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Neither calculators nor any outside notes or other material are allowed in the exam.

1. Please note the transformation matrixes for 2D rotation, scaling, and translation in homogenous coordinate systems (3 points)
2. Please explain the different lightening models (3 points)
3. Which data structures do you know for describing scene graphs. What are their principles? How can they be applied (3 points)?
4. Question of understanding (6 points)
Your client asks you to develop a 3D computer online gaming platform. How would you approach this task? Which bottlenecks would exist? What are the key-points you have to consider to develop such a system? Which content models for modeling scenes exist? Which system components would you use?