MAJOR : CVL 756 ADVANCED STRUCTURAL ANALYSIS
## (2018-19)

Time allowed: 2 hours **Date:** 24 Nov 2018
Venue: LH 408 **Max marks :** 40

NOTE: (a) All questions are compulsory. (b) Draw neat and clear sketches wherever required.
(c) Assume suitable data if necessary. (d) Assume members as INEXTENSIBLE unless otherwise stated. (e) All answers must be supported by calculations/ justification to secure assigned marks. (f) This question paper has two printed pages
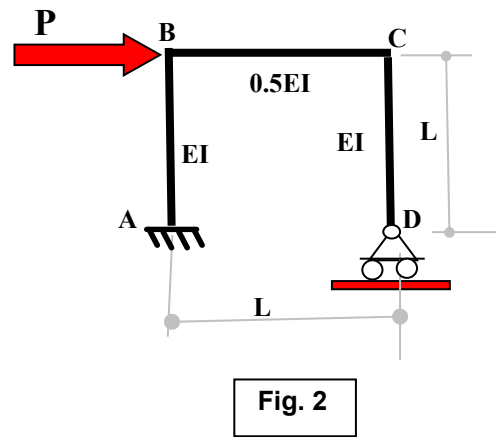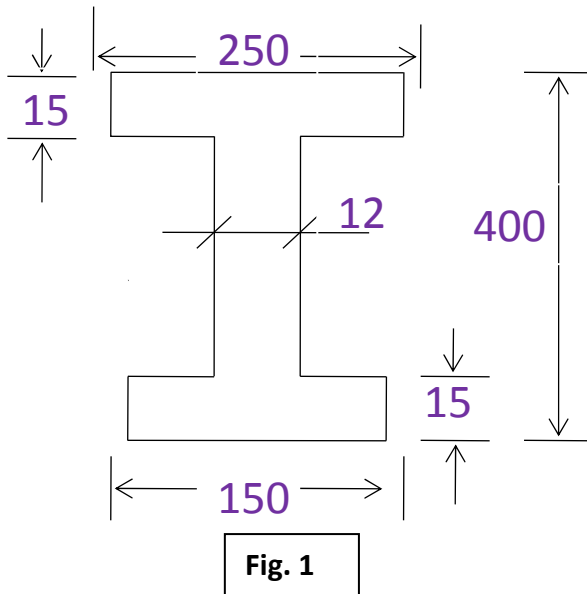
Fig. 1

Fig. 2

Q1. Obtain the shape factor of the section shown in Fig. 1. All dimensions are in mm
(**5 marks**)

Q2. Obtain the horizontal displacement of the frame structure shown in Fig. 2 using the matrix force method. The EI values of the members are marked on the members.
(**7 marks**)

Q3. Using first principles, prove that the sum of curvatures in any two mutually perpendicular directions for a plate is constant
(**5 marks**)

Q4. For the frame structure shown in Fig. 3, obtain the ultimate failure load for the mechanism in which plastic hinges develop at all joints except "A". Which point should be checked for satisfaction of yield criteria? Perform the yield check at that point.

(12+3 = 15 marks)

Q5. How can the effect of the presence of floor slabs be considered for 3D analysis of a frame structure using a software based on general 3D analysis which does not include the action of slabs.

(3 marks)

Q6. State any two disadvantages of the matrix force method as compared to the matrix stiffness approach.

(2 marks)

Q7. Derive the coordinate transformation matrix for a truss element.

(3 marks)

Fig. 3