## Sample 10

**Consider the following Poisson partial differential equation with Dirichlet**

**boundary conditions:**

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**Write a MATLAB program as follows:**

**1) Use the 5-point scheme to calculate numerical values for the unknown u**

**for 0 < x < 1 and 0 < y < 1 . Divide both the x interval [0, 1] and the**

**y interval [0, 1] into 16 equal subdivisions (there will be 17 equally**

**spaced grid points in both the x and y directions). Use 1e-8 as the**

**accuracy factor. The main program will call a function named poisson that**

**solves the Poisson equation for the unknown u (u is a two dimensional**

**array) and returns it to the main program.**

**2) Plot u versus x and y for 0 ≤ x ≤ 1 and 0 ≤ y ≤ 1 . u will be a surface**

**in 3-dimensional space. Use the MATLAB function surf to plot u.**

**The graph should look like the one on the attached sheet.**