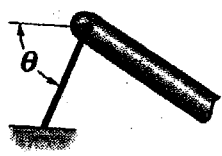
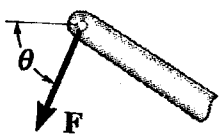
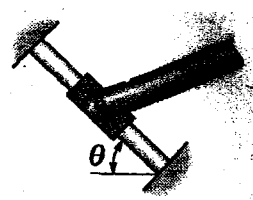
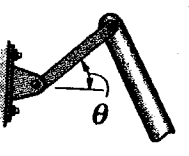
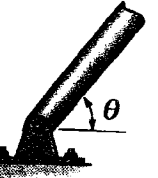
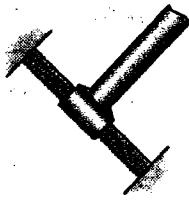



1. (a) Use one short sentence to state the meaning of the following concepts in engineering mechanics. (10 pts)

- (1) Particle
- (2) Rigid Body
- (3) Concentrated Force
- (4) Internal force and external force
- (5) Concurrent force

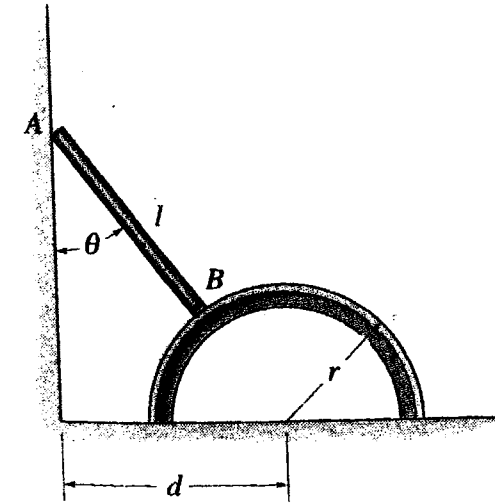
(b) Please draw the free body diagram of the rod in the following diagrams (from (1)-(5)), and also state how many unknowns in the reactions. (10 pts)

For example:

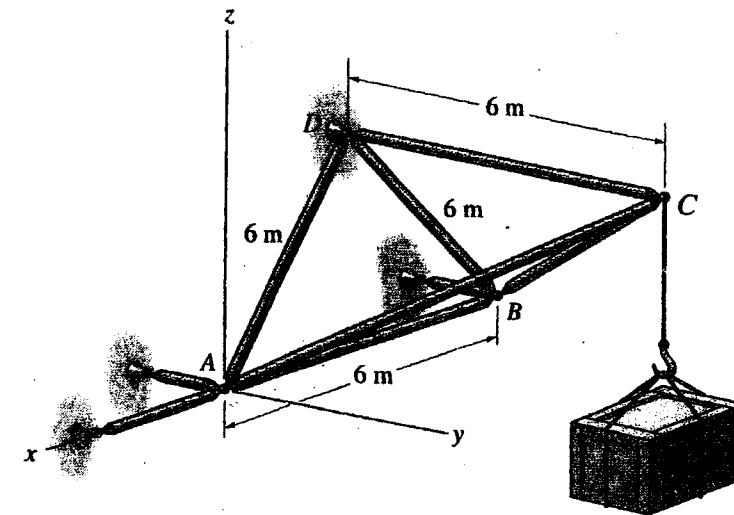
Types of connection	Reaction	Number of Unknowns
 cable	 F	one
(1) 	(2) 	(3) 
member pin connected to collar on smooth rod	weightless link	smooth pin or hinge
(4) 	(5) 	
member fixed connected to collar on smooth rod	fixed support	

2. The smooth uniform rod has a mass m and is placed on the semicircular arch and against the wall. Neglect the friction force between rod and the wall as well as the semicircular arch, and show that for equilibrium the angle θ must satisfy

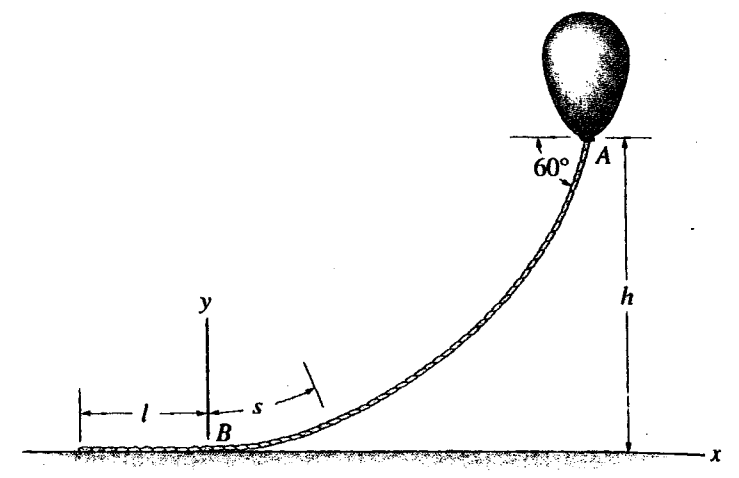
$$\sin \theta = \frac{1}{r}(\sqrt{1+3\cos^2 \theta})(d-l \sin \theta) \quad (20 \text{ pts})$$



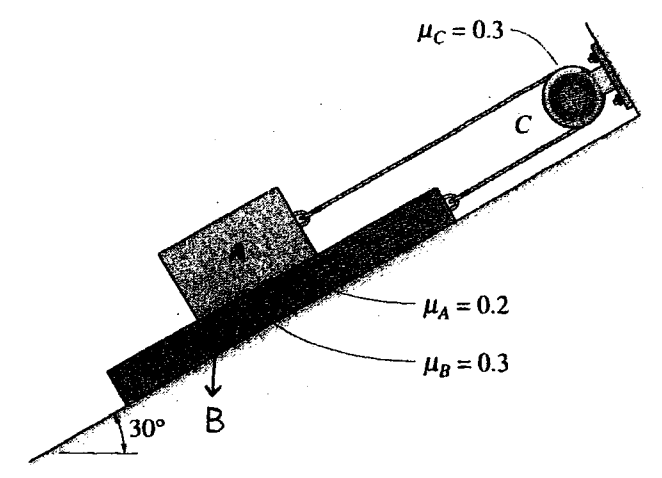
3. Determine the force developed in each member of the space truss and state if the members are in tension or compression. The crate has a weight of 150 N. (15 pts)



4. The balloon is held in place using a 400-m cord that weighs 0.8 N/m and makes a slope angle of 60° . If the tension in the cord at point A is 150 N, determine the length of the cord, l , that is lying on the ground and the balloon's height h . (15 pts)



5. A cable is attached to a 60-N plate B, passes over a fixed disk at C, and is attached to the block at A. Using the coefficients of static friction shown in the figure, determine the smallest weight of block A that will prevent sliding motion of B down the plane. (15 pts)



八十九學年度 工程與系統科學 系(所) 乙 組碩士班研究生招生考試
科目 工程力學(靜力) 科號 3602 共 4 頁第 4 頁 *請在試卷【答案卷】內作答

6. The triangular block of weight W rests on the smooth corners which are a distance a apart. If the block has three equal sides of length d , determine the angle θ for equilibrium (please use virtual work method). (15 pts)

