Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 131304 Date: 04-01-2013

Subject Name: Basics of Structural Engineering

Time: 10.30 am – 01.00 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)**	Define the terms Void ratio, Porosity, Dry density, Degree of saturation and Bulk density.Explain three phase and two phase diagram for soils.	**07**
	(b)	What is workability explain any one test to determine workability of fresh concrete.	**07**
Q.2	**(a)**	Explain alkali aggregate reaction and state factors promoting and controlling alkali aggregate reaction.	**07**
	(b)	Derive relation among G, w, S and e.	**07**
		OR	
	(b)	State physical properties of cement and describe the test for any one.	**07**
Q.3	**(a)**	Describe various methods of mixing and placing of concrete.	**07**
	(b)	State Bogue's compound, its abbreviations and properties.	**07**
		OR	
Q.3	**(a)**	Define Liquid limit, Plastic limit and Shrinkage limit.	**07**
	(b)	What is compaction of soils? State factors affecting compaction in field and methods to test compaction.	**07**
Q.4	**(a)**	Define coefficient of permeability of soils, explain factors affecting permeability.	**07**
	(b)	Explain bearing capacity of soils and factors affecting bearing capacity.	**07**
		OR	
Q.4	**(a)**	Analyse the continuous beam shown in figure 1 by moment distribution method and draw bending moment and shear force diagrams.	**10**
	(b)	Derive condition for no tension for a rectangular section of width b and depth d	**04**
Q.5	**(a)**	A rectangular pier is subjected to a compressive load of 500 kN as shown in figure 2. Find the stress intensities below all four corners.	**07**
	(b)	Find out the slope and deflection at free end of the cantilever shown in figure 3 by moment area method. Take $E = 2 \times 10^5$ N/mm^2 and $I = 5 \times 10^8$ mm^4.	**07**
		OR	
Q.5	**(a)**	Find out the slope and deflection at free end of the cantilever shown in figure 4 by moment area method. Take $E = 2 \times 10^5$ N/mm^2 and $I = 5 \times 10^8$ mm^4.	**07**
	(b)	A trapezoidal dam with a vertical water face is 3 m wide at the top and 12 m wide at the base and is 24 m high. Determine the maximum depth of water so that no tension develops in the dam. Take the weight of masonry as 20 kN/m^3 and of water as 10 kN/m^3.	**07**

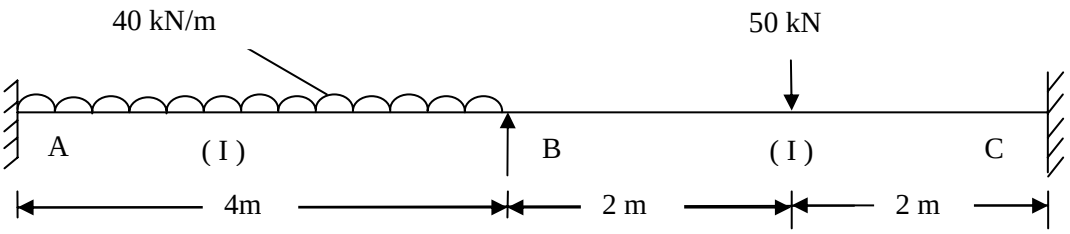

Figure-1 (Q.4 (a))

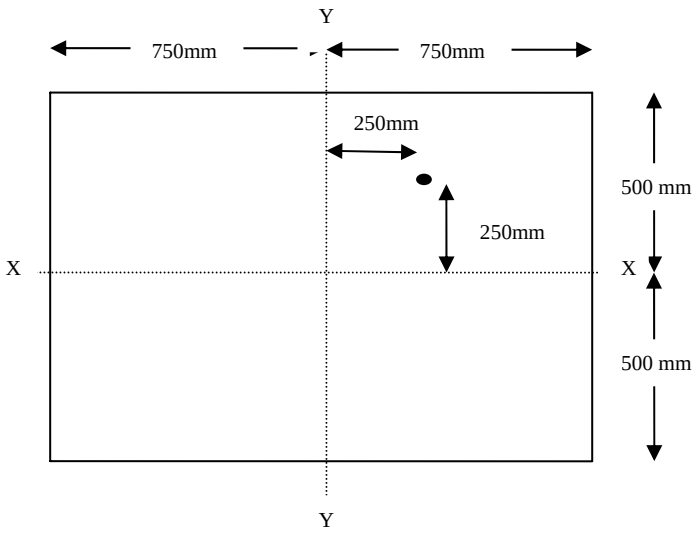

Figure-2 (Q. 5 (a))

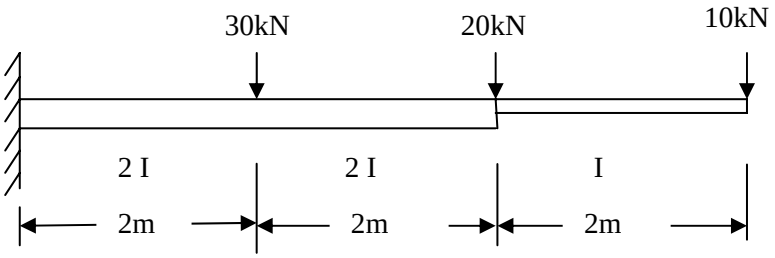

Figure-3 (Q. 5 (b))

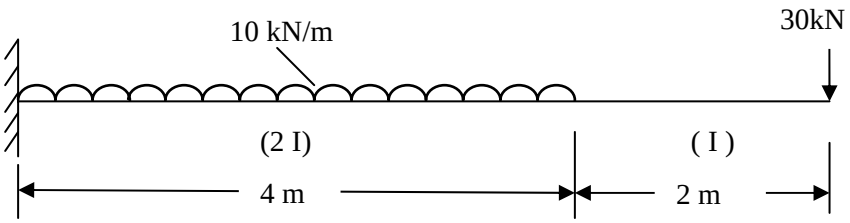

Figure-4 (OR Q.5 (a))