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TEST-1 EXAMINATION (February 2016)

M.Tech 2<sup>nd</sup> Sem. & B.Tech 8<sup>th</sup> Sem

COURSE CODE :- 16M1WEC231

MAX. MARKS :15

COURSE NAME :- Advanced Digital Image Processing

COURSE CREDITS: 3

MAX. TIME :1 HR.

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

**Q1(a).** When you enter a dark theater on a bright day, it takes an appreciable interval of time before you can see well enough to find an empty seat. Which is of the visual processes is at play in this situation? Justify your answer. (1)

**Q1b).** What do Weber's ratio signify? (1)

**Q1c).** What useful information can be extracted from *isopreference curves*? (1)

**Q1d).** Why and in which devices Gamma correction is required? (1)

**Q2a).** What are checkerboard pattern and false contouring effects? (1+1=2)

**Q2b).** What do you mean by dynamic range of an image? How is it related to the contrast of image? (1+1=2)

**Q2c).** What is the important characteristic of logarithmic transformation? Explain in detail with an application. (1+1=2)

**Q2d).** In some applications it is useful to model the histogram of input images as Gaussian probability density functions of the form 
$$p_r(r) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(r-m)^2}{2\sigma^2}}$$
 where  $m$  and  $\sigma$  are the mean and standard deviation of the Gaussian PDF. The approach is to let  $m$  and  $\sigma$  be measures of average intensity and contrast of a given image. What is the transformation function you would use for histogram equalization? (2)

**Q3.** Consider the image segment shown in figure below. Let  $V = \{0,1\}$ , compute the lengths of the shortest 4-, 8-, and  $m$ -path between  $p$  and  $q$ . If a particular path does not exist between these two points, explain why.

	3	1	2	1 (q)
	2	2	0	2
	1	2	1	1
(p)	1	0	1	2

(1+1+1=3)