國立成功大學

114學年度碩士班招生考試試題

編　號：93

系　所：工程科學系

科　目：材料力學

日　期：0211

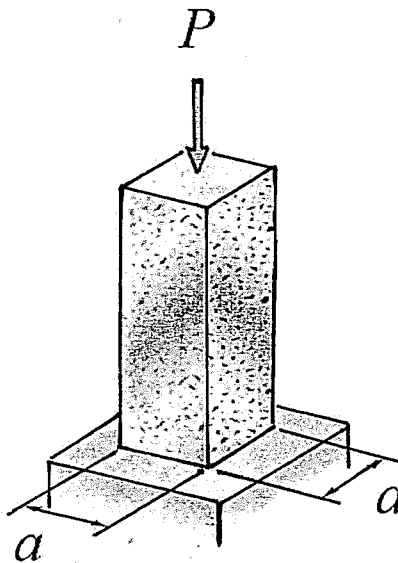節　次：第 2 節

注　意：1.可使用計算機
2.請於答案卷(卡)作答，於試題上作答，不予計分。

共有 5 題，**請詳細條列**計算或誘導過程。請考生將每題的答案（若有單位請包含單位）以**方框**標註出來，以利批改考卷。
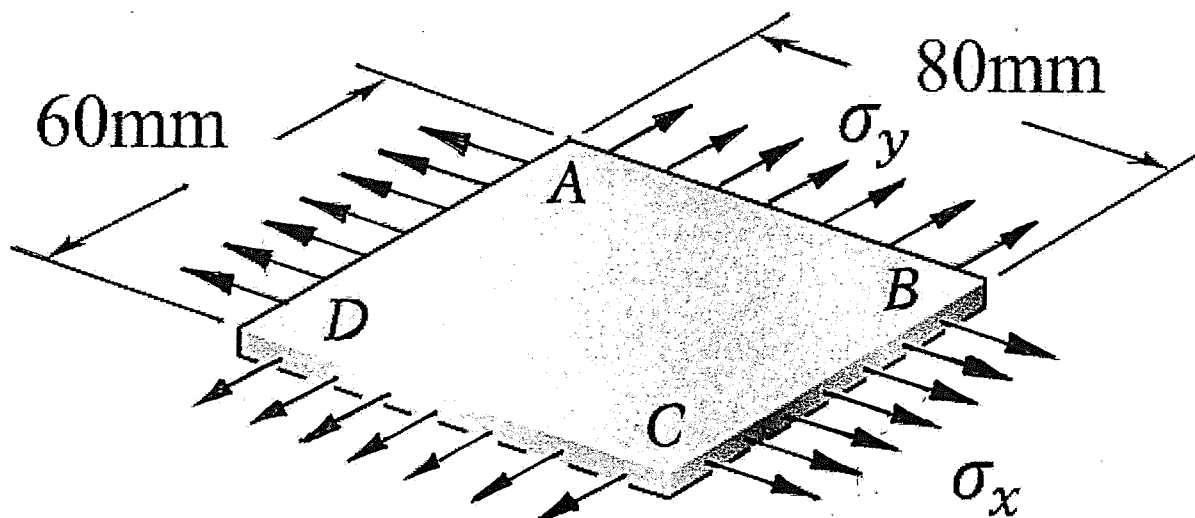
1. (16%) Explain the following terms:
   (a) yield point (b) residual strain (c) neutral surface (d) ultimate strength
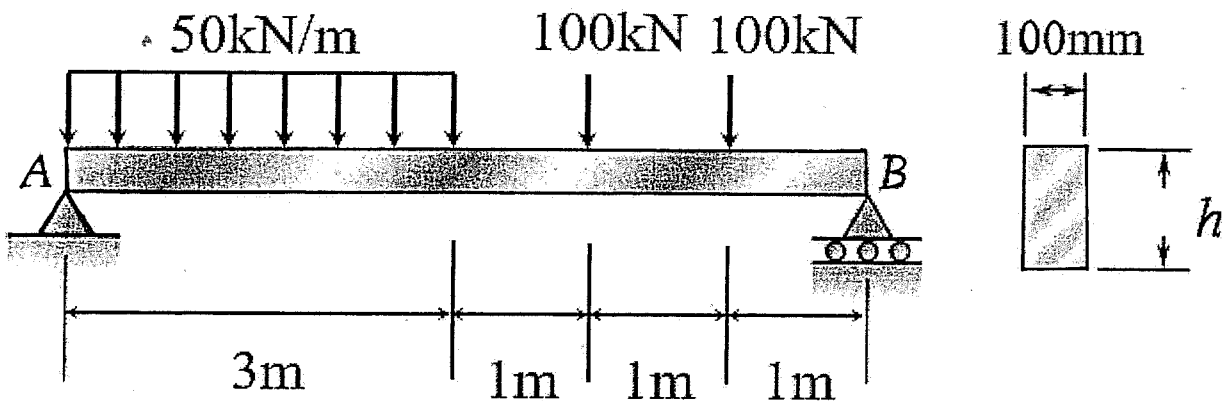
2. (10%) A load P is applied to the block shown. Determine the maximum normal stress and the maximum shearing stress. Also, determine the orientation of the plane on which each of these maximum values occurs.

3. (24%) A thin plate is subjected to a biaxial loading $\sigma_x = 100MPa$ and $\sigma_y = 120MPa$. Knowing that the properties of the plate are E = 70 GPa and $v = 0.33$, determine the change in length of (a) AB, (b) BC (c) BD.

4. (20%) (a) For the beam and loading shown, determine the location and magnitude of the maximum normal stress. (b) Determine the height of the beam h if the allowable normal stress is 160MPa

50kN/m 100kN 100kN 100mm

A   B

3m   1m   1m   1m

h

5. (30%) As shown in the figure, the pipe has inner and outer radii equal to 20 mm and 22 mm, respectively, determine the normal and shearing stresses at (a) point H, (b) point K.

y

600N

500N

200 mm

z

80 mm

80 mm   500N

120 mm   100N x

2mm

20mm

Section properties