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|  | **King Saud University** |  |
| **College of Sciences** |  |
| **Department of Mathematics** |  |
| **Math 373** |  |
| **Second Midterm** |  |
| **Second Semester 1437-1438** |  |

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| Student’s Name:  Student’s ID: |

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| **Question** | MARK |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **Total** |  |

**Question 1:**

**Let be a topological space and .**

1. **Prove that is a topology for the set .**
2. **Is ? Justify your answer.**

**Question 2:**

1. **Let be topological spaces, and let and . Prove that .**
2. **Let and be continuous functions. Prove that is a continuous function.**
3. **Let be a bijective function. Prove that is a homeomorphism if and only if for each subset .**

**Question 3:**

1. **Show that with Co-finite topology is a compact but with discrete topology is not.**
2. **Prove that a closed subset of a compact space is compact. Give an example to show the convers is not true.**

**Question 4:**

1. **Define what you mean by a Hausdorff space.**
2. **Show that the property of being a Hausdorff space is a topological property.**