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| **King Saud University** | **KSU logo tiff.tif** | **Math 151** |
| **Science and Medical Studies Section for girls** | **First Term 1433-34H** |
| **College of Science** | **Final Exam** |
| **Department of Mathematics** | **3 Hours** |

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| **Name:** | | | | **Student No.:** | | | |
| **Section No.:** | | | | **Staff member name:** | | | |
| **Question No** | **1** | **2** | **3** | | **4** | **Total** |
| **Mark** |  |  |  | |  |  |
| **Question 1**  **Choose the correct answer and write it in the following table:**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | | **Answer** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   **1) The compound propositions and the proposition r are logically equivalent**  **a) true b) false**  **2) The compound proposition is**  **a) a tautology b) a contradiction c) a contingency**  **3) The proposition “ ” is**  **a) true b) false**  **4) Let be the equivalent relation “”. Then**  **a) b) .**  **c) Both (a) and (b) are true. c) None of the previous.**  **5) Which of the next relations is a partial order relation on ?**  **(a) .**  **(b) . .**  **(c) .**    **6) The relation represented by the following directed graph is**  **a)reflexive b) symmetric. c) antisymmetric.**  **d) transitive. e) non of the previous.**  **7) The diagonal relation is a partial order relation and an equivalence relation at the same time.**  **a) True b) False**  **8) If is a Boolean function, then is equivalent to**  **a) b) c) d) None of the previous.**  **9) If as in (8), then the dual of is**  **a) b) c) d) None of the previous.**  **10) Assume that , and represent Boolean variables, then .**  **a) true b) false**  **11) There is a simple graph with six vertices, whose degree sequence is 12, 2, 2, 3, 5, 4.**  **a) true b) false**  **12) The graph D is bipartite**    **a) True b) False**  **13) The graph has**  **a) vertices and edges. b) vertices and edges. c) vertices and edges.**  **14) A subgraph of a simple graph is simple.**  **a) true b) false**  **15) If G is a planar connected graph with 20 vertices, each of degree 3, then G has 12 regions.**  **a) true b) false**  **16) There is a connected simple planar graph with 10 vertices and 16 edges and 8 regions.**  **a) true b) false** | | | | | | | |
| **Question 2**  **Prove the following statements:**  **1) .**  **2) .**  **3) Let be a Boolean algebra, and such that then .**  **4) Let . Define on the next operations:**  **Then, is a Boolean algebra.**  **5) Let be a simple connected planar graph with 5 vertices then |E| .**  **6) This graph is planar.**    **Question 3**   1. **Let for all Prove by using the second principle of mathematical induction that**   **for all**   1. **Are the two graphs isomorphic?**      1. **a) Draw the graph** 2. **Prove that is not a planar graph.**   **IV) State the Euler formula for a connected simple graph.**  **V) If G is a connected graph with 12 regions and 20 edges, then G has \_\_\_\_\_\_\_\_ vertices.** | | | | | | | |
| **Question 4**  **Use Karnaugh maps (K-maps) to simplify the following Boolean function**  **,**  **and then draw the minimal “and” and “or” circuit. (شبكة عطف و فصل أصغرية)** | | | | | | | |

**Good Luck**