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| **Section** | **Required Exercises** |
| **1.1**  **Propositional Logic** | **2,3,8(a,d,g),11(a,c,e),17,28,29(a,c),31(c,e), 35(e),40.** |
| **1.3**  **Propositional Equivalences** | **1(a),3(a),7,9(c),10(c),11,12,14,16,19.** |
| **1.4**  **Predicates and Quantifiers** | **1,5,7,11,14,15,19.** |
| **1.6**  **Rules of Inference** | **1,2,and The sheet below** |
| **1.7**  **Introduction to Proofs** | **1,3,6,9,11,15,16,17,26,31.** |
| **1.8**  **Proof Methods and Strategy** | **1,3,6,9,14,19,29,34.** |

**Chapter 1: The Foundations: Logic and Proofs**

**Section 1.6**

**Are the following arguments valid or invalid?**

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**Chapter2:Basic Structures: Sets, Functions, Sequences, Sums and Matrices**

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| **2.1**  **Sets** | **1,2,3,5,7,8,10,19,27(a)** |
| **2.2**  **Set Operations** | **4,14,25,28** |

**Chapter 5:Induction and Recursion**

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| **5-1**  **Mathematical Induction** | **4-5-6-8-9-12-18-20-28-31-32-38-39-43** |
| **5-2**  **Strong Induction and Well-Ordering** | **Q1: Let be a sequence of integers defined inductively as:**    **Prove that**    **Q2: Let be a sequence of integers defined inductively as:**    **Prove that**  **Q3: Let be a sequence of integers defined inductively as:**    **Prove that** |

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| **9.1**  **Relations and their Properties** | **1,3,6,10,11,18,26,30,32,34(a,d,e)- 36(d,e,h) ,41 ,50 ,51,52,53,56.** |
| **9.3**  **Representing Relations** | **18,22,24,26,27, 31,32.** |
| **9.4**  **Closures and Relations** | **1,2,4,5,6,8,9,19,22,24,29.** |
| **9.5**  **Equivalence Relations** | **1,3,9,16,21,22,23,26,28,36,40(a),42,46,48(a),55,**  **56(a,b).** |
| **9.6**  **Partial Ordering** | **1,6,9,10,11,14,20,22.** |

**Chapter 9:Relations**

**Chapter10: Graphs**

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| **10-1**  **Graphs and Graph Models** | **3,4,5,6,7,8,9,10** |
| **10-2**  **Graph Terminology and Special Types of Graphs** | **1,2,3,4,5,6,20(a,b,c,d),21, 22, 23, 24, 25, 26(a,b), 35, 36,37,38,39,40,41, 48,49,59(a,b),60.** |
| **10-3**  **Representing Graphs and Graph Isomorphism** | **34,35,36,37,38,39,50,51,53,54,55.** |
| **10-4**  **Connectivity** | **1,2,3,4,5,6.** |
| **10-7**  **Planar Graphs** | **1,2,3,4,5,6,7,8,9,12,13,14.** |

**Chapter11Trees**

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| **11.1**  **Introduction to Trees** | **2,4,6,8,10,16,17.** |
| **11.2**  **Application of Trees** | **1,2** |
| **11.4**  **Spanning Trees** | **2,3,4,5,6,7,8** |

**Chapter12Boolean Algebra**

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| **12-1**  **Boolean Functions** | **1,2,3,4,5(b,d),6(c,d),11,28** |
| **12-2**  **Representing Boolean Functions** | **1(b,c,d),2(a,d),3(a,d),7(c)** |
| **12-3**  **Logic Gates** | **1,2,3,4,5,6** |
| **12-4**  **Minimization of Circuits** | **1,2,3,4(c),6(a,b),12,13 ,14.** |