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| **GE 2318 Homework #4 Solutions 2024**  **Name: Student ID:**  **Q1:** Based on the “degree principle”, at first-level there are **3** communities:    **Q2:** Consider the 4-node power network shown below:    Here, assume that the collapsing thresholds are:  , , , .  Initial loading: All nodes have same load  Now: an extra load is added to Node A  (a) Calculate the load spreading through Node B, Node C, Node D  Node A: so Node A collapses  Then, the load of Node A will be equally distributed to Nodes B, C, D  Node B: so Node B remains normal  Node C: so Node C collapses  Then, the load of Node C will be equally distributed to working nodes B, D  Node B: so Node B collapses  Then, the load of Node B will be given to the only other working node D  Node D: so Node D collapses  (b) Collapsing sequence: A 🡪 C 🡪 B 🡪 D (OR: Write 🡪 B, D)  **Q3:** Consider a special epidemic infection model of a very large population:    where is the proportion (number0 of infected people, is the infective rate, is the recovery rate, and is the reproduction number.  Now, the solution of this SI model is given: , where is the initial condition (a given constant).  (a) If , then (meaning all people are infected) as .  (b) If , then as .  (c) If , then as . |