

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV • EXAMINATION – WINTER • 2014

Subject Code: 140603

Date: 31-12-2014

Subject Name: Structural Analysis - II

Time: 02:30 pm - 05:00 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) Explain following terms in respect of moment distribution (i) Distribution factor (ii) Carry over factor **04**
(b) Determine end moments for frame loaded as shown in fig. (i) using moment distribution method. Take $EI = \text{constant}$ for all members. **10**
- Q.2** (a) Determine fixed end moments for the fixed beam loaded as shown in fig. (ii). Take $EI = \text{constant}$. **07**
(b) Determine horizontal and vertical displacements of point C for the frame loaded as shown in fig. (iii) using unit load method. Take $EI = \text{Constant}$ **07**
- OR**
- (b) Find deflection and slope at the free end C for the frame loaded as shown in fig. (iii). Take $EI = \text{Constant}$ **07**
- Q.3** (a) Determine support reactions and plot SFD and BMD for the continuous beam ABC loaded as shown in fig. (iv), using theorem of three moments. **07**
(b) Determine end moments for the beam ABC loaded as shown in fig. (v) using slope deflection method. Take $EI = \text{Constant}$ **07**
- OR**
- Q.3** (a) Determine support reactions for the propped cantilever beam loaded as shown in fig. (vi), using consistent deformation method. **07**
(b) Determine end moments for the beam ABC loaded as shown in fig. (v) using moment distribution method. **07**
- Q.4** (a) Determine rotation factors at joints B and C for the frame shown in fig. (i) **04**
(b) Analyze and draw BMD for the frame ABC loaded as shown in fig. (vii) using theorem of least work. **10**
- OR**
- Q.4** (a) Formulate only slope deflection equations in terms of fixed end moments, unknown rotations and unknown displacements for the beam ABC shown in fig. (iv) **04**
(b) Determine final end moments for the frame loaded as shown in fig. (viii) using Kani's method. Take $EI = \text{constant}$ for all members. **10**
- Q.5** (a) Discuss the advantages and disadvantages of post tensioning as compare to pre tensioning for prestressed concrete members. **04**
(b) A concrete beam prestressed with a parabolic tendon loaded as shown in fig (ix). The prestressing force in steel is 1500 kN. The beam is loaded with uniformly distributed load including self weight of 30 kN/m. Compute the extreme fiber stresses at the mid span of the beam at transfer and after application of live load. Also plot stress distribution diagram at mid span of beam. **10**
- OR**
- Q.5** (a) Justify the need of high strength steel and concrete in prestressed concrete members. **04**
(b) Plot influence line for vertical reaction at support A for the two span continuous beam shown in fig.(x) Compute ordinate at every 1 m interval. Also plot qualitative ILD for reaction at B and C. **10**


