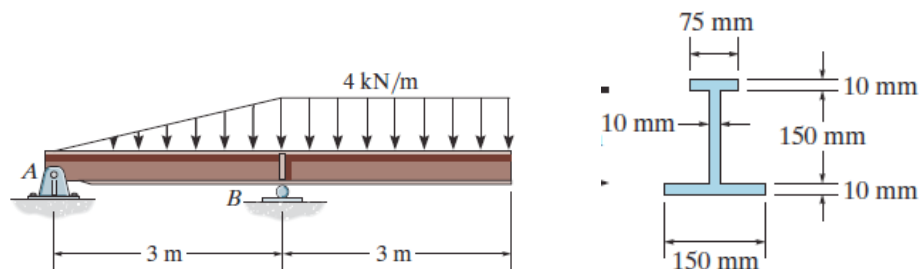


*Exam 3*  
*May 24, 2012*  
*60 minutes*

**Problem 1 (40 Points)**

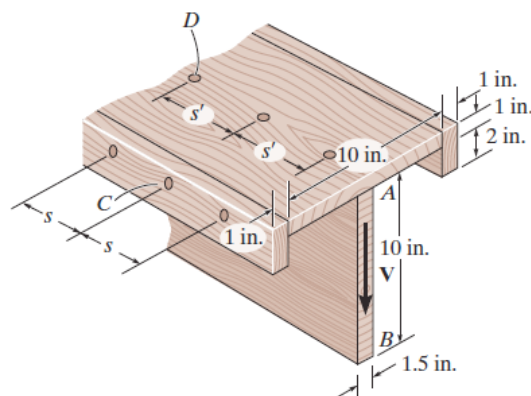
For the Beam Shown Below:

- Draw the shear and moment diagrams
- Determine the maximum shear stress in the beam at the critical section where the internal shear force is maximum

**Problem 2 (30 Points)**

The beam is made from four wood boards nailed together as shown. The nails can each support a shear force of 100 lb, and the allowable shear stress for the wood is 500 psi.

- Determine the maximum shear force  $V$  that can be applied to the beam.
- Determine the corresponding required nail spacing  $s'$  and  $s$ .



**Problem 3 (30 Points)**

The gear system shown below is made of aluminum ( $G = 26 \text{ GPa}$ ). Compute:

- The maximum shear stress
- The angle of twist at end D

