

Q. No.		Marks
1(a)	Image types (Monochrome image, Grey scale image, colour image, Half toned image)	5M
(b)	• grey level slicing without background: transformation & explanation	2 1/2 M
	• grey level slicing with background: transformation & explanation	2 1/2 M.
(c)	Objective error criteria: explanation (ems, erms)	5M
(d)	Boundary extraction formula & explanation	5M
2(a)	Region Growing:	
	• Region based segmentation meaning	1 M
	• explanation (seed pixel, predicate, threshold) with example	4M
	• Region split & merge: explanation with example	5M
2(b)	opening: • $[D(E(A))]$ explanation, & application with an example.	5M
	closing: • $[E(C(A))]$ explanation with an example & application	05M

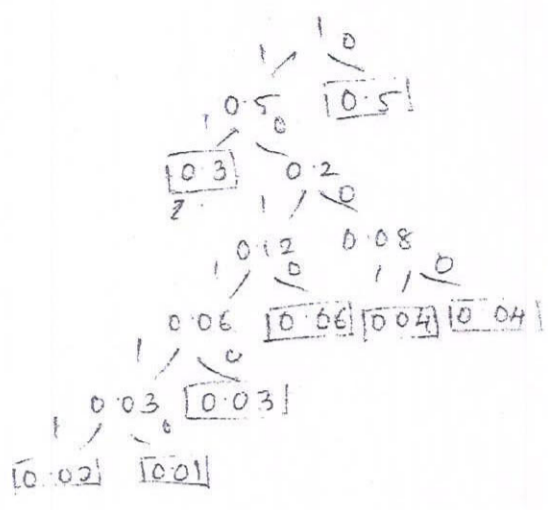
Q. No.	Marks																																																																						
Q3(a) Lossless Compression → explanation & Methods	2M																																																																						
• Dictionary based coding	1M																																																																						
• LZW compression	1M																																																																						
Q3(b) Hadamard transform matrix $H(8)$ derivation	4M																																																																						
• check if $H(8)$ is orthogonal	4M																																																																						
• Basis function for $H(8)$	2M																																																																						
Q4(a) Histogram equalisation:	10M																																																																						
<table border="1"> <thead> <tr> <th>Grey Levels</th> <th>No. of Pixels</th> <th>Pd f</th> <th>Cdf</th> <th>L-1x cdf</th> <th>Round off</th> <th>New Grey Level</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>220</td> <td>0.224</td> <td>0.224</td> <td>1.563</td> <td>2</td> <td>2 → 220</td> </tr> <tr> <td>1</td> <td>140</td> <td>0.142</td> <td>0.366</td> <td>2.562</td> <td>3</td> <td>3 → 250</td> </tr> <tr> <td>2</td> <td>50</td> <td>0.0510</td> <td>0.417</td> <td>2.919</td> <td>3</td> <td>3 → 250</td> </tr> <tr> <td>3</td> <td>60</td> <td>0.0612</td> <td>0.478</td> <td>3.246</td> <td>3</td> <td>3 → 250</td> </tr> <tr> <td>4</td> <td>70</td> <td>0.0714</td> <td>0.549</td> <td>3.843</td> <td>4</td> <td>4 → 20</td> </tr> <tr> <td>5</td> <td>170</td> <td>0.173</td> <td>0.722</td> <td>5.054</td> <td>5</td> <td>5 → 170</td> </tr> <tr> <td>6</td> <td>130</td> <td>0.132</td> <td>0.854</td> <td>5.978</td> <td>6</td> <td>6 → 130</td> </tr> <tr> <td>7</td> <td>160</td> <td>0.163</td> <td>1.0121</td> <td>7</td> <td>7</td> <td>7 → 160</td> </tr> <tr> <td></td> <td>950</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Grey Levels	No. of Pixels	Pd f	Cdf	L-1x cdf	Round off	New Grey Level	0	220	0.224	0.224	1.563	2	2 → 220	1	140	0.142	0.366	2.562	3	3 → 250	2	50	0.0510	0.417	2.919	3	3 → 250	3	60	0.0612	0.478	3.246	3	3 → 250	4	70	0.0714	0.549	3.843	4	4 → 20	5	170	0.173	0.722	5.054	5	5 → 170	6	130	0.132	0.854	5.978	6	6 → 130	7	160	0.163	1.0121	7	7	7 → 160		950						
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Q4(b) Homomorphic Filter:	10M																																																																						
• Explanation: Image formation model (illumination & Reflection) get back original image																																																																							
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Q5(a) • edge linking explanation	2M																																																																						
• Hough transform with an example	8M																																																																						

Q. No. Huffman coding

Q5b)

a1	0.06	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
a2	0.02	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
a3	0.3	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
a4	0.5	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
a5	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
a6	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
a7	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
a8	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Marks



- a1 0.06 → 1010
- a2 0.02 → 10111
- a3 0.3 → 11
- a4 0.5 → 0
- a5 0.04 → 1001
- a6 0.01 → 10110
- a7 0.03 → 10110
- a8 0.04 → 1000

Q. No.		Marks
Q6(a)	low pass median filter: • explanation example	3M 2M
Q6(b)	Gaussian High pass filter: formula, Response explanation	3M 2M
Q6(c)	2D sampling explanation, diagram	5M
Q6(d)	Hit/miss transform: explanation with an example	5M
Q6(e)	DCT: • formula, DCT matrix, application of DCT. explanation	5M