Topics for the Ph.D.-Level Examination in Complex Analysis

The written examination on complex analysis will include all the materials contained in the chapters 3,4,5,6 and 7 of John B. Conway's text "Functions of one complex variable," 2nd. edition, Springer-Verlag, 1984. The partial listings of the topics in the above 5 chapters

1. Power series
2. Basic properties of Mobius transformations
3. Zero of an analytic function
4. The index of a closed curve
5. Cauchy-Goursat's theorem, Morera's theorem
6. The open mapping theorem
7. Rouche's theorem
8. Calculus of residues
9. The maximum modulus theorem
10. Schwarz's lemma
11. Hadmard's three circle theorem
12. Phragmen-Lindelof theorem

The students should also understand the following materials which could be found in the chapters 7,8,9,10,11,12 of the above mentioned book:

13. Weierstrass factorization theorem
14. Infinite product representation of functions such as sin z, $1/\Gamma(z)$, etc.
15. Basic properties of Riemann zeta function
16. Hurwitz theorem
17. Normal family and Montel's theorem
18. Riemann mapping theorem
19. Mittag-Leffler's theorem
20. Schwarz reflection principle
21. Analytic continuation
22. Harmonic functions
23. Poisson-Jensen formula
24. Picard's theorem