Section A (70 points)

1. T	2. T	3. F	4. T	5. F
6. F	7. T	8. F	9. F	10. F
11. D	12. E	13. E	14. D	15. D
16. C	17. D	18. E	19. B	20. C
21. E	22. E	23. B	24. A or E	25. D
26. D, E	27. A, B, C, E, F	28. B, C, D	29. D	30. A, D, F
31. A, B, C	32. E, F	33. C, F	34. B, C, E, F	35. A, D, E

Section B (90 points)

1. (a) One of the six basic mechanical devices that creates a mechanical advantage.
   (b) Multiple simple machines connected to each other.
   (c) Multiply the MAs of all the simple machines that make up the compound machine.
   (d) A measure of how much energy is successfully transferred through the device (AMA/IMA).
   (e) Wedge
   (f) Wheel and axle; second-class lever

2. Rubric outlined in solutions.

3. (a) $10Mg/d$
   (b) Since the spring is less elongated, it exerts a smaller force, and thus we know the sphere must be "helping" the spring, and so it is on the same side as the spring.
   (c) $D/9$
   (d) $2D/15$

4. (a) Parallel to the line tangent to the curve where the block is located at that time.
   (b) $\sin^{-1}(F/Mg)$
   (c) $\tan^{-1}(P/Mg)$
   (d) Not enough information.
   You don't know what height the block will be at when it reaches the maximum angle of inclination. If you were given a function of how the angle changes with distance (horizontal or vertical), you could use it to solve for the final height.

5. (a) i. 408
      ii. 204
      iii. 0.0243
      iv. 277 N
   (b) i. $4.16\,\mathrm{m\,s^{-1}}$
      ii. $0.462\,\mathrm{m\,s^{-1}}$
      iii. 11.1 %
      iv. 2.80 cm