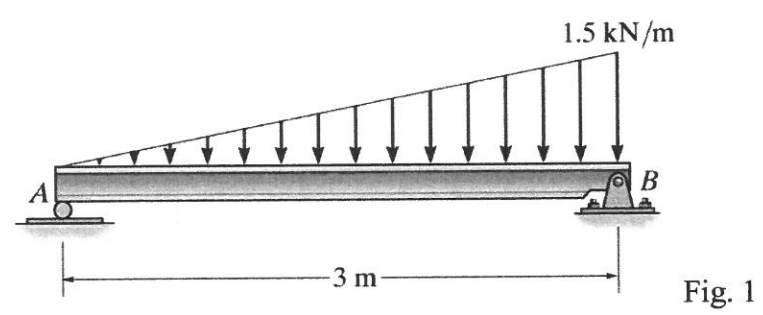注意事項：

1. 本試題共四題，每題 25 分，共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、The simply-supported beam subjected to distributed loading is shown in Fig. 1.

1. Find the reactions at A and B, respectively. (10 分)
2. Draw the shear and bending diagrams for the beam and find M_{max}. (15 分)

1.5 kN/m

A　　　　　　　　　　　B

3 m

Fig. 1

二、A spool is pulled by a force **P** as shown in Fig. 2. If the coefficients of static friction at contact points A and B are 0.4 and 0.2, respectively, determine the smallest force **P** that will cause the 150-kg spool to have impending motion.(25 分)

200 mm

400 mm

P

B

150 mm

A

Fig. 2
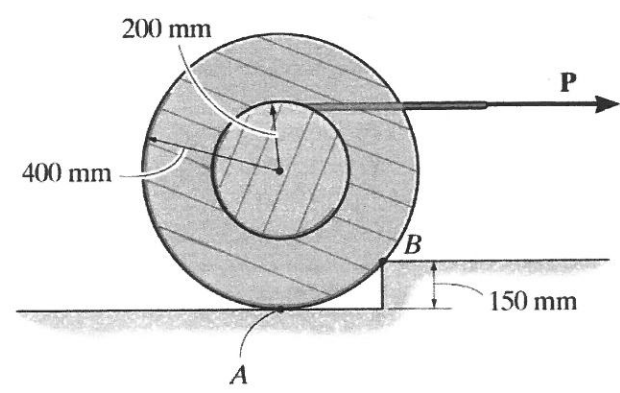
三、Fig. 3 shows a crank-rocker mechanism. Given d, $\beta=60°$, and $\dot{\beta} = \omega =$ constant, find:

1. $\dot{r}, \dot{\theta}$　(10 分)
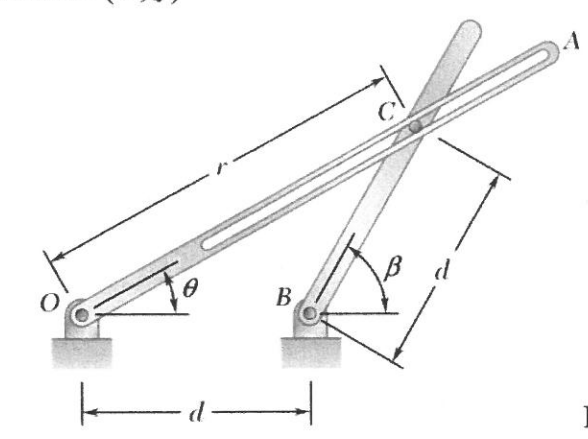2. $\ddot{r}, \ddot{\theta}$　(10 分)
3. Coriolis acceleration (5 分)

A

C

r

O　θ　B　β　d

d

Fig. 3

四、Member ABC has a mass of 2.4 kg and is attached to a pin support at B, as shown in Fig. 4. An 800-g sphere D strikes the end of member ABC with a vertical velocity v_1 of 3 m/s. Knowing that $L_{AB}=L_{BC}= 750$ mm and the coefficient of restitution between the sphere D and member ABC is 0.5, determine immediately after the impact the angular velocity of member ABC and the velocity of the sphere D. (25 分)
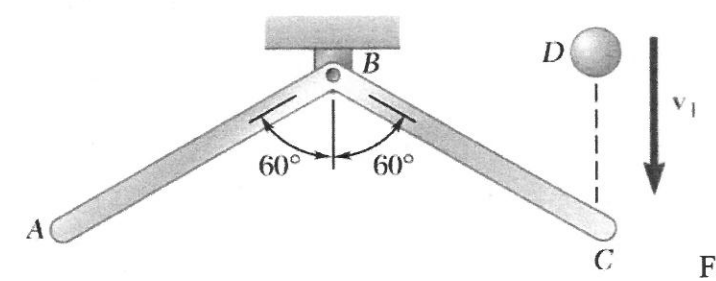
B　D

v_1

60°　60°

A

C　Fig. 4