

21. A simply supported beam, that spans 20', supports a 10 kip point load at its mid-span. The maximum Bending stress **and** shear stress occur at the following locations respectively. (Circle one answer from each category).

Bending Stress

- I. Near the supports at the neutral axis
- II. Near the supports at the extreme fibers
- III. At the mid-span at the extreme fibers
- IV. At the mid-span near the neutral axis

Shear Stress

- V. Near the supports at the neutral axis
- VI. Near the mid-span at the neutral axis
- VII. Near the supports at the extreme fibers
- VIII. The stress is greatest at the neutral axis and is equal along the length of the beam.

21). The correct answers are III & VIII.

The shear and moment diagrams for the loading described in the problem statement are shown below. The load described in the problem statement is a point load applied at the mid span of the beam. Thus, the shear is constant over the entire length of the member. The maximum shear stress occurs at the neutral axis of the member. The moment varies over the length of the member and is maximum at the mid-span. The stresses due to bending are greatest at the extreme fibers.

