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Subject code: 140603 Date:19 / 06 /2010

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-IV Examination June- 2010

Total Marks: 70

Subject Name : Structural Analysis - II Time: 10.30 am - 01.00 pm

Instructions:			
		Attempt all questions.	
		Make suitable assumptions wherever necessary.	
	3.	Figures to the right indicate full marks.	
Q.1		Answer the following.	
Q.1	(a)	State advantages and disadvantages of a fixed beam	04
	(b)	Explain the methods of prestressed concrete	04
	(c)	For a joint 'O' of a plane frame with the members OA, OB, and OC having	02
	()	constant EI and length 2m, 3m and 4m respectively, if end A is free, end B is	
		hinged and end C is fixed, then moment distribution factor for OA, OB and OC	
	(T)	will be respectively	
	(d)		02
		will be the reaction developed at each support? $E = 200 \text{ x} 10^3 \text{ N/mm}^2.\text{I} = 3 \text{ x} 10^7 \text{ mm}^4.$	
	(0)		02
	(e)	'δ', What will be the moment developed at end A and at end B?	UZ
Q.2	(a)		03
Q.2	(a) (b)		03
	(6)	any convenient method.	UT
	(c)	•	07
	(-)	Draw shear force and bending moment diagram. Assume constant EI.	
		OR	
	(c)	Determine the vertical deflection at free end in the overhanging beam as	07
		shown in fig.(iii). Assume constant EI. Use Castigliano's method.	
Q.3	(a)	• • • • • • • • • • • • • • • • • • • •	07
	~ \	Draw shear force and bending moment diagram.	^ -
	(b)		07
		supports if, end A rotates by 0.002 radian in the clockwise order and the	
		support B settles by 4 mm. $E = 200 \times 10^{3} \text{ N/mm}^{2}.I = 9 \times 10^{7} \text{ mm}^{4}.$ OR	
Q.3	(a)		04
Q.0	(4)	supports of a fixed beam settles by amount '\delta'.	0.
	(b)	Determine the support moment for a continuous beam as shown in fig.(vi)	10
	(~)	by moment distribution method. Also draw bending moment diagram.	
Q.4	(a)	Derive the fixed end moment developed due to rotation of support B by	04
		amount θ in clockwise direction for a fixed beam AB.	
	(b)	Using slope deflection method analyse the continuous beam shown in	10
		fig.(vii) . Draw bending moment diagram.	
<i>~</i> ·		OR	
Q.4	(a)	Mention the grade of concrete and grade of steel used in prestressed	02
	/1- \	concrete. Concrete the influence line diagram for M, and B. Defer fig (viii)	12
	(b)	Generate the influence line diagram for M _A and R _B . Refer fig.(viii)	12

- Q.5 (a) State and explain Muller Breslau's principle. State the significance of 04 influence line diagram in structural analysis.
 - (b) A rectangular concrete beam of cross section, 300mm deep and 200mm wide is pre stressed by means of 15 wires of 5 mm diameter located at 65 mm from the bottom of the beam. and 3 wires of 5 mm, 25 mm from the top. Assuming the pre stress in the steel as 840 N/mm², calculate stress at the extreme fiber of the mid span section when the beam is supporting its own weight over a span of 6 m. If a uniformly distributed live load of 6 kN/m is imposed, evaluate the maximum working stress in concrete. The density of concrete is 24 kN/m³. Refer **fig.(ix).**

OR

Q.5 (a) Explain about losses in prestressed materials.

04

(b) For the continuous beam shown in **fig.(x)** show one complete iteration 10 cycle by Kani's method.


