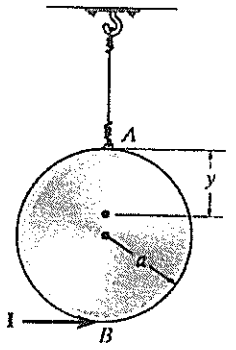
題號： 275　　國立臺灣大學 107 學年度碩士班招生考試試題

科目： 動力學(B)

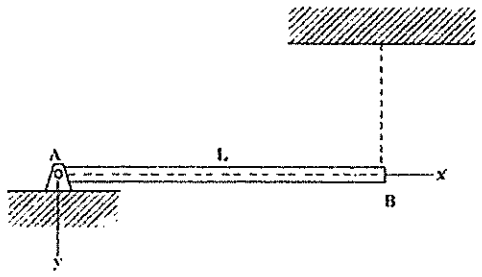
節次： 7

※ 注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

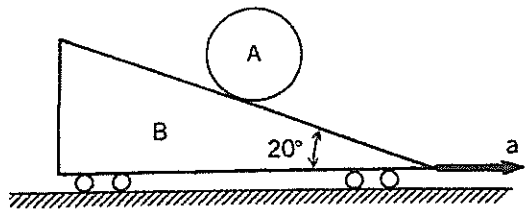
1. The circular disk has a mass m and is suspended at A by a wire. If it receives a horizontal impulse I at its edge B, determine the location y of the point P about which the disk appears to rotate during the impact. (15%)



2. A uniform rod of weight W and length L supported by a pin connection at A and wire at B is shown in the right figure. (a) What is the force on pin A at the instant that the wire is released? (b) What is the force at A when the rod has rotated 30°? (20%)



3. A wedge B is shown with a cylinder A of mass 20 kg and diameter 50 cm on the incline. The wedge is given a constant acceleration of 20 m/sec^2 to the right. How far d does the cylinder move in 1 sec relative to the incline if there is no slipping? The system starts from rest. (15%)



4. A heavy block of mass M slides down a frictionless inclined plane under the influence of gravity. The heavy block is released a height H above the bottom of the loop.

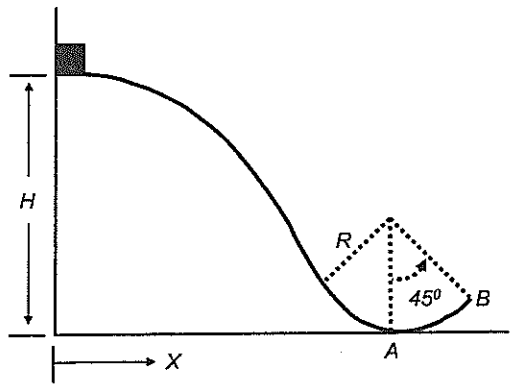
(a) What is the force of the track on the block at the bottom (point A)?

(b) What is the force of the track on the block at point B right before it leaves?

(c) At what speed and acceleration does the block leave the track?

(d) How far away from the bottom (point A) does the block land on level ground?

(e) Sketch the potential energy $U(x)$ of the block and please indicate the total energy on the sketch. (30%)



5. A uniform rope of total length $2X$ (mass M and density ρ) hangs in equilibrium over a smooth nail. A very small impulse causes the rope to slowly roll off the nail. Please find the velocity and acceleration of the rope as it just clears the nail (ignore all friction). (20%)

試題隨卷繳回