Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: 140603 **Date: 23-06-2014**

Subject Name: Structural Analysis - II

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) (i)State and explain Muller Breslau Principal. **07**
(ii) Advantages and Disadvantages of Indeterminate Structures.

(b) Find the fixed end moments if one of the supports of fixed beam settles by δ. **07**

Q.2 (a) A Fixed Beam of 7 m span carries a uniformly distributed load of 10 kN/m from left end for 3 m. Analyze the beam and draw Bending Moment Diagram (BMD) showing important values. **07**

(b) Determine redundant reaction B using method of consistent deformation for propped cantilever as shown in Fig.1. **07**

OR

(b) Find the slope and deflection of free end of a cantilever beam carrying a uniformly distributed load over the entire span. **07**

Q.3 (a) Analyze the portal frame ABC shown in Fig.2 and draw Bending Moment Diagram (BMD) by Slope and Deflection Method. **07**

(b) Determine the support moments and draw BMD for the beam shown in Fig.3 by Moment Distribution Method. **07**

OR

Q.3 (a) A beam AB of uniform section of span 9m and constant EI=3.6x10^4 Nm^2 is partially fixed at ends when the beam carries a point load of 90 kN at distance of 3m from the left end A. The following displacements were observed. **07**
(i) rotation at A = 0.01 rad (clockwise) and settlement at A= 20 mm
(ii) rotation at B = 0.0075 rad (anticlockwise) and settlement at B= 15 mm
Analyze using Slope Deflection Method.

(b) Analyze the Portal frame shown in fig.4. by Moment Distribution Method and draw B.M. Diagram and S.F. Diagram. **07**

Q.4 (a) Calculate vertical deflection of the joint C of the pin – jointed plane frame shown in Fig.9 by Energy Principle Method. The cross section area of AB, AC and BC are same. E = 2 x 10^5 N/mm^2. **07**

(b) Find the support moments of the frame shown in fig.5 by Kani's Method, EI is constant. **07**

OR

Q.4 (a) Explain Castigliano's First and second theorems. **07**

(b) Determine the Support moments for the continuous beam shown in fig,6 by Kani's Method. **07**

Q.5 (a) What does an Influence Line Diagram indicate? What are the characteristics for ILD of an indeterminate structure **07**

(b) Draw Qualitative I.L.D.(fig.7) for **07**

(i) Three Span Continuous Beam (ILD for Va,Vb,Vc,Vd,Mx,Vx)

(ii) Three Storey Building Frame.(BM x-x,BM y-y, SF x-x, SF y-y)

OR

Q.5 (a) A Concrete beam of symmetrically I – Section spanning 8 m has flange width and thickness of 200 mm and 60 mm respectively. The overall depth of the beam is 400 mm. The thickness of web is 80 mm. The beam is pre stressed by a parabolic cable with an eccentricity of 120 mm at centre and zero at the supports with an effective force of 150 KN. The L.L. on beam is 3 kN/m. Draw the stress distribution diagram at the centre section for : **07**

(i) Prestress + Self Wt.

(b) Draw I.L.D. for V_A, V_B for a Beam shown in fig.8. **07**

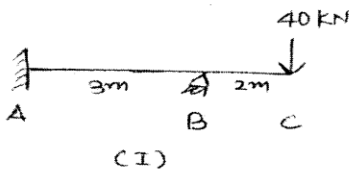

fig 1 (Q.2(b))

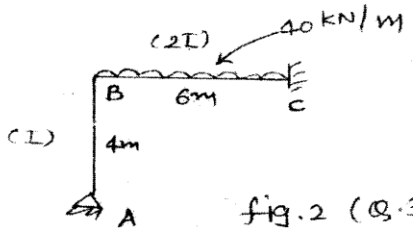

fig.2 (Q.3(a))

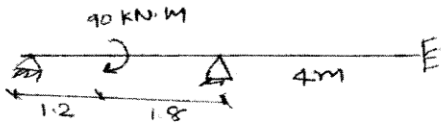

fig.3 (Q.3(b))

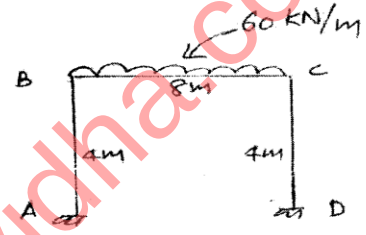

fig. 4 (Q.3(b) (OR))

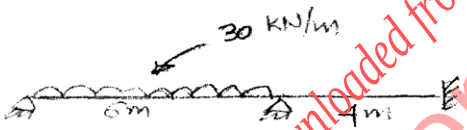

fig. 6 (Q.4(b) (OR))

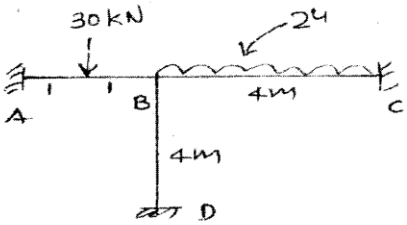

fig. 5 (Q.4(b))

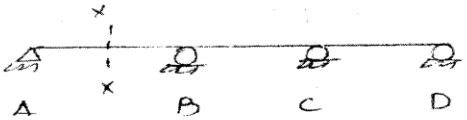

fig.7 (i)

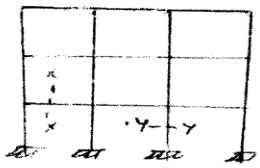

fig.7 (ii)

(fig.7 (i), (ii) Q.5(b))

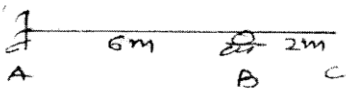

fig. 8 (Q.5(b) OR)

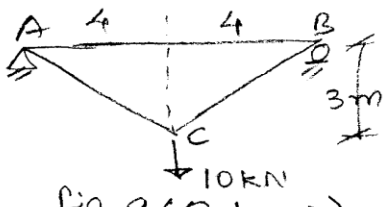

fig.9 (Q.4(a))