations.	4	CO1
Q.3	Explain the difference between strip & strap footings	4	CO2
Q.4	Briefly explain when raft footing is provided.	4	CO2
Q.5	Explain three types of machine foundations.	4	CO3

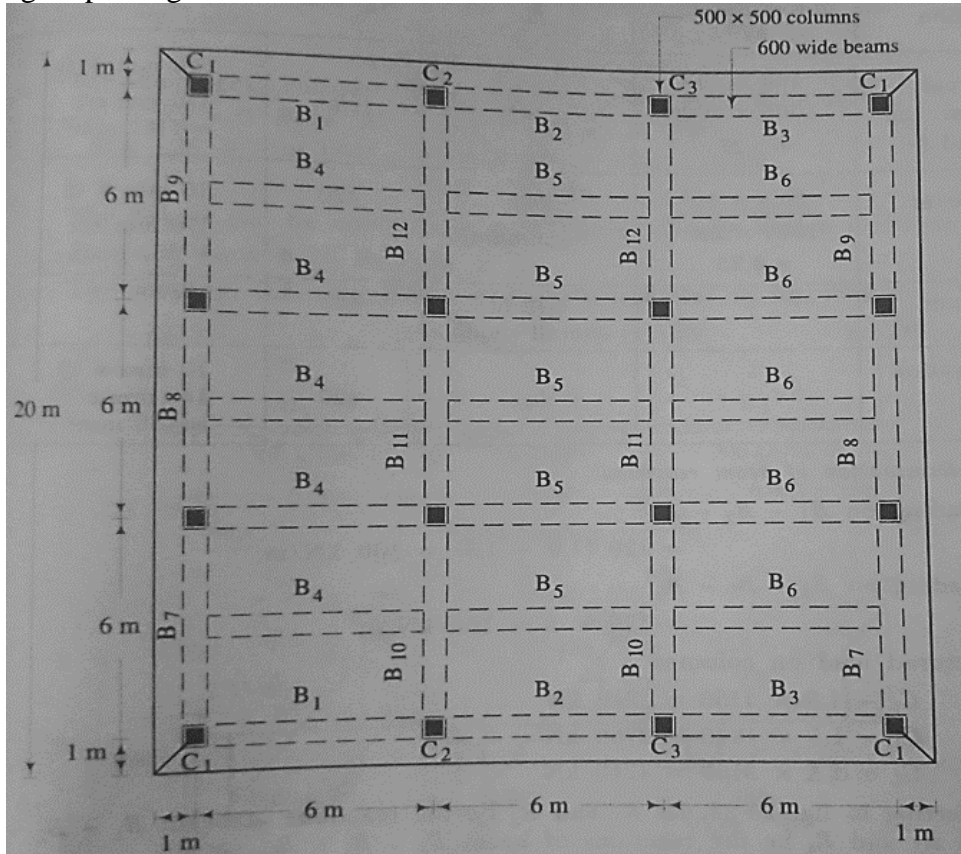
SECTION B

Q.6	Design the combined footing for two columns C_1 & C_2 at the boundary of building 4m X 12m. The size of columns is 230mm X 400mm spaced at 4m c/c. The columns C_1 & C_2 carry the load of 1000kN & 600kN. The ABP of the soil is 50kPa. Assume M20/fe415	10	CO1
Q.7	Design the strap footing for the two columns of transmission tower 300mm X 300mm carrying loads of 1000kN & 600kN. The columns are spaced 5m c/c. There is a restriction beyond the lighter column. The ABP of the soil is 150kPa. Use M25/fe415	10	CO2
Q.8	Design the raft foundation for the column configuration as shown in figure below. The size of the columns is 300 X 300mm & ABP of the soil is 60kpa. Use M20/fe415 steel. <div style="text-align: center; margin: 10px 0;">  </div>	10	CO2
Q.9	A Machine foundation has weight equal to 4 times the weight of the engine. The soil bearing pressure is 65kPa and has a foundation base dimension of 1.8m X 3.5m. Determine the maximum weight of the engine. <p style="text-align: center;">OR</p> An unknown weight W is attached to the end of an unknown spring K and the natural frequency of the system was found to be 90cpm. If 1kg weight is added to W , the natural frequency is reduced to 75cpm. Determine the unknown weight W and spring constant K .	10	CO3

SECTION-C

Q.10

The column layout of the multistoried building at the foundation level is shown in the figure below. The size of the columns is 500m X 500mm. The working loads on the columns are 1160kN, 1840kN & 3160kN for C1, C2 & C3 buildings. Design the foundation for the buildings if ABP on the soil is 2.6m depth is 110kN/m². The plinth level of the building is +0.0m. The loading on plinth is taken as 10kN/m² including loading on parking. Use M20/fe415



20

CO2

Q.11

Design the foundation of transmission tower of the height 75m. The diameter of the transmission tower is 3.5m. The tower rests on medium soil bearing pressure of 190kN/m². The thickness of the transmission tower is 100mm. The tower has an opening. The topography of the site is flat & location of terrain is 2.

OR

The resonance of test block 2m X 1m X 1m occurred at 25cycles/sec in the vertical direction. The other data are as follows. Weight of Oscillator = 62kg. Vertical unbalanced force = 0.5T. Unit weight of soil = 1.7t/m². Calculate the apparent mass of the soil.

20

CO3