



Polytechnic Tutoring Center

Final Exam REVIEW Answer Key – CM 1013, Fall 2021

Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department

1. -238.7KJ/mol

2. -129KJ/mol

reactants \rightarrow $\text{HNO}_2(\text{aq})$ $\frac{1}{2}\text{H}_2(\text{g}) + \frac{1}{2}\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{HNO}_2(\text{aq})$

$\text{N}_2(\text{g}) + 2\text{H}_2\text{O}(\ell) \rightarrow \text{NH}_4\text{NO}_2(\text{aq}) \quad \Delta H^\circ = +320.1 \text{ kJ}$

$\text{NH}_4\text{NO}_2(\text{aq}) \rightarrow \text{NH}_3(\text{aq}) + \text{HNO}_2(\text{aq}) \quad \Delta H^\circ = +37.7 \text{ kJ}$

$\text{NH}_3(\text{aq}) \rightarrow \frac{1}{2}\text{N}_2(\text{g}) + \frac{3}{2}\text{H}_2(\text{g}) \quad \Delta H^\circ = +84.95 \text{ kJ}$

$2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\ell) \quad \Delta H^\circ = -571.6 \text{ kJ}$

$\text{N}_2(\text{g}) + 2\text{H}_2\text{O}(\ell) \rightarrow \text{NH}_4\text{NO}_2(\text{aq}) \quad \Delta H^\circ = +320.1 \text{ kJ}$

$\text{NH}_4\text{NO}_2(\text{aq}) \rightarrow \text{NH}_3(\text{aq}) + \text{HNO}_2(\text{aq}) \quad \Delta H^\circ = +37.7 \text{ kJ}$

$\text{NH}_3(\text{aq}) \rightarrow \frac{1}{2}\text{N}_2(\text{g}) + \frac{3}{2}\text{H}_2(\text{g}) \quad \Delta H^\circ = +84.95 \text{ kJ}$

$2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\ell) \quad \Delta H^\circ = -571.6 \text{ kJ}$

$(+320.1) + (+37.7) + (+84.95) + (-571.6) = -128.85 \text{ kJ}$

3. 3896J

4. C

5. E

6. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$

7. B

8. 241KJ/mol

9. D

10. A

11. A

12. A

13. D

14. trigonal pyramidal

15. C

16. E

17. C

18. B

19. A

20. A

21. C

22. B

23. C

24. D

25. C

26. B

27. C

28. D

29. C

30. B

31. A

32. A

33. A

34. D

35. D

36. E

37. A

38. A

39. A

40. B

41. $\text{C}_4\text{H}_6\text{O}_2$