



SCIENCE OLYMPIAD
— AT THE —
UNIVERSITY OF FLORIDA

Northern Regional: January 19th, 2019

Circuit Lab B Answer Key

Name(s): _____

Team Name: _____

School Name: _____

Team Number: _____

Rank: _____

Score: _____

Multiple Choice

1. E (1 point)
2. A (1 point)
3. D (1 point)
4. C (1 point)
5. B (2 points)
6. A (2 points)
7. A (1 point)
8. B (3 points)
9. C (3 points; tiebreaker)
10. C (2 points)
11. E (1 point)
12. C (2 points)
13. B (2 points)
14. A (1 point)
15. D (2 points)
16. E (2 points)
17. D (1 point)
18. A (2 points) (if they put E, give 1 point)

True/False

19. False (1 point)
20. True (1 point)
21. False (2 points)
22. False (1 point)
23. True (2 points)
24. False (1 point)
25. True (1 point)
26. True (2 points)
27. True (1 point)
28. False (2 points)
29. True (1 point)
30. True (1 point)
31. False (1 point)
32. True (1 point)

Matching (1 point each)

- 33. C
- 34. D
- 35. B
- 36. A

Free Response

- 37. The force is 190 N (4 points) directed towards the left (2 points). The electric field is 4.75E7 N/C (4 points) directed towards the left (2 points). (tiebreaker)
- 38. A rheostat is constructed the same as a potentiometer with 3 terminals present, but only uses two connections, but a potentiometer uses all 3 (5 points). Rheostats have to carry a significant current, but potentiometers don't have to (5 points).
- 39. -8 C (3 points for number, 2 points for charge)
- 40. 4.9 V (4 points for numerical answer; 1 point if work shown)
- 41. The total of the electric flux out of a closed surface is equal to the charge enclosed divided by the permittivity. (2 points)

Formula: $\epsilon_0 \Phi = Q_{enclosed}$ (1 point)