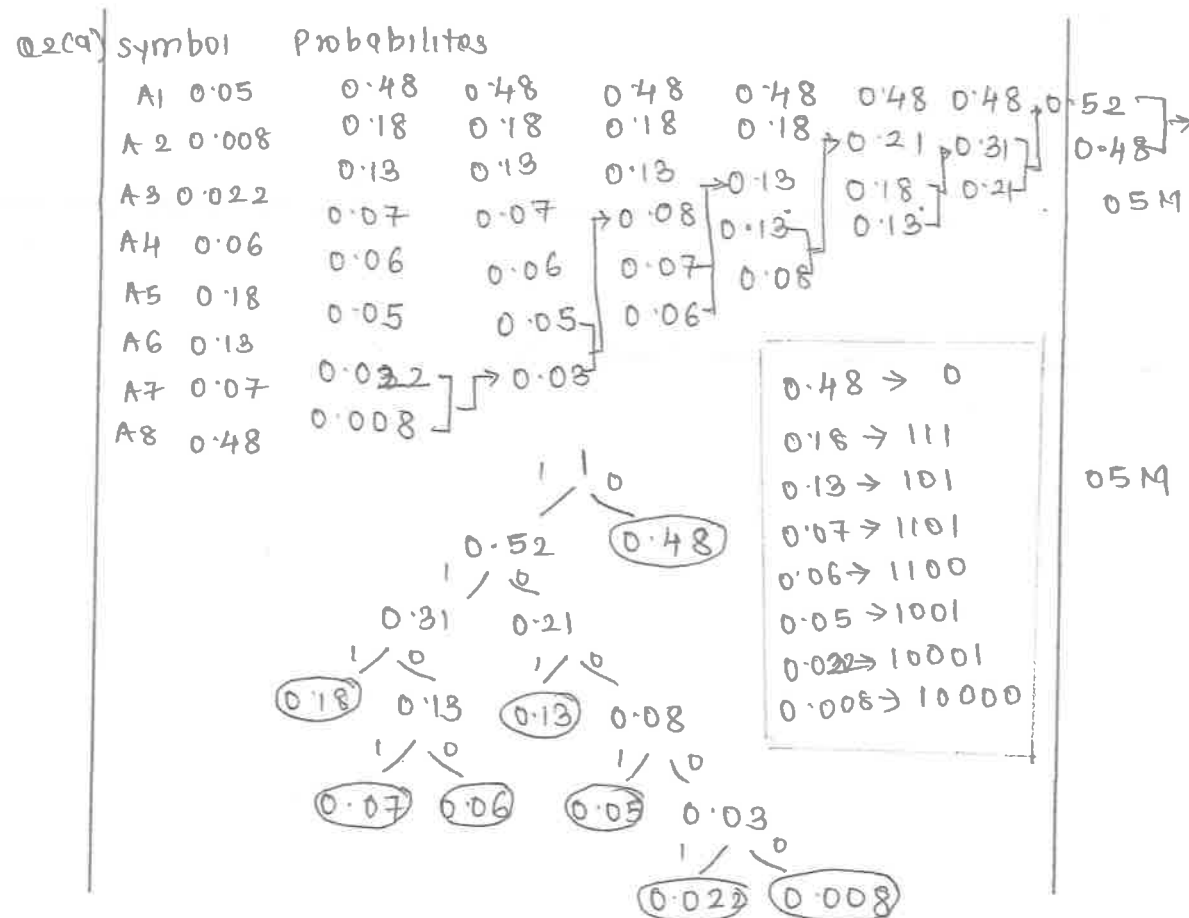Solution:-

Q. 1   a) Two error criteria each 2.5 marks

b) Spatial resolution and grey level resolution each 2.5 marks

c) Opening diagram and example

d) Homomorphic filter diagram, equation and explanation

Q.2 a)

Q2(a) symbol   Probabilites

A1	0.05	0.48	0.48	0.48	0.48	0.48	0.48	0.52
A2	0.008	0.18	0.18	0.18	0.18	0.21	0.31	0.48
A3	0.022	0.13	0.13	0.13	0.13	0.18	0.21	
A4	0.06	0.07	0.07	0.08	0.13	0.13		05M
A5	0.18	0.06	0.06	0.07	0.08			
A6	0.13	0.05	0.05	0.06				
A7	0.07	0.022	0.03					
A8	0.48	0.008						

0.48 → 0
0.18 → 111
0.13 → 101
0.07 → 1101
0.06 → 1100
0.05 → 1001
0.022 → 10001
0.008 → 10000

05M

b) Explain the edge linking technique (3 Marks) and Hough transform with example (7 marks)

Q. 3 a) Each laplacian and convolution property proof carry 5 Marks

b) Each prewitt and composs operator with mask carry 5 Marks

Q.4   a)

Q4 (a) Histogram equalisation 10M

Grey level	No of Pixels	Pdf	cdf	L-1 X cdf	Round off	New grey level
0	220	0.224	0.224	1.568	2	2→220
1	140	0.142	0.366	2.562	3	3→250
2	50	0.0510	0.417	2.919	3	
3	60	0.0612	0.478	3.346	3	
4	70	0.0714	0.549	3.843	4	4→70
5	170	0.173	0.722	5.054	5	5→170
6	180	0.132	0.854	5.978	6	6→180
7	160	0.163	1.012	7	7	7→160
	980					

b)   1. Hit and Miss transformation explanation with example 5 Marks

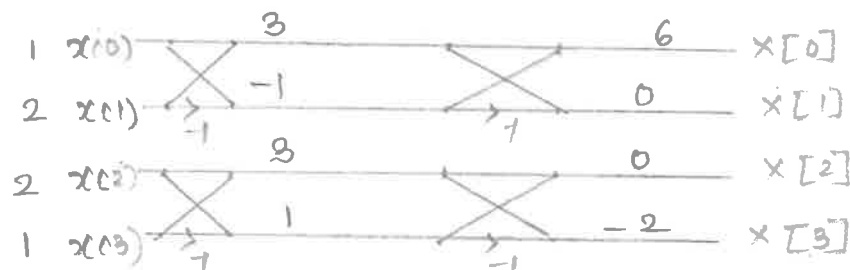2. Thinning and thickening transformation explanation 5 marks

Q.5   a) Ideal Low pass filter explanation

- Blurring and ringing effects
- Explain how to avoid blurring and ringing

Q5 (b) → Hadamard transformation Matrix   02 Y2 M
→ to check if H(4) is orthogonal   02 Y2 M
Fast Hadamard transform $x(n) = \{1, 2, 2, 1\}$ 05 M

$$x[n] = \{6, 0, 0, -2\}$$

Q. 6

I. Signature explanation 5 marks
II. LZW with example 5 marks
III. Butterworth diagram with equation and explanation
IV. Point detection mask and explanation
V. Various image types