

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. Sem-IV Examination June- 2011****Subject code: 140603****Subject Name: Structural Analysis-2****Date: 10/06/2011****Time: 10.30 am – 01.00 pm****Total Marks: 70**

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Draw neat & clean sketches, wherever required.**

- Q.1 (a)** Analyze the frame shown in fig.1 with using moment distribution method. **10**
Draw bending moment diagram only.
- (b)** Find the displacement at C, as shown in fig. 2 by using Castigliano's theorem. **04**
 $E = 2 \times 10^4 \text{ N/mm}^2$.
- Q.2 (a)** Draw BMD and SFD for a beam shown in fig. 3 by using slope deflection **07**
method.
- (b)** Calculate the support moments and reactions of fixed beam shown in fig. 4. **07**
- OR**
- (b)** Find the displacement of B, for fig. 5, by Castigliano's theorem. Sectional area **07**
varies linearly from A to B.
- Q.3 (a)** Analyze the beam shown in fig. 6 by using kani's method and draw bending **08**
moment diagram.
- (b)** Determine the reaction components for fig. 7. EI is constant throughout. **06**
- OR**
- Q.3 (a)** Calculate the displacement factor for the columns of the portal frame shown in **04**
fig. 8.
- (b)** Explain how do you account for sway in slope-deflection method for portal **04**
frames?
- (c)** Distribute a moment of 6 kN.m at a joint among three members whose relative **06**
stiffnesses are 1/6, 1/3 and 1/2.
- Q.4 (a)** State Muller-Breslau principle and sketch qualitative influence line diagram **06**
for the shear force at mid span section of a propped cantilever beam.
- (b)** Draw ILD for bending moment at mid point D, for fig. 9, of continuous beam. **08**
Find the ordinates at 3 m intervals.
- OR**
- Q.4 (a)** Determine the vertical and horizontal deflection at free end for fig. 10, by **08**
using unit load method. EI is constant.
- (b)** Draw the ILD for reaction at A for a beam shown in fig. 11. Find the ordinates **06**
at 3 m intervals.
- Q.5 (a)** Differentiate between pre-tensioning and post-tensioning in detail. **07**
- (b)** Define the term 'sway'. Enlist the situation wherein say occur in portal **07**
frames.
- OR**
- Q.5 (a)** What are the losses in prestress? Explain any one in detail. **06**
- (b)** Explain in detail the reasons of using high grade concrete and high grade steel **08**
in prestressed concrete.

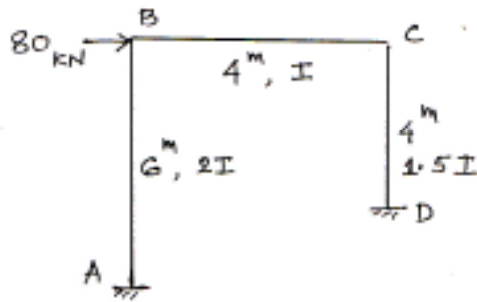


Fig. 1 - (Q. 1 (a))

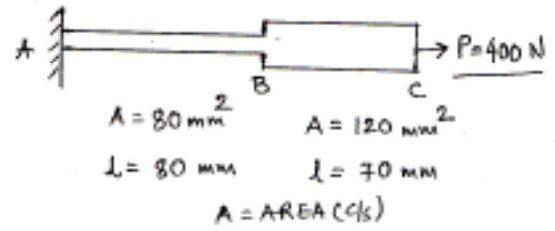


Fig. 2 - (Q. 1 (b))

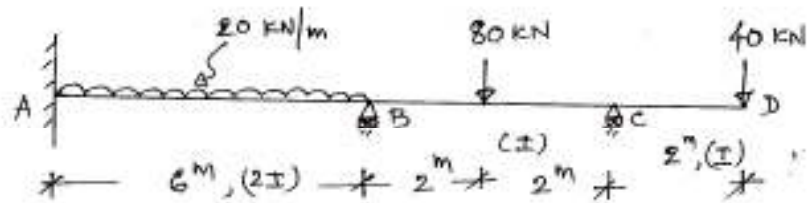


Fig. 3 (Q. 2 (a))

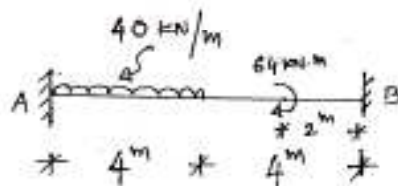


Fig. 4 (Q. 2 (b))

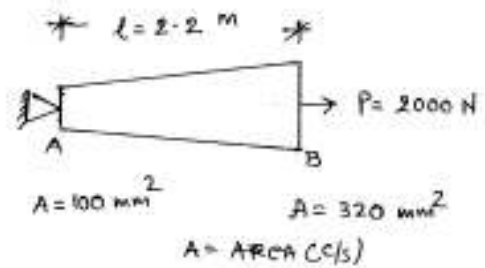
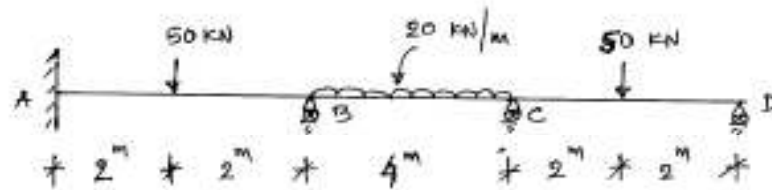


Fig. 5 (OR Q. 2 (b))



$EI = \text{constant.}$

Fig. 6 (Q. 3 (a))

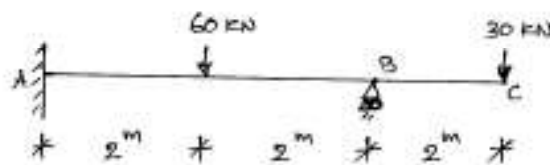


Fig. 7 (Q. 3 (b))

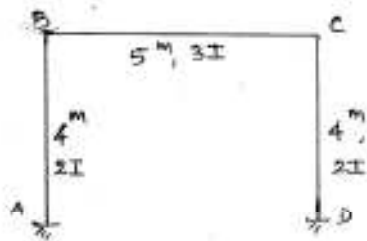


Fig. 8 (OR Q.3 (a))

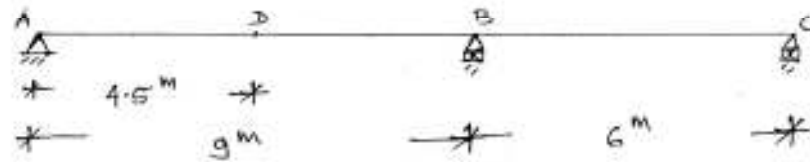


Fig. 9 (Q.4 (b))

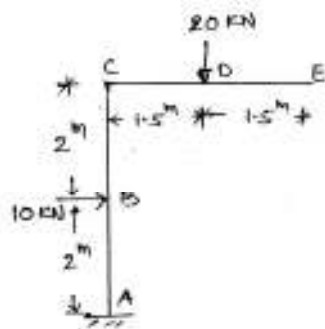


Fig. 10 (OR Q.4 (a))

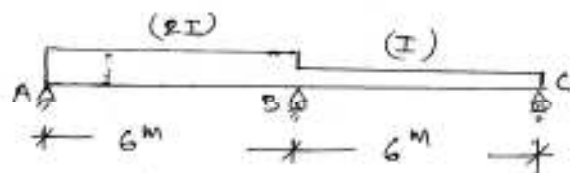


Fig. 11 (OR Q.4 (b))
