Code No: NR410408 **NR**

IV B.Tech I Semester Supplementary Examinations, November 2005
DIGITAL IMAGE PROCESSING
(Common to Electronics & Communication Engineering, Bio-Medical Engineering, Electronics & Telematics and Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain in detail about patterns and pattern classes with examples. Also, explain how the pattern classes are useful for recognition.
   (b) With a neat block diagram, explain a pattern recognition system in detail. [8+8]

2. Write a short note on the following:
   (a) Classification principle
   (b) Cluster analysis [8+8]

3. Find the solution vector ω using reward punishment algorithm to separate the two classes, where the patterns in each class are given by $\omega_1 : \{(0,0,1),(0,1,1)^1\}$ and $\omega_2 : \{(1,0,1)^1,(1,1,1)^1\}$ [16]

4. (a) Can you construct context free grammar for even palinrome? If so, write the grammar? If not give the reasons.
   (b) Can you construct a regular grammar for odd palinrome? If so write the grammar? If not give the reasons. [8+8]

5. (a) Give the transformation matrix used to rotate an image by 45^0 clockwise. How would this transformation is used to achieve the desired image rotation
   (b) Write short notes on sampling & quantization of an image. [8+8]

6. (a) Write a note on the following:
      i. image subtraction
      ii. image averaging [4+4]
   (b) Show that a high pass filtered image can be obtained in the frequency domain as High pass = original - low pass (assume 3x3 filters) [8]

7. (a) State the noiseless coding theorem and explain its significance in image compression. [6+4]
   (b) Explain under what circumstances the source-coding theorem is applicable for image compression [6]

8. (a) What is meant by image segmentation? Mention the applications of image segmentation. [4+4]

(b) Explain about detection of discontinuities. [8]

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