

國立中山大學 102 學年度碩士暨碩士專班招生考試試題

科目名稱：工程力學（含靜力與材力）【海工系碩士班甲組選考】

題號：459001

※本科目依簡章規定「可以」使用計算機（廠牌、功能不拘）

共 2 頁第 1 頁

1. Please draw the shear force and bending moment diagrams of the beam shown in Fig. 1-(a). If the beam section is shown as Fig. 1-(b), and the factor of the safety is 1.5, please calculate the allowable normal stress of the material. (The weight of the beam is neglected, and). (30%)
2. A steel bar is fractured (as shown in Figure 2) under a pure torque applied at both ends. Please explain the failure mechanism of the bar. (give your theoretical reason of the failure). (20%)

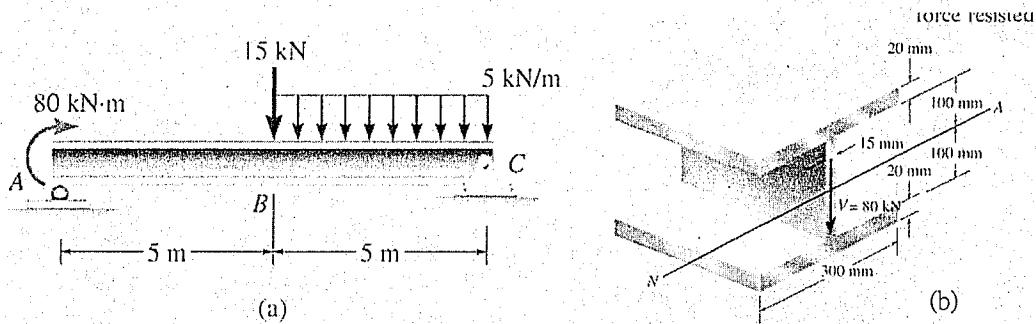


Fig. 1

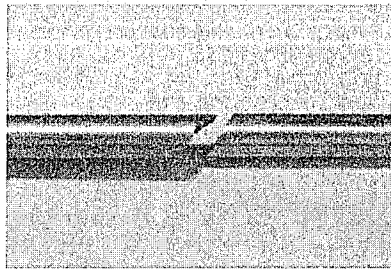


Fig. 2

3. The bar AB has a built-in support at A and is loaded by the forces as shown in Fig.3

$$\mathbf{F}_B = 2\mathbf{i} + 6\mathbf{j} + 3\mathbf{k} \text{ (kN)},$$

$$\mathbf{F}_C = \mathbf{i} - 2\mathbf{j} + 2\mathbf{k} \text{ (kN)}.$$

- (a) Draw the free-body diagram of the bar. (10%)
- (b) Determine the reactions at A. (15%)

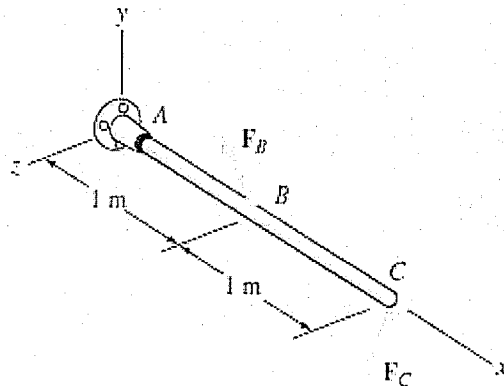


Fig.3

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4. Determine the axial forces in the members in terms of the weight W as shown in Fig.4. (25%)

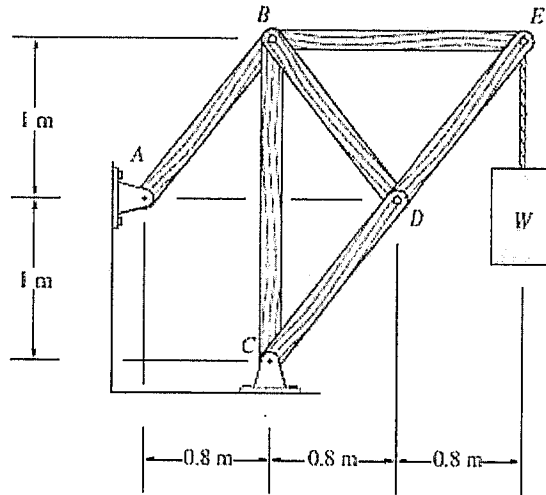


Fig.4