Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech Winter 2018 - 19 Examination

Semester: 2 **Date: 14/12/2018**
Subject Code: 03209180 **Time: 2:00 pm to 4:30 pm**
Subject Name: Soil Structure Interaction **Total Marks: 60**

Instructions:
1. Attempt all questions from each section.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.

Q.1 **(a)** Define contact Pressure. Draw contact pressure distribution diagram for flexible footing. **(05)**
(b) State different types of sheet pile walls. Draw the sketches showing the pressure distribution. **(05)**
(c) Explain Experimental determination of the Modulus of Subgrade reaction by Plate load test. **(05)**

Q.2 **Answer the following questions.** (Attempt any three) (Each five marks) **(15)**
(a) Elaborate ANY ONE field test for finding the dynamic soil properties.
(b) Give with suitable sketches the various functions and applications of geosynthetics in Civil Engineering.
(c) State different factors affecting contact pressures under a shallow footing.Explain Any Two in detail.
(d) Define Liquefaction. Enlist factors affecting it.

Q.3 **(a)** Explain finite difference method for the design of combined footing. **(07)**
(b) Draw the Bending Moment diagram for the rectangular combined footing having L= 6.13m, B= 1.2 m and D=0.85 m. A 70t point load is acting at 1.95m distance from the left edge and 27t point load is acting at 0.18m from the right edge, using the method of subgrade reaction. The footing depth below ground surface is 1.5m. The value of modulus of subgrade reaction is 5 kg/cm^3 determined from plate load test conducted on a plate of 30cm x 30cm size. Value of Elastic modulus E is 0.2x 10^{10} kg/m^2.Use hetenyi's method. Refer table 1. **(08)**

OR

(b) Draw actual pressure distribution diagram and simplified pressure distribution diagram of cantilever sheet pile in cohesion less soil. **(08)**

Q.4 **(a)**Explain soil line method to determine contact pressure and bending moments. **(07)**

OR

(a)A cantilever sheet pile retains soil to a height of 6 m. Find the depth to which the pile should be driven assuming two-thirds of the theoretical passive resistance is developed on the embedded length. Take unit weight of backfill as 19 kN/m3and angle of internal friction as 30°. Use Approximate method. **(07)**

(b) Calculate the cyclic stress ratio developed at the site for the given data **(08)**

Depth(m)	1	2	3	6	8	10	12
N	6	8	10	8	15	20	22
rd	0.99	0.98	0.96	0.93	0.90	0.88	0.85

Take amax = 0.2g, rsat =17 kN/m3. GWT is touching the GL. Also check the Liquefaction potential at 3.0 m depth if CRR is 0.12.?

TABLE 1: ƛL= 0.2

Load at 0.0L		Load at 0.3L	
x/L	**B'**	**x/L**	**B'**
0.0	0.0000	0.0	0.0000
0.0	0.0000	0.2	0.1545
0.1	-0.3150	0.3	0.3384
0.2	-0.4837	0.3	0.3384
0.3	-0.5401	0.4	0.1841
0.4	-0.5150	0.6	0.0239
0.6	-0.3273	0.7	-0.0028
0.7	-0.2105	0.8	-0.0084
0.8	-0.1051	0.9	-0.0039
1.0	0.0000	1.0	0.0000