Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2724309 Date: 30/05/2015

Subject Name: Software Project Management

Time: 2:30 PM – 5:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	(a)	What do you mean by contact pressure? Explain contact pressures based on theory of elasticity. Define perfectly flexible and perfectly rigid conditions.	07
	(b)	Differentiate contact pressures under perfectly flexible footings and perfectly rigid footings in detail. Support your answer with neat sketches for sand and clay.	
Q.2	(a)	Enlist the various factors affecting the magnitude of the coefficient of subgrade reaction (kv and kh). Explain the influence of width B on coefficient of vertical soil reaction in detail. Support your answer with necessary plots.	07
	(b)	Calculate the foundation pressures and moments for a beam of 40m span with three point loads of 150000kg each spaced equally 10m apart from each other.Take K = 1 x 10^7 kg/m^2 and E = 2 x 10^9 kg/m^2.	07
		OR	
	(b)	Calculate the foundation pressure for the simply supported beam with point load of 200000kg acting at the centre of 40m span. Assume K = 5 x 10^5 kg/m^2 and E = 2 x 10^9 kg/m^2.	07
Q.3	(a)	Enlist the various methods of computing elastic settlements. Explain elastic settlement based on theory of elasticity in detail.	07
	(b)	Explain in detail the solution of a beam on an elastic foundation using FDM given by Malter.	07
		OR	
Q.3	(a)	Estimate the immediate settlement of a concrete footing 1.5m x 1.5m in size founded at a depth of 1m in silty soil whose modulus of elasticity is 90kg/cm2. The footing is expected to transmit a unit pressure of 200 kN/m^2. Take μ = 0.35, I_f = 0.82 for rigid footing.	07
	(b)	Explain Winkler foundation and derive its equation for finding slope, deflection, moment, shear and load for a beam resting on elastic foundation.	07
Q.4	(a)	Show the differential equation of the elastic curve applicable to laterally loaded piles and explain concept of *p-y* curve.	07
	(b)	A steel pile of 620mm outside diameter with a wall thickness of 25mm is driven into loose sand (Dr = 30%) under submerged condition to a depth of 20m. The submerged unit weight of the soil is 8.85 kN/m^3 and $\varnothing$ = 34°. The EI value of the pile is 4.37 x 10^2 MN-m^2. Compute the ground line deflection of the pile under lateral load of 268 kN at ground level under free head condition by Reese and Matlock method. Assume n_h = 6 MN/m^3.	07
		OR	
Q.4	(a)	A 300mm square wooden pile is driven 5m below ground level in pre-	07

loaded clay. The load to be applied is 1m above the ground. Determine the ultimate load that can be applied on a pile with Mu = 110kNm. Assume Kh = 16 MN/m^2, E = 10 X 10^2 MN/m^2 and cohesion of clay = $1kg/cm^2$.Assume e/R = 1.83, Zf/R = 1.42, m = 0.62. Use IS 2911 method only.

(b) Explain linear elastic weightless spring approach given by Barkan for machine foundation. With reference to block foundation explain with neat sketch various types of motion for rigid foundation. **07**

Q.5 (a) What do you mean by curved failure surfaces? Explain logarithmic spiral method for determining passive earth pressure of sand with neat sketch. **07**

(b) Explain in detail Poulos-Davis-Randolph approach for assessing vertical bearing capacity of piled raft foundation. **07**

OR

Q.5 (a) Discuss the various design philosophies given by Randolph for piled rafts. Explain Burlands approach when piles are designed as settlement reducers. **07**

(b) Elaborate the steps to estimate settlement of footings from constitutive laws. **07**

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