Answer all the following questions

QUSTION (1)

: The cross section of the stand of a vertical drilling machine has the form shown in Fig. (1). the line of action of thrust of the drill passes through N which moves on an arc of a circle 36 cm as indicated. Find the position of N to produce maximum stress and calculate the value of N if the tensile stress is limited to .4 ton/cm^2.

QUSTION(2)

: A thick cylinder, having an external diameter k times its internal diameter is subjected to an internal pressure. If the ratio of maximum λ to minimum hoop stress is n . Find the relation between n and k . If n=1.5 and the maximum hoop stress is 420 kg/cm^2 find

: (I) the internal pressure

(ii) The wall thickness for the internal diameter of 12.5

QUSTION (3)

,Direct stress of 120 MN/m^2 in tension and 90 MN/m^2 in compression are applied to an elastic material at a certain point on planes at right angles to another. If the maximum principal stress is not to exceed 150 MN/m^2 in tension, to what shearing stress can the material be subjected?

What is then the maximum resulting shearing stress in the material?

Also find the magnitude of the other principal stress and its inclination to 120 MN/m^2 stress.

QUSTION (4)

An element in plane stress is subjected to stress σ_x =100MPa, σ_y =34MPa and τ_{xy} =28MPa.as shown in figure(2).Determine the stresses on an element at an angle θ from x axis,where the angle θ is positive when counterclockwise. Show these stresses on a sketch on the element oriented at the angle θ
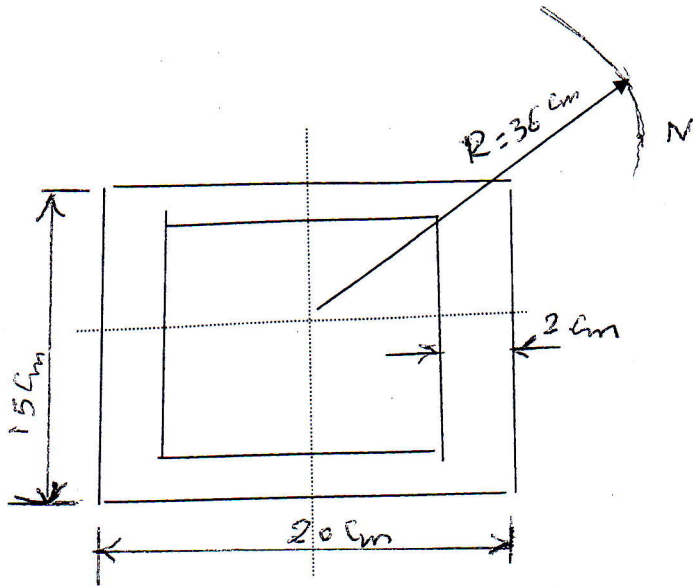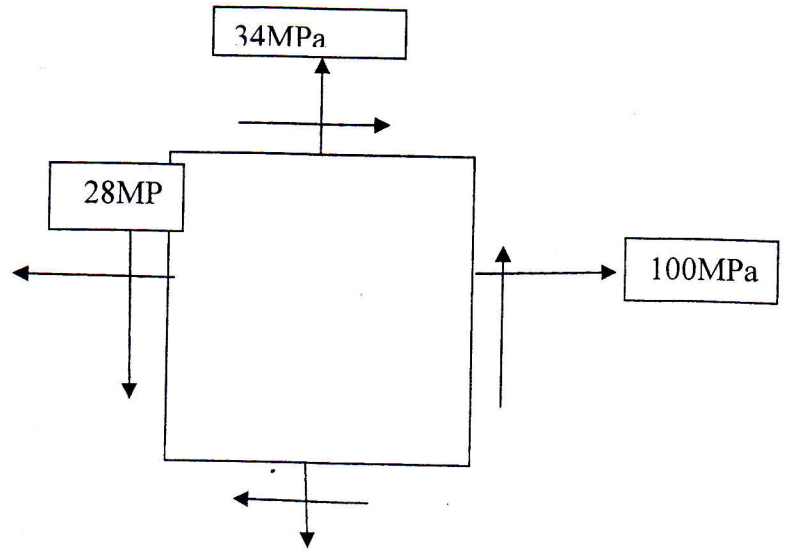
Fig.1

Fi9g.2