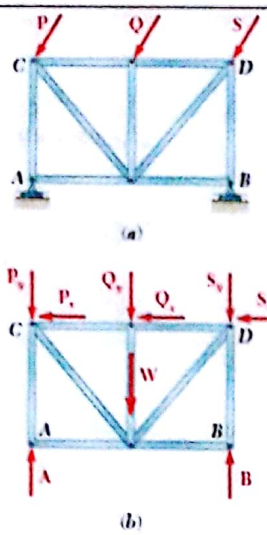
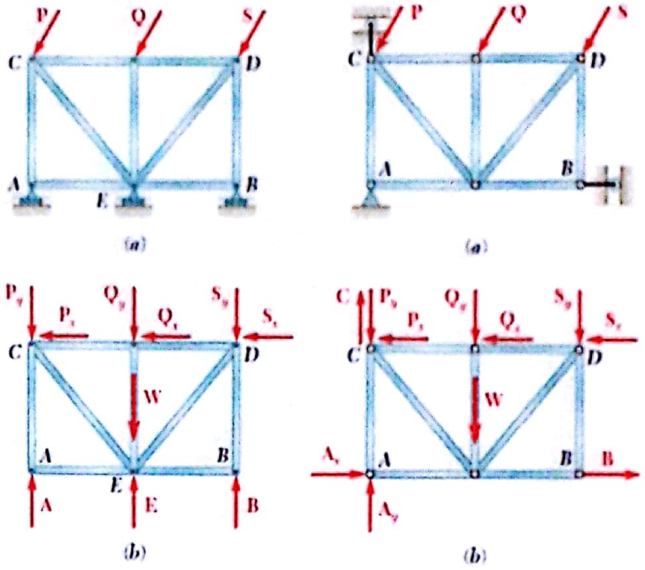


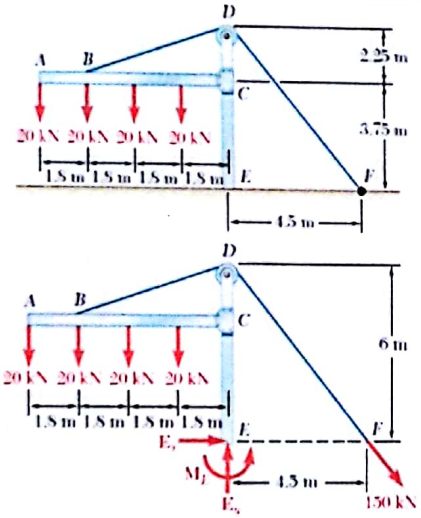
PARTIAL CONSTRAINTS

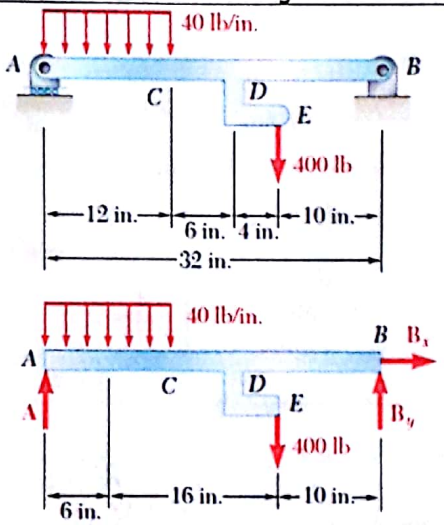
The reactions involve fewer than three unknowns; the body is said to be partially constrained and motion of the body is possible

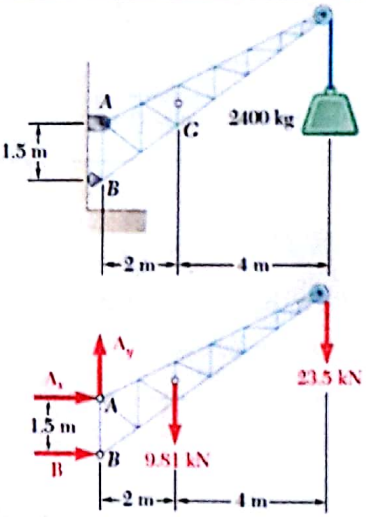


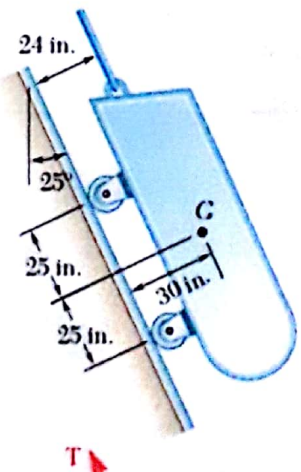
IMPROPER CONSTRAINTS

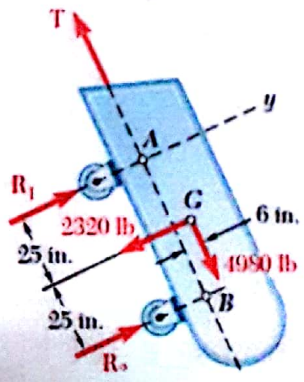
The reactions pass through a single point or are parallel; the body is said to be improperly constrained and motion can occur under a general loading condition.





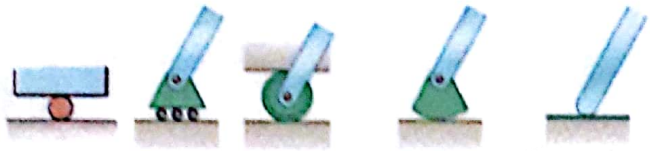
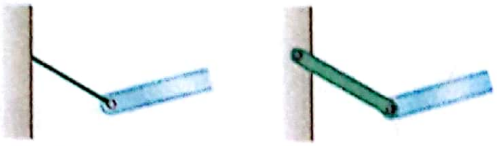
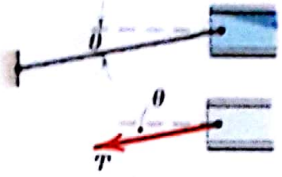
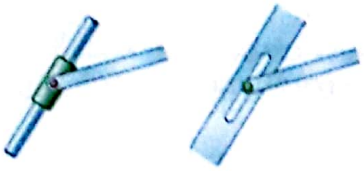
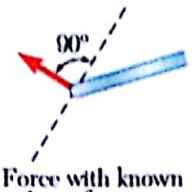
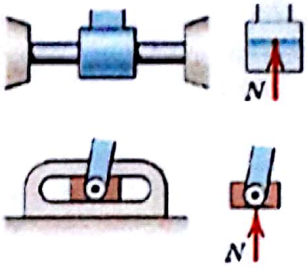
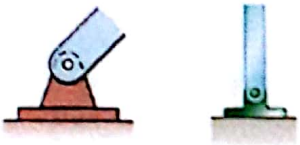
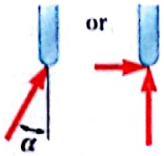
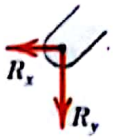
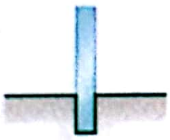
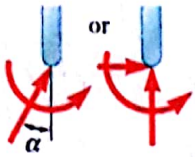
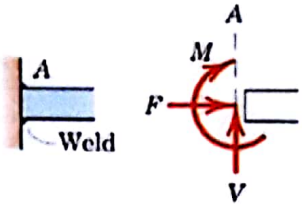


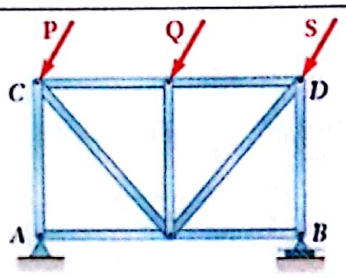




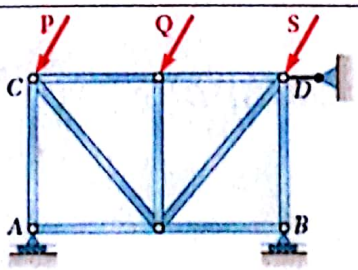
Mechanical System	Free-Body Diagram of Isolated Body
1. Plane truss Weight of truss assumed negligible compared with P	
2. Cantilever beam	
3. Beam Smooth surface contact at A. Mass m	
4. Rigid system of interconnected bodies analyzed as a single unit Weight of mechanism neglected	

TYPES OF SUPPORTS

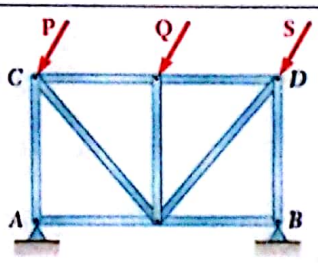
Support or Connection	Reaction	Number of Unknowns	
 Rollers, Rocker, Frictionless surface	 Force with known line of action	1	smooth surface 
 Short cable, Short link	 Force with known line of action	1	
 Collar on frictionless rod, Frictionless pin in slot	 Force with known line of action	1	
 Frictionless pin or hinge, Rough surface	 Force of unknown direction	2	
 Fixed support	 Force and couple	3	



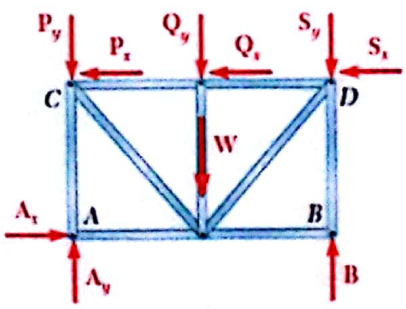
(a)



(a)

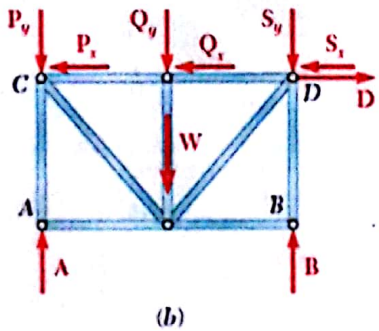


(a)



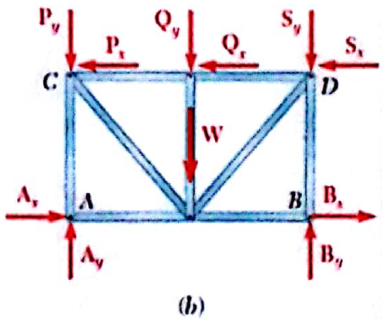
(b)

$\Sigma M_A = 0, \Sigma M_B = 0, \Sigma M_C = 0$
$\Sigma F_x = 0\ \Sigma F_y = 0\ \Sigma M_A = 0$



(b)

rollers at 'A' and 'B' and a short link at 'D'



(b)

Statically Indeterminate Reactions

Pruthviraj U, NITK Surathkal