Exercise I
FBDs

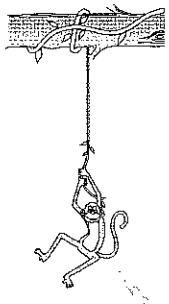
Name_____

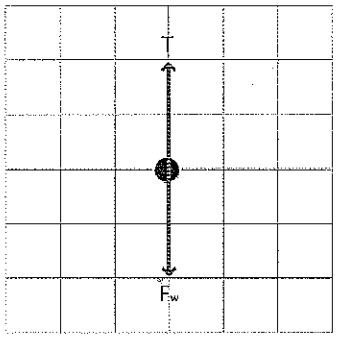
Date_____

On this exercise remember that a Free-Body Diagram shows only the pertinent forces acting on an object. For our purposes, all the forces will be drawn as if they act on the center of mass of the object. Column one contains the physical representation of a situation. In the second column to the right, draw the free body diagram assuming the forces act on the black dot provided. *Do not resolve any of the forces into components. The components are not a part of the FBD as prescribed on Advanced Placement* Exams.*

Free Body Diagrams

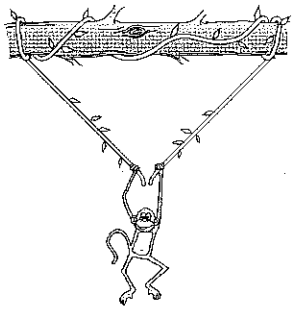
1. Static

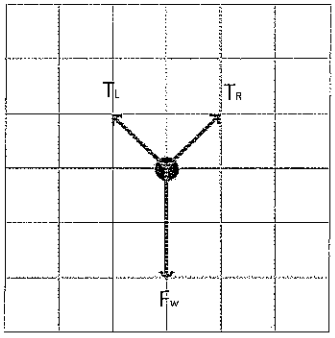




---

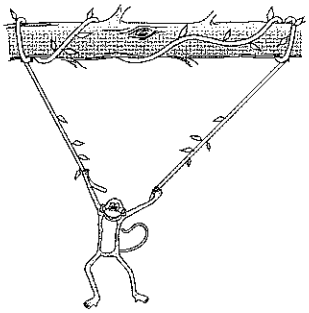
2. Static

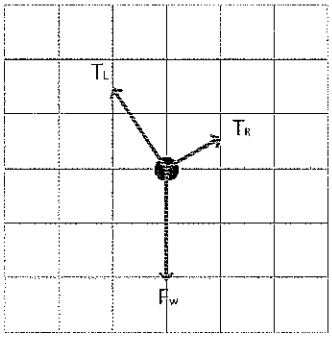




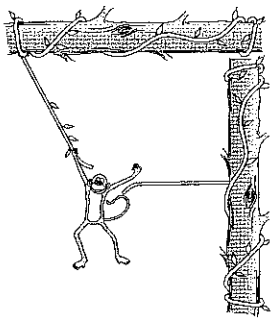
---

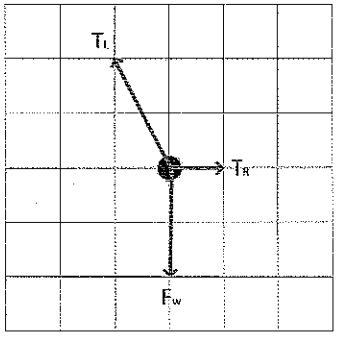
3. Static





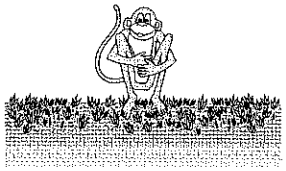
4. Static

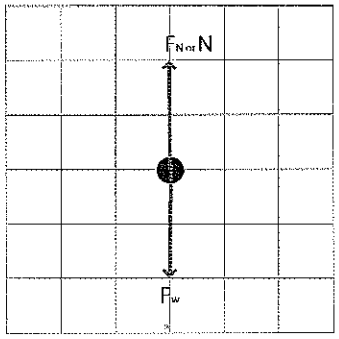




---

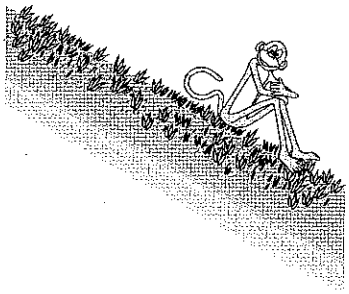
5. Static

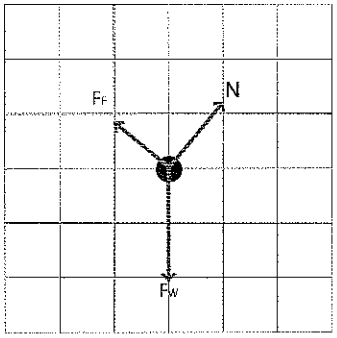




---

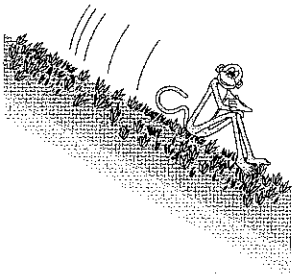
6. Static

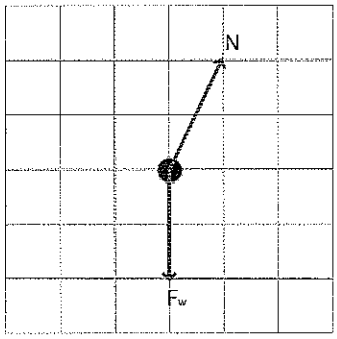




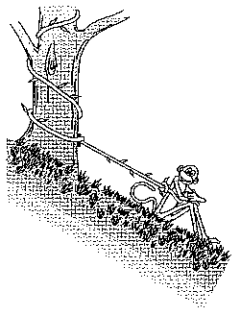
---

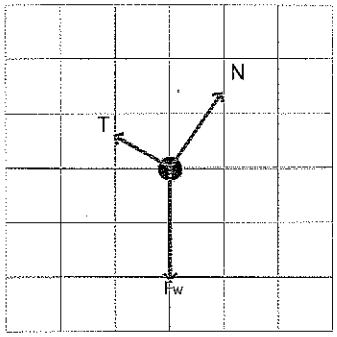
7. Sliding without friction.





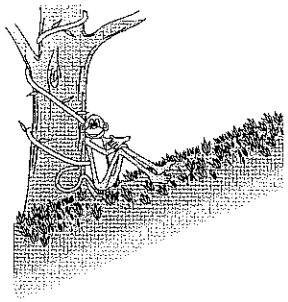
8. Static

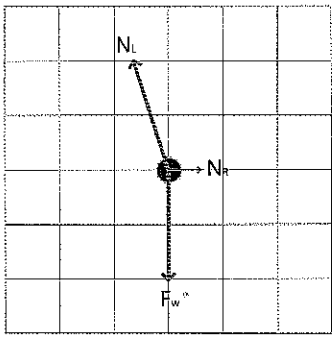




---

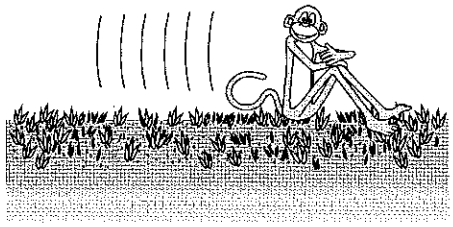
9. Static

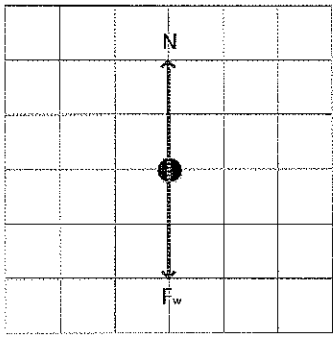




---

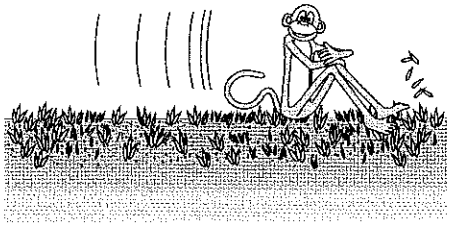
10. Sliding at constant speed without friction.

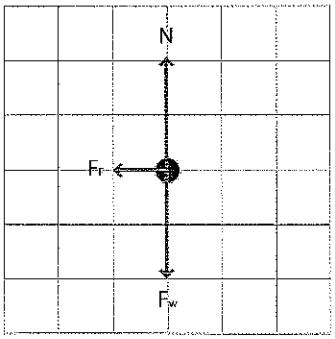




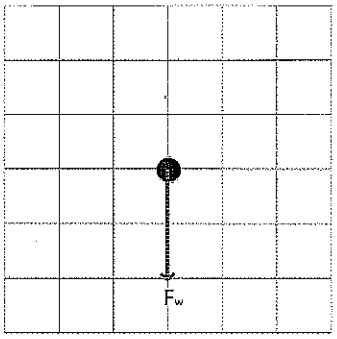
---

11. Negatively accelerating because of kinetic friction.

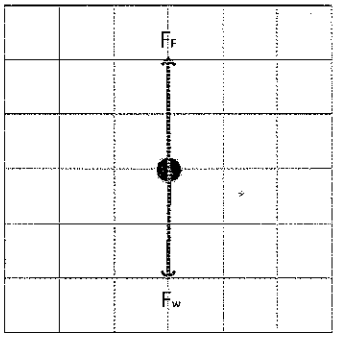




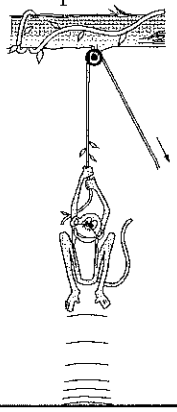
12. Falling with no air friction.

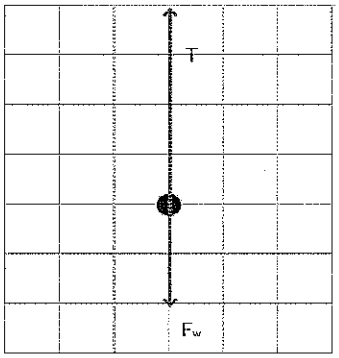


13. Falling at constant (terminal) velocity.

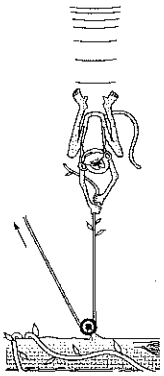


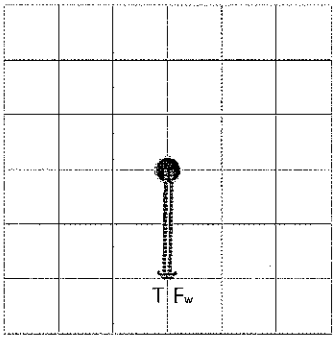
14. Tied to a vine and pulled straight upward. Accelerating upward at 9.8 m/s^2. No friction.



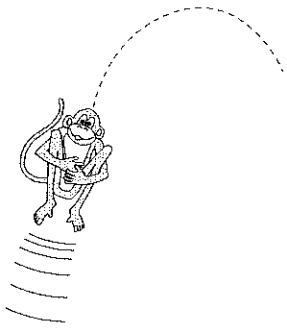


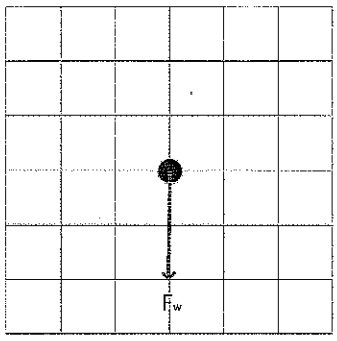
15. Tied to a vine and pulled straight downward. Accelerating downward at 19.6 m/s^2. No friction.



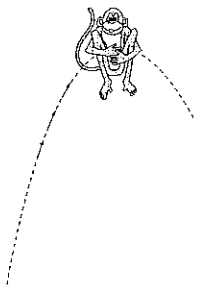


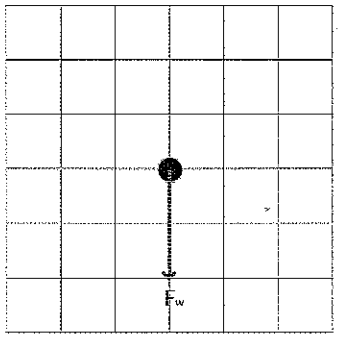
16. Rising in a parabolic trajectory.



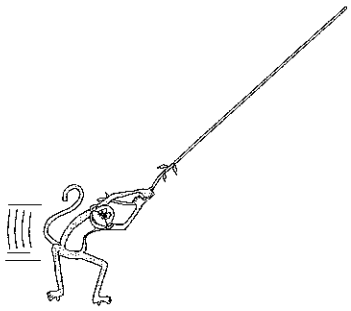


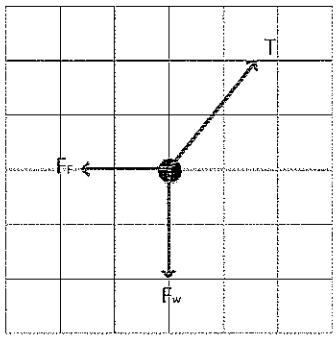
17. At the top of a parabolic trajectory.



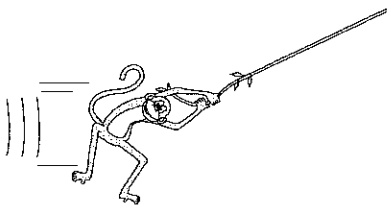


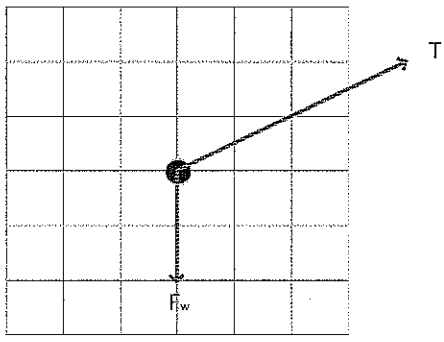
18. Tied to a vine and pulled so that the monkey moves horizontally at constant velocity. Note: There must be air friction in this case.



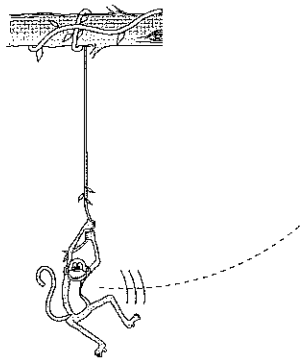


19. Tied to a vine and pulled so that the monkey accelerates horizontally at 2 *g*. No air friction.

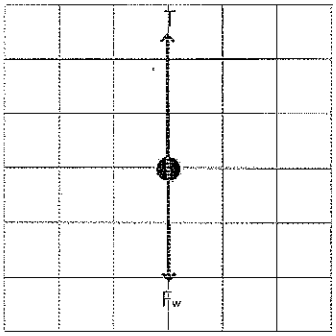




20. Swinging on a vine, at lowest position. No friction.

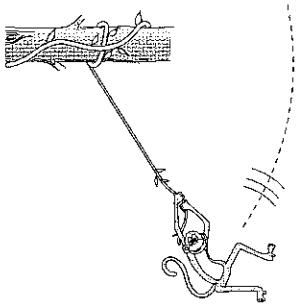


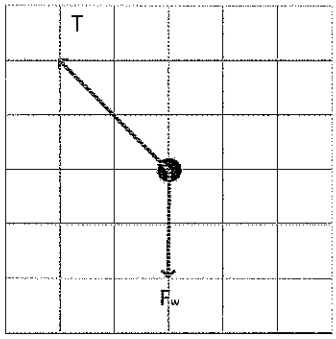
T > Fg centripetal force



---

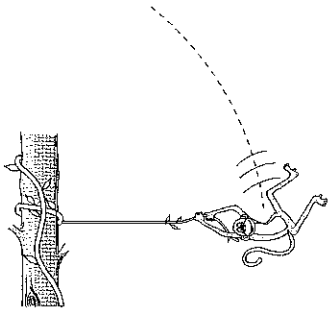
21. Swinging on a vine. No friction.

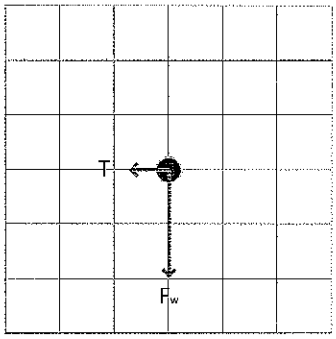




---

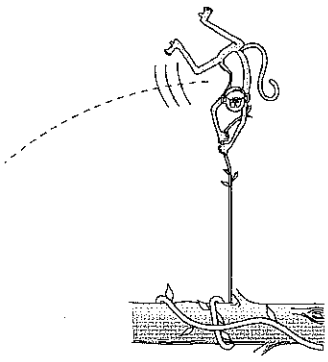
22. Tied to tree at stationary point. Moving downward in a vertical circle with string horizontal. No friction.

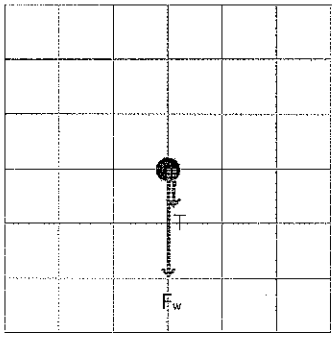




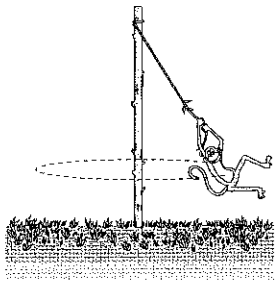
---

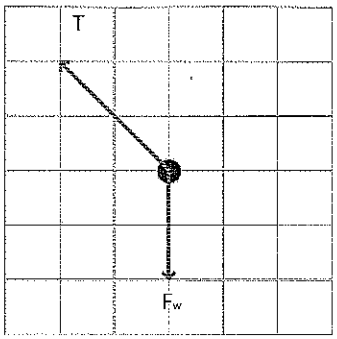
23. Swinging on a vine at the top of a vertical circle.





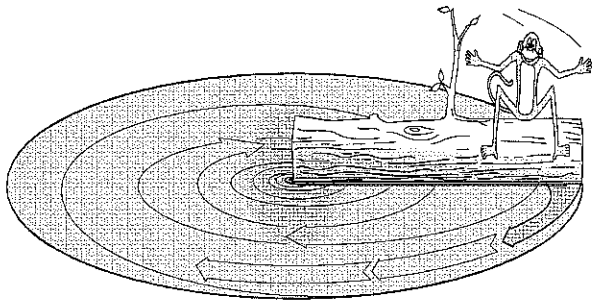
24. Tied to tree with a vine. Moving in a horizonal circle at constant speed. Not resting on solid surface. No friction. Coming straight out of the paper.

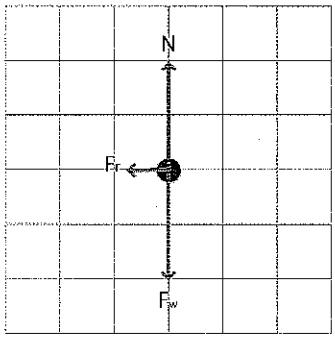




---

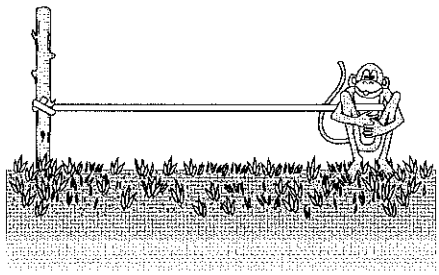
25. Riding on a log that is rotating at constant speed about its vertical axis. Monkey is moving straight out of the paper.

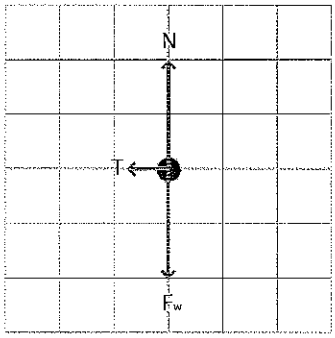




---

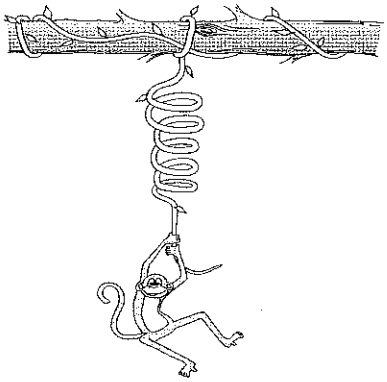
26. Tied to a post and moving in a circle at constant speed on a frictionless horizontal surface. Coming straight out of the paper.

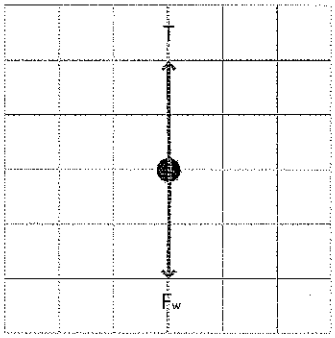




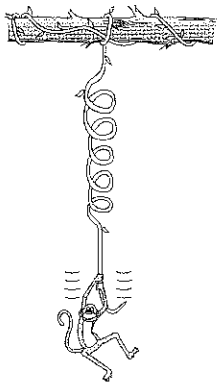
---

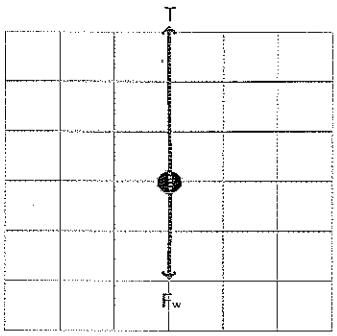
27. Suspended from a spring. Instantaneously at rest in the equilibrium position.



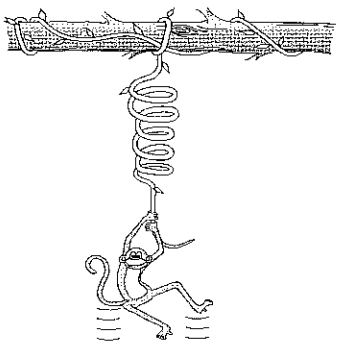


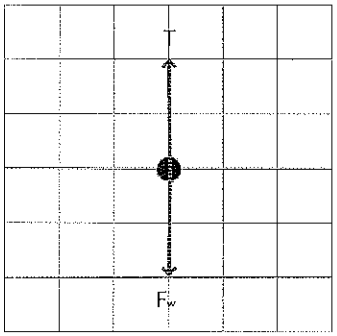
28. Suspended from a spring. Moving downward through the equilibrium position. No friction.



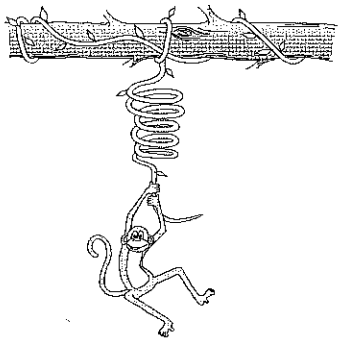


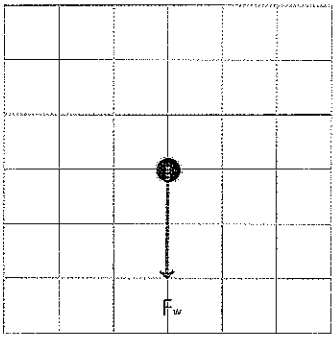
29. Suspended from a spring. Moving upward through the equilibrium position. No friction.





30. Suspended from an unstretched spring. Instantaneously at rest at the top of its travel.





31. Suspended from a spring. Moving downward from the portion.