

THE TWENTY-SECOND ANNUAL SLAPT PHYSICS CONTEST
SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE
APRIL 21, 2007

MECHANICS TEST ANSWERS

1. (d) average speed
2. (e) +16.1 cm
3. (a) 39.9 cm
4. (d) 53.7 km/h
5. (d) The x -component of the velocity of the ball is the same throughout the ball's flight.
6. (d) The car travels eastward and slows down.
7. (a) Newton's first law of motion is valid.
8. (b) 12.7 s
9. (d) a is constant.
10. (e) Both cars could be accelerating at the same rate.
11. (c) 6.0 m
12. (b) 18 m/s
13. (d) $4.0h$
14. (e) 0.10 m/s
15. (e)
16. (c) 5.4 m 0.91 m
17. (b) 30°
18. (c) $F_A > F_B = F_C$
19. (e) 4.1 m/s^2 , 52° north of east
20. (b) Her weight is equal to one-fourth her weight on earth.
21. (e) 0.644 m/s^2
22. (e) 370 N 0.26
23. (a) case I only

24. (e) less than 0.5, but greater than zero.
25. (a) $F_1 = F_2 = F_3$
26. (b) 0.33
27. (c) 7 s
28. (a) 50 lb, to the right
29. (a) 7 m/s^2 to the right
30. (b) 0.54
31. (d) 1100 m
32. (e) 12 m/s^2
33. (c) 29 m/s
34. (a) $1.97 \times 10^4 \text{ N}$
35. (b) $2.66 \times 10^6 \text{ J}$
36. (d) 10 m/s
37. (d) 0.50 kW
38. (b) 66 J
39. (a) $0.69 \text{ N} \cdot \text{s}$
40. (d) The vector sum of the linear momenta of the fragments must be zero.
41. (b) It is 1/2 the original kinetic energy of the sled.
42. (d) 4
43. (a) 80° above the $+x$ axis
44. (c) 10 rad/s^2
45. (b) $0.84 \text{ N} \cdot \text{m}$
46. (d) 4.0
47. (e) $9.1 \text{ kg} \cdot \text{m}^2$
48. (e) 8.0 rad/s^2
49. (c) Her moment of inertia decreases causing her to speed up.
50. (d) 0.044 m