

1. (a). What is Russell's traction?
 (b) From Fig. 1-a, Calculate the femoral traction force F .

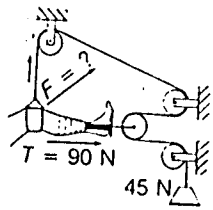


Fig 1-a

2. Fig. 2-a, Fig. 2-b are two Cases of bone-ligament failures Problem.
 (a) In what Loading Condition will the failure occur as shown in Fig. 2-a and in Fig 2-b
 (b) Explain those phenomena from biomechanical point of view.

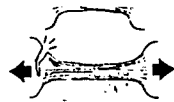


Fig. 2-a

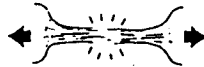


Fig 2-b

3. Fig 3-a. and Fig. 3-b are two Cases of bone fracture under torsion.
 (a) In What Loading condition will the fracture occur as shown in Fig. 3-a and Fig. 3-b.
 (b) Explain those phenomena from biomechanical point of view.



Fig. 3-a



Fig 3-b

4. (a). Define the term "Center of Rotation".
 (b). Find the Instant Center of a Knee Joint. If an infinitesimal displacement takes place from (x, y) to (x_1, y_1) as shown in Fig. 4.
 (c). From the concept of instant rotating center, define
 (1) Rolling Motion (2) Sliding Motion

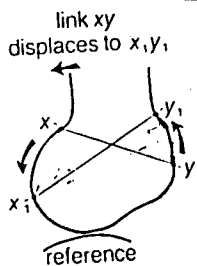


Fig. 4.

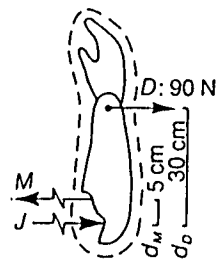


Fig. 5

5. As shown in Fig. 5 the dynamometer force $D = 90 \text{ N}$ is applied 30 cm from the elbow joint. Calculate the muscle force M and joint reaction force J
6. Describe the function of knee joint from ~~the~~
 (a) Anatomical (b) Biomechanical point of view
7. How can you calculate the ~~the~~ compress force, shear force and moment of a knee joint during a gait cycle. Use 2-D and simple Link-segment Model if the ground reaction forces (F_x, F_y, F_z) are measured by force plate, and motion trajectories are taken by Motion Analyzer, as shown in Fig. 6

4 Biomechanics as an Interdiscipline

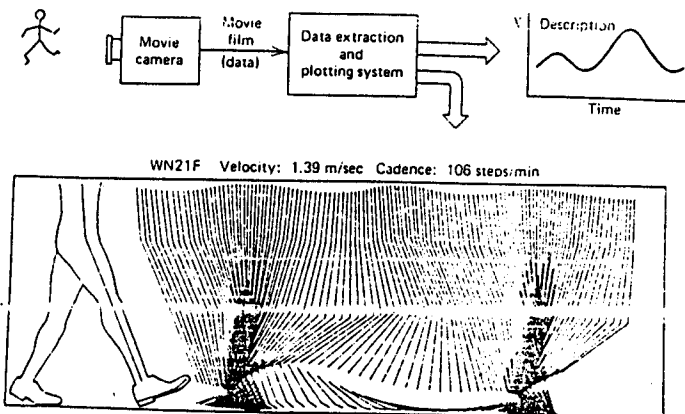


Fig. 6