COURSE CODE (CREDITS): 18B1WEC847 (3) MAX. MARKS: 25

COURSE NAME: Medical Image Processing

COURSE INSTRUCTOR: Dr. Shruti Jain MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory.

Q1. (1 × 5 = 5) [CO2, CO3]

a) Segmentation is difficult for images that are _____ (trivial/ non trivial)

b) Which segmentation is based on the connectivity of similar pixels in a region?

c) A texture is a set _____ occurring in some regular or repeated pattern.

d) In moment calculation, m_{00} defines _____ Also, the center of the object (Y_C) is defined as _____.

e) What is the condition of Splitting?

Q2 (a) Geetika is unable to understand the difference between GLRL and GLCM techniques. Help her in differentiating the two assuming the 3 × 3-pixel values.

(b) Find the co-occurrence matrix for $(1, 90°)$ of the image having intensity value as

$$\begin{matrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 1 & 2 \end{matrix}$$

[CO4] [2.5 + 2.5]

Q3 Aditi segmented the image using *region growing* having the following intensity values. Let us know what are regions she segmented? Assume initial point : (2,2), threshold value: 2, and connectivity: 4 way. [CO3] [5]

$$\begin{matrix} 1 & 0 & 0 & 2 \\ 2 & 6 & 5 & 1 \\ 1 & 4 & 7 & 3 \\ 0 & 2 & 3 & 1 \end{matrix}$$

Q4 Using the *Local Binary Pattern technique,* extract the attribute for the 3 × 3-pixel values

$$\begin{matrix} 10 & 18 & 10 \\ 9 & 10 & 6 \\ 5 & 2 & 4 \end{matrix}$$

Validate the result using another method. [CO4] [5]

Q5 Shyam segmented the image using *region split and merge* having the following intensity values.

5	6	4	7	4	5	5	3
6	7	7	6	3	3	2	1
6	6	4	4	3	2	5	6
4	5	4	5	4	6	2	3
3	2	3	0	7	5	3	2
1	0	1	0	2	2	6	5
1	0	1	1	3	0	4	4
0	2	1	0	2	3	5	4

[CO3] [5]

Draw the Quadtree structure of Splitting. Assume the threshold value as 3.