

科目：基礎工程力學 I

應考班別：建築二真

班級：建築二真

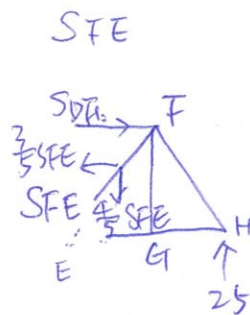
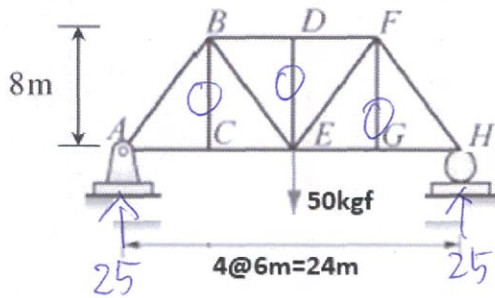
座號：\_\_\_\_\_

姓名：\_\_\_\_\_

解

※每節考試未滿 20 分鐘不得交卷(可使用計算機，但未詳列計算式者，不予計分)(答案統一算至小數點第 2 位，並標示單位，否則扣分處理)

1. 請依此桁架桿件回答下列問題(1)請找出此桁架所有之零桿？(2)請求出  $S_{FE}$ 、 $S_{DF}$  桿件內力(答案需標明壓力或張力桿)



$$\begin{aligned} S_{DF} \\ \sum M_E = 0 \\ 25 \times 12 - S_{DF} \times 8 = 0 \\ S_{DF} = 37.5 \text{ kgf (C)} \end{aligned}$$

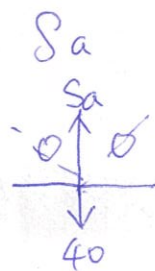
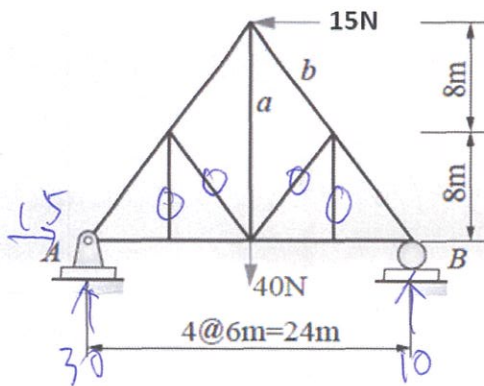
$$\begin{aligned} \sum F_y = 0 \\ \frac{4}{5} S_{FE} = 25 \\ S_{FE} = 31.25 \text{ kgf (T)} \end{aligned}$$

$$(1) \text{零桿: } S_{BC}, S_{DE}, S_{FG} \quad (9 \text{分})$$

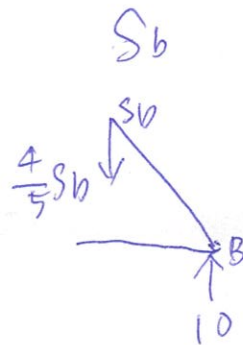
$$(2) S_{FE} = 31.25 \text{ kgf (T)} \quad (8 \text{分})$$

$$\text{答: } S_{DF} = 37.5 \text{ kgf (C)} \quad (8 \text{分})$$

2. 請依此桁架桿件回答下列問題，請求出(1) $S_a$  (2) $S_b$  桿件內力(答案需標明壓力或張力桿)



$$S_a = 40 \text{ N (T)}$$



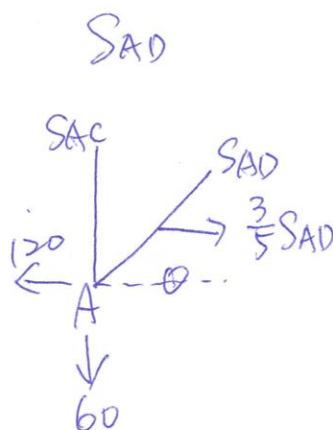
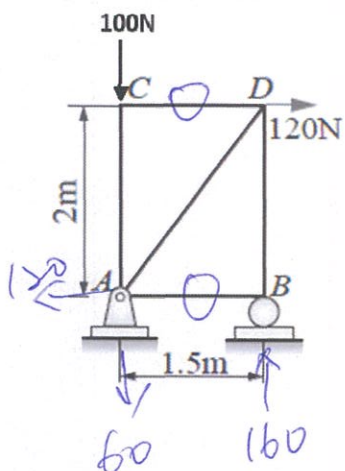
$$\begin{aligned} \frac{4}{5} S_b = 10 \\ S_b = 12.5 \text{ N (C)} \end{aligned}$$

$$\begin{aligned} -40 \times 12 + 15 \times 16 + R_B \times 24 = 0 \\ R_B = 10 \text{ N (T)} \end{aligned}$$

$$(1) S_a = 40 \text{ N (T)} \quad (8 \text{分})$$

$$\text{答: } (2) S_b = 12.5 \text{ N (C)} \quad (8 \text{分})$$

3. 請依此桁架桿件回答下列問題(1)請找出此桁架所有之零桿？(2)請求出  $S_{AD}$  桿件內力(答案需標明壓力或張力桿)



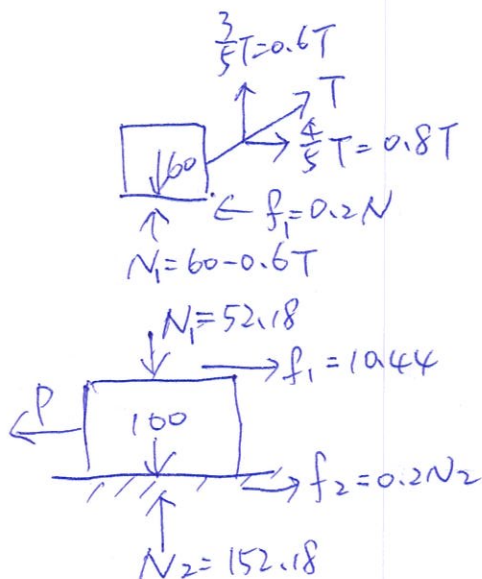
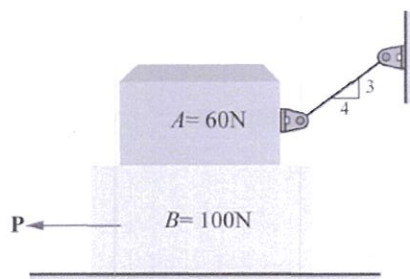
$$\begin{aligned} \frac{3}{5} S_{AD} = 120 \\ S_{AD} = 200 \text{ N (T)} \end{aligned}$$

$$(1) \text{零桿: } S_{CD}, S_{AB} \quad (6 \text{分})$$

$$(2) S_{AD} = 200 \text{ N (T)} \quad (8 \text{分})$$

$$\text{答: } S_{AD} = 200 \text{ N (T)} \quad (8 \text{分})$$

4. 如圖所示，物體 A 重 60N，B 重 40N，各接觸面上之摩擦係數為 0.2，(1)若欲拉動 B 物體，則水平力 P 為？(2)繩索拉力為？(20分)



$$0.8T = 0.2(60 - 0.6T)$$

$$T = 13.04 \text{ (N)}$$

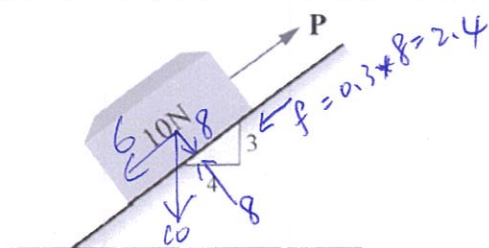
$$p = f_1 + f_2$$

$$= 10.44 + 30.44 = 40.88 \text{ (N)}$$

(1)  $p = 40.88 \text{ N}$

答：(2)  $T = 13.04 \text{ N}$

5. 如圖所示，斜面上物塊重量為 10N，力量  $P = 5\text{N}$ ，物塊與斜面之摩擦係數為 0.3，(1)請問物塊呈現何種狀態？(請計算後述明理由)(2)此時物塊所受摩擦力為？(20分)



(2) 物塊下滑力 = 6N

力量  $P = 5\text{N}$

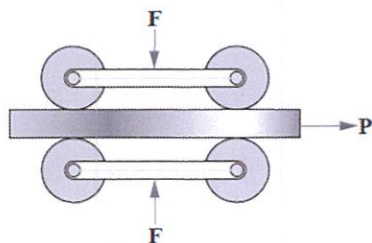
$\Rightarrow$  物塊摩擦力 =  $6 - 5 = 1\text{N}$

(1)  $p = 6 + 2.4 = 8.4 > p = 5$   
呈靜止狀態

(1) 靜止狀態

答：(2)  $1 \text{ N}$

6. 如圖所示鋼板，兩旁各裝有兩同等大小之鋼滾子，鋼滾子直徑為 4cm，滾動摩擦係數為 0.05cm， $F = 100\text{N}$ ，則所需 P 力至少為若干？(10分)



$d = 4, r = 2$

取一顆鋼滾子

$$p \times r = W \times a$$

$$\frac{p}{4} \times 2 = \frac{F}{2} \times a$$

$$\frac{p}{4} \times 2 = \frac{100}{2} \times 0.05$$

$$p = 5\text{N}$$

答：  $p = 5\text{N}$