Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

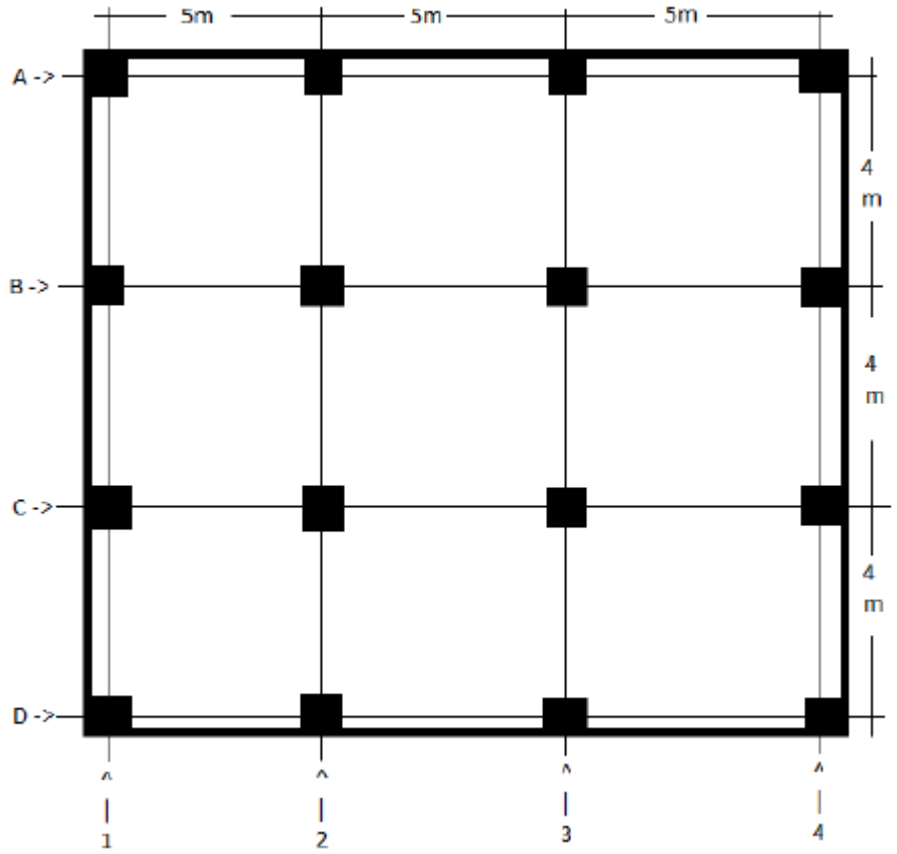
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, June 2021

Course: Foundation of Structures — **Semester: II**
Program: M.Tech Civil Engg — **Time 03 hrs.**
Course Code: CIVL 7015 — **Max. Marks: 100**

Instructions: This is open book examination. Use of notes, codes and other reference material is permitted. Any other data required , but not stated may be assumed and mentioned clearly.

SECTION A (30 Marks)

S. No.		Marks	CO
Q 1	If rocks contain fissures, what remedial action can be taken to place foundations on them.	**5**	**CO1**
Q 2	Consider a shallow footing foundation and pile foundation resting on rock, which foundation is likely to have more settlement and why.	**5**	**CO1**
Q 3	In an eccentric foundation, what is the limiting condition of design for no tension to develop below the foundation.	**5**	**CO1**
Q 4	In the design of floating raft foundation, the bearing capacity of soil below need not be considered. Why.	**5**	**CO1**
Q 5	In case of a raft foundation below a multistoreyed building, if the loads on the columns are not uniform, how can size of raft be adjusted to obtain uniform pressure below the raft.	**5**	**CO1**
Q 6	What is the role of inertia block in machine foundations.	**5**	**CO1**
SECTION B (50 Marks)			
Q 7	The plan of a multistoreyed building is as follows:	**10**	**CO2**

	 The columns D1, D2, D3,D4 terminate at single storey. The columns A1, A2, B1,B2,C1,C2 terminate at double storey. Rest of columns terminate at eight storeys. Assume suitable projections at the base. Assume column size as 400x400mm and density of soil as 17 KN/m^3 and M40 grade concrete. The loads carried by each of the columns are as follows: D1,D2,D3,D4 Dead load= 200KN Live load= 150KN A1, A2, B1,B2,C1,C2 Dead load= 400KN Live load= 300KN Remaining columns Dead load= 1600KN Live load= 1200KN Design a beam and slab raft foundation for the building as follows: • Calculate total load on the raft foundation		
Q 8	In continuation of Q7 of section B. Do the following: Calculation the eccentricities of resultant loads . Sketch all design details clearly.	**10**	**CO2**
Q 9	In continuation of Q7 of section B. Do the following: Determine size of raft such that there is uniform pressure from below the raft. Sketch all design details clearly.	**10**	**CO2**
Q 10	In continuation of Q7 of section B. Do the following: For a floating raft foundation, determine the depth of soil to be excavated Sketch all design details clearly.	**10**	**CO2**

Q 11	In continuation of Q7 of section B. Design the thickness of base slab of the floating raft, and provide a pedestal if considered necessary. Sketch all design details clearly.	**10**	**CO2**
	SECTION-C (20 Marks)		
Q 12	A four legged micro wave tower 50 m high is to be built in an industry located in Dehradun. A hemispherical flood light disc of diameter 2.5m is to be attached to the tower at the top on each side. Assuming the width of side of tower at the top to be 3 m select a suitable configuration for the tower and design a foundation for the tower. • Assume wind load moment about the base as 6000KNm, and SBC of soil as 140KN/sq.m. at all depths up to 4.5m. • Assume that foundation soil is good and individual footings can be provided. • Assume that the tower is determinate having least number of members in panels. • Use M25 concrete with a base plate for the foundation. **Or** Illustrate through a figure, how a machine can impart rotational as well as translational vibrations in all three planes to the block foundation. What is the main purpose to match the centre of gravity of vibrating machine with that of the foundation. Sketch the graph of amplification versus frequency ratio for a vibrating machine on a foundation, and explain through it the difference between a low tuned foundation and a high tuned foundation.	**20**	**CO3**