Islamic University of Technology (IUT) **CSE Department**

CSE 4733/4561 **Digital Image Processing**	**Quiz #03**
Time: 30 Minutes	Marks: 15

Instructions:

i. CLOSED book exam. No browsing. Keyboard use is prohibited.
ii. Keep your camera ON throughout the test time.
iii. Write your Student ID & Page Number at the top of each page.
iv. At the end of the test, take pictures of your script, and convert it to a single pdf file. Rename it as **STUDENTID_CT3**.pdf
v. Capture & Submit during the upload session ONLY. DO NOT take pictures or upload even if your exam finishes early.

Questions:

1. What would happen in binary dilation if the structuring element is a single point, i.e., a single position valued 1? Justify your answer in no more than three sentences. 3

2. In the application of microscopy, one issue that frequently arises is to count particles of different sizes. One example image is shown in Figure 1 (assume the particles do not overlap). Assume the image has binary pixel values, i.e., particles have value 1 and background has value 0. Assume there are three different sizes. Propose a morphological algorithm to compute the number of particles of each size. Sketch a flowchart or schematic diagram of your algorithm, plus some explanation of each step. 7

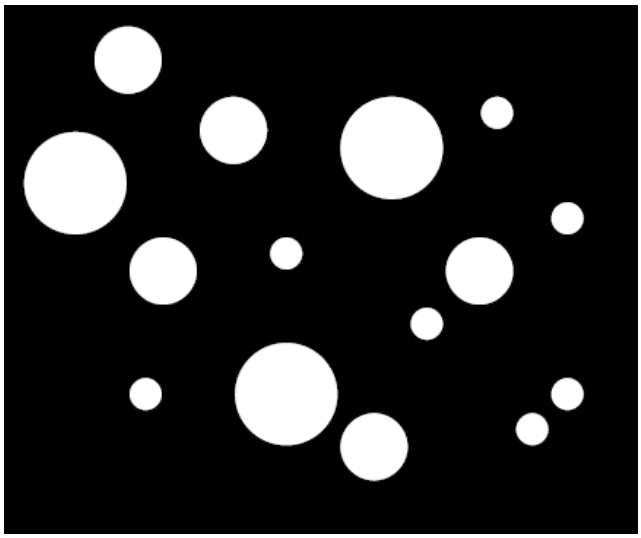

Figure 1.

3. Erosion with circular structuring element (SE) produces round corners which were sharp beforehand. Describe when and why these inward or outward sharp corners are rounded. Draw necessary illustrations. 5