Islamic University of Technology (IUT) CSE Department

CSE 4733 **Digital Image Processing**	**Quiz #01**	Date:
Time: 20 Minutes	Marks: 15	**ID:**

Questions:

1. Suppose your gray-scale image contains gradual increase or decrease of intensity values in smooth regions. What kind of side effects can you have if there is insufficient intensity resolution to represent smooth regions? Explain the reason behind it. 7 [CO2, PO2]
2. When is an operation *H* called linear? The median, ζ, of a set of numbers is such that half the values in the set are below ζ and the other half are above it. For example, the median of the set of values {2, 3, 8, 20, 21, 25, 31} is 20. Show that an operator *H* that computes the median of a subimage area, is nonlinear. 5 [CO1, PO1]
3. Ultra High-Definition television (4K UHD) generates images with 2160 horizontal TV lines interlaced (where every other line is painted on the tube face in each of two fields, each field being of a 1/60th of a second in duration). The width-to-height aspect ratio of the images is 16:9. The fact that the number of horizontal lines is fixed determines the vertical resolution of the images. A company has designed an image capture system that generates digital images from UHDTV images. The resolution of each TV (horizontal) line in their system is in proportion to vertical resolution, with the proportion being the width-to-height ratio of the images. Each pixel in the color image has 24 bits of intensity resolution, 8 bits each for a red, a green, and a blue plane. These three 'primary' images form a color image. How many bits would it take to store a 1-hour UHDTV movie? 3 [CO1, PO1]