



Reg. No. :

Name :

**Sixth Semester B.Tech. Degree Examination, June 2015
(2008 Scheme)
08.626 Elective – II : DIGITAL IMAGE PROCESSING (TA)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. Define brightness and intensity.
2. What are the various distance measures between pixels ?
3. Define Walsh transform.
4. How image sharpening is achieved by differentiation ?
5. What are Roberts and Sobel operators ?
6. What are the various noise models in restoration process ?
7. What is lossless predictive coding ?
8. Illustrate on the advantages of JPEG 2000.
9. What is gray scale morphology ?
10. How boundary of an image is described using simple descriptors ?



PART – B

Answer **2** questions from **each** Module. **Each** question carries **10** marks :

Module – I

11. a) Define 2D sampling theorem.
b) An image is described by the function $f(x, y) = 2\cos 2\pi(3x + 4y)$. It is sampled such that $\Delta x = \Delta y = 0.2$. Find the reconstructed image.



12. Perform KL transform for the following matrix.

$$x = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$$

13. Convolve.

$$\begin{bmatrix} 2 & 5 & 7 \\ 1 & 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \\ 1 & 1 \end{bmatrix}$$

Module – II

14. The histogram of an image is given by $P(r) = kre^{-cr^2}$, $0 \leq r \leq 1$, where k and c are constants. The image is transformed to another image using the point operation $S = T(r)$. Find the transformation $T(r)$ such that the transformed image has uniform distribution.
15. Derive the expression for Wiener filter used for image restoration.
16. How image enhancement is achieved using Homomorphic filtering? Describe.

Module – III

17. Draw the block diagram for image compression and describe each block.
18. Differentiate between point, line and edge detections.
19. How opening and closing is achieved in morphological image processing.

(10x6=60 Marks)