

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – V (NEW) EXAMINATION – WINTER 2015

Subject Code: 2150608

Date: 10/12/ 2015

Subject Name: Structural Analysis II

Time: 10:30am to 1:00pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Assume the value of $EI = 20000 \text{ kN-m}^2$ wherever required.

- Q.1** (a) For a two span simple support continuous beam ABC having $AB=4\text{m}$ and $BC=5\text{m}$, calculate the ILD ordinates for R_A at every 1m interval. **07**
- (b) A simple support beam of span 30m is loaded by a train of six wheel loads each of equal magnitude 5kN and separated by 2m distance. Calculate the maximum positive and negative shear force and bending moment at 10m from left support. **07**
- Q.2** (a) Calculate the vertical displacement at free end C for the cantilever bent as shown in the figure.1. **07**
- (b) A propped cantilever beam of span 6m has fixed support at left end and roller support at right end is loaded by a udl of 10kN/m upto 3m from left support. Analyze the beam by energy principle and draw bending moment diagram. **07**
- OR**
- (b) A two span simple support continuous beam ABC having $AB=6\text{m}$ and $BC=6\text{m}$. The span AB is loaded by a point load at centre by 60kN and span BC is loaded by 10kN/m over entire span. Analyze the beam by energy principle and draw the bending moment diagram. **07**
- Q.3** (a) A two span continuous beam ABC has $AB=6\text{m}$ and $BC=9\text{m}$. The span AB is loaded by a point load of 90kN at 4m from A and span BC is loaded by 2 point loads each of 45kN at 3m and 6m from B. Support A is fixed and supports B and C are roller supports. Analyze the beam by Slope-Deflection equations method and draw bending moment diagram. **07**
- (b) Analyze the portal frame as shown in the figure.2 by moment distribution method and draw bending moment diagram. **07**
- OR**
- Q.3** (a) Analyze the portal frame as shown in the figure.3 by slope deflection equation method and draw bending moment diagram. **10**
- (b) Analyze the continuous beam shown in the figure.4 by moment distribution method and draw the bending moment diagram. **04**
- Q.4** (a) Analyze the continuous beam shown in the figure.3 by stiffness matrix method and draw the bending moment diagram. **10**
- (b) Analyze the portal frame shown in the figure.5 by slope deflection equation method and draw the bending moment diagram. **04**
- OR**
- Q.4** (a) Analyze the portal frame shown in the figure.3 by stiffness matrix method and draw the bending moment diagram. **10**
- (b) Form slope deflection equations only for the beam shown in the figure.4. the middle support sinks by 3mm. **04**

- Q.5 (a)** A two span beam ABC has support A as fixed support and support B and C as roller support, span AB=3m and BC=3m. If the entire beam is loaded by udl of 20kN/m, Analyze the beam by flexibility matrix method assuming support moment at A and reaction at B as unknowns. And then draw bending moment diagram. **10**
- (b)** Analyze the portal frame shown in the figure.5 by moment distribution method and draw the bending moment diagram. **04**

OR

- Q.5 (a)** Calculate the support reactions for the portal frame shown in the figure.6 by flexibility matrix method. **11**
- (b)** Calculate the distribution factors for moment distribution method only for the portal frame shown in the figure.3. **03**

