工程力學

Exam. # 3 (12/17/2018)

1. (30pts) Using the method of joints, determine the force in each member of the truss shown in **Fig. 1**. State whether each member is in tension or compression.

2. (15pts) Determine the force in members *CE* and *EF* of the truss shown in **Fig. 2**.

3. (15pts) Determine the components of all forces acting on member *ABCD* when $\theta = 90°$ shown in **Fig. 3**.

4. (15pts) In using the bolt cutter as shown in **Fig. 4**, a worker applied two 300-N forces to the handles. Determine the magnitude of the forces exerted by the cutter on the bolt.

5. (25pts) The bucket of the front-end loader shown in **Fig. 5** carries a 16-kN load. The motion of the bucket is controlled by two identical mechanisms, only one of which is shown. Knowing that the mechanism shown supports one-half of the 16-kN load, determine the force exerted (a) by cylinder *CD*, (b) by cylinder *FH*.

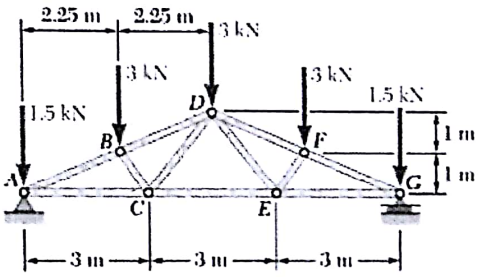

Fig. 1

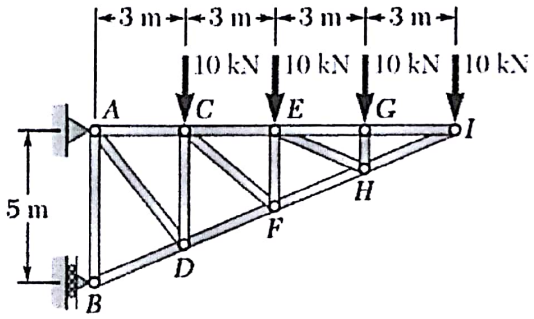

Fig. 2

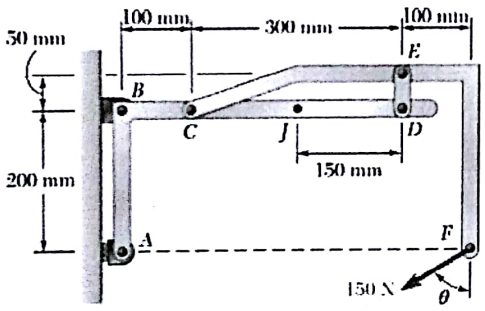

Fig. 3

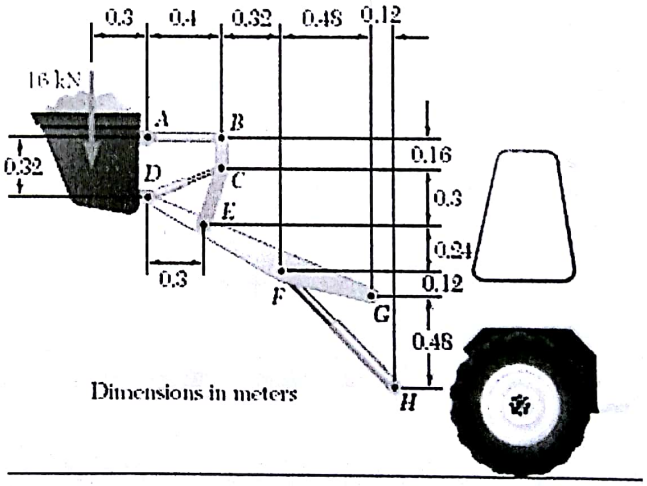

Fig. 5

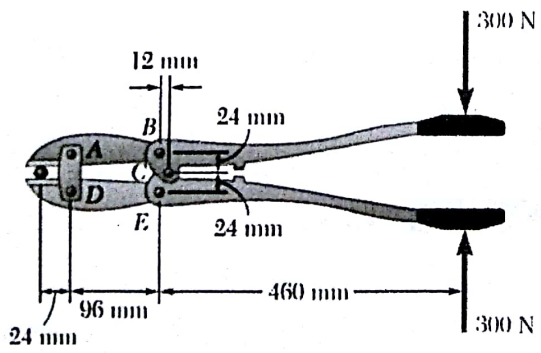

Fig. 4

107 上 微積分 第三次期中考 12/21

考試時間:15:10~17:00

1 D 為直線 y=x ，曲線 $y=\frac{2}{x}-1$ 與 x 軸圍成的區域

a. 求出 D 之面積　　a 10% b,c 對一題得 10% 兩題得 15%

b. 利用圓盤法求出 D 對 x 軸旋轉之旋轉體體積

c. 利用剝殼法求出 D 對 x 軸旋轉之旋轉體體積

2 求以下各積分　　30%

a. $\int_0^{\frac{\pi}{2}} sinxcosx\ dx$　　b. $\int \frac{1}{x^2-1}dx$　　c. $\int \frac{1}{x^2+2x+x}dx$

d. $\int_{-2}^{-1} \frac{1}{x}dx$　　e. $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{1+4cotx}{4-cotx}dx$　　f. $\int \sqrt{1-sinx}\,dx$

3 求以下各瑕積分　　10%

a. $\int_0^{\infty} xe^{-x}dx$　　b. $\int_0^1 \frac{x}{\sqrt{x-1}}dx$

4 求以下各極限　　15%

a. $\lim_{x\to 0}\frac{1-cosx}{x^2}$　　b. $\lim_{x\to\infty} x^2e^{-x}$　　c. $\lim_{x\to 0^+}(1+rx)^{\frac{1}{x}}$ r 為實數

5 利用分部積分法求出積分　　20%

a. 用分部積分求出 $\int \sqrt{1-x^2}\,dx$

($\frac{d}{dx}sin^{-1}x=\frac{1}{\sqrt{1-x^2}}$ ，且被積函數為 1 和$\sqrt{1-x^2}$之積)

b. 函數 f(x) 定義為 $f(x)=\int_1^x sin\pi t^3dt$

求出 $\int_0^1 xf(x)dx$

姓名 學號 助教姓名記得寫在答案卷上